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5th Tehran, Iran 2020

7th-10th November

# The International USERN Congress And Prize Awarding Festival

11th- 14th November

Post Congress Program

Organized by:

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Hosted by:

TEHRAN UNIVERSITY OF MEDICAL SCIENCES

Venue:

Childerns Medical Center
مرکز طبی کودکان
Iran Mall
IMEC
دانشکده پزشکی
دانشگاه علوم پزشکی تهران

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## The 5-year Progress of a New Initiation

**And**

## The 5th International USERN Congress and Prize Awarding Festival
November 7th -10th, 2020
Tehran, Iran

# The 5th International USERN Congress and Prize Awarding Festival

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Nima Rezaei

**USERN Congress Invited Lecturers and Guests**

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*Leland Harisson Hartwell (USA) [Nobel Laureate, Physiology and Medicine, 2001]*

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Alessio Pomponio (Iran)
Mohammad Reza Pourjafar (Iran)
Jennifer Puck (USA)
Vicentiu Radulescu (Saudi Arabia)
Babak Rahbaran (Austria)
Roja Rahimi (Iran)
Masoud Rahimi (Iran)
Vafa Rahimi-Movaghar (USA)
S. M.Ashrafur Rahman (Australia)
Mohamed Fawzy Ramadan Hassanien (Saudi Arabia)
Seeram Ramakrishna (India)
Mohammad Ramezani (Iran)
Idupulapati M. Rao (Colombia)
Lingamallu Jaganmohan Rao (India)
Jahanbakhsh Raoof (Iran)
Esmat Rashedi (Iran)
Farhad Ravandi (USA)
Seyed M.A. Razavi (Iran)
Seyed Hadi Razavi (Iran)
Keramatollah Rezaei (Iran)
Siavash Riahi (Iran)
Ya'acov A. Ritov (USA)
Simon Robson (USA)
Valery Romanovski (Slovenia)
Laszlo Rosivall (Hungary)
Ali Rostami (Iran)
Wolff-Michael Roth (Canada)
Willibald Ruch (Switzerland)
André Russowsky Brunoni (Brazil)
Ali Akbar Saboury (Iran)
Amirhossein Sahebkar (Iran)
Upendra Man Sainju (USA)
Masoud Salavati-Niasari (Iran)
Peyman Salehi (Iran)
Lucio Sarno (UK)
Saeid Saryazdi (Iran)
Philip Scheltens (the Netherlands)
Reinnold E. Schmidt (Germany)
Michael Schreiber (Germany)
Andrea Scozzafava (Italy)
Constantine Sedikides (UK)
Athena Sefat (USA)
Nicolas Segata (Italy)
Joao Seixas (Portugal)
Frank Sellke (USA)
Juan Benigo Seoane-Sepulveda (Spain)
Igor B. Sevostianov (USA)
John Francis Seymour (Australia)
Reza Shadmehr (USA)
Abbas Shafiee (Iran)
Shahram Shahbazpanahi (Canada)
Saeed Shahrokhian (Iran)
Mohsen Sheikholeslami (Iran)
Shengli Victor Sheng (USA)
Shouri Sheng (China)
Ramin Shiekhattar (USA)
Mariano Sigman (USA)
Abdolreza Simchi (Iran)
Daniel Simson (Poland)
Ian Sloan (Australia)
Sidney Smith (Australia)
Dalbir Singh Sogi (India)
Abraham Sonenshein (USA)
Armin Sorooshian (USA)
Francesco Stellacci (Switzerland)
E. Richard Stiehm (USA)
Kathleen Sullivan (USA)
Xiaoming Sun (USA)
Ben Zhong Tang (Hong Kong)
Reza Tavakkoli-Moghaddam (Iran)
Mohammad Saleh Tavazoei (Iran)
Sabu Thomas (India)
Maria Titirici (Germany)
Seyed Ali Torabi (Iran)
Alireza Torabi (Iran)
Pedro Torres (Spain)
Jan Treur (the Netherlands)

Jaakko Tuomilehto (Finland)
Lucina Qazi Uddin (USA)
Rudolf Valenta (Austria)
Paul A.M. Van Lange (the Netherlands)
Zhale Varshowsaz (Iran)
Hassan Vatandoost (Iran)
Eric Vivier (France)
C Van Der Vleuten (the Netherlands)
Matthias Georg Von Herrath (USA)
Paul T. Von Hippel (USA)
Jiu-Yao Wang (Taiwan)
Zhong Lin Wang (USA)
Zhi Jian Wang (Scotland)
Klaus Warnatz (Germany)
Elisabete Weiderpass (Sweden)
Scott Weiss (USA)
Daniel Werz (Germany)
Eske Willerslev (Denmark)
Christopher Wlezien (USA)
Kin-Lu Wong (Taiwan)
Mahmoud Yaghoubi (Iran)
Peidong Yang (USA)
Jiaguo Yu (China)
Salim yusuf (Canada)
Hassan Ali Zamani (Iran)
Mostafa Zandieh (Iran)
Hamid Reza Zare (Iran)
Mohammad Reza Zarrindast (Iran)
Jianhua Zhang (China)
Chaohui Zhang (China)
Theodoros A. Tsiftsis (China)

**Support and Resource Development Division**

Saboura Ashkevarian
Mahsa Keshavarz-Fathi
Zahra Kolahchi
Kawthar Mohamed
Sara Momtazmanesh
Negar Moradian
Zahra Rahimi Pirkoohi
Elham Rayzan
Noosha Samieefar
Mojdeh Sarzaeim
Aida Vahed
Niloufar Yazdanpanah
Heliya Ziaei

**USERN Junior Ambassadors**

Sunny Abrikwu (Nigeria)
Aram Pascal Abu Hejleh (Germany)
Hameeda Faiq Al-Musawi (Australia)
Faiz Alnusairi (Yemen)
Eliza Arakelyan (Armenia)
Annabelle Armstrong (South Africa)
Ayesha Bacha (Kyrgyzstan)
Faten Attig Bahar( Tunisia)
Maggi Cavalcanti (Peru)
Orsolya Cseprekál (Hungary)
Sarah Cuschieri (Malta)
Mickael Essouma (Cameroon)
Bianca Gegea (Romania)
Rayan Goda (Sudan)
Giulia Grancini (Italy)
Jahan Hara M.N (Sri Lanka)
Amine Harbi (Algeria)
Sevan Iritsyan (Armenia)
Md.Shahidul Islam (Bangladesh)
Mariya Ivanovska (Bulgaria)
Aliyu Tijani Jabril (Ghana)
Musa Joya (Afghanistan)
Ajeet Kaushik (USA)
Sila Kaya (Ireland)
Amjad Khan (Pakistan)
Lucas Lucasa (UK)
Irene Ling (Malaysia)
Sara Makke (Lebanon)
Rangarirai Makuku (Zimbabwe)
Otávio Marques (Brazil)
Kseniia Minakova (Ukraine)
Lindelwa Mmema (Kingdom of Swaziland)
Kawthar Mohamed (Bahrain)
Adeeb Nasser Eldin (Palestine)
Lamin Ndow (Gambia)
Leander P.Marquez (Philippines)
Atiye Pezeshki (Canada)
Laila Rahmah (Indonesia)
Tiago Ribeiro (Portugal)
Eduardo Rodríguez-Román (Venezuela)
Piotr Rzymski (Poland)
Dalia Sabaliauskiene (Lithuania)
Esra Sayer (Turkey)
Mauro Scalercio (Argentina)
Mujtaba Shaw (India)
Shagajeg Soloukey (the Netherlands)
Semira Suleiman (Ethiopia)
Chunfeng Xiao (China)

Harris Tokpah (Liberia)
Hongbo Zhang (Finland)

**USERN Interest Groups**

Association of Nuclear Medicine and Molecular Imaging (ANMMI)
Association of Science and Art (ASA)
Big Data and Networking Team (BDAN_Team)
Bioinformatics and Computational Biology (BCB)
Biology & Biochemistry Interest Group (BBIG)
BioMedical Visualization Association (BMVA)
Blue Mouth Group (BMG)
Brain Cancer Research Core (BCRC)
Breast Cancer Association (BrCA)
Cancer Immunology Project (CIP)
Cardiac Outcome Research and Education (CORE)
Clinical Psychology and Psychotherapy Studies (CPPS)
Computational Biology and Chemistry Group (CBCG)
Computational Medicine and Systems Biology Network (CMSBN)
Dietitians and Nutrition Experts Team (DiNET)
Early Childhood Education, Development, and Intervention research group (ECEDI)
Gastrointestinal Pharmacology Interest Group (GPIG)
Health and Art (HEART)
Immunology Board for Transplantation and Cell-based Therapeutics (Immuno_TACT)
ImmunologyToday (ImmunologyToday)
Innovation and Creativity Research Association for Transforming Education (I_CREATE)
Integrated Science Association (ISA)
Integration of Renewable Energy Resources in Smart Grid (IRERSG)
Intelligent Big Data Analysis in Medicine (IBDAM)
Interactive Research Education and Training Association (IRETA)
Interest Group of CoronaVirus 2019 (IGCV_19)
International Hematology/Oncology of Pediatrics Experts (IHOPE)
International Network for Photo Medicine and Photo Dynamic Therapy (INPMPDT)
International Network of Integrated Care in Nursing (INICN)
International Network of Robo Care Nursing (INRCN)
Iranian Association of Magnetic Resonance in Medicine (IAMRM)
Media and Life Promotion Group (MLPG)
Medical Education Development Network (MED_NET)
Medical Genetics Network (MeGeNe)
MetaCognition Interest Group (MCIG)
Microbial Toxin's Physiology Group (MTPG)
Microbiome and Microbial Ecology Interest Group (MMEIG)
Molecular Immunology Interest Group (MIIG)
Molecular Medicine Interest Group (MMIG)
Nano-encapsulation in the Food, Nutraceutical, and Pharmaceutical Industries Group (NFNPIG)
Nanomedicine Research Association (NRA)
Network of Childhood Speech and Language Disorders (NCSLD)
Network of Dermatology Research (NDR)
Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA)
Network of Interdisciplinarity in Neonates and Infants (NINI)

NeuroImaging Network (NIN)
Neuroscience Research Group (NRG)
Non-Ionizing Radiation Group (NIRG)
Nutritional Health Team (NHT)
Oral Cancer (OralCancer)
Pharmaceutical Association for Research and Manufacturing (PhARMa)
PhytoPharmacology Interest Group (PPIG)
Plasma-Medicine (Plas_Med)
Primary Immunodeficiency Diseases Network (PIDNet)
Primordial Prevention of Non Communicable Disease Group (PPNCDG)
Regenerative Medicine Group (REMED)
Scientific Union of Community Health (SUCH)
Smart Asset Condition Evaluation (SACE)
Space Biology and Astrobiology Research Team (SBART)
Systematic Review and Meta-analysis Expert Group (SRMEG)
Tissues and Biomaterial Research Group (TBRG)
Two Dimensional Materials for Electronics and Optoectronics, Nanoscience and Nanotechnology (TDMfEO_NSNT)
Universal Council of Epidemiology (UCE)
Universal Council of Ophthalmology (UCO)
Universal Council of Radiation Therapy (UCRT)
Universal Network of Interdisciplinary Research in Oral and Maxillofacial Surgery (UNIROMS)
Urology Research Taskforce (URT)
Urticaria Community of Interest and Action (URTICA)

**USERN Anthem Vocals**

Shayan Shekarabi
Ghazal Mahdavi
Heila Mojtabavi
Melina Sharbati
Ali Sani
Pejman Mansouri
Saina Ahmadi Moghaddam
Arash Barzkar
Zahra Rahimi Pirkoohi
Ariana Rezaei
Arnika Rezaei


USERN

# The 5th International USERN Congress and Prize Awarding Festival

# Message from USERN President

**Nima Rezaei**

Founding President of USERN
Professor of Clinical Immunology, Tehran University of Medical Sciences, Tehran, Iran

During all these years, starting as a junior medical student and researcher, and then as a faculty member, I often wondered, what makes a perfect researcher, a perfect teacher, a mentor, or a leader? Realizing that none of these would make me a perfect human, was one of the most important discoveries of my life.

As one dives deep into his own scientific field, interacting with his colleagues, and joining educational and research groups, we realize how high we've built the walls around ourselves, and those who share the same interests as us. We learn not to resist invaders into our territories and to think and behave as affiliates of a certain virtue.

Art, Medicine, Plants, Mathematics, and Astronomy, are all parts of the heritage of ancient, true pioneers of knowledge. The enormity of this prodigious legacy can only reach its true potential when these segments, reunite as a whole and into knowledge without borders. It is undeniable that science today, is unintentionally mistaken for a line to draw boundaries with, a weapon to display power, or a rule to rank orders. We believe that the golden key to this reconciliation, is by the hands of the scientist themselves, by the hands of artists, mathematicians, and by the hands of anyone who has an ability to share what they know, for the greater good.

USERN has been established with the main purpose of peaceful and humanitarian promotion of education and research, universally. It comprises of top 1% scientists in all scientific fields as the advisory board members who would manage and supervise the educational and research programs in their field of specialty. There are more than 450 top scientists, including 18 Nobel/Abel Laureates, among the advisory board members of USERN.

The theme of the Congress this year is "**Science to Society**", emphasizing the important role of multidisciplinary studies to society! Therefore, different aspects of science is covered in the scientific program, which would be presented by top scientists worldwide. In the meantime, the gathering of senior and junior scientists in the context of USERN Congress would be a forward step in eliminating the age and level borders of science. Not only the senior scientists, but also junior students/scientists would get the chance to present their experiences in science within USERN Congress in the context of "**Junior Talks/Posters**". The concept of USERN has been supported by a hundred scientific centers and universities.

Importantly and beyond the noble goal of USERN Congress in scientific promotions, USERN Prize has been also established in order to identify the most talented qualified junior scientists in all areas of science, who have devoted their times to science promotion and performed outstanding scientific projects so far! The bests of bests in each field will be awarded each year to be distinguished to the scientific world and to be acknowledged for their humanitarian efforts. The **USERN Prize Awarding Festival** will be held annually on November 10th, the **Global Day of Science for Peace and Development.**

It should be mentioned that as of the global impact of COVID-19 pandemic, our top priority will always be the health and safety of all the delegates. It is from the bottom of our hearts that we wish you safety, health, and peace of mind during these uncertain times.

Now, here as we are standing on the verge of the fifth official international event of this network, the USERN Congress and Prize Awarding Festival 2020, let us express our gratitude to your presence, and together witness the propagation of Science without Borders.

Nima Rezaei
Founding President of USERN
USERN Congress Chair and Secretary-General of the USERN Prize 2020


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# Messages from the Nobel Laureates

**"**Let me congratulate you on your civilized and far-sighted initiative; USERN.
I shall be with you in spirit"

John Charles Polanyi | 1986 Nobel Prize in Chemistry

*for his research in chemical kinetics*

"I am taking the opportunity to wish you fruitful results and much success for this international Scientific Event, and an excellent USERN Festival
Wishing you much success for the USERN Congress and the Prize Festival."

Theodor Hänsch | 2005 Nobel Prize in Physics

*for contributions to the development of laser-based precision spectroscopy*

"wish you the best of luck with your symposium"

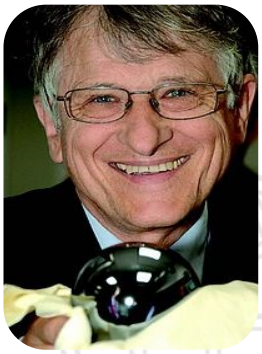
Roger Y. Tsien | 2008 Nobel Prize in chemistry

*for the discovery and development of the green fluorescent protein, GFP*

"I whole-heatedly endorse the goals of the meeting you described"

Hugh David Politzer | 2004 Nobel Prize in Physics

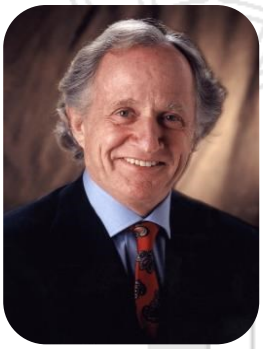
*for discovery of asymptotic freedom in quantum chromodynamics*



"The subject of your meeting "sciences without borders" is exactly the topic I mentioned in my dinner speech when I received the Nobel Prize 30 years ago"

Klaus von Klitzing | 1985 Nobel Prize in Physics

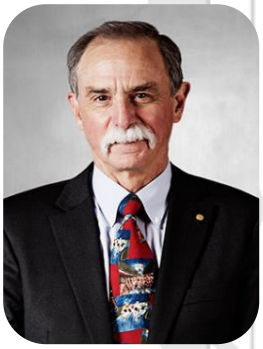
*for discovery of the integer quantum Hall Effect*



"I wish you a productive and enjoyable meeting"

Mario Ramberg Capecchi | 2007 Nobel Prize in Physiology or Medicine

*for discovering a method to create knockout mice*



" I would very much enjoy this meeting, in particular meeting with the young scientists .
I send my best wishes for a successful meeting"

David J. Wineland | 2012 Nobel Prize in Physics

*for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems*

"USERN is a very worthwhile initiative.
I recognize that such a meeting is indeed a very significant contribution to scientific exchange and communication"

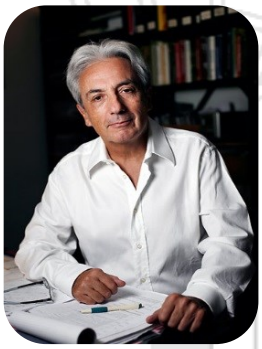
Jean-Marie Lehn | 1987 Nobel Prize in Chemistry

*for synthesis of cryptands*

"I accept to be a member of the advisory board, but cannot join the USERN congress this year, but I might be able to join your future meetings."

Sir Peter Ratcliffe | 2019 Nobel Prize in Physiology or Medicine

for their discoveries of how cells sense and adapt to oxygen availability



"Best wishes for the congress."

Albert Fert | 2007 Nobel Prize in Physics

for the discovery of Giant Magnetoresistance

"Thank you for the kind invitation to participate in the USERN congress. Of course I have long loved travelling and interacting with young scientists and students! You are offering both.
I wish you a wonderful and inspiring USERN experience this year, especially for the young researchers who will participate."

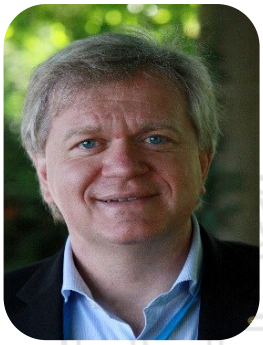
John Hall | 2005 Nobel Prize in Physics

*for contributions to the development of laser-based precision spectroscopy*

"I wish you much success with this event."

Angus Deaton | 2015 Nobel Prize in Economic Sciences

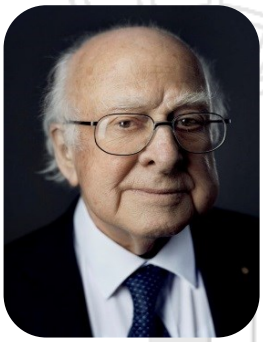
for his analysis of consumption, poverty, and welfare



"Wishing you all the best for a great Festival."

Brian Schmidt | 2011 Nobel Prize in Physics

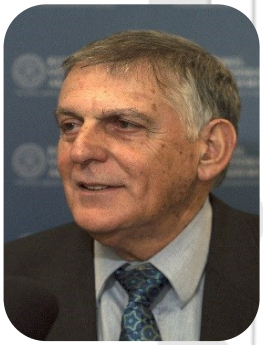
for his discovery of dark energy



"Best wishes and hope your meeting goes well."

Peter Higgs | 2013 Nobel Prize in Physics

for the theory of how particles acquire mass



"I wish you a successful gathering."

Dan Shechtman | 2011 Nobel Prize in Chemistry

for the discovery of quasicrystals

"All the best for your festival."

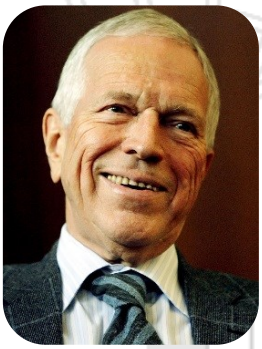
Stefan W. Hell | 2014 Nobel Prize in Chemistry

for the development of super-resolved fluorescence microscopy

"I congratulate you for the success of USERN."

Takaaki Kajita | 2015 Nobel Prize in Physics

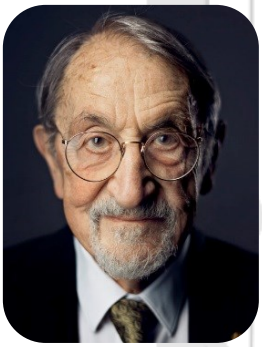
for the discovery of neutrino oscillations, which shows that neutrinos have mass



"wish you the best success with the event."

Edmund S. Phelps | 2006 Nobel Prize in Economic Sciences

for his analysis of intertemporal tradeoffs in macroeconomic policy



"Congratulations on your progress in USERN
I have looked at the program that you have organized for the USERN Congress. It is outstanding and should be a great inspiration for young scientists."

Martin Akarplus | 2013 Nobel Prize in Chemistry

for the development of multiscale models for complex chemical systems

"I am happy to be a member of the honorary advisory board of USERN and would be delighted to work closely with you."

Stanley B. Prusiner | 1997 Nobel Prize in Physiology or Medicine

for his discovery of Prions - a new biological principle of infection

"I wish you all the very best with your exciting festival."

Bruce Beutler | 2011 Nobel Prize in Physiology or Medicine

For the discoveries concerning the activation of innate immunity

"I wish you good luck with the preparations for this congress."

Ben Feringa | 2016 Nobel Prize in Chemistry

for the design and synthesis of molecular machines


USERN

# Scientific Program at a Glance

# In-Person Program, November 7th

| | | Day 1: Saturday, November 07, 2020 |
|---|---|---|
| **GMT** | Tehran Time | Subject |
| **4:30 -5:30** | 8:00 – 9:00 | **Registration** |
| **5:30 – 6:30** | 9:00 – 10:00 | **Opening Session** |
| **5:30 – 5:40** | 9:00 – 9:10 | Introductory Clips, Welcoming, and Art Performance |
| **5:40 – 5:55** | 9:10 – 9:25 | Welcome Message by USERN Founding President<br>*Nima Rezaei* |
| **5:55 – 6:05** | 9:25 – 9:35 | Introduction on Science to Society by Tehran University of Medical Sciences<br>*Shahriar Nafissi* |
| **6:05 – 6:10** | 9:35 – 9:40 | Message from the Director of Iranian National Commission for UNESCO |
| **6:05 – 6:15** | 9:40 – 9:45 | Message to the USERN 2020 from Tehran Municipality |
| **6:15 – 6:20** | 9:45 – 9:50 | Welcome Note from the Iran Mall |
| **6:20 – 6:30** | 9:50 – 10:00 | Message to USERN from the Nobel Laureates |
| **6:30 – 7:30** | 10:00 – 11:00 | **USERN Keynote Lectures (UKL)** |
| **6:30 – 7:00** | 10:00 – 10:30 | Carcinogenicity of Opium consumption in Human<br>*Reza Malekzadeh, Iran* |
| **7:00 – 7:30** | 10:30 – 11:00 | From the Origin of the Universe to the Origin of Life: The Latest Scientific Views<br>*Bahram Mobasher, USA* |
| **7:30 – 8:00** | 11:00 – 11:30 | **Coffee Break** |
| **8:00 – 10:00** | 11:30 – 13:30 | **USERN Keynote Lectures (UKL)** |
| **8:00 – 8:30** | 11:30 – 12:00 | Professionalism in Science<br>*Ali Jafarian, Iran* |
| **8:30 – 9:00** | 12:00 – 12:30 | Evidence-Informed Policy Making for Sustainable Health Development<br>*Amirhossein Takian, Iran* |
| **9:00 – 9:45** | 12:30 – 13:15 | Steps Towards Life: Chemistry! (virtual lecture)<br>*Jean-Marie Lehn, France (Nobel Laureate in Chemistry)* |
| **9:45 – 10:00** | 13:15 – 13:30 | **Questions and Answers** |

# Conference Room Programs

| | **Day 2: Sunday, November 08, 2020<br>and<br>Day 3: Monday, November 09, 2020<br>Morning: Parallel Programs in 17 Conference Halls** |
|---|---|
| **Conference Room 1 (Main Hall E1, virtual room)** | Nobel Laureate Keynote Lectures at morning (virtual) |
| **Conference Room 2** | Junior Talks and mTalks (English)<br>- Abstract Presentation by students and juniors<br>- Each 6 Minutes<br>- In All 5 Fields of Science |
| **Conference Room 3** | Junior Talks and mTalks (Persian)<br>- Abstract Presentation by students and juniors<br>- Each 6 Minutes<br>- In All 5 Fields of Science |
| **Conference Room 4** | UT-Med<br>- Focused on traditional medicine<br>- Lectures by national and international speakers |
| **Conference Room 5** | U-Pharmacy Program (virtual)<br>- Focused on pharmacology<br>- Educational workshops<br>- Audience mostly in pharmacology |
| **Conference Room 6** | In-Person Workshops<br>- Highly Requested Topics<br>- Each Workshop 2 Hours<br>-30-60 Participants |
| **Conference Room 7 (Main Hall E1, virtual room)** | Webinar<br>- Virtual Lectures<br>- International Speakers<br>- Requires Good Internet Coverage<br>- Zoom Platform |
| **Conference Room 8 (Main Hall E1, virtual room)** | Webinar<br>- Virtual Lectures<br>- International Speakers<br>- Requires Good Internet Coverage<br>- Zoom Platform |
| **Conference Room 9** | - Health and Art (HEART) Events for Kids and Youth<br>- Painting Competition for Children<br>- Children under 18 years<br>- Topic: Health<br>- In 4 Age Groups<br>- Awards for the Bests Paintings<br>- Attractive Events and Programs for Children |

| | |
|---|---|
| **Conference Room 10-11 (B2B Halls 1 and 2)** | Meet the Experts<br>- Friendly Discussions Between Juniors and Expert Scientists<br>- Limited Number of Participants<br>- UEEEs and FGDs |
| **Conference Room 12 (B2B Hall 3)** | Virtual Workshops<br>- Highly Requested Topics<br>- Scientific Writing, Publishing Books, etc.<br>- Each Workshop 2 Hours<br>- 17 capacity for in person attendance |
| **Conference Room 13 (Black Box 1)** | InnoUSERN<br>- Practical workshops on entrepreneurship<br>- Focused on creativity and entrepreneurship<br>- Practical workshops<br>- Inspirational lectures |
| **Conference Room 14 (Black Box 2)** | U-Debate<br>- Debates by USERN Stockholders (Ambassadors/Offices/Interest Groups Talks)<br>- Discussion on a specific topic by applicants |
| **Conference Room 15** | Science and Art Festival<br>- Art Performance Competitions<br>- Awards for the Bests Artworks and Performances |
| **Conference Room 16 (Mirror Hall)** | USERN Official Meetings<br>- USERN Advisory Board Meeting<br>- MoUs<br>- Senior Policy Making Meetings<br>- Welcome Reception to Ambassadors |
| | Afternoon: Meet The Expert |
| **14:30 – 16:30 (Black Box 1)** | Meet the Expert: Nima Rezaei |

# Conference Room 2: Junior Talk (English), November 8th

| Day 2: Sunday, November 08, 2020 | |
|---|---|
| | Conference Room 2 |
| | **Session 1: The Interaction of COVID-19, Immunobiology and Society** |
| **Tehran Time** | **Senior Jury: Alireza Sima, Ehsan Sharif, Pouyan Amini Shakib, Mohammad Hossein Nekoofar, Alir Mir, Mahnaz Arshad, Mohammad Jalili** |
| **8:00 – 9:00 (Main Hall E1)** | **"Do Science" Rather Than "Learn Science": How to Creating an Educational Environment (Virtual talk, E1 Hall)** *Leland H. Hartwell, USA (Nobel Laureate in Physiology or Medicine)* |
| **9:00 – 9:15** | **Self Esteem and Its Role in Academic Performance** *Mohammad Jalili, Iran* |
| **9:15 – 9:25** | Monoclonal Antibodies as A Potential Anti-COVID-19 Leila Jahanshahlu |
| **9:25 – 9:35** | COVID19, The Earth Restart Button Mostafa Kamali |
| **9:35 – 9:45** | Research in COVID-19, A Symbol of Science to Society in Medicine Parinaz Sedighi |
| **9:45 – 9:55** | Nutrients in Prevention, Treatment, and Management of Viral Infections; Special Focus on Coronavirus Fatemeh Bourbour |
| **9:55 – 10:10** | **From Science to Technology to More Science: A TPCF story** *Ehsan Sharif, Iran* |
| **10:10 – 10:20** | Potential Therapeutic Approach of Intravenous Immunoglobulin Against COVID-19 Zahra Kolahchi |
| **10:20 – 10:30** | The Role of Herbal Medicine in COVID-19 Faezeh Soveyzi |
| **10:30 – 10:40** | Management of Dental Emergency Patients During COVID-19 Samin Sirous |
| **10:40 – 11:50** | The Biological Effects of Childhood Trauma Shabnam Zahirian |
| **11:50 – 11:00** | Exploring Children's Concepts of an Ideal Treatment Environment; Analyzing the Pediatric Patients' Paintings Using Visual Grounded Theory Helia Mojtabavi |
| **11:00 – 11:30** | Coffee Break |
| | **Session 2: Human Brain: Bench to Bedside of All Dimensions** |
| **11:30 – 11:45** | Human & Resilience in The VUCA World: How Principles of Innovation Design Can Lead to Healthier Citizens & Lifestyles *Kaveh Yazdifard, Iran* |
| **11:45 – 11:55** | A Sui Generis Journey Kawthar Mohammad |

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|---|---|
| **11:55 – 12:05** | Direct Conversion of Somatic Cells Towards Oligodendroglial Lineage Cells: A Novel Strategy for Enhancement of Myelin Repair<br>Haniah Yavarpour-Bali |
| **12:05 – 12:15** | Can You Grow New Brain Cells? Yes!<br>Mohammad Sedaghati Jahromi |
| **12:15 – 12:25** | Is Multiplex Genome Modification of Astrocytes A Novel Candidate Therapy of Chronic Ischemic Stroke in The Rat?<br>Melika Lotfi |
| **12:25 – 12:35** | Why Are Most Scientific Presentations Boring?<br>Mohammad Javad Kamali Ashtiani |
| **12:35 – 12:45** | Education and Entertainment via Animation<br>Fatemeh Afsharchi |
| **12:45 – 12:55** | Broca's Aphasia<br>Mobina Fathi |
| **12:55 – 13:05** | Suicide: Is There A Way Out?<br>Homa Pourriyahi |
| **13:05 – 13:15** | Digital Health and The Challenges of Health System Transformation<br>Negar Moradian |
| **13:15-13:30** | Artwork Review and Evaluation |

# Conference Room 3: Junior Talk (Persian), November 8th

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| | Conference Room 3 |
| | **Session 3: Interdisciplinary Social Sciences to Society** |
| **Tehran Time** | **Senior Jury: Parvin Pasalar, Mojtaba Sedeghat Siahkal, Haleh Ashraf Talesh, Ehsan Rezaei, Mehrzad Mehdizadeh, Reza Majdzadeh, Farnoosh Faridbod, Mohammad Jalili, Amir Ali Hamidieh** |
| **8:00 – 9:00 (Main Hall E1)** | "Do Science" Rather Than "Learn Science": How to Creating an Educational Environment (Virtual talk, E1 Hall)<br>*Leland H. Hartwell, USA (Nobel Laureate in Physiology or Medicine)* |
| **9:00 – 9:15** | The Key to Be Successful in University! What to Do or Not to Do!<br>*Parvin Pasalar, Iran* |
| **9:15 – 9:25** | Effective Altruism: The Most Good You Can Do!<br>Negar Ahmadi |
| **9:25 – 9:35** | Growth Mindset vs. Fixed Mindset: Does It Really Matter?<br>Hadi Mohammadi |
| **9:35 – 9:45** | Art Meets Science<br>Sepideh Sargoli |
| **9:45 – 9:55** | The Think of Spiderweb<br>Gilda Khandan |
| **9:55 – 10:10** | Stem Cell to Society<br>*Amir Ali Hamidieh, Iran* |
| **10:10 – 10:20** | The Influence of Reading Fiction on Social and Cognitive Capacities<br>Mojgan Salmanizadeh |
| **10:20 – 10:30** | How Artificial Intelligence Can Help in A Pandemic Situation?<br>Mahdi Mohammadi |
| **10:30 – 10:40** | Why Everyone Should Start A Startup<br>Sanaz Rahimi |
| **10:40 – 10:50** | Artificial Intelligence, The Dark Side<br>Amirhossein Foroughi |
| **10:50 – 11:00** | Why Are Some People Always Successful in All Fields?<br>Mohammad Hossein Jadidinezhad |
| **11:10 – 11:30** | Coffee Break |
| | **Session 2: Psychosocial Dimension of Human** |
| **11:30 – 11:50** | Knowledge Transfer and Exchange Strategies: What Are the Evidences?<br>*Mojtaba Sedaghat Siahkal, Iran* |
| **11:50 – 12:00** | An Easy Way to Diagnose Depression<br>Maryam Ghorbani |

| | |
|---|---|
| **12:00 – 12:10** | The Roots of Suicide<br>Fatemeh Sodeifian |
| **12:10 – 12:20** | Effectiveness of Cognitive-Behavioral Therapy on Childhood Obesity, Narrative Review<br>Mohaddeseh Hasanzadeh |
| **12:20 – 12:30** | Investigate Environmental Behaviors: Correlation Between Environmental Values and Ecological Behavior<br>Salman Garavand |
| **12:30 – 12:40** | Relationships Patterns Between Central Auditory Processing Disorders and Language Disorders and Learning Disabilities<br>Ehsan Kaviani |
| **12:40 – 12:50** | Telerehabilitation, Virtual Therapists, and Acquired Neurologic Speech and Language Disorders<br>Azin Golmoradizadeh |
| **12:50 – 13:00** | Indicators of Sensory and Intellectual Thinking And its Relationship with Mental Health and Health-Promoting Lifestyle: New Model of Optimal Thinking<br>Nasiroddin Javidi |
| **13:00 – 13:10** | PTSD and Fear Extinction Memory<br>Kimiya Vakili |
| **11:10-11:30** | Artwork Review and Evaluation |

# Conference Room 4: UT-Med, November 8th

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| | Conference Room 4 |
| **Tehran Time** | **Session 1: Traditional Medicine & Society** |
| **8:00 – 9:00 (Main Hall E1)** | "Do Science" Rather Than "Learn Science": How to Creating an Educational Environment (Virtual talk, E1 Hall)<br>*Leland H. Hartwell, USA (Nobel Laureate in Physiology or Medicine)* |
| **9:00 – 9:20** | Loss of Traditional Medicine Knowledge: Consequences and Opportunities<br>*Roy Upton, USA* |
| **9:20 – 9:40** | "Quarantine" - The Word Coined by Abu Ali Sina<br>*Amina Ather, India* |
| **9:40 – 10:00** | Science Based SMEs: A Reply to Social Needs for CAM Products<br>*Abdolali Mohagheghzadeh, Iran* |
| **10:00 – 10:20** | Ethnopharmacology<br>*Arman Zargaran, Iran* |
| **10:20 – 10:40** | Chinese Medicine in Chinese Society<br>*M. Hossein Ayati, Iran* |
| **10:40 – 11:00** | Role of Traditional Medicine in Healthcare Delivery<br>*Syed Mohd Abbas Zaidi, India* |
| **11:00 – 11:30** | Coffee Break |
| | **Session 2: Traditional Medicine Role in Integration of Science** |
| **11:30 – 11:50** | Traditional Medicine, A Multidisciplinary Approach to Integration of Science<br>*MohamadReza Shams Ardekani, Iran* |
| **11:50 – 12:10** | Finding Needles in Haystacks; Systems Biology Techniques in Drug Discovery<br>*Pouya Faridi, Australia* |
| **12:10 – 12:30** | Multidimensionality and Complexity of Integration: An Inquiry to Creative and Metacognitive Problem-Solving Through Logos-Bios Paralogue<br>*Majid Anushiravani, Iran* |
| **12:30 – 12:50** | Persian Medicine Approach to Integrative Medicine<br>*Hossein Rezaeizadeh, Iran* |
| **12:50 – 13:10** | Traditional Medicine and Conventional Medicine: Coexist Paradigms in Medical Community<br>*Mehrdad Karimi, Iran* |
| **13:10 – 13:30** | Indigenous Knowledge or Universal Discipline (Science)? The Role of The Culture-Based Basis of Traditional Medicine in Integrating Modern Medicine with The Humanities and Social Sciences<br>*Ghasem Darzi, Iran* |

# Conference Room 5: U-Pharmacy, November 8th

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| **Tehran Time** | Conference Room 5 |
| **8:00 – 9:00 (Main Hall E1)** | "Do Science" Rather Than "Learn Science": How to Creating an Educational Environment (Virtual talk, E1 Hall)<br>*Leland H. Hartwell, USA (Nobel Laureate in Physiology or Medicine)* |
| **9:00 – 11:00** | Lecture Performance: An Artistic Performance with Scientific Lecture About Covid-19 Pandemic and Drug/Vaccine Approvals<br>Amirreza Mazandarani, Iran |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 13:30** | Drugs development and approval in crisis<br>*Farzad Kobarfard, Iran* |

## Conference Room 9: Health and Art (HEART), November 8th

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| **9:00 – 9:10** | Introduction and HEART Clips |
| **9:10 – 9:15** | Story Telling by Children (Video) |
| **9:15 – 9:25** | HEART Band Performance<br>Soraya Ghaderi, Sanaz Alinia, Yalda Heidari |
| **9:25 – 9:30** | Top 10 Paintings in Group B (Clip) |
| **9:30 – 11:00** | Appreciating Top Iranian Paintings in Group B (Part 1) |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 11:35** | Video Clips of IFPPP 6 |
| **11:35 – 11:40** | Story Telling by Children (Video) |
| **11:40 – 11:50** | HEART Band Performance |
| **11:50 – 13:30** | Appreciating Top Iranian Paintings in Group B (Part 2) |

# Conference Room 13 (Black Box 1): InnoUSERN

| Day Name | Titles | Speakers | Output |
|---|---|---|---|
| **Day 1 (Pre-event): Wednesday, October 28, 2020**<br>**Time: 19:00 – 21:30** | | | |
| 1. The future is now<br>2. The life on the fast lap<br>3. Challenges of Modern Lifestyle | 1. Why are we here?<br>2. How to solve complex problems?<br>3. What is Design?<br>4. Roots of lifestyle challenges (before & after Covid-19)<br>5. How Design helps public health? | 1. Kaveh Yazdifar<br>2. Ramin Khatibi<br>3. Saleh Amini<br>4. Maryam Mahmoudi<br>5. Zabiz | - Design Introduction<br>- Why are we here?<br>- How to solve complex problems?<br>- What is Design?<br>- Roots of lifestyle challenges (before & after Covid-19)<br>- How Design helps public health? |
| **Day 2(Pre-event): Monday, November 02, 2020**<br>**Time: 19:00 – 21:30** | | | |
| 1. Lifestyle under construction: challenge discovery<br>2. The day before you came | 1. Mental health challenges<br>2. Physical health challenges<br>3. Nutrition & diet<br>4. Education | | - Lifestyle Introduction<br>- Mental health challenges<br>- Physical health challenges<br>- Nutrition & diet education |
| **Day 3: Sunday, November 08, 2020**<br>**Time: 9:00 – 13:30** | | | |
| Learning by Doing | 1. Team up<br>2. Discover/Empathize<br>3. Define<br>4. Ideate | 1. Ramin Khatibi<br>2. Saleh Amini | Practical experience of using design tools:<br>Ice breaking<br>Know the user and stakeholders<br>Definition of brief design<br>Ideation - Sketching or writing of ideas<br>Team finalization and problem identification<br>What are prototypes? |
| **Day 4: Monday, November 09, 2020**<br>**Time: 9:00 – 16:30** | | | |
| The Day after Tomorrow | 1. Prototype<br>2. Test<br>3. Present | | - Prototyping and test<br>- Finalization of prototypes for presentation<br>- Presentations |

# Conference Room 14 (Black Box 2): U-Debate, November 8th

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| | **Which One Has Higher Influence on Behavior: Nature or Nurture?**<br><br>**Senior Jury: Azarakhsh Morkri, Azim Mirzazadeh, Mohammad Jalili, Fariba Asghari** |
| **8:00 – 9:00 (Main Hall E1)** | **"Do Science" Rather Than "Learn Science": How to Creating an Educational Environment (Virtual talk, E1 Hall)**<br>*Leland H. Hartwell, USA (Nobel Laureate in Physiology or Medicine)* |
| **9:00 – 9:30** | **Inspirational Talk**<br>*Azarakhsh Mokri, Iran* |
| **9:30 – 10:45** | Round 1 of Debate |
| **10:45 – 11:00** | Concluding Remarks and Comments by Jury |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 12:00** | **Inspirational Talk**<br>*Azim Mirzazadeh, Iran* |
| **12:00 – 13:15** | Round 2 of Debate |
| **13:15 – 13:30** | Concluding Remarks and Comments by Jury |

# Meet the Experts and Workshops, November 8th

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| | **9:00 – 11:00** |
| **Conference Room 10** | Meet The Expert 01: *Bahram Mobasher, USA* (In-Person) |
| **B2B Hall 1** | Meet The Expert 02: *Ajith Abraham, USA* (Virtual) |
| | **Coffee Break (11:00-11:30)** |
| | **11:30 – 13:30** |
| **B2B Hall 1** | Workshop 02: Artificial Intelligence (Virtual)<br>*Tommaso Dorigo, Italy* |
| **B2B Hall 2** | Workshop 03: Investigating the Brain with Explore DTI (Virtual)<br>*Alexander Leemans, the Netherlands* |
| | **14:30 – 16:30** |
| **Black Box 1** | Meet The Expert 03: *Nima Rezaei, Iran* (In-Person) |
| **Conference Room 17 (Virtual Room)** | Workshop 04: Publishing Books with Elsevier (Virtual)<br>*Linda Versteeg-Buschman, UK* |
| | **17:00 – 19:00** |
| **Conference Room 17 (Virtual Room)** | Workshop 05: Critical Thinking for Transformative Research (Virtual)<br>*Shirin Moossavi and Deborah Chan, Canada* |
| | **21:00 – 23:00** |
| **Conference Room 17 (Virtual Room)** | Meet The Expert 04: *Abass Alavi, USA* (Virtual) |

# Conference Room 2: Junior Talk (English), November 9th

| Day 3: Monday, November 09, 2020 | |
|---|---|
| Conference Room 2 | |
| **Tehran Time** | **Session 5: Dentistry and Biology to Society**<br>**Senior Jury: Alireza Sima, Ehsan Sharif, Pouyan Amini Shakib, Mohammad Hossein Nekoofar, Ali Mir, Mohammad Ali Shahbazi, Mahnaz Arshad, Serge Brand** |
| **9:00 – 9:20** | **The Role of International Collaborations in Development of Dentistry in the 21st Century**<br>*Mohammad Hossein Nekoofar, Iran* |
| **9:20 – 9:30** | Evaluating an Aesthetical Smile<br>Parisa Bayat |
| **9:30 – 9:40** | Temporomandibular Disorders (TMD): Heritable or Not?<br>Marziye Rezaei |
| **9:40 – 9:50** | The Advantages and Disadvantages of Clear Aligners Compared with Fixed Orthodontic Appliance<br>Moein Azizi |
| **9:50 – 10:00** | Does Affect Coffee on Oral Health or Not?<br>Fatemeh Kamali |
| **10:00 – 10:10** | Fluoride in Society: Myths and Facts<br>Mahshad Saie |
| **10:10 – 10:20** | The Relationship between Pre-procedural Lipid Profile and Peri-procedural Myocardial Injury in Patients Undergone Elective Percutaneous Coronary Intervention<br>Sanam Alilou |
| **10:20 – 10:30** | A Study of The Association Between Neuropsychological Performance and Allergic Rhinitis in Young Females<br>Malaksima Ayadilord |
| **10:30 – 10:40** | Hyperdense Middle Cerebral Artery Sign and Its Application in The Diagnosis and Prognosis of Stroke<br>Elham Khalili |
| **10:40 – 10:50** | Intraoral Mesenchymal Stem Cells for Periodontal Tissue Regeneration<br>MohammadMostafa Aghamohseni |
| **10:50 – 11:00** | HDAC Expression in Uveal Melanoma<br>Zahra Souri |
| **11:00 – 11:30** | Coffee Break |
| | **Session 6: Integrated Science and Medicine** |
| **11:30 – 11:50** | MBSR (Mindfulness Based Stress Reduction)<br>*Serge Brand, Switzerland* |
| **11:50 – 12:00** | Engineering A Novel Immunogenic Chimeric Vaccine to Deviate Specific Immune System Responses in Atherosclerosis Via Robust Immunoinformatics Approaches<br>Kiarash Saleki |

| | |
|---|---|
| **12:00 – 12:10** | 50 Years After Tragedy, Second Chance for Thalidomide<br>Amirreza Mazandarani |
| **12:10 – 12:20** | Quercetin Enhances Chemotherapeutic Effect of Doxorubicin Against Human Breast Cancer Cells While Reducing Toxic Side Effects of It<br>Niloofar Deravi |
| **12:20 – 12:40** | **Cell-Mimicking Carriers for Drug Delivery: A New Paradigm with a Bright Future**<br>*Mohammad-Ali Shahbazi, Finland* |
| **12:40 – 12:50** | The Role of Aryl Hydrocarbon Receptor, H. Pylori, Tryptophan, And Arginine and Their Cooperation in Gastric Cancer<br>Marziyeh Pirzadeh |
| **12:50 – 13:00** | Design and Evaluation of a Topical Wound Healing Gel Formulation of Myrtus communis Fruit<br>Taraneh Goudarzian |
| **13:00 – 13:10** | Nanotechnology in Cryopreservation<br>Alireza Sarkarlotfabadi |
| **13:10 – 13:20** | Interaction of Platelets and T Cells in Cancerous Tissue<br>Azadehsadat Razavi |
| **13:20 – 13:30** | Dancing Through MS Disability<br>Mojdeh Sarzaeim |

# Conference Room 3: Junior Talk (Persian), November 9th

| | Day 3: Monday, November 09, 2020 |
|---|---|
| | Conference Room 3 |
| | Session 7: Combining All Fields of Science! |
| **Tehran Time** | Senior Jury: Parvin Pasalar, Mojtaba Sedeghat Siahkal, Haleh Ashraf Talesh, Ehsan Rezaei, Mehrzad Mehdizadeh, Reza Majdzadeh, Farnoosh Faridbod, Mohammad Jalili, AmirAli Hamidieh |
| **9:00 – 9:20** | A good mentor not only makes you a better researcher but a better human being<br>*Haleh Ashraf Talesh, Iran* |
| **9:20 – 9:30** | Particle Physics in the Early Universe<br>Maedeh Farhoush |
| **9:30 – 9:40** | Brain-Computer Interfaces<br>Alaleh Jamali |
| **9:40 – 9:50** | Evaluation of Immunomodulatory Effects of Exosomes in Multiple Sclerosis<br>Maryam Azimi |
| **9:50 – 10:00** | Let7b miRNA is New Treatment of Endometriosis (Review Systematic)<br>Sima Amidifar |
| **10:00 – 10:20** | The Role of Biosensors in Modern Human Life and Interdisciplinary Design for Future<br>*Farnoosh Faridbod, Iran* |
| **10:20 – 11:00** | Brief Overview on Top Posters (Part 1) |
| **11:00 – 11:30** | Coffee Break |
| | Session 8: Biological Sciences to Society |
| **11:30 – 11:50** | The History of Epidemics<br>*Ehsan Rezaei, Iran* |
| **11:50 – 12:00** | The Challenges of Calcium Phosphate-based Bone Scaffold Fabricating via Additive Manufacturing<br>Nima Beheshtizadeh |
| **12:00 – 12:10** | Natural Killer Cell-Derived Extracellular Vesicles as Living Therapeutic Boxes for Cancer Immunotherapy<br>Farbod Ghobadinezhad |
| **12:10 – 12:20** | New Generation Pharmacy<br>Paria Fadaee Heydarabadi |
| **12:20 – 12:30** | Approaches to confronting the Biological Epidemic; Prevention Tools with an Emphasis on COVID-19: A Systematized Review<br>Marzieh Hadian |
| **12:30 – 13:10** | Brief Overview on Top Posters (Part 2) |
| **13:10 – 13:30** | Artwork Review and Evaluation |

## Conference Room 5: U-Pharmacy, November 9th

| | Day 3: Monday, November 09, 2020 |
|---|---|
| **Tehran Time** | Conference Room 5 |
| **9:00 – 11:00** | Workshop: Vaccines Development and Approval In Crisis |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 13:30** | Panel Discussion: COVID-19 pharmacotherapy and drug approvals<br>Farzaneh Dastan, Payam Tabarsi, Fanak Fahimi |

## Conference Room 9: Health and Art (HEART), November 9th

| | Day 3: Monday, November 09, 2020 |
|---|---|
| **9:00 – 9:10** | Introduction and HEART Clips |
| **9:10 – 9:15** | Story Telling by Children (Video) |
| **9:15 – 9:25** | HEART Band Performance<br>Soraya Ghaderi, Sanaz Alinia, Yalda Heidari |
| **9:25 – 9:30** | Top 10 Paintings in Group A (Clip) |
| **9:30 – 11:00** | Appreciating Top Iranian Paintings in Group A |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 11:35** | Video Clips of IFPPP 6 |
| **11:35 – 11:40** | Story Telling by Children (Video) |
| **11:40 – 11:50** | HEART Band Performance |
| **11:50 – 12:00** | Top 10 Paintings in Groups C and D (Clip) |
| **12:00 – 13:30** | Appreciating Top Iranian Paintings in Groups C and D |

## Conference Room 14 (Black Box 2): U-Debate, November 9th

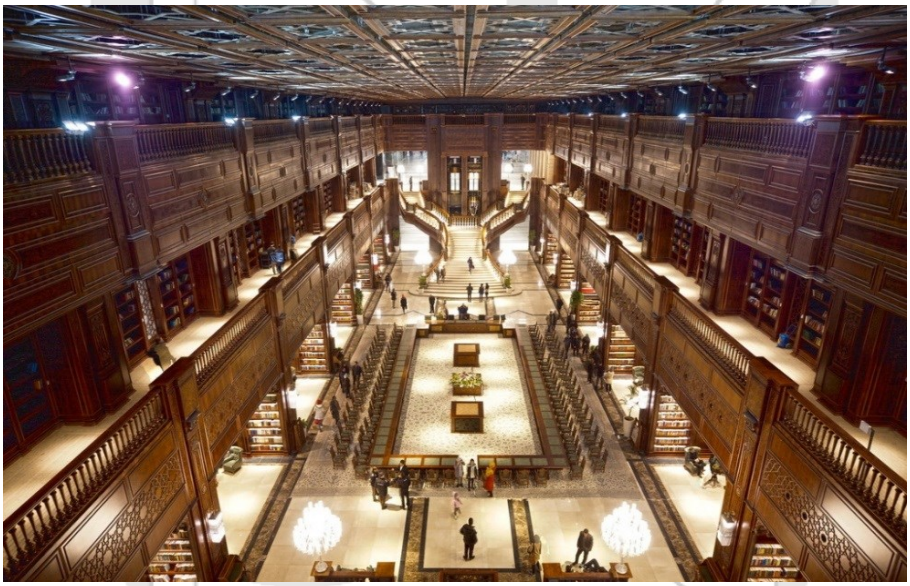
| | Day 3: Monday, November 09, 2020 |
|---|---|
| | **Decision-Making: Is It A Logical or An Emotional Process?**<br><br>**Senior Jury: Hamid Reza Namazi, Fariba Asghari, Farshid Noorbakhsh** |
| **9:00 – 9:30** | **Inspirational Talk**<br>*Hamidreza Namazi, Iran* |
| **9:30 – 10:45** | Round 1 of Debate |
| **10:45 – 11:00** | Concluding Remarks and Comments by Jury |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 12:00** | **Inspirational Talk**<br>*Farshid Noorbakhsh, Iran* |
| **12:00 – 13:15** | Round 2 of Debate |
| **13:15 – 13:30** | Concluding Remarks and Comments by Jury |

## Meet the Experts and Workshops, November 9th

| | Day 3: Monday, November 09, 2020 |
|---|---|
| | **9:00 – 11:00** |
| **Conference Room 6** | Workshop 06: Scientific Writing (In-Person)<br>*Shahin Akhondzadeh, Iran* |
| **B2B Hall 1** | Meet The Expert 05: *Hans Ochs* (Virtual) |
| | **Coffee Break (11:00-11:30)** |
| | **11:30 – 13:30** |
| **Conference Room 6** | Workshop 07: Basic Relaxation Techniques (In-Person)<br>*Serge Brand, Switzerland* |
| **Conference Room 10** | Meet The Expert 06: *Azarakhsh Mokri* (In-Person) |
| **Conference Room 17 (Virtual Room)** | Workshop 08: Research Design and Codes of Practice (Virtual)<br>*Benjamin Sovacool, UK* |
| | **17:00 – 19:00** |
| **Conference Room 17 (Virtual Room)** | Workshop 09: Bioengineering as a Vehicle to Increase the Entrepreneurial Mindset (Virtual)<br>*Lisa Bosman and Katey Shirey, USA* |

# In-Person Program, November 10th

| | | Day 4: Tuesday, November 10, 2020 |
|---|---|---|
| **GMT** | Tehran Time | The 5th USERN Prize Awarding Festival |
| **5:30 – 6:00** | 9:00 – 9:30 | Official Welcome Reception of The Ambassadors |
| **6:00 – 6:15** | 9:30 – 9:45 | Quran, National Anthem, Music Group Performance |
| **6:15 – 7:00** | 9:45 – 10:30 | Closing Ceremony of The 6th International Festival of Paintings for Pediatric Patients (IFPPP) |
| **7:00 – 7:30** | 10:30 – 11:00 | Science and Art Festival and appreciating Top mTalk, JTalk, UDebaters and SciArt Presenters |
| **7:30 – 8:15** | 11:00 – 11:45 | Closing Ceremony of USERN 2020 Prize Awarding Festival |
| **8:15 – 8:30** | 11:45 – 12:00 | Announcement of The Host for USERN 2021 |



# Virtual Program-Morning

**Day 2: Sunday, November 08, 2020**

**Main Hall (E1)**

| GMT | Tehran Time | **Biophysics to Society** |
|---|---|---|
| **4:30 – 5:15** | 8:00 – 8:45 | "Do Science" Rather Than "Learn Science": How to Creating an Educational Environment (virtual talk)<br>*Leland H. Hartwell, USA (Nobel Laureate in Physiology or Medicine)* |
| **5:15 – 5:30** | 8:45 – 9:00 | Questions and Answers |
| **5:30 – 5:50** | 9:00 – 9:20 | Photovoltaics and Energy Storage Challenges From 2020<br>*Federico Bella, Italy* |
| **5:50 – 6:10** | 9:20 – 9:40 | Self-Healing Concrete with Superabsorbent Polymers for A Sustainable Future<br>Didier Snoeck, Belgiums |
| **6:10 – 6:30** | 9:40 – 10:00 | Advanced Functional Materials for Sustainable Energy Applications<br>*Xavier Moya, UK* |
| **6:30 – 6:50** | 10:00 – 10:20 | The Push of Ulysses for the Construction of the Future<br>*Massimo Capaccioli, Italy* |
| **6:50 – 7:10** | 10:20 – 10:40 | Ligand Binding Free-Energy and Kinetics Calculation<br>*Vittorio Limongelli, Switzerland* |
| **7:10 – 7:30** | 10:40 – 11:00 | Emerging Magnesium Technology for Engineering and Biomedical Applications<br>*Manoj Gupta, Singapore* |
| **7:30 – 8:00** | 11:00 – 11:30 | Concluding Remarks |
| | | **Art and Science Science to Society** |
| **8:00 – 8:20** | 11:30 – 11:50 | Archaeology to Society: Journey to The Past of Humanity<br>*Derya Yılmaz, Turkey* |
| **8:20 – 8:40** | 11:50 – 12:10 | The Idea of Science in Early Modern Age<br>*Mauro Scalercio, Italy* |
| **8:40 – 9:00** | 12:10 – 12:30 | Art, science, Interdisciplinarity<br>*Salvatore Lorusso, Italy* |
| **9:00 – 9:20** | 12:30 – 12:50 | How Interactive Art Implements Scientific Research Both for Data Collection and Dissemination<br>*Paola Lopreiato, Italy* |
| **9:20 – 9:40** | 12:50 – 13:10 | Methodological Implication of Digital Twist on Film and Media Studies<br>*Milos Milosevic, Serbia* |
| **9:40 – 10:00** | 13:10 – 13:30 | Triple Foreignness of Artist and Ethnographer Involved in Biotechnology - The Problem with Status in Liminal Cognitive Practices<br>*Karolina Zyniewicz, Poland* |
| **10:00 – 10:30** | 13:30 – 14:00 | Break |
| | | **Interdisciplinary and Integrated Science to Society** |
| **10:30 – 10:50** | 14:00 – 14:20 | A Psychological Vaccine Against Misinformation<br>*Sander van der Linden, UK* |
| **10:50 – 11:10** | 14:20 – 14:40 | Massivization and Barbarism in Modern Society: Causes and Effects<br>*Natalya Shelkovaya, Ukraine* |
| **11:10 – 11:30** | 14:40 – 15:00 | Logical Processing and Language Taboos<br>*Wojciech Krysztofiak, Poland* |

| | | |
|---|---|---|
| **11:30 – 11:50** | 15:00 – 15:20 | Cognition and Religious Thought<br>*Sławomir Sztajer, Poland* |
| **11:50 – 12:10** | 15:20 – 15:40 | Critical Rationalism<br>*Chi-Ming Lam, Hong Kong* |
| **12:10 – 12:30** | 15:40 – 16:00 | What Classical and Modern Rhetorical Theory Offers Thinkers, Researchers, and Problem Solvers in the Sciences and Arts<br>*Wayne H Slater, USA* |
| **12:30 – 12:50** | 16:00 – 16:20 | Public Policy in the News<br>*Christopher Wlezien, USA* |
| **12:50 – 13:10** | 16:20 – 16:40 | Apuleius's Philosophy of Curiosity in Education: Building an Education of Philosophy<br>*Amine Harbi, Algeria* |
| **13:10 – 17:00** | 16:40 – 20:30 | **Afternoon Sessions** |

| | | **Day 3: Monday, November 09, 2020**<br>**Main Hall (E1)** |
|---|---|---|
| **GMT** | Tehran Time | **Mathematics and Physics to Society** |
| **5:30 – 5:50** | 9:00 – 9:20 | Mobile Health Diagnostics<br>*Hadi Shafiee, USA* |
| **5:50 – 6:10** | 9:20 – 9:40 | Anomalies in Light Scattering: Recent Breakthroughs and Nascent Advanced Applications<br>*Alex Krasnok, USA* |
| **6:10 – 6:30** | 9:40 – 10:00 | A Resilient Electricity Grid of the Future<br>*Payman Dehghanian, USA* |
| **6:30 – 6:50** | 10:00 – 10:20 | Role of Artificial Intelligence and Data Sciences<br>*Ajith Abraham, USA* |
| **6:50 – 7:10** | 10:20 – 10:40 | Machine Learning in Brain-Computer Interfaces<br>*Dongrui Wu, China* |
| **7:10 – 7:30** | 10:40 – 11:00 | The Role of Artificial Intelligence in Achieving the SDGs. Sustainable Cities<br>*Ricardo Vinuesa, Sweden* |
| **7:30 – 7:50** | 11:00 – 11:20 | Development of Scalable Ultrasmall Nanowire Transistor Probes for High-Resolution Brain-Machine Interface<br>*Yunlong Zhao, UK* |
| **7:50 – 8:10** | 11:20 – 11:40 | Global Challenges in Addressing Unhealthy Digital Technology Habits<br>*Daniel King, Australia* |
| **8:10 – 8:30** | 11:40 – 12:00 | Hybrid Perovskite Solar Cells: A Game Changer for Near Future<br>*Giulia Grancini, Italy* |
| **8:30 – 8:50** | 12:00 – 12:20 | Switching with Light: A Palette of Opportunities for Photochromic Materials<br>*Rossella Castagna, Italy* |
| **8:50 – 9:10** | 12:20 – 12:40 | Lead-Free Perovskite Solar Cell: A Sustainable Photovoltaic<br>*Antonio Abate, Germany* |
| **9:10 – 9:30** | 12:40 – 13:00 | Neutrosophic Numbers: History and Basic Notions<br>*Surapati Pramanik, India* |
| **9:30 – 9:50** | 13:00 – 13:20 | Mathematical Models for COVID-19; Gradients, Singularities and Interatomic Potentials: From Nanomaterials to Tissues and Cells<br>*Elias C. Aifantis, Greece* |
| **9:50 – 10:10** | 13:20 – 13:40 | Towards Reliable Brain-Computer Interaction with High Quality User Training<br>*Fabien Lotte, France* |
| **10:10 – 10:30** | 13:40 – 14:00 | Break |
| | | **Social Science to Society** |
| **10:30 – 10:50** | 14:00 – 14:20 | Science and Citizenship<br>*Jeff Scheuer, USA* |

| | | |
|---|---|---|
| **10:50 – 11:10** | 14:20 – 14:40 | Cooperation, Collaboration and Communication- Necessary Ingredients for Community-Based Research<br>*Monica Lakhanpaul, UK* |
| **11:10 – 11:30** | 14:40 – 15:00 | Simple Micro, Complex Macro<br>*Orlando Manuel da Costa Gomes, Portugal* |
| **11:30 – 11:50** | 15:00 – 15:20 | The Essence of Human Centered Design<br>*Mileha Soneji, the Netherlands* |
| **11:50 – 12:10** | 15:20 – 15:40 | Deciding, Moving and Feeling: What Fits in The Box!<br>*Amer Burhan, Canada* |
| **12:10 – 12:30** | 15:40 – 16:00 | Concluding Remarks Session 4 |
| **13:00 – 17:00** | 16:30 – 20:30 | **Afternoon Sessions** |

# Afternoon Virtual Event Program

| | Day 1: Saturday, November 07, 2020 |
|---|---|
| | **Pandemic: A Global Challenge for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Zanjan Office of USERN) |
| **13:20 – 13:40 GMT** | The Role of Transdicisplinary Science in Times of Pandemics and Climate Change<br>*Ortwin Renn, Germany* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | Technological Systems in Post-Pandemic World<br>*Christopher Ryan Maboloc, Philippines* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | Deconstructing Wisdom for The Post-Pandemic World<br>*Igor Grossmann, Canada* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 –14:55 GMT** | The Role of Pharmacovigilance during COVID-19 Pandemic<br>*Liz Veramendi, Peru* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 – 15:20 GMT** | Pandemics and the Citizens Need for a Holistic View of Planet Earth<br>*Clara Vasconcelos, Portugal* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:20 -15-40 GMT** | Role of Quantum and Nanoscience in Food Security for the post-COVID19 New World<br>*Seeram Ramakrishna, Singapore* |
| **15:40 – 15:45 GMT** | Q&A |
| **15:45 – 16:05 GMT** | Education and Training during a Pandemic<br>*Jan Nouwen, the Netherlands* |
| **16:05 – 16:10 GMT** | Q&A |
| **16:10 – 16:30 GMT** | The Impact of Pandemic on Geriatric Mental Health<br>*Peyman Raoofi, USA* |
| **16:30 – 16:35 GMT** | Q&A |
| **16:35 – 16:55 GMT** | Herbal Blended Essential Oil Formulation Development for The Treatment of COVID -19<br>*Tigran Davtyan, Armenia* |
| **16:55 – 17:00 GMT** | Q&A |
| **17:00 – 17:15 GMT** | **Panel (Pandemic and Society) and Free Discussion** |
| **17:15 – 17:30 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 2: Sunday, November 08, 2020 |
|---|---|
| | **Modern Medicine for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Abadan Office of USERN) |
| **13:20 – 13:40 GMT** | A Network Physiology Approach to Medicine: Lessons from Complex Diseases<br>*Alireza Mani, UK* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | Personalized Medicine: The Future of Preventive Healthcare System<br>*Shahram Shahabi, USA* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | α-MSH a potential therapeutic agent for sarcoidosis<br>*Mehdi Mirsaeidi, USA* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 –14:55 GMT** | Personalized Medicine Tailored for Immunodeficiencies<br>*Hans Ochs, USA* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 – 15:20 GMT** | CD8 Treg in Health and Disease<br>*Sudhir Gupta, USA* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:25 – 15:45 GMT** | Extracellular vesicles for the treatment of inoperable coronary disease: a future option or another regenerative failure?<br>*Frank Sellke, USA* |
| **15:45 – 15:50 GMT** | Q&A |
| **15:50 – 16:10 GMT** | At the Intersect of Outcome Prediction, Machine Learning, and Precision Health<br>*Ramin Zand, USA* |
| **16:10 – 16:15 GMT** | Q&A |
| **16:15 – 16:35 GMT** | Science without Borders: Rethinking Art and Humanity in Modern Medical Practice<br>*Stephen E. Kekeghe, Nigeria* |
| **16:35 – 16:40 GMT** | Q&A |
| **16:40 – 16:50 GMT** | **Panel (Modern Medicine to Society) and Free Discussion** |
| **16:50 – 17:00 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 3: Monday, November 09, 2020 |
|---|---|
| | **Clinical Immunology for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Hormozgan USERN Office) |
| **13:20 – 13:40 GMT** | Guanylate-Binding Proteins 2 and 5 Reduce SARS-CoV-2 Infectivity<br>*Daniel Sauter, Germany* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | The Impact of Environmental Factor on the Allergic Disorders in Children<br>*Jiu-Yao Wang, Taiwan* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | HIV cure approaches from bench to bedside<br>*Tokameh Mahmoudi, the Netherlands* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 – 14:55 GMT** | Transdisciplinarity in the Clinic and Research of Inborn Immunity Errors<br>*Carolina Prando, Brazil* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 –15:20 GMT** | Targeted Therapies for the Primary Immunodeficiency Diseases<br>*Safa Baris, Turkey* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:25 – 15:45 GMT** | Genetic predisposition to infections<br>*Emmanuelle Jouanguy, France* |
| **15:45 – 15:50 GMT** | Q&A |
| **15:50 – 16:10 GMT** | Newborn Screening: An Ethical Dilemma<br>*Antonio Condino-Neto, Brazil* |
| **16:10 – 16:15 GMT** | Q&A |
| **16:15 – 16:35 GMT** | Self-Amplifying RNA Vaccines for the Prevention of SARS-CoV-2 Infection<br>*Anna Blakney, UK* |
| **16:35 – 16:40 GMT** | Q&A |
| **16:15 – 16:45 GMT** | **Panel (Clinical Immunology for the Society) and Free Discussion** |
| **16:45 – 17:00 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 4: Tuesday, November 10, 2020 |
|---|---|
| | **Education for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Iran Mall Jundi-Shapour Library, Tehran) |
| **13:20 – 13:40 GMT** | Working in the Interdisciplinary Areas of Public Health Research and Education: Promises and Perils<br>*Alireza Ahmadvand, Australia* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | The Importance of the Education in Sciences<br>*Ekaterini Goudouris, Brazil* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | Strategies in Medical Education for Basic and Clinical Sciences<br>*Juan Carlos Aldave Becerra, Peru* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 –14:55 GMT** | Deconstructing Hate Speech in Social Science Teaching: Theoretical and Methodological Bases for Democratic Citizenship Education<br>*Delfín Ortega-Sánchez, Spain* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 – 15:20 GMT** | The Danger of Pseudoscience and Science Denialism to Society<br>*Kiarash Aramesh, USA* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:25 – 15:45 GMT** | Measure of Science: Merits and Dangers of Rankings in Higher Education<br>*Michael Schreiber, Germany* |
| **15:45 – 15:50 GMT** | Q&A |
| **15:50 – 16:10 GMT** | Sharing Space: Interdisciplinary Approaches Beyond STEM and STEAM<br>*Louise Mackenzie, UK* |
| **16:10 – 16:15 GMT** | Q&A |
| **16:15 – 16:35 GMT** | Distance Learning and the New Frontiers of Knowledge on the Web<br>*Serena Sanseviero, Italy* |
| **16:35 – 16:40 GMT** | Q&A |
| **16:40 – 17:00 GMT** | How to be an Entrepreneur within Academia?<br>*Majid Ebrahimi Warkiani, Australia* |
| **17:00 – 17:05 GMT** | Q&A |
| **17:05 – 17:20 GMT** | **Panel (Education for the Society) and Free Discussion** |
| **17:20 – 17:30 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 5: Wednesday, November 11, 2020 |
|---|---|
| | **Interdisciplinary Neuroscience and Psychology for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Shahrekord USERN Office) |
| **13:20 – 13:40 GMT** | The Art and Science of Cognitive Behavioral Therapy (CBT)<br>*Umberto Crisanti, UK* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | New Targets in Neuropathic Pain Pathophysiology<br>*Livio Luongo, Italy* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | Brain Dynamics and Flexible Behaviors<br>*Lucina Qazi Uddin, USA* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 –14:55 GMT** | Identification of Novel Mechanisms of Neuronal Death in Alzheimer's Disease offers New Hope for New Therapies<br>*Eftekhar Eftekharpour, Canada* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 – 15:20 GMT** | Medication Development for Drug Addiction: Novel Gut-Brain Neuroendocrine Targets<br>*Mehdi Farokhnia, USA* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:25 – 15:45 GMT** | Mental Health and Society<br>*Orkideh Behrouzan, UK* |
| **15:45 – 15:50 GMT** | Q&A |
| **15:50 – 16:10 GMT** | Unraveling the Human Connectome with Diffusion MRI: From Random Walk of Water Molecules to Brain Connections<br>*Alexander Leemans, the Netherlands* |
| **16:10 – 16:15 GMT** | Q&A |
| **16:15 – 16:35 GMT** | Functional Connectome Fingerprinting: Identifying Individuals and Predicting Behavior Using Patterns of Brain Functional Connectivity<br>*Emily S. Finn, USA* |
| **16:35 – 16:40 GMT** | Q&A |
| **16:40 – 17:00 GMT** | Social Brain<br>*Dena Bahmani, USA* |
| **17:00 – 17:05 GMT** | Q&A |
| **17:05– 17:20 GMT** | **Panel (interdisciplinary Neuroscience for the Society) and Free Discussion** |
| **17:20 – 17:30 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 6: Thursday, November 12, 2020 |
|---|---|
| | **Biological Sciences, Nutrition and Diet for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (IUMS USERN Office) |
| **13:20 – 13:40 GMT** | Aquaculture Side Streams as Source of Nutrients and Antioxidant Bioactive Compounds<br>*Francisco J. Barba, Spain* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | Globalization and The Pandemic of Human Obesity: Finding The legal Reason for a Symptom of Cultural Decline<br>*Joseph Garske, Italy* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | Precision Nutrition in Obesity<br>*Alfredo Martínez, Spain* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 –14:55 GMT** | Clinical Implications of Gut Microbiota<br>*Nikrad Shahnavaz, USA* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 – 15:20 GMT** | Creating a Path for Healthy Sustainable Diets<br>*Walter Willett, USA* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:25 – 15:45 GMT** | Three Molecules, A Protein, and Binding Affinity: What Do They Have in Common?<br>*Julie B. Ealy, USA* |
| **15:45 – 15:50 GMT** | Q&A |
| **15:50 – 16:10 GMT** | Engineering in Personalized Medicine<br>*Ali Khademhosseini, USA* |
| **16:10 – 16:15 GMT** | Q&A |
| **16:15 – 16:35 GMT** | Clinical Applications of Microengineered Elastic Hydrogels<br>*Nasim Annabi, USA* |
| **16:35 – 16:40 GMT** | Q&A |
| **16:40 – 17:00 GMT** | Nurse and Nursing for Humanity (Nursing is art and science)<br>*Ş.Dilek Güven, Turkey* |
| **17:00 – 17:05 GMT** | Q&A |
| **17:05 – 17:25 GMT** | Pediatric Obesity, Addiction, and Family Dynamics: Concept of Co-obesity<br>*Anne-Frédérique Naviaux* |
| **17:25 – 17:30 GMT** | Q&A |
| **17:30 – 17:45 GMT** | **Panel (Nutrition and Society) and Free Discussion** |
| **17:45 – 18:00 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 7: Friday, November 13, 2020 |
|---|---|
| | **Applied Immunology for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Tehran University of Medical Sciences) |
| **13:20 – 13:40 GMT** | Spatial Profiling of The Tumor Microenvironment to Identify Biomarkers of Therapy Response<br>*Arutha Kulasinghe, Australia* |
| **13:40 – 13:45 GMT** | Q&A |
| **13:45 – 14:05 GMT** | Small Molecule Immune Potentiators Targeting TLRs for the Development of Novel Chemoimmunotherapy and Vaccine Adjuvants<br>*Deepak Salunke, India* |
| **14:05 – 14:10 GMT** | Q&A |
| **14:10 – 14:30 GMT** | Statins and Cancer: Is It A Possible New Combination Therapy Strategy?<br>*Saeid Ghavami, Canada* |
| **14:30 – 14:35 GMT** | Q&A |
| **14:35 –14:55 GMT** | New Translational Approaches to Understand Skin Immunology<br>*Mehdi Rashighi, USA* |
| **14:55 – 15:00 GMT** | Q&A |
| **15:00 – 15:20 GMT** | Current Challenges in Organ Transplantation<br>*Reza Saidi, USA* |
| **15:20 – 15:25 GMT** | Q&A |
| **15:25 – 15:45 GMT** | Immunobioengineering in Therapy and Regeneration<br>*Mohammad Mahdi Hasani-Sadrabadi, USA* |
| **15:45 – 15:50 GMT** | Q&A |
| **15:50 – 16:10 GMT** | Macrophage-Cancer Cell Fusion and Hybridization: The Driving Force in Solid Tumor Metastasis<br>*John Pawelek, USA* |
| **16:10 – 16:15 GMT** | Q&A |
| **16:15 – 16:45 GMT** | **Panel (Applied Immunology for the Society) and Free Discussion** |
| **16:45 – 17:00 GMT** | Art performance, Concluding Remarks, and Group photo |

| | Day 8: Saturday, November 14, 2020 |
|---|---|
| | **Integrated Science for the Society** |
| **13:00 – 13:20 GMT** | Introduction and Virtual Social Program (Shahid Beheshti USERN Office) |
| **13:20 – 13:50 GMT** | Integrated Socratic Education…An Improved Paradigm<br>*Brian Lighthill, UK* |
| **13:50 – 13:55 GMT** | Q&A |
| **13:55 – 14:15 GMT** | Current Strategies for Addressing the World's Leading Cause of Death: Coronary Artery Disease<br>*Armin ArbabZadeh, USA* |
| **14:15 – 14:20 GMT** | Q&A |
| **14:20 – 14:40 GMT** | Only Trans-Inter-Multidisciplinary Approach Can Solve Complex Problems in Medicine, Public Health, and Earth<br>*Shuji Ogino, USA* |
| **14:40 – 14:45 GMT** | Q&A |
| **14:45 –15:05 GMT** | Evolving Role of PET Imaging in Assessing and quantifying Atherosclerosis in majories<br>*Abass Alavi, USA* |
| **15:05 – 15:10 GMT** | Q&A |
| **15:10 – 15:30 GMT** | Microscopy with UV Surface Excitation (MUSE) for Slide-free Rapid Examination of Surgical Pathology Specimens<br>*Amir Qorbani, USA* |
| **15:30 – 15:35 GMT** | Q&A |
| **15:35 – 15:55 GMT** | Proof of Concept for Oral Levodopa Treatment in Rescuing Retinal Morphology and Visual Function in A Murine Model of Human Albinism<br>*Helena Lee, UK* |
| **15:55 – 16:00 GMT** | Q&A |
| **16:00 – 16:20 GMT** | Finding the Balance Between Freedom and Security<br>*Barry Schwartz, USA* |
| **16:20 – 16:25 GMT** | Q&A |
| **16:25 – 16:55 GMT** | Multidisciplinary Approach to Fetal Surgery<br>*Alireza Shamshirsaz, USA* |
| **16:55 – 17:00 GMT** | Q&A |
| **17:00 – 17:15 GMT** | **Panel (Integrated Science for the Society) and Free Discussion** |
| **17:15 – 17:30 GMT** | Art performance, Concluding Remarks, and Group photo |

# USERN Congress Satellite Events

**USERN SBMU Office Satellite Event**

| | | |
|---|---|---|
| November 11 | 16:00-17:30 | Artificial Intelligence in Medical Sciences<br>*Seyed-Mahdi Khaligh-Razavi* |
| November 13 | 16:00-18:30 | Design Thinking in Health Problem Solving<br>*Salar Arzideh* |
| November 13 | 19:00-21:30 | Stem Cell Therapies in COVID-19<br>*Masoud Soleimani* |
| November 14 | 16:00-19:00 | Neuroscience: A New Approach to Our Being<br>*Mohammad Nami* |
| November 15 | 16:00-18:30 | Nutrition in COVID-19<br>*Zahra Vahdat Shariat panahi* |
| November 15 | 19:00-21:30 | Critical Thinking<br>*Armin Shirvani* |

**USERN HUMS Office Satellite Event**

| | | |
|---|---|---|
| November 12 | 17:40-18:10 | Marine Stem Cells and Tissue Engineering: Novel Approaches for Human Tissue Regeneration<br>*Amin Tamadon* |
| November 12 | 18:10-18:40 | Marine Microorganisms, Micro and Macro Algae from the Persian Gulf, Immense Scope toward Pharmacology<br>*Saed Tamadoni* |
| November 12 | 18:40-19:10 | Study of Antitumoral Activity of Polysaccharide Composition of Some of Key Brown Micro Algae in Persian Gulf<br>*Azim Nejatizadeh* |
| November 12 | 19:10-19:40 | Antioxidant and Anti-Inflammatory Effect Properties of Some Species of Persian Gulf<br>*Soheila Moein* |
| November 12 | 19:40-20:10 | Application of Marine Sources in Pharmaceutical Nanotechnology<br>*Sara Nikoofal* |
| November 12 | 20:10-20:40 | Marine Stem Cell, Tissue Engineering Using Marine Stem Cell, 3D Bioinjection 3D Printing Method, Challenges and Advances in Marine Bioinjection Production<br>*Amin Tamadon* |
| November 12 | 20:40-21:00 | Concluding Remarks |

**USERN Abadan Office Satellite Event**

| | | |
|---|---|---|
| November 7 | 18:00-20:00 | Interpretation of Arterial Blood Gases Workshop<br>*Samaneh Hashemi* |
| November 8 | 18:00-20:00 | Submission and Journal Selection Workshop<br>*Amene Saghazadeh* |
| November 10 | 20:30-18:30 | Identification and Management of Dealing with Suspected Cases of Child Abuse Workshop<br>*Mahshid Darabi* |
| November 11 | 18:00-21:00 | Systematic Review Articles Workshop<br>*Amene Saghazadeh* |
| November 12 | 18:00-21:00 | Meta-analysis Workshop<br>*Amene Saghazadeh* |

**USERN Shahrekord Office Satellite Event**

| | | |
|---|---|---|
| November 10 | 10:00-12:00 | Genetic Engineering – Protein Analysis (Protein Extraction-SDS-PAGE-Western Blotting)<br>*Seyed Abbas Mirzaei* |

**USERN Zanjan Office Satellite Event**

| | | |
|---|---|---|
| November 11 | 9:25-10:05 | Advanced Drug Delivery Platforms for Hard -to- Treat Diseases<br>*Mohammad Ali Shahbazi* |
| November 11 | 10:10-10:50 | Creating a Path for Healthy Sustainable Diet<br>*Walter willett* |
| November 11 | 10:55-11:35 | Genetic Analysis of Rare Bleeding Disorders: An Experience with Over 50 Cases of Severe FVII Deficiency<br>*Tina Shahani* |
| November 11 | 11:40-12:20 | Topic of the lecturer<br>Lecture by one of the USERN's speakers |

# USERN Keynote Lectures (UKLs)

Abass Alavi

## Evolving Role of PET Imaging in Assessing and quantifying Atherosclerosis in majories

- **Professor of Radiology, Hospital of the University of Pennsylvania, Philadelphia, USA, Department of Radiology, Perelman School of Medicine, University of pennsylvania, Philadelphia, USA**

This presentation will cover the following 2 topics: 1.) Review the available methodologies for quantifying atherosclerosis by FDG- and NaF-PET/CT imaging. 2.) Present a novel quantitative method called the “Alavi Carlsen Calcification Score (ACCS)” that provides global assessment of cardiovascular molecular calcification by NaF-PET/CT in patients with suspected or proven cardiovascular diseases (CVD).

Atherosclerosis, which is the underlying cause of CVD, follows a very complex biological process and eventually leads to inflammation and micro-calcification in areas of cell death and ischemia. Both of these processes have been shown to correlate with plaque instability and risk of future CVD events. As a result, there is a dire and pressing need to develop novel quantitative molecular imaging techniques that will allow predicting impending CVD events. Many studies have shown that FDG-PET/CT imaging is relatively sensitive technique for detecting and characterize atherosclerosis in the vascular wall and may be a predictor for CVD complications. However, recent well-designed research studies suggest that NaF based imaging finding are highly correlated with the risks from CVD and therefore may prove to be superior to those of FDG-PET/CT

Over the past decade, we have been able to demonstrate that global disease assessment with NaF-PET/CT imaging is strongly correlated with the presence of CVD risk factors when compared to that of FDG-PET/CT. This approach has been used to quantify molecular calcification in the major arteries and the entire heart (representing the disease in coronary arteries) as the Alavi-Carlsen Calcification Score. This method can potentially be used for risk stratification and assessing therapeutic intervention in patients with CVD risk factors.

Ajith Abraham

## Role of Artificial Intelligence and Data Sciences

- **Director of Machine Intelligence Research Labs (MIR Labs), Scientific Network for Innovation and Research Excellence, Washington, USA**

We are blessed with the sophisticated technological artifacts that are enriching our daily lives and the society. Industry 4.0 enables automation and data exchange, which also includes a close integration of cyber-physical systems, the Internet of things and cloud computing. In this talk, the concept we emphasize the role of artificial intelligence and data sciences and then various research challenges from several medical applications perspective will be illustrated.

Reza Malekzadeh

## Fifty Years of Research and One Conclusion: Opium Causes Cancer


- **Digestive Oncology Research Center, Digestive Diseases Research Institute, Tehran University of Medical Sciences, Tehran, Iran**
- **Digestive Disease Research Center, Digestive Diseases Research Institute, Tehran University of Medical Sciences, Tehran, Iran**


In September 2020, the International Agency for Research on Cancer (IARC) announced that opium consumption causes cancer in humans, a conclusion reached after reviewing data from five decades of research. Given the widespread use of opium and its derivatives by millions of people across the world, the classification of opium consumption as a “Group 1” carcinogen has important public health ramifications. In this presentation we offer a short history of opium use in humans and briefly review the body of research that led to classifying opium consumption as a carcinogen. We also discuss possible mechanisms of opium’s carcinogenicity and potential avenues for future research.

In 2002, an important case-control study named GEMINI (Gastroesophageal and Esophageal Malignancies in Northern Iran) was planned to investigate the risk factors of esophageal and gastric cancers in the Golestan Province, in northern Iran . This was a follow-up to the unfinished studies conducted before the revolution. Detailed questionnaires were developed to assess opium use, as opium was one of culprits for high risk of esophageal cancer in the area . A very influential study, the Golestan Cohort Study (GCS), was launched in by the same group of investigators, and hence GCS essentially used the same questionnaires as the GEMINI did . However, for several reasons, the GCS was a pivotal study and took studies of opium use and cancer to a higher level. First, the GCS validated the opium use questionnaire against the urinary opium metabolites, and showed very good validity and reliability for reporting opium use. As such, that same questionnaire was used in at least 12 subsequent epidemiologic studies to assess opium use and cancer risk. Second, the GCS was the first study to prospectively follow a large number of opium users for more than a decade with a negligible loss to follow-up, allowing a robust investigation of the risk of different cancer outcomes among these individuals.

Altogether, since 2003, at least 25 independent case-control 24,28–38,40–52, and 2 cohort studies 12,39 have been conducted on this subject and nearly all have shown increased risk of cancers of different sites among opium users. Reviewing the results of all studies conducted over the past 50 years, the IARC Working Group found “sufficient evidence” for the carcinogenicity of opium consumption in relation to cancers of the larynx, lung, and bladder, and “limited evidence” for the carcinogenicity of opium for cancers of the esophagus, stomach, pharynx, and pancreas.

The results reached by the IARC apply only to minimally processed opium, which is a complex mixture; it is unclear whether pure forms of naturally occurring opiates (e.g., morphine) or semi-synthetic or synthetic opioids (e.g., fentanyl and tramadol) also cause cancer. Given the widespread use of these opioids all across the world, conducting careful studies are of utmost importance. We invite all scientists with relevant research interests to contribute to this field. The 2020 IARC Working Group meeting was the culmination of 50 years of research yet the beginning of another era of research on opium use and cancer

Alexander Leemans

## Unraveling the Human Connectome with Diffusion MRI: From Random Walk of Water Molecules to Brain Connections

- **Associate Professor of Medical Imaging, Image Sciences Institute, University Medical Center Utrecht, The Netherlands**

Studying the organization of the complex network of brain connections remains challenging to date, partly because of the strong multi-scale nature of the brain's circuitry and the numerous characteristics available for defining boundaries between brain regions. Combining neuroimaging techniques that capture structural and functional information at different resolutions may overcome this issue and has been widely adopted in "connectomics", the comprehensive study of brain connectivity. With its unique ability to investigate tissue microstructure in vivo, diffusion magnetic resonance imaging (MRI) is the preferred approach for investigating the brain's structural connectivity and will be the main topic of this lecture. After a brief introduction of the key concepts in diffusion MRI, I will present some of the major challenges that we are currently facing in this burgeoning field of research.

Alfredo Martínez Hernández

## Precision Personalized Nutrition

- **Professor of Nutrition, Universidad de Navarra, Pamplona, Spain**

Little is known about who would benefit from Internet-based personalised nutrition (PN) interventions. This study aimed to evaluate the characteristics of participants who achieved greatest improvements (i.e. benefit) in diet, adiposity and biomarkers following an Internet-based PN intervention. Adults (n 1607) from seven European countries were recruited into a 6-month, randomised controlled trial (Food4Me) and randomised to receive conventional dietary advice (control) or PN advice. Information on dietary intake, adiposity, physical activity (PA), blood biomarkers and participant characteristics was collected at baseline and month 6. Benefit from the intervention was defined as ≥5 % change in the primary outcome (Healthy Eating Index) and secondary outcomes (waist circumference and BMI, PA, sedentary time and plasma concentrations of cholesterol, carotenoids and omega-3 index) at month 6. For our primary outcome, benefit from the intervention was greater in older participants, women and participants with lower HEI scores at baseline. Benefit was greater for individuals reporting greater self-efficacy for 'sticking to healthful foods' and who 'felt weird if [they] didn't eat healthily'. Participants benefited more if they reported wanting to improve their health and well-being. The characteristics of individuals benefiting did not differ by other demographic, health-related, anthropometric or genotypic characteristics. Findings were similar for secondary outcomes. These findings have implications for the design of more effective future PN intervention studies and for tailored nutritional advice in public health and clinical settings.

Ali Jafarian

## Professionalism in the Era of Resource Limitation


- **Founding Chief, Division of Hepatopancreatobiliary and Liver Transplantation, IKHC**
- **Former Chancellor, Tehran University Medical Sciences**


Professionalism as described in Annals of Internal Medicine in 2002 is “the basis of medicine’s contract with society” and is based on 3 principles: primacy of patient welfare, patient autonomy and social justice. 10 professional responsibilities are listed afterward including commitment to professional competence, honesty, confidentiality, appropriate relations with patients, o improving quality of care, improving access, just distribution of resources, scientific knowledge, managing conflicts of interest and professional responsibilities. These terms and words make a high pressure on medical staffs around the world and although all of those should be transferred to new generations, be evaluated and followed seriously, major issues are interfering with this approach to medicine including resources scarcity, inequalities, gender issue, payment methods, market forces, technology drive, societal pressure especially thru social media, economic crises, patients’ centeredness and will, global injustice among many others.

New generations have questions about different aspects of life and those who are growing in Medical Schools have their own version of dilemmas about professionalism, which affects all aspects of doctors’ life. We have to deal with these questions in a way that keeps Medicine as professional as could be in 21st century, and make the work environment as suitable and tolerable as might be for our young colleagues.

## Ali Khademhosseini

## Engineering in Precision Medicine

- **Director and CEO, The Terasaki Institute, Former Professor, the University of California, Los Angeles, USA**

Engineered materials that integrate advances in polymer chemistry, nanotechnology, and biological sciences have the potential to create powerful medical therapies. Dr. Khademhosseini's group is interested in developing 'personalized' solutions that utilize micro- and nanoscale technolgoies to enable a range of therapies for organ failure, cardiovascular disease and cancer.In enabling this vision he works closely with clinicians (including interventional radiologists, cardiologists and surgeons). For example, he has developed numerous techniques in controlling the behavior of patientderived cells to engineer artificial tissues and cell-based therapies. His group also aims to engineer tissue regenerative therapeutics using water-containing polymer networks called hydrogels that can regulate cell behavior. Specifically, he has developed photo-crosslinkable hybrid hydrogels that combine natural biomolecules with nanoparticles to regulate the chemical, biological, mechanical and electrical properties of gels. These functional scaffolds induce the differentiation of stem cells to desired cell types and direct the formation of vascularized heart or bone tissues. Since tissue function is highly dependent on architecture, he has also used microfabrication methods, such as microfluidics, photolithography, bioprinting, and molding, to regulate the architecture of these materials. He has employed these strategies to generate miniaturized tissues. To create tissue complexity, he has also developed directed assembly techniques to compile small tissue modules into larger constructs. It is anticipated that such approaches will lead to the development of next-generation regenerative therapeutics and biomedical devices.

Alireza Mani

## A Network Physiology Approach to Medicine: Lessons from Complex Diseases

- **Principal Lecturer, Division of Medicine, University College London, London, UK**

Reductionism, which considers involvement of distinct physiological components in the disease process has been the dominant approach in biomedical research in the last two centuries. Although such an approach has been fruitful in the development of therapy for simple disorders, it has failed to uncover the true mechanism of complex disorders such as sepsis, cirrhosis and multiple organ failure.

A network approach in medicine represents a shift from a reductionist approach and reveals the functional interactions between different components of physiological systems. This approach evaluates the degree of information transfer between organ systems rather than evaluating each physiological process separately. A network physiology approach has recently been applied to complex disorders such as sepsis and liver failure.

In this talk we will discuss the application of a network approach in evaluating functional connectivity of organ systems in complex disorders, demonstrating a significant degree of network disruption in organ systems in non-survivors. Network analysis of organ systems may provide insight in developing novel prognostic models and pave the way for addressing better ways to prevent and treat complex multifactorial disorders.

Antonio Abate

## Lead-free Perovskite Solar Cell: a Sustainable Photovoltaic

- **Helmholtz Center Berlin For Materials And Energy, Berlin, Germany**

Halide perovskites are revolutionising the field of solar energy, allowing to reach maximal energy production with cost-effective processing. However, the best performing and the more stable perovskite-based solar cells (PSCs) make use of lead, which can pollute the environment with dramatic health consequences. The regulation currently in force indicates that the lead content in PSCs is low enough to be safe or at least no more dangerous than other electronics also containing lead. In reality, the actual environmental impact of lead contamination from PSCs is unknown.
Here we show that the lead in halide perovskites can enter into plants, and consequently into the food cycle, ten times more effectively than standard lead-contaminated soil. We further demonstrate that replacing lead with tin represents an environmentally-safer option. While the lead risk in PSCs has been so far addressed referring to existing regulation, this work provides the first experimental evidence that we need to treat PSCs with exceptional care. Our data suggest that the safety level for lead content in PSCs needs to be lower than other lead-containing electronics and potential solutions are foreseen in completely replacing lead with more inert metals.

Antonio Condino-Neto

## Newborn Screening: an Ethical Dilemma

- **Professor of Experimental Medicine, Institute of Biomedical Sciences, University of São Paulo, São Paulo, Brazil**

Newborn screening has been implemented during the 60s – 70s decades in many countries in world. The major objective is the early detection of otherwise asymptomatic diseases at birth, which will evolve with a high morbidity and mortality rates, possible to treat and prevent. Newborn screening for severe combined immunodeficiency and agammaglobulinemia has been implemented universally in the United States and partially in Canada, some European countries and Brazil. The results are robust and show the change in the epidemiological profile of SCID worldwide. The costs and the possibility to extend newborn screening to several other diseases in the format of newborn exome analysis is an ethical dilemma requiring our attention.

Armin Arbabzadeh

## Current Strategies for Addressing the World's Leading Cause of Death: Coronary Artery Disease

- **Director of Cardiac Computed Tomography, Associate Professor of Medicine, Johns Hopkins University, Baltimore, USA**

Coronary artery disease is the leading cause of mortality worldwide. Starting as early as in adolescence, coronary artery disease is a chronic, systemic condition which may remain asymptomatic but may also cause a wide range of symptoms, clinical outcomes, and healthcare expenditure. The progression and adverse events from coronary artery disease can be mitigated or avoided with lifestyle and risk factor modifications, and medical therapy. With increasing effectiveness of prevention and medical therapy, the role of coronary artery revascularization has decreased and is largely confined to subgroups of patients with unacceptable angina, severe left ventricular systolic dysfunction, or high-risk coronary anatomy. There is a compelling need by all societies to allocate resources appropriately to improve both primary and secondary prevention and thus to curb morbidity, mortality, and rising healthcare expenditure from coronary artery disease.

Arutha Kulasinghe

## Spatial Profiling of the Tumour Microenvironment to Identify Biomarkers of Therapy Response

- **Peter Doherty NHMRC Research Fellow, Queensland University Of Technology (QUT), Australia**

Immune checkpoint inhibitors (ICI) have shown durable and long-term benefits in a subset of head and neck squamous cell carcinoma (HNSCC) patients. To identify patient-responders from non-responders, biomarkers are needed which are predictive of outcome to ICI therapy. Cues in the tumour microenvironment (TME) have been informative in understanding the tumour-immune contexture. In this study, the NanoString GemoMx™ Digital Spatial Profiling (DSP) technology was used to determine the immune marker and compartment specific measurements in a cohort of HNSCC tumours from patients receiving ICI therapy. Our data revealed that markers involved with immune cell infiltration (CD8 T-cells) were not predictive of outcome to ICI therapy. Rather, a number of immune cell types were found to correlate with progressive disease. This study, to our knowledge, represents the first spatial analysis of HNSCC tumours.

## Bahram Mobasher

## From the Origin of the Universe to the Origin of Life: The Latest Scientific Views

- **Professor of Physics and Astronomy, University of California Riverside, California, USA**

We are living in a unique time in the history of the humankind. Over the last few years, rapid developments in science and technology have allowed us to address the most fundamental questions that had occupied the greatest minds for centuries. At the largest scales, using the Hubble Space Telescope, we have taken the deepest images of the Universe ever seen by the humankind, we have discovered the most distant galaxies and know details about the origin, content and faith of our Universe. At the smallest scales, using electron microscopes, we have studied the atoms, molecules and the cells, all the building blocks of the world around us. Using our scientific discoveries, we can now elaborate about the origin of life, how it evolved and about our own position in the Universe. These questions are no longer in the domain of philosophy but one could seek scientific answers to them. This talk presents the state-of-the art knowledge about the origin of everything we observe in the nature. It covers the latest about the origin of the Universe, origin of matter and origin of galaxies, stars and planets. It further presents details about the origin of the chemical elements, origin of the Earth's atmosphere, oceans and minerals. Finally, it reviews the latest scenarios about the origin of life. It connects the largest and smallest scales and investigates the conditions that led to the creation of this world the way it is. We explore what would have happened if the Universe had started a different way. The talk would elevate you to a new understanding of the nature and answers questions (or create new ones) about our very existence. This could potentially change your views about the life and the world around you.

## Barry Schwartz

## Finding the Balance Between Freedom and Security

- **Professor of Social Theory and Social Action, Haas School of Business, U.C. Berkeley, USA**

During crises such as the COVID-19 pandemic, policymakers must often increase security at the cost of freedom.Behavioral science, however, has shown that the restriction of freedom may have strong negative consequences for human behavior and mental health. There is a tradeoff between freedom and security that people often do not want to acknlowledge. I suggest that behavioral science can inform policy both by elucidating some consequences of lost freedom and by illuminating strategies to address these consequences. I propose “SAFE” principles that can help policymakers to restore the freedom-security balance—by increasing the perceived value of gaining security; by framing security as an altruistic, moral value; by framing securityas“freedom /from/;/”/and by//encouraging freedom in other domains. Careful consideration of the psychology of freedom can help policymakers develop policies that most effectively promote public health and wellbeing.

Brian Lighthill

## Integrated Socratic Education...An Improved Paradigm

- **Actor, Television and Radio, Drama Producer/Director, Facilitator and Lecturer Round the UK to Learners in both an Academic Setting and in the Real-Life World**

In 2020, because of the Coronavirus pandemic, the modus operandi of our work-life has changed immeasurably, and unemployment has increased exponentially. I will argue that the workforce of tomorrow now, more than ever, need to become less **compartmentalized** and more reactive, adaptive, and creative.

My talk will focus on the '*Science* meets *Shakespeare*' programmes I designed for The University of Warwick's outreach department which involved academics from the Physics, Chemistry, Psychology, Law and Sociology faculties and the university's Medical School. I will explore how my own integrated epistemology could inform education practice so that the workforce of tomorrow are able to think outside the box and outside the silos of subject specificity - and thus are fit for this 'brave new world'.

I will conclude that as Educationalists we need to be open to a new paradigm which is based on integrated learning - and that we academics need to develop a mindset which can enable this paradigm to become a reality.

Chi Ming Lam

## Critical Rationalism

- **Associate Professor of Philosophy and Education, Department of International Education, Education University of Hong Kong, Hong Kong, China**

According to Karl Popper's critical rationalism, criticism is the only way we have of systematically detecting and learning from our mistakes so as to get nearer to the truth. Meanwhile, it is arguable that the emphasis of Confucianism on creating a hierarchical and harmonious society can easily lead to submission rather than opposition, producing a conformist rather than a critical mind. A question arises here as to whether Confucianism tends to denigrate criticism and thus run counter to critical rationalism. In this lecture, I first consider the political and educational implications of critical rationalism. Then I examine the connection between Confucianism and criticism, arguing that Confucianism prizes criticism and critical discussion. Indeed, criticism and critical discussion in Confucianism play two crucial roles in realizing benevolence (*ren*), which is the ultimate goal of optimizing learning and achieving harmony. On the one hand, criticism, in the form of reflection (*si*) on the knowledge accumulated during learning (*xue*) and on oneself, serves to optimize learning. On the other hand, critical discussion, interpreted as a collaborative undertaking among participants who show concern and accept responsibility for a matter of common interest, aims to achieve harmony in diversity. Finally, I compare Confucianism and critical rationalism, arguing that Confucianism is, to a certain extent, reconcilable with critical rationalism.

## Christopher Wlezien

## Public Policy in the News

- **Hogg Professor of Government, Department of Government, University of Texas at Austin, USA**

Accurate media coverage of public affairs is a critical feature of democratic governance. Indeed, it is impossible to imagine how large-scale representative democracy would work without sufficiently accurate and reliable media coverage of current affairs. It is of some significance, then, that we are in the midst of both public and scholarly debate about the nature and quality of media coverage in various countries. The current debate is fueled by selective exposure and motivated reasoning in an increasing high-choice media environment, alongside concerns about inaccurate information — or even mis-information — on a wide range of political and policy issues. The current climate is in some ways relatively unique, but the availability of inaccurate information is not one of those ways. There has always been variation in the quality and accuracy of media coverage, over time, across issues, and across media outlets. The goal of this research is to provide some context for current events — to capture and compare the accuracy of media coverage on a range of policy domains, over the past 40 years, in the United States. The project relies on automated content analysis of millions of newspaper articles, television programs, and social media communications relating to spending on defense, welfare, health, education, immigration and the environment, alongside measures of budgetary policy. Results highlight areas in which media coverage provides a remarkably accurate view of public policy and also areas in which media coverage has been systematically inaccurate — not just recently, but over an extended period of time.

Clara Vasconcelos

## Pandemics and Citizens' Need for a Holistic View of Planet Earth

- **Assistant Professor of Geosciences, Environment and Spatial Planning, The University of Porto, Porto, Portugal**

Coronavirus disease 2019 (COVID-19), lead to high rates of mortality and morbidity, devasting economic impacts and aggravated the already existing social inequalities. As such the sustainability on Earth is, once again, compromised and, this time, by an unexpected factor never before experimented: an uncontrolled virus that is changing our daily routines in a dramatic way. The emergence of this infectious disease reinforced citizens' need for a holist view of planet Earth, not only due to social and environmental changes but also reflected on the economic pillar that stands in Agenda 2030 of the United Nations for Sustainable Development. The different modes of infectious disease transmission known so far (contact, airborne, common vehicle like water or food, and vector-borne like insects or vermin), along with the also known consequences that climate change and the disruption of ecosystems have on the emergence of them highlight some of the different Earth sub-systems that can be involved in the process. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) origin seems to be related to an interaction within the biosphere that led to the transmission of the virus from animals to humans, followed by its spreading through contact (direct and indirect) and through air, therefore linking it to the atmosphere. The lockdown imposed in most cities following the outbreak has led to changes in societal behaviours, which, in turn, has had consequences on all other earth subsystems: the geosphere, with the reduction of coal and oil consumption; the hydrosphere, with reports in the improvement of water quality; and, again, the atmosphere, with a reduction of air pollution (reduction of traffic and gas emissions) and an improvement in air quality. However, not everything is positive: following the coronavirus outbreak, there has been a growing amount of unrecyclable waste and a rise in unemployment numbers, reflecting the economic and societal problems that can stem from the COVID-19. *The pandemic we are experiencing is the greatest proof of the holistic vision that we must have of the planet Earth and that individual ethical behaviour is the imperative solution for us to be able to continue to interact as a human community.*

Deepak Salunke

## Small Molecule Immune Potentiators Targeting TLRs for the Development of Novel Chemoimmunotherapy and Vaccine Adjuvants

- **Assistant Professor & Ramalingaswami Fellow (DBT), Department of Chemistry & Centre for Advanced Studies in Chemistry, Panjab University, Chandigarh, India**

Toll Like Receptors (TLRs) are the pattern recognition receptors (PRRs) of the innate immune system. They are activated upon specific recognition of pathogen associated molecular patterns (PAMPs) that are distinct to the pathogen, providing immediate defence mediated by a variety of effector mechanisms including the production of proinflammatory cytokines, up-regulation of major histocompatibility complex (MHC) molecules, and costimulatory signals in antigen-presenting cells (APCs), as well as the activation of natural killer (NK) cells. So far, 13 TLRs are reported out of which 10 are found to be functional in humans. Among all human TLRs, TLR7/8 which express on the surface of endosomes, have been widely explored as a promising target for drug discovery. A robust humoral and cellular immunity, including both CD4 and CD8 responses are required for complete elimination of intracellular organisms and TLR7/8 ligands have potential to provide the desired immune activation. Several small molecule synthetic heterocycles are known to specifically activate TLR7 and/or TLR8 or having dual TLR7/8 agonistic activity. Synthetic small molecule TLR7/8 agonists such as Imiquimod, Resiquimod, Gardiquimod, CL075, CL097, loxoribine and TL8-506 are commercially available and further detailed structure activity relationship (SAR) studies have resulted in additional active analogs. It was quite evident from the SAR studies that a very limited chemotypes with specific structural features are known to activate TLR7/8 and few selective and potent TLR7 or TLR8 agonists are reported in the literature. It was also evident that small structural modifications result in variable TLR7/8 activation with differential cytokine/chemokine profiling. Our recent findings towards the discovery of novel TLR7/8 agonistic small molecules, process optimization of lead molecules as well as efforts towards their formulation to minimize the potential hazards will be described along with their application as potent immunochemotherapeutic agent against murine malaria and potent adjuvantic activity when used in vaccines against Malaria as well as Influenza.

Delfín Ortega-Sánchez

## Deconstructing Hate Speech in Social Science Teaching: Theoretical and Methodological Bases for Democratic Citizenship Education

- **Professor of Teaching of History and Geography, University of Burgos, Spain**

Cognitivists, sociologists, and anthropologists have been arguing about the direct influence of emotions and feelings on the perception of social reality, on its future projection, on communication, on personal decision-making, on creativity or on the value system. One of the most recognizable spaces in the construction of speech about perceived social reality and in the acquisition of informal learning are social networks.

Educational programs need to incorporate these digital social speeches, particularly those that generate hatred, work with them, and provide the necessary tools to counteract them with democratic values, human rights, and the principles of social justice.

In this lecture, we will address the theoretical and methodological bases of the construction and deconstruction of digital social discourses on socially alive issues from the principles of education for critical global citizenship.

Dena Bahmani

## The Social Brain: From Emotion Recognition to Social Behavior


- **Departments of Physical Therapy, University of Alabama at Birmingham, Birmingham, AL, USA**
- **University of Basel, Psychiatric Clinics (UPK), Center of Affective, Stress and Sleep Disorders (ZASS), Basel, Switzerland**


The evolution of the complex and extraordinary sized human brain initiated the social brain hypothesis. Researchers in the field of social neuroscience attempt to explain the cognitive dynamics of expressing and perceiving social behaviors. In addition, studies in both nonhuman primates and humans indicated the role of emotional expression and emotion recognition in social contexts. This presentation is focused on the interlinked concepts of the social brain and emotion recognition in humans' social life.

Derya Yılmaz

## Archaeology to Society: Journey to the Past of Humanity

- Assistant Professor, Ankara University, Faculty of Languages, History, and Geography, Archaeology Department, Protohistory and Near Eastern Archaeology, Ankara, Turkey

The relationships between archaeology and society constitute some of the most important areas of practicing archaeology at the beginning of the 21st century. Because of advances in methods and theory, archaeology now addresses issues central to debates in the social sciences from the point of human history.

The archaeological past is represented featured a significant element of archaeology's relationship with society. These are issues connected to the past, for example, reconstructions, or archaeological festivals, Archaeology and the new media, open-air exhibitions, and historical reenactment, etc.. Archaeological Festivals currently fulfill a significant role in the activities connected to the dissemination of knowledge of the past. Museum educational activities program for child and adult. Archaeological Festivals currently fulfill a significant role in the activities connected to the dissemination of knowledge of the past. A revival of an archaeological event such as Battle of Kadesh of computer games is the other social approaching. The main purpose here to inform society about archaeological discoveries. While making this information a variety of virtual or real applications, even applied instruments are used. The best way to apply an archaeological production to the society is to produce the modern imitation of the archaeological work using old production methods. For example, ceramic, bone tool, metal casting, stone tool production. There are many realities in human history proven with the help of archaeological sciences. This information gives information about the extraordinary adventure of human life. While transferring the discovery of mysterious information to society creates great excitement it will open new horizons for archeology to society. Multiscalar archaeological studies around the world help understanding of the past for modern humans. Archaeologists focus on creating a new approach to illustrate the past established a new relationship with modern society. For example, Göbeklitepe excavation shows all human how the oldest human occupation before agricultural purposes. K. Schmidt used many media arguments to create knowledge about Göbeklitepe in society. Consequently, the project managed to reach the whole society.

As a result, archeology plays an important role in the transfer of ancient knowledge into modern society. Archaeological studies which are focused on human provides a unique perspective on long-term changes in human societies. These documentations also effect as a mirror to the origin of today's modern human. In other words, archeology, the memory of humanity, transfers this information to the modern society using some methods and completes its social mission as a social science. Because of the nature of science, this circulation continues throughout the history of humans. Making a journey to the past of humanity, connects archaeology to society.

## Dongrui Wu

## Machine Learning in Brain-Computer Interfaces

- **PhD of Electrical Engineering, University of Southern California, Los Angeles, USA**

A brain-computer interface (BCI) enables a user to communicate with a computer directly using brain signals. Electroencephalograms (EEGs) used in BCIs are weak, easily contaminated by interference and noise, non-stationary for the same subject, and varying across different subjects and sessions. Thus, sophisticated machine learning approaches are needed for accurate and reliable EEG-based BCIs. This talk will introduce the basic concepts of BCIs, review the latest progress, and describe several newly proposed machine learning approaches for BCIs.

Eftekhar Eftekharpour

## Identification of Novel Mechanisms of Neuronal Cell Death in Alzheimer's Disease Offers New Hopes for Novel Therapies.

- **Associate Professor, Department of Physiology and Pathophysiology, Regenerative Medicine Program & Spinal Cord Research Centre, Canada**

Despite decades of research in the field of neurodegenerative diseases, numerous clinical trials have not resulted in any tangible clinical improvements. Alzheimer's Disease (AD) is the most common form of these diseases and is identified by the loss of neurons in regions of the brain than control memory and emotion. AD is quickly becoming a health crisis in developing countries. Although 5-10% of cases are related to hereditary factors, the cause for targeted loss of neurons in majority of cases remains a controversial topic. AD is identified by two major microscopical features: extracellular amyloid plaques, also known as senile plaques (SP), and intracellular neurofibrillary tangles (NFT). Targeting SP as a therapeutic approach has been extensively researched with only disappointing results. Attempts in preventing of NFT are a more recent trend in AD therapy with some promising results. Other pathological features of AD include excessive oxidative stress and interruption of survival mechanisms.

Over the last few years, AD has been identified as a laminopathy disease, a group of diseases that are identified by damage to nuclear lamina. Nuclear lamina is a proteinous layer at the interface between nuclear envelope and cellular DNA. Damage to the nuclear lamina is shown to cause robust changes in nuclear architecture and gene expression that contributes to AD pathology. Our research has identified molecular players in induction of nuclear lamina damage that can be used for therapeutic approaches.

**Learning Objectives**: This lecture will cover the current trends in AD treatment and will discuss the molecular players that cause neuronal damage. We will present novel morphological and molecular evidences on how nuclear lamina damage affects the downstream signaling and present potential pharmacological treatments for reversing the damage.

Ekaterini Simoes Goudouris

## The Importance of the Education in Sciences

- **Professor of Pediatrics, Allergy and Clinical Immunology, Faculty of Medicine, Universidade Federal do Rio de Janeiro, Brazil**

The pandemic of the new coronavirus takes place in the information age, which started with the digital revolution. We receive, scientific community and the general population, a huge amount of information daily, both through the mainstream media and through open access scientific manuscripts, many of which are released in versions without peer review. A number of problems stemmed from this enormous contact with practically real-time information, for example: searching for medicines before their efficacy and safety are confirmed, establishment of treatment protocols by public authorities using many drugs without proof of efficacy, inadequate use of laboratory tests, particularly point-of-care tests and serological tests for SARS-CoV-2, and dissemination of fake news on social networks.

In addition, it is clear that there is a predominance of scientific publications from developed countries, not only related to COVID-19.

At the heart of these issues seems to be the insufficiency of science education with consequent ignorance of the scientific method, procedures and steps of scientific research by the general population.

Science education has significant social relevance, is a cornerstone for the development of the scientific mind, of critical thinking, relevant to the full exercise of citizenship and development of research.

Elias C. Aifantis

## Mathematical Models for COVID-19; Gradients, Singularities and Interatomic Potentials: From Nanomaterials to Tissues and Cells

- **Professor of Mechanics, Department of Civil Engineering, Aristotle University, Thessaloniki, Greece**

The presentation is a preliminary effort to address questions on COVID-19 issues through mathematical models earlier advanced by the second author and his co-workers for reaction-diffusion processes under the influence of an external bias. Various techniques used on stability theory/pattern formation, fractional/fractal analysis, as well as nano-chemo-mechanics and Tsallis q-statistics are employed. Their applicability is exploring inception and spreading of COVID-19 in individuals and populations is discussed.

Federico Bella

## Photovoltaics and Energy Storage Challenges from 2020

- **Associate Professor of Chemistry, Institute of Chemistry, Department of Applied Science and Technology – DISAT, Torino, Italy**

The stability of energy devices is a critical (but often disregarded) issue, since great focus is often devoted to the efficiency records (even if these values rapidly decrease upon time). However, today's research in the energy field must be connected to concepts such as long-term stability, safety and environmental impact.
In this seminar, light-induced photopolymerization/curing processes and water-based approaches will be shown for the design and straightforward preparation of polymeric components for different energy devices (both storage and conversion). Photopolymerization represents a very attractive technique to this purpose, since it does not require solvents, catalysts, thermal treatments and purification steps.
The seminar will consider the following concepts in the renewable energy field:
The design of stable cell components for lithium and post-Li batteries;
The transition towards aqueous photovoltaics.
The use of photopolymers in frontier applications of energy devices, i.e. in floating units and in integrated systems.
Solar fuels from emerging conversion technologies.
The importance of considering stability and industrial scalability as main target in the research work will be stressed, along with a real consideration of efficiency results presented in the literature.

Francisco J. Barba

## Aquaculture Side Streams as Source of Nutrients and Antioxidant Bioactive Compounds

- **Professor Of Nutrition, Food Science And Technology, Faculty Of Pharmacy, University Of Valencia, Spain**

Currently there is a growing society´ demand for proteins and antioxidant compounds. That is why there is an increase in the number of studies carried out both by the scientific community and industries (food, pharmaceutical, cosmetic, etc.) regarding new natural sources alternatives to those already existing. In this sense, *Aquaculture Side Streams* represent a very interesting material since they are produced in large quantities and in many cases are wasted without giving them added value. Likewise, there is also great interest in the use of alternative extraction technologies, green and sustainable with the environment that can reduce the consumption of solvents, which in many cases are toxic, the use of high temperatures that can degrade thermolabile compounds and reduce extraction time. In this sense, the use of techniques such as fermentation assisted by lactic acid bacteria and innovative technologies such as pulsed electric fields (PEF) and accelerated solvent extraction (ASE) are shown to be promising technologies to favor an improved and green extraction of proteins, as well as amino acids (essential and non-essential) as well as antioxidant compounds present in *Aquaculture Side Streams*. So, in this presentation the use of the extraction techniques mentioned above to recover proteins and antioxidant compounds from *Aquaculture Side Streams* will be discussed.

Frank Selke

## Extracellular Vesicles for the Treatment of Inoperable Heart disease: A Future Option or Another Regenerative Failure?

- **Karlson Professor and Chief of Cardiothoracic Surgery and Director of the Cardiovascular Institute at the Alpert Medical School of Brown University and Lifespan Hospitals, USA**

Most regenerative cardiac therapies have not been effective. Mesenchymal stem cells (MSC) are considered to be a promising approach to treatment of ischemic heart disease. More recently non-cellular based approaches of treatment with MSC-derived extracellular vesicles (EVs) that contain miRNAs and proteins appear to be a novel approach that may allow an "off the shelf" approach. In this study, we used a swine model of chronic myocardial ischemia to evaluate the efficacy of treatment by both intramyocardial (IM) and intravenous (IV) injection of extracellular vesicles.

**Methods:** Male Yorkshire swine underwent placement of an ameroid constrictor on the left circumflex artery at age 11 weeks to induce chronic myocardial ischemia. They were then divided into a normal diet or high fat fed group. Pigs underwent intramuscular or intravenous injection of MSC-derived EV's into the chronically ischemic myocardium two weeks after the placement of the ameroid constrictor. Animals underwent euthanasia five weeks after either treatment with the IM or IV extracellular vesicles, or no treatment, and ischemic myocardium was harvested for blood flow, vascular density and cell signaling analysis.

**Results:** In the normal diet pigs, the injection of EVs improved blood flow and increased vascular density to the chronically ischemic myocardium in the IM group but not the IV group, despite an increase in angiogenic signaling in both groups. The injection EVs was associated with decreased expression of DLL-4, troponin T, α-actinin and GATA-6 in the ischemic myocardium of the IM EV group compared to the control group. Administration of EVs was associated with an increase in IL-6 in the ischemic myocardium compared to the control group. In the high fat fed pigs, a similar increase in myocardial perfusion, increased vascular density and improved pro-angiogenic signaling was observed as in the normal diet pigs, but the response was less robust. EVs are thought to contain miRNAs such as miRNA-125, which downregulate inhibitors of angiogenesis such as DLL-4. Upregulation of IL-6 in the EV-treated group suggests anti-inflammatory and pro-myokine function. The decreased levels of GATA-6 and α-actinin seen in the treated group suggest attenuation of overactive repair mechanisms to chronic myocardial ischemia which would otherwise result in hypertrophy. Furthermore, modulation of the PI3K/Akt pathway resulted in decreased caspase 3 activation of both groups, suggesting decreased apoptosis. Both IV and IM injection of EVs resulted in attenuation of apoptosis, suggesting a beneficial effect in both treatments.

**Conclusions:** The IM injection but not the IV injection of EVs appears to have a beneficial effect on chronically ischemic myocardium in both normal diet and high fat fed pigs. Our findings suggest that improvement in EV-treated ischemic myocardium occurs via an increase in angiogenic response, a reduction in inflammation and by decreased expression of DLL-4 that induces endothelial sprouting and increased blood flow in myocardial ischemia. Whether the injection of EVs will be an effective method to treat patients with ischemic heart disease will only be determined after multiple clinical trials.

## Hadi Shafiee

## Mobile Health Diagnostics

- **Assistant Professor of Medicine, Division of Engineering in Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, USA**

The advances in micro- and nano-technologies and the surge in consumer electronics have paved a solid foundation for developing mobile health (mhealth) technologies with the potential to transform the current paradigm in global health. Dr. Shafiee's laboratory strives to develop mHealth diagnostics and solve unmet medical problems through bioengineering approaches and utilizing the advances in consumer electronics such as cellphones, nanoscale/microscale materials, and computer programing particularly artificial intelligence (AI). mHealth technologies offer novel approaches to diagnose, track, and control diseases including infectious diseases, cancer, and infertility in both resource-rich and resource-poor settings. In this talk, Dr. Shafiee will present examples of how smartphones can be seamlessly integrated with hardware, software, microfluidics, and nanotechnology to develop point-of-care diagnostic devices to address clinical gaps in the management of infectious diseases and infertility.

Amirali Hamidieh

## Stem Cell to Society

- **Pediatric Cell Therapy Research Center, Tehran University of Medical Sciences, Tehran, Iran**

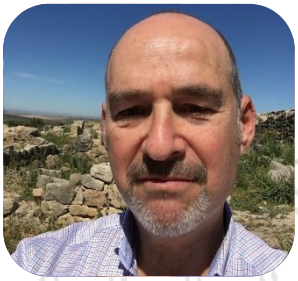
Stem cell sciences and technologies have revolutionized medicine and the approach to many serious and hard-to-cure diseases. Recognized as a multidisciplinary area of science, stem cell and regenerative medicine (SCRM), have brought the scientists and researchers of different branches of basic medical sciences as well as mathematical and technical sciences together to achieve a breakthrough in unmet medical needs. In recent years and with the advent of novel technologies in cell and tissue engineering, a robust platform for the development of more effective treatments has been implemented. Hence, it is not far from expectation that this converging field of science and technology would be able to offer curative keys not only for malignancies, inherited disorders and chronic debilitating diseases, but also for unforeseen health problems that have challenged the human societies, such as the current COVID-19 outbreak. It is of note that since the onset of SARS-CoV2 pandemic, numerous cell-based therapies have been trialed, and some provided promising results. In another view and considering the rapid population ageing in the forthcoming decades, many societies will require the solutions the SCRM would develop and deliver. During the recent years, more and more cell- and tissue-based therapies have been approved to enter into the pharmaceutical market. Hence and by creating additional values to science, health, economy and society, it is projected that the SCRM market size would grow at 26% CAGR through 2030 worthing170 billion dollars by then. Among Islamic countries, Iran has a unique position and is a leading country in the field of SCRM. This may not have been achieved without disseminating this knowledge among students at different levels of education from high school to post-doctoral fellows. The SCRM Olympiads for high school students and undergrad university students have been fruitful in training and motivating the next generation of scientists in this field. Moreover, with fundraising and provision of financial support for SCRM projects, the Iranian Council for Development of Stem Cell Sciences and Technologies, has paved the way for imminent advancements and progresses. With over 100 companies, 50 academic institutions and over 1000 researchers around the country actively involved in this field of science, a brighter future is conceivable for further successes of Iran.

Igor Grossmann

## Deconstructing Wisdom for the Post-Pandemic World

• **Associate Professor of Psychology, University of Waterloo, Waterloo, Ontario, Canada**

As the world is fighting through a devastating pandemic, many people wonder about wisdom and resilience needed to manage the uncertainty, and preparing for the post-pandemic future. Yet, what exactly is wisdom? Long though to the theme in philosophy and religious studies, behavioral scientists recently made fundamental advances toward decomposing this ancient construct and equipping it with modern measurement tools. In the present talk, I will discuss such recent advances, with an eye for the challenges the science of wisdom is facing, as well as evidence-based insights for fostering wisdom-related characteristics in daily live.



Jeff Scheuer

## Science and Citizenship

Science and citizenship are complex concepts, but they are deeply interconnected on a number of levels. Citizenship is essentially triangular: a system of community that includes political, cultural, and economic dimensions. We equate science with the STEM disciplines, but it is also integral to the liberal arts, and the purpose of a liberal arts education is to prepare students for all three forms of citizenship. Science is unique in some ways, as a mode of learning, but it is also connected to other ways of learning that require rational analysis, fact-gathering, and reasoned debate. Citizens need to be science-literate and technology literate, but must also avoid scientism: the idea that science has primacy over other forms of learning, or that the products of technology are uniquely valuable. Scientists who understand their public role, and citizens who understand the importance and limits of science, are essential for a robust democratic community.

John M. Pawelek

## Macrophage-Cancer Cell Fusion and Hybridization: The Driving Force in Solid Tumor Metastasis

- **Senior Research Scientist, Department of Dermatology and the Yale Comprehensive Cancer Center, Yale University School of Medicine, New Haven, Connecticut, USA**

According to estimates from the International Agency for Research on Cancer, by the year 2030 there will be 22 million new cancer cases and 13 million deaths per year. The main cause of cancer mortality is not the primary tumor itself but metastasis to distant organs and tissues. Macrophage–cancer cell fusion and hybrid formation as an initiator of metastasis was proposed more than a century ago by the German gynecologist Prof. Otto Aichel. This proposal has since been confirmed in many animal models and more recently by us in two patients with renal cell carcinoma and three patients with malignant melanoma. Leukocyte–tumor cell fusion provides a unifying explanation for metastasis. While primary tumors arise in a wide variety of tissues representing not a single disease but many different diseases, metastatic cancer may be only one disease arising from a common, non-mutational event: fusion of primary tumor cells with leukocytes. From the findings to date, it would appear that such hybrid formation is a major pathway for metastasis. Studies on the mechanisms involved could uncover new targets for therapeutic intervention.

Joseph Garske

## Globalization and the Pandemic of Human Obesity: Finding the Legal Reason for a Symptom of Cultural Declinea

- **Chairman at The Global Conversation, Florence Area, Italy**

One obvious trend in human health and disease occurring in the global age is the growing worldwide incidence of morbid obesity. There are many ways to understand this phenomenon, including to view it as a symptom of cultural decline. Specifically, it may be understood as a crisis resulting from the abnegation of traditional cultures by a developing mode of legal rule that works to impose a single transcendent order on all persons and things in all regions of the earth.

This paper describes traditional culture as cultivation in thought, word, and deed, with the end of personal self-control, self-reliance, and resourcefulness, and as a basis of harmony within family and locality. Such traditions invariably teach respect for the products of nature and a knowledge of their usefulness for purposes of medication and nutrition in accord with local topography and climate.

By contrast, a global way of life is coming to prevail that acts upon nature by scientific principles and that orchestrates human life by technological mediation—with both these methods regulated under the authority of law. Although the new legal regimen derives from a convergence of Anglophone and Civilian legal practice, its Civil aspect is gradually being subsumed within an Anglicized fellowship that is guided by distinct collegial purposes and underlying material values.

As this method of legal rule becomes the unitary arbiter in all aspects of global life, its underlying values and purposes displace the influence of local culture and tradition in the various regions, as it also becomes the final determinant in patterns of human nutrition and health.

This paper attempts to explain how characteristic patterns that distinguish the Anglophone mode of law do not provide the benefits of traditional enculturation. It discusses how a concentrated regime of material values, when applied by force, work in adversarial relation to such traditions. It examines how the corporatizing of labor, atomizing of families, individuation of persons, and the immersive atmosphere of electronically transmitted sound and image can be employed in ways that are fatal to the indigenous—and can ultimately lead to a pathology of food production, distribution, and consumption. It will explain how the worldwide crisis of human obesity can be understood as a global symptom of cultural decline.

Juan Carlos Aldave Becerra

## Strategies in Medical Education for Basic and Clinical Sciences

- **Professor of Allergy and Immunology, Hospital Nacional Edgardo Rebagliati Martins, Lima, Peru**

Innovative resources in medical education are essential to improve learning. I am pleased to share with the audience our experience and knowledge on didactic strategies to teach Immunology, a complex basic/clinical science, to physicians, students, and the general community in a developing country.

Julie B. Ealy

## Three Molecules, a Protein, and Binding Affinity

• **Associate Professor of Chemistry, Penn State Lehigh Valley, Pennsylvania, USA**

The precursor of FAD and FMN, co-factors for enzymes involved in energy metabolism, is riboflavin. Riboflavin binding protein is specific for transporting riboflavin from the human mother to the fetus during pregnancy. Elevation of riboflavin binding protein (RBP) has been associated with breast cancer in women, thus it might be a good biomarker to detect early breast cancer. Riboflavin binding protein (RBP) antisera has been observed to cause riboflavin depletion in the human cervical cancer cell line (HeLa). This observation suggests that RBP can be a point of intervention for therapeutic drugs against cancer. Because RBP has been implicated in cancer, researchers have been striving to develop new cancer drugs for RBP. It is important to ascertain the binding affinity of small molecules that could be used to develop a model for drug development. Binding affinity is the result of the ionic and intermolecular interactions between a ligand and a protein. The strength of the interactions is measured by the concentration of free and associated species at equilibrium. Fluorescence spectrometry, isothermal calorimetry, and computational chemistry were used to assess the binding affinity of three flavins – riboflavin (vitamin $B_2$), flavin adenine dinucleotide (FAD), and flavin mononucleotide (FMN) - with chicken egg white riboflavin binding protein (RBP). Computational chemistry was used to calculate the estimated binding energy of the flavins with human folate receptor beta (HFRB, 4kmy.pdb).

Karolina Żyniewcz

## Triple Foreignness of Artist and Ethnographer Involved in Biotechnology – the Problem of Status in Liminal Cognitive Practices

- **PhD of Nature-Culture Program, Artes Liberales Faculty, University of Warsaw, Poland**

Liminal practices, combining many different methodologies derived from different fields, are fruitful as cognitive strategies but they can also be complicated. One of the main problems is the uncertainty about the identity of the artist - researcher. Double foreignness is characteristic for field work in general. There is being a stranger in the research area. The feeling of being a stranger is an individual thing but also the result of interaction with people being confused about who is actually the person next to them. This is the first kind of foreignness. This second aspect appears when the research has to be confronted with the academic environment organized in a certain order. The foreignness can be multiplied in case of a person being a researcher and an artist at the same moment. There is still a problem with the perception of liminal practitioners. An artist doing ethnography in scientific laboratories is somehow out of context. This is why it is hard to explain why production of art is based on science while it is even harder to convince the academic environment about le legitimacy of this field work. It is an open question if these kinds of issues can be resolved in the future or maybe they are an integral component of this complex cognitive processes. What should be changed in the academic area to make this kind of activity more comprehensible and accepted?

Kiarash Aramesh

## The Danger of Pseudoscience and Science Denialism to Society

- **Assistant Professor of Biology and Health Sciences, College of Science and Health Professions, Edinboro, USA**

Over the past decades, scientific achievements have been accompanied by the waves of various types of pseudoscience and science denialism. Some events, such as the current COVID-19 pandemic, have caused surges of such claims. Pseudoscience and science denialism are factually false and misleading. They defy and violate the ethical standards of science and the scientific community. In addition, they are incredibly harmful and dangerous for society.

For example, in the realm of clinical medicine, pseudoscientific treatments may impose a financial burden on the patients and their families. Also, health pseudoscience imposes health risks such as the side effects of unproven remedies and unsafe interventions. In addition, it may cause a dangerous delay in necessary treatment. At the same time, it promulgates false beliefs about health and disease in society.

In many cases, pseudoscience and science denialism are promoted or inspired by political ideologies and interests, which shapes a notorious version of biopolitics in the realm of health sciences.

Although a clear set of demarcation criteria for distinguishing science from pseudoscience have not been agreed upon yet, the difference between these two entities is evident beyond the grey zones. Approaches such as relying on the scientific attitude, valid methodology, and working within the scientific community have been proved to be helpful in dealing with the demarcation problem. Therefore, in most cases, pseudoscience and science denialism are distinguishable and, at the same time, dangerous and potentially harmful.

Ethical principles such as scientific validity and social value, virtues such as honesty and care, and case-based approaches adopted by the oversight institutions are parts of an ethical framework to address the problem of pseudoscience and science denialism in the scientific community and the society at large.

This paper concludes that dealing with the problems of pseudoscience and science denialism is an ethical duty for the activists and leaders of both the scientific community and civil society. Accordingly, a significant part of ethical oversight and monitoring of scientific activities needs to be concerned with the problems of pseudoscience and science denialism.

Anne-Frédérique Naviaux

## Pediatric Obesity, Addiction and Family Dynamics: Concept of Co-Obesity

- **Consultant Psychiatrist and Child Psychiatrist, Community Mental Health Centre, Wexford, Ireland**

**Background:** The obesity epidemic has been a crucial health concern over the past few decades. Multiple contributing factors have been identified at various levels: genetic, biological, environmental, social, economic etc. In many ways obesity presents some similarities with substance dependence and abuse. The term “co-dependency” originates from the realm of addiction. Co-dependency mechanisms can also appear between parents and children and enable obesity.

**Methods**: Between January 2020 and May 2020, a literature search based on electronic bibliographic databases as well as other sources of information (grey literature) was conducted in order to investigate the most recent data on obesity, addiction and co-dependencies. Some clinical examples of these concepts applied to everyday life were chosen to illustrate how they are all linked together, especially in terms of familial co-obesity (between children and parents).

**Results :** Many studies link obesity and addiction, even though, the Diagnostic and Statistical Manual of Mental Disorders (DSM) does not list obesity as a psychiatric disorder. Both obesity and addiction share a common neural basis and use the same reward pathways which has been described and studied through many works. Dopamine certainly plays an important part in that system. Pediatric obesity is particularly worrying but might offer an opportunity for intervention, and once tackled, reduce the severity of adult obesity. Working with children, means working with families, and investigating intra-familial contributing dynamics. The concept of co-obesity emerged from the addiction model applied to pediatric obesity. Clinical examples illustrate an integrative biopsychosocial model of parent-child co-dependencies in obesity.

**Conclusion:** Co-obesity often emerges from great altruism, tolerance towards inappropriate and maladaptive behaviors and emotions that are difficult to manage. A new and promising model of intervention is developed, based on addiction techniques (withdrawal/abstinence) associated to behavioral strategies (distraction, alternative behaviors, distress tolerance, trigger avoidance and stress lessening).

Livio Luongo

## New Targets in Neuropathic Pain Management

- **Department of Experimental Medicine, Università della Campania "L. Vanvitelli, Italy**

Chronic pain such as neuropathic pain, osteoarthritic pain, or abnormal pain associated with neurological diseases represents a debilitating condition which strongly affects the quality of life of patients The mechanisms at the basis of the induction and maintenance of chronic pain are still poorly understood. Thus, an appropriate therapy for chronic pain is not yet available and there are many failures in treatments.

Recent evidence suggests a role for central and peripheral immune cells (microglia, macrophages, astrocytes, mast cells, and T-cells) in the initiation of peripheral and central sensitization. They mediate the plastic changes occurring within pain pathways that result in sensory dysfunctions and behavioural correlates, such as thermal/mechanical hyperalgesia and tactile allodynia. Because of the complex molecular and cellular mechanisms involved in the neuropathic pain induction and maintenance, several mediators have been demonstrated to be crucial in its induction and maintenance in the last years. Historically the NMDA receptor for glutamate has been deeply investigated for the spinal wind-up occurring in the establishment of tactile allodynia. More recent data suggest a role for lipid-mediated pathways such as sphingosine-1-phosphate or endocannabinoid systems in the modulation of spinal and supraspinal events associated with peripheral neuropathy. Novel data suggest a role also for ketone body receptor HCAR2 in neuropathic pain. In conclusion, further efforts are needed in order to better understand the molecular and cellular mechanisms at the basis of neuropathic pain and for discovering new molecular targets.

Louise Mackenzie

## Sharing Space: Interdisciplinary Approaches Beyond STEM and STEAM

- **Independent Artist and Researcher, Newcastle, UK**

STEM and STEAM have become pedagogical buzzwords, advancing an interdisciplinary approach to education. The application of STEAM approaches varies widely and is often influenced by institutional funding models that seek 'educational competititiveness' (Colucci-Gray et al. 2019, 3). To this end, the 'Art' in STEAM is sometimes seen as an instrumental or transactional lever in progressing STEM goals. Drawing upon three personal examples of interdisciplinary practice: an artist-led public workshop, an interdisciplinary project primer and the development of an interdisciplinary teaching module, I will reflect upon a pedagogical approach that values knowledge generation through art practice and as such, offers space for disciplines to think beyond educational models that are limited by drivers such as competition and progress

Lucina Qazi Uddin

## Brain Dynamics and Flexible Behaviors

- **Associate Professor and Director of Brain Connectivity and Cognition Laboratory, Department of Psychology, University of Miami, USA**

Executive control processes and flexible behaviors rely on the integrity of, and dynamic interactions between, several core large-scale brain networks. The right insular cortex is a critical component of a salience/midcingulo-insular network that is thought to mediate interactions between brain networks involved in externally oriented (central executive/lateral frontoparietal network) and internally oriented (default mode/medial frontoparietal network) processes. How these brain systems reconfigure with development is a critical question for cognitive neuroscience, with implications for neurodevelopmental pathologies affecting brain connectivity. I will describe studies examining how brain network dynamics support flexible behaviors in typical and atypical development, presenting evidence suggesting a unique role for the dorsal anterior insular from studies of meta-analytic connectivity modeling, dynamic functional connectivity, and structural connectivity. These findings from adults, typically developing children, and children with autism suggest that structural and functional maturation of insular pathways is a critical component of the process by which human brain networks mature to support complex, flexible cognitive processes throughout the lifespan.

MohammadMahdi Hasani Sadrabadi

## Immunobioengineering in Therapy and Regeneration

- **Assistant Project Scientist (Research Faculty), Department of Bioengineering, Henry Samueli School of Engineering, University of California, Los Angeles, USA**

The unique properties of immune cells have inspired many efforts in engineering advanced biomaterials capable of mimicking their behaviors and tuning their function in cancers and infectious diseases. However, an inclusive model capable of mimicking immune cells in different situations remains lacking. Such models can provide invaluable data for understanding immune–biomaterial crosstalk. Inspired by T cells, polymeric microparticles with physicochemical properties similar to naïve and active T cells are engineered. These artificial cells are able to engage with natural immune cells, release and/or "produce" cytokines upon external stimulation, and as a result, fine-tune the immune response *in vitro* and *in vivo*. This biomimicry model not only enables the optimization of design parameters required for engineering more efficient therapeutic carriers to alter immunity against cancers and infectious diseases but also can serve as a potent replica for understanding the mechanical behavior of immune cells.

Majid Ebrahimi Warkiani

## Micro/Nano-engineered Systems for Biomedical Research

- **Associate Professor, School of Biomedical Engineering, University of Technology Sydney, Australia**

Microfluidics, a technology characterized by the engineered manipulation of fluids at the micro-scale, has shown considerable promise in point-of-care diagnostics and clinical research. Microfluidic platforms are creating powerful tools for cell biologists to control the complete cellular microenvironment, leading to new questions and new discoveries. By simply miniaturizing macroscopic systems and taking advantage of the possibility of massive parallel processing, some microfluidic chips enable high-throughput biological experiments such as cell sorting, single cell analysis, PCR, ELISA and chromatography.

Over the past 10 years, my group has developed several microfluidic systems, which are translated into practice. In this seminar, I will describe our recent efforts in development of new **Microfluidic** systems using 3D printing and microfabrication for various biological research applications. I will showcase our novel systems for high-throughput rare cell sorting (e.g., circulating tumour cells (CTCs), circulating fetal cells, and circulating stem cells) and their clinical utilities. I will present some of our efforts for large-scale manufacturing and enrichment of hybridoma cells inside perfusion bioreactors for drug development and therapeutic applications. In addition, I will present some of our new 2D and 3D microfluidics systems for single cell analysis, stem cell research and drug screening.

Manoj Gupta

## Recent Pursuits to Lightweight the Magnesium for Mitigating Environmental Damage

- **Former Head of Materials, Division of the Mechanical Engineering, Department and Director designate of Materials Science and Engineering Initiative at NUS, Singapore**

Most common sources of energy for movable devices are fossil fuels. Fossil fuels on burning releases greenhouse gases that lead to global warming leading to ever increasing catastrophic events across the planet earth. To mitigate this damage, one of the solution is to use nutritional magnesium element in engineering applications specially the transport sector. Magnesium is sustainable and non-toxic unlike aluminum and at the same time about 33% lighter than aluminum. Hence replacement of aluminum based materials with magnesium based materials is the first logical step. In order to further alleviate the 'weight' problem of movable devices which has a direct relationship with 'greenhouse gas emissions', it is prudent to further lightweight magnesium based materials so that they also become capable to replace plastics which are another nuisance for all the living beings on our planet. Accordingly, the prime focus of this paper/presentation will be to highlight some of the approaches we are pursuing to lightweight the lightest metallic element that can be safely used for load bearing applications with a single focus to improve the health of our planet.

Mehdi Farokhnia

## Medication Development for Drug Addiction: Novel Gut-Brain Neuroendocrine Targets

- **Staff Scientist, CPN, NIDA IRP and NIAAA DICBR, National Health Institute (NIH), USA**

Despite the high prevalence of alcohol and substance disorders and considerable medical, psychosocial, and economic burden associated with these conditions, pharmacological treatments for drug addiction are limited in number and efficacy. While most of the research in this regard has been focused on central neurobiological targets and mechanisms involved in addiction, there is growing interest in understanding the role of peripheral/modulatory pathways (e.g., endocrine system, immune factors, gut microbiome) and their potential as novel therapeutic targets. Among addictive drugs of abuse, alcohol has some unique characteristics, as it not only exerts pharmacological actions in the central nervous system and the periphery, but also has palatable properties and is a direct source of calories. In fact, previous research indicates considerable overlap between biological processes involved in food craving, intake, and metabolism and those that regulate alcohol seeking and consummatory behaviors. Consequently, gut-brain neuroendocrine pathways that control homeostatic feeding and metabolism have also been found to regulate hedonic and addictive properties of food and alcohol, mainly through interactions with reward- and stress-related neural mechanisms. Increasing evidence from both preclinical and clinical research suggests that the orexigenic hormone ghrelin and the anorexigenic hormone glucagon-like peptide-1 (GLP-1) are involved in biobehavioral regulation of alcohol use/addiction and, therefore, can be studied as potential pharmacotherapeutic targets. A summary of this growing body of evidence, as well as ongoing translational work to develop novel medications for alcohol use disorder based on the aforementioned gut-brain neuroendocrine pathways will be discussed.

Mehdi Mirsaeidi

## α-MSH a Potential Therapeutic Agent for Sarcoidosis

- **Associate Professor of Pulmonary & Critical Care, University of Miami, USA**

Introduction: Sarcoidosis causes inflammation in the lung and triggers a complex cascade of immunopathologic events, including leukocyte recruitment and granulomata formation. In sarcoidosis, macrophages and lymphocytes play a crucial role in the inflammatory cascade, both activated by unknown agents on airway epithelium cells and immune cells. Currently, there are few FDA approved therapeutic agents for sarcoidosis.

Methods: To explore the anti-inflammatory effects of $\alpha$-MSH, PBMC of patients with confirmed sarcoidosis and treatment-naïve were treated with microparticles generated from mycobacterial cell walls and with 10 µM of $\alpha$-MSH (MILLIPORE-SIGMA, St. Louis, MO, USA) or saline as control. The supernatants of developed *in vitro* granuloma treated with saline and developed *in vitro* granuloma treated with $\alpha$-MSH were collected on Day 3. The cytokine concentrations, gene expression profiles were measured using Illumina multiplex Elisa and RANSeq, respectively. On Day 3, PBMC, granuloma and granuloma+ $\alpha$-MSH cells from 3 patients with sarcoidosis were harvested and cellular protein was extracted for western blotting for NF-kB, CREB and p-CREB.

Results: We found a significant increase in IL-7, IL-7R, IFN-$\gamma$ protein expressions in developed granuloma compare to PBMC without challenge with microparticles. In comparison between granuloma treated and untreated with $\alpha$-MSH, IL-7, IL-7R, and IFN-$\gamma$ protein expressions were significantly reduced. We showed that phosphorylated of CREB concentration increased in granuloma. This effect was reversible with adding CREB blocker.

Conclusion: We explored the anti-inflammatory properties of α-MSH by measuring the expression of phosphorylated CREB (p-CREB) in a granuloma before and after exposure to α-MSH. We developed *in vitro* granuloma by exposing human peripheral blood mononuclear cells (PBMCs) to microparticles. This granuloma was immunophenotypically similar to a sarcoidosis granuloma with dominant Th1 and Th17 responses. Further investigation is needed to explore its potential therapeutic role in sarcoidosis via its anti-inflammatory properties.

## Mehdi Rashighi

## New Translational Approaches to Understand Skin Immunology

- **Assistant Professor of Dermatology, University of Massachusetts Medical School (UMMS) in Worcester, USA**

Skin is the largest organ in the body with constant exposure to the outside environment. It is a very complex tissue and is composed of both stromal and immune cells. Although the skin-resident immune cells display some unique skin-specific features, significant similarities exist between the immune signaling pathways involved in the pathogenesis of cutaneous and no-skin autoimmune and inflammatory diseases. Unlike most other organs, skin diseases' course and disease activity is clinically apparent and do not require sophisticated laboratory or imaging investigations. Further, the skin is readily accessible, enabling the investigators to collect fresh cells and proteins directly from the inflamed peripheral tissue using minimally invasive techniques. This makes the skin an ideal organ for translational research to better understand the immunopathogenesis of organ-specific autoimmune and inflammatory diseases and eventually identifying new targets to develop novel therapies.

Michael Schreiber

## Measures of Science: Merits and Dangers of Rankings in Higher Education

- **Professor of Physics, Institut für Physik, Technische Universität, Chemnitz, Germany**

Evaluations of higher education institutes have become ubiquitous, worldwide, national, and regional, some of them field specific, others more general. However, the methodologies have often been questioned, and the resulting ranking lists frequently differ significantly. This provokes the questions, how useful they are and how serious one should take them.
Most scientists probably do not care much, students are somewhat more attentive at least with respect to national comparisons. Politicians use the rankings if the results fit their aims, and administrators love them because of their simplicity. I will discuss these and further aspects, advantages and disadvantages, merits and dangers of rankings.
Many of these evaluations are based on questionnaires. In scientometric investigations apparently objective quantitative measures are studied. For example, based on citation data in bibliometrics, measures like the infamous impact factor and the notorious Hirsch index are determined. Again I shall discuss various problems and possible solutions.
The time-consuming peer review appears to be a good solution for evaluation on a smaller scale like academic hiring, grant applications, manuscript refereeing. But anonymous or not, it suffers from prejudice, subjective opinions, group pressure, and so on. In conclusion, no best way for evaluations exists, and one should be (made) aware of the various difficulties and then be able to combine different approaches in order to avoid the most unfair consequences and inappropriate deductions.

## Mileha Soneji

## The Essence of Human Centered Design

- **Senior UX Manager and Independent Keynote Speaker, the Netherlands**

Simple & effective solutions are often best, even when dealing with something as complicated as Parkinson's. In this inspiring talk, Mileha Soneji shares not only accessible designs that make the everyday tasks of those living with special needs easier, but also simple hacks of how to achieve the inclusive design approach in every day projects at companies. The key is that in this ever evolving smart world how can we still create products and services that provide value to people and fulfill their core need.

Milos Milosevic

## Methodological Implication of Digital Twist on Film and Media Studis

- **Professor Of Psychology, Singidunum University, Belgrade, Serbia**

The aim of this presentation will be to summarize and analyze methodological implications of the global process of digitization and the massification of the practice of producing and consuming media contents on film and media studies, that is to emphasize the need and set foundations for creation of a new wider and deeper methodologically grounded theoretical discourse, as response to radical social and media changes in the twenty-first century. Frist of all, digitization has led to a change in the material basis of the film and media, which has numerous implications in determining, researching and understanding its nature. By moving to digital information gained autonomy in relation to the physical reference, which radically changed the nature of its relationship to physical reality. Because of this, there is a need for defining the concept of a digital moving image as the main subject of digital film and media studies and ontological differences in relation to the concept of an analogue moving image. The development of a post-screen media image, enabled by digitization, draws attention to the constructional nature of the image and the necessity of explore the role of psychological processes in its creation. The digitization process has also enabled the democratization of film and media industry and art, which are generator of radical changes in social domain. That is why online video clips and related clip culture should receive equal treatment as a subject of research with film and media theory as film and other moving image based art forms. All mentioned phenomena brought into question numerous of previous theoretical assumptions and concepts currently in use in film and media theory. The new theoretical discourse must also take into account the process of transforming media and society towards virtual and simulated reality which will dominantly shape future media but even more broader social domain.

In order to be able to understand and describe in proper manner the transformation of the film, media and the wider global community, which has already happened to some extent, but also which is yet to come, film and media studies should innovate and change traditional methodology and approach to research. Integration of the film and media studies with disciplines from natural, technical, theological and medicine domain as a two way collaboration as well as application of statistical methods in film, media and dramatic text analysis will be discussed as possible answer to postulated problems.

Natalya Shelkovaya

## Massivization and Barbarism in Modern Society

- **Associate Professor at the Department of Philosophy, Cultural Studies and Information Activity, Volodymyr Dahl East Ukrainian National University, Ukraine**

Report reveals the nature of barbarism, the criteria of modern barbarism and its faces, studies reasons and specifics of neovarvarization and massivization in modern society, highlights the main features of a barbarian human and a mass-man, analyzes the phenomenon of aggression as a major sign of barbarism, reveals the nature of human evil, deep roots of aggression and sado-masochistic tendencies in the relationship of people to each other and to nature. Based on a synergistic approach to understanding of social processes, the author puts forward and justifies the idea that the growth of aggression, cruelty, violence and armed conflicts in today's world is a cascade of bifurcations of society, which is characteristic of transition of the society from one type to another. It is shown and proved that in modern society there are all signs of barbarism, moreover, there is a purposeful policy of massivization and barbarizing the population in the interests of certain power structures with the aim of facilitating the process of manipulation by the masses. The degradation of modern culture, the main function of which at all times was to contain the aggressive principle in man, which is one of the main signs of barbarism, led to the spread of aggression and barbarism in all spheres of life, at all levels: from personal to interstate and universal. The author sees the favorable way of human development in the return of people to their lost spiritual and psycho-physical integrity, in which the spirit, the return to himself, to the man of the heart – homo cardiacus and not to his animal or technical origin is dominated, and in the transition to such type of civilization in which Hi-Tech and a significant transformation of consciousness (the appearance of cosmic consciousness) and psychosphere of the Earth will be connected harmonically.

Nikrad Shahnavaz

## Clinical Implications of Gut Microbiota

- **Director of Motility, Emory St. Joseph's Hospital, Assistant Professor of Medicine, Division of Digestive Diseases, Emory University School of Medicine, USA**

The gut microbiome is a diverse ecosystem containing different microorganisms such as bacteria, fungi, archaea and viruses. Different factors are known to affect the variability of gut microbiome including sex, age, genetics, lifestyle and medications as well as geography. There is overwhelming evidence of interaction between intestinal microbiome and the host in distinctive levels. The role of gut microbiome in a wide range of medical conditions including metabolic, inflammatory and malignant diseases has been demonstrated in clinical studies. Similarly, modulation of gut microbiome could be a promising therapeutic intervention as we develop more precise medicine.

Orlando Gomes

## Simple Micro, Complex Macro

- **Professor of Economics, Lisbon Accounting and Business School of the Lisbon Polytechnic Institute (ISCAL-IPL), Portugal**

Common sense and a careful examination of people's behavior both point to an undeniable reality: individuals, acting as economic, social, or political agents, are heavily constrained in their ability to collect and process information and, therefore, they typically choose simple courses of action based on relatively unsophisticated mental accounts. Straightforward individual decisions and the actions they trigger often contrast, though, with the complexity of the aggregate outcome: actions and interactions at the micro level frequently culminate on a macro result that is inscrutable when looking in isolation to the parts that constitute the whole. The role of the scientist is, then, to uncover and explain how simple micro turns into complex macro. This paper takes a step on the mentioned direction, by conceiving and analyzing a straightforward life-cycle model of consumption and savings for the individual agent. The model is dynamic, and agents are finitely lived; this implies that the economy evolves through the renewal of generations. If generations are somehow dissimilar, their simple decisions might lead to complex aggregate outcomes. This is illustrated on the proposed setup by assuming a minimal degree of heterogeneity in the ability of new generations to access and apprehend state-of-the-art knowledge. The analysis illustrates how a microscopic amount of micro diversity bursts into unpredictable and irregular macro outcomes.

# Ortwin Renn

## The Role of Transdicisplinary Science in Times of Pandemics and Climate Change

- **Professor For Environmental Sociology And Technology Assessment, University Of Stuttgart, Germany**

In light of the major global transformations such as globalization, digitalization and sustainabilization and the current global challenges such as pandemics and climate change, scientific research faces new challenges and targets. Scientific studies are supposed to provide background knowledge, to facilitate the desired transformations and to offer assistance for resolving complex problems that challenge modern society. Concepts such as transformative, transdisciplinary or co-creative research elucidate the direction in which scientific research finds it new role(s). Based on the discussion of these concepts and their different roots, the key note address analyzes a new modular concept for a transdisciplinary scientific approach combining and integrating curiosity driven research with goal oriented (advocacy) knowledge generation and catalytic, process-oriented expertise. This integration leads to processes of co-creation aimed at merging different knowledge pools and providing orientation for collective action. Theis will be exemplified for the two cases: pandemics and global climate change.

Paola Lopreiato

## How Interactive Art Implements Scientific Research Both for Data Collection and Dissemination

- **Instructor of Sound Design, Academy of Fine Art, Carrara, Italy**

Installation art has become increasingly interested in topics that were previously considered the exclusive prerogative of science.
More and more often current artistic experimentation share a common ground with scientific investigation often based on the same employment of new technologies.
It sometimes happens that, because experiments are constrained in a lab setting, scientist cannot completely grasp the true nature of what they are looking for or at least, having to decontextualize the subject of the research to make it objective, they move away from reality and from people.
It is at this point that art intervenes, providing a different point of view, with the aim of improving scientific results. It is important to underline that art is not purely speculation and, with the help of new technologies, there are many examples showing that it can also be reliable in terms of research and outcomes.
Science and art have always shared their (a?) curiosity towards real life and I believe that the many examples in art prove that, besides improving research, art can also be a vehicle to bring people closer to research by making the results understandable and usable.

Payman Dehghanian

## A Resilient Electricity Grid of the Future

- **Assistant Professor of Electrical and Computer Engineering, George Washington University (GWU), Washington, USA**

Disruptive events whether they are malicious attacks, natural disasters, or human-caused accidents continuously pose a risk to large-scale power grid operations. Lessons learned from some recent catastrophes have pushed the electric sector's research and development focus on the concept of "resilience". It is becoming more and more apparent that further considerations beyond the classical reliability oriented view are needed for enhancing the electricity grid resilience in the face of High Impact Low Probability (HILP) emergencies and to keep the lights on at all times. Both the frequency and intensity of such wide-area outage events have been trending higher in recent years. With increasing dependence on electricity for most daily activities and vital services (e.g., transportation, commerce, communications, health care, etc.), efforts to enhance the resilience of the electricity delivery infrastructure and to reduce the impact and risk from natural and human-triggered events are urgently needed.

In this talk, I will first discuss the use of predictive tools and smart sensors for grid-scale online situational awareness and vulnerability analysis in power systems in the face of various hazards. I will then describe the need for efficient decision making support tools for system operators, which helps to achieve an improved survivability and resilience to a wide range of fast- and slow-dynamic threats. A decision-making framework founded based on efficient use of smart sensors and the network built-in flexibilities for recovering from the HILP events will be lastly presented along with several critical and practical considerations an operator will have to deal with in practice.

Peyman Raoofi

## The Impact of Pandemic on Geriatric Mental Health

- **Clinical Psychologist, Board of Directors, The Los Angeles County Psychological Association, USA**

Aging comes with a myriad of psychological, social, and environmental vulnerabilities making elderly most susceptible to mental health problems related to pandemics. Pandemics have significant psychosocial impact such as Health anxiety, panic, adjustment disorders, depression, chronic stress, and insomnia. Therefore special care needs to be taken for geriatric mental health during such crisis. This presentation will discuss the impacts and treatments.

Ramin Zand

## At the Intersect of Outcome Prediction, Machine Learning, and Precision Health

- **Associate Professor of Medicine and Neurology, Geisinger Health System and University of Tennessee, USA**

The proliferation of patient data in the forms of electronic health records (EHRs), daily activities, as well as social and genetic information has improved our understanding of the individual patient and has provided opportunities for tailored interventions to their precise needs. Applying machine learning on these large multidimensional biological and social datasets has enabled us to find different patterns in structured and non-structured EHR data and achieve reasonable success in predicting risk and treatment in certain cancers and vascular diseases. Defining patient subpopulations and complicated phenotypes has also been made possible by contemporary machine learning models. Here we discuss some of the promise and limitations of big data and machine learning methods. We further review some of our translational research projects in this field.

Reza F. Saidi

## Recent Advances in Organ Transplantation

- **Associate Professor of Surgery, Director of Kidney Transplantation, Division of Transplant Services, Department of Surgery, SUNY Upstate Medical University, USA**

Organ transplantation (OT) has been established and practical definitive treatment option for patients with end-organ failure. The evolution of OT has seen the field progress rapidly over the past few decades with incorporation of a variety of solid organs—liver, kidney, pancreas, heart, and lung—into the donor pool. New advancements in surgical technique have allowed for more efficient and refined multi-organ procurements. Additionally, immunosuppression therapy has also seen advancements with the expansion of immunosuppressive protocols to suppress the host immune response and improve short and long-term graft survival. However, the field of OT faces new barriers, most importantly the expanding demand for OT that is outpacing the current supply. Allocation protocols have been developed in an attempt to address these concerns. Other avenues for OT are also being explored to increase the donor pool, including split-liver donor transplants, islet cell implantation for pancreas transplants, and xenotransplantation. The future of OT is exciting with exciting new research being explored to overcome current obstacles.

Rossella Castagna

## Switching with Light: a Palette of Opportunities for Photochromic Materials

- **Director of Machine Intelligence Research Labs (MIR Labs), Scientific Network for Innovation and Research Excellence, Washington, USA**

Through photochromic materials, light enables a spatio-temporal control over the activation-deactivation of physical-chemical functions. Photochromic switches can be designed to be converted with electromagnetic radiation all over the UV-vis light spectrum [1]. Color, transmittance, refractive index, dipole moment and electrical conductivity are some of the physical-chemical properties that reversibly change by irradiation with light of suitable wavelength because of an isomerization that converts the species in a stable or metastable photoproduct [3-5].

Thanks to the modular synthesis of photochromic switches, a wide range of functional compounds featuring good optical fatigue resistance, remarkable structural changes as well as fast responses, can therefore be designed and assembled for smart devices. [3,6].

The action of a photochromic switch can have an impact in a wide range of applications in the field of optics, optoelectronics and, as more recently demonstrated, in pharmacology and life science.

Indeed, photopharmacology has established itself as an innovative complement to optogenetics to control and manipulate biological activity with light [8].

Christopher Ryan Maboloc

## Technological Systems in Post-Covid-19 World

- **Associate Professor of Philosophy, Ateneo de Davao University, Philippines**

The COVID-19 pandemic is the greatest socio-economic disaster in human history. It shatters the idea of human control as globalization and capitalism suffer from a paralysis due to a virus-induced cataclysm. Modern technical systems have failed. Airlines, sports and entertainment, parks and malls, and railway systems are paralyzed. This study traces the social as well as the technological implications of this pandemic. Our civilization draws its strength from modern technology. Our world has been determined by systems and advanced tools, from the symbols of religion, to the space age, and the information era. The technological divide between rich and poor societies is made apparent by this pandemic. But the critical point to consider is how to determine the nature and role of technology in a post-pandemic world. As states and governments realize all the limits and consequences of power, this inquiry articulates how we must prepare for that new normal in which humans cannot possibly be at the center of everything.

Saeid Ghavami

## Statins and Cancer: Is it a Possible New Combination Therapy Strategy?

- **Associate Professor, Department of Human Anatomy and Cell Science, University of Manitoba, Canada**

Glioblastoma (GBM) is one of the most deadly cancers and has very low survival rate. The routine chemotherapy strategy for this tumor is Temozolomide (TMZ). It is an alkylating agent and induces apoptosis in tumor cells. TMZ-chemo resistance is one of the major challenge for GBM therapy. Statins are the inhibitor of HMG-CoA reductase which is rate determining step of mevalonate cascade (cholesterol biosynthesis pathway). Recent epidemiological studies showed that long term using of statins could have beneficial effect on cancer patients and significantly increase their survival and response to chemotherapy. In our recent investigation we have used GBM cells and investigated the mechanism of the co-treatment effect of Simvastatin (Simva) with TMZ in GBM cells. Our investigations showed that Simva sensitize GBM to TMZ induced apoptosis. We also showed that Simva-TMZ treatment-induced cell death is depended on mevalonate cascade. Farnesyl pyrophosphate and geranylgeranyl pyrophosphate inhibit Simva-TMZ-induced cell death while cholesterol did not inhibit this effect. We later showed that Simva-TMZ induced autophagy flux inhibition while its effect was not linked to ATG-7-induced autophagy. On the other hand our investigation showed that Simva-TMZ co-treatment induced unfolded protein response (UPR) in GBM cells. Using highly selective IRE1 RNase activity inhibitor MKC8866, PERK inhibitor GSK-2606414 (PERKi), and eIF2α inhibitor salubrinal, we showed that Simva-TMZ induced autophagy flux inhibition is depended on UPR pathway but did not affect Simva-TMZ-induced cell death. Overall, our investigation showed a new potential pleiotropic effect of simvastatin in GBM cells and could have potential therapeutic approach in future GBM therapy.

Safa baris

## Targeted Therapies for the Primary Immune Deficiency Diseases

• **Professor of Pediatrics, Marmara University Hospital Pediatric Allergy and Immunology, Istanbul, Turkey**

In recent years, the high speed of the development in the era of high-throughput DNA sequencing leads to the increased the number of genes associated with inborn errors of immunity. The most recent primary immune deficiency (PID) classification of the International Union of Immunological Sciences includes more than 400 genes and by the definition new genes, the functionality of the mutated genes was evaluated in more detail as some of the mutations expose the cells to enhanced protein responses that explained by gain of Function (GOF) or causes a loss of function (LOF). Interestingly, both of the different effect can be observed in same gene. The clinical features of PIDs are broad, ranging from increased susceptibility to infections and/or multiple immune dysregulatory symptoms, which can basically involve all the body systems. As expected, those kind of disease also causes lymphoproliferation and malignancy. The treatment of immune disorders with immune dysregulation is stringent, as it requires careful balancing of immunosuppression in patients with increased risk for infections. In most recent years, new therapies that aiming to target the defective mechanism of cells has been developed. As a consequence, this approach result in better disease control with lower drug side effects. Precision medicine for PID has been applied with promising results that permit to avoid deleterious side effects on other tissues. One of the most appealing disease that arise as a model for the targeted therapy in era of PID is lipopolysaccharide-responsive beige-like anchor (LRBA) deficiency. LRBA deficiency is a primary immunodeficiency characterized by recurrent sinopulmonary infections with hypogammaglobulinemia, lymphoproliferation and immunodysregulation, which presents by enteropathy, cytopenias and autoimmune endocrinopathy. LRBA plays a pivotal role in the intracellular trafficking of cytotoxic T lymphocyte protein-4 (CTLA-4) by re-routing it away from lysosomal degradation and back to the cell surface. CTLA-4 is an key immune checkpoint protein that is constitutively expressed on fork-head box P3 $(FOXP3)^+$ regulatory T (Treg) cells and is also induced upon activation of conventional T cells. LRBA deficiency results in very low CTLA4 expression, which explains the phenotypic overlap between LRBA and CTLA4 deficient subject. Furthermore, reduced Treg cells number and function have been demonstrated in LRBA-deficient patients. Consequent upon this, LRBA deficiency may manifest as an IPEX like disease with early onset autoimmunity.

To date, different agents have been applied in the treatment of LRBA deficiency, including corticosteroids, intravenous immunoglobulin therapy (IVIG), sirolimus, infliximab, rituximab and azathioprine. Some patients also benefit from hematopoietic stem cell transplantation (HSCT), which can be curative. More recently, studies have suggested the effectiveness of abatacept as a targeted therapy, a CTLA4-Ig fusion protein, in controlling disease-related immune dysregulatory phenotypes. We demonstrated that Long-term treatment with abatacept is effective in controlling disease activity. Superior clinical responses are achieved with a weekly or biweekly drug dosing regimen. Lymphoproliferation and chronic diarrhea demonstrated the best responses to abatacept therapy, followed by other immune dysregulatory manifestations. Finally, we able to test some biomarkers like sCD25 and circulating T follicular helper cells, which provide a good correlation with the disease activity, and found to be reliable biomarkers for monitoring targeted therapy responses.

## Salvatore Lorusso

### Art, Science, Interdisciplinarity

- **Former Professor, University of Bologna Alma Mater Studiorum, Department of Cultural Heritage, Italy**

Why this title for my speech? The reason comes from the theme of this USERN Congress "Science to Society" on which the objective specified in the invitation is "Emphasizing the important role of multidisciplinarity studies to society".
Therefore, in my speech I first of all wish to underline the clear distinction between the three conceptual terms: multidisciplinarity, interdisciplinarity and transdisciplinarity in education, training and research, which are attributable to different starting points, paths and objectives. Closely connected to this, is the situation related to my experience in the University of Bologna, Italy and, in particular, the relationship between art and science. It is important to highlight the integration of the human sciences and experimental sciences, and the mutual need they have of each other; this is multidisciplinarity, or more correctly, interdisciplinarity and – though it may take more time - transdisciplinarity, and finally reaching the acceptance and commonality of one scientific truth.
It is thus possible, considering the holistic value of the cultural asset, to contribute to addressing the numerous and diversified problems in the field of the protection and enhancement of cultural heritage, but also to educate and properly train the professional figures that are needed to work in the sector, by involving the territorial forces, i.e. local organizations and *SOCIETY* itself.
To conclude, an overall picture is presented of the teaching and research activity carried out at the University of Bologna in the cultural heritage sector, together with some emblematic case studies relating to a painting, a sculpture and a codex.

Seeram Ramakrishna

## Role of Quantum and Nanoscience in Food Security for the post-COVID19 New World

• **Chair of Circular Economy Taskforce, National University of Singapore, Singapore**

One of the most prominent concerns of the COVID-19 pandemic is its impact on the world food system, i.e. causing food shortages and malnutrition across the world. FDA reports estimated that by the end of 2020 as a result of COVID19 around 265 million people will be into chronic hunger and acute food insecurity due to the socioeconomic recession, while at the beginning of 2020 was 135 million people. Also, the reports put a spotlight on the quality of diet as a critical link between nutrition and food security. Quantum and nano-based materials offer various approaches to accomplish this emergency based on nanostructured materials and functionalization of them to inhibit food insecurity in the future pandemic. The antiviral activity of quantum nanomaterials is based on ROS generation, Vander Waals forces, electrostatic interaction, Fluctuation of medium, thermal and electrodynamic fluctuation, the local field enhancement impact on virus function and inhibit virion functionality. Quantum and nanomaterials with antiviral properties can be used in food packaging materials, food processing, nutraceuticals, artificial meat, and agriculture. Quantum dots and nanomaterials with their unique features and antiviral properties can be applied to prevent food insecurity by increasing the shelf life of the food, detecting viruses on the surface of foodstuff, carrying nutraceutical to prevent malnutrition by increasing the bioavailability of trace elements, and smart packaging, biosensor in food and agriculture (https://doi.org/10.1016/j.bios.2020.112731).

Coincidentally, the Nobel Peace Prize for 2020 awarded to the UN's World Food Program (WFP) for its efforts to combat hunger, for its contribution to bettering conditions for peace in conflict-affected areas and for acting as a driving force in efforts to prevent the use of hunger as a weapon of war and conflict (https://www.nobelprize.org/prizes/peace/2020/press-release/). The World Food Program is the world's largest humanitarian organization addressing hunger and promoting food security. Food is an undeniable need of humankind. Therefore, it is imperative to intensify worldwide research and innovations efforts to meet the food and nutritional needs of current as well as future generations (https://doi.org/10.1080/07373937.2020.1829885).

Shahram Shahabi

## Personalized Medicine: The Future of Preventive Healthcare System

- **Professor of Immunology, Director of Research at Hyland's Inc., Adjunct Faculty Member at Ric Scalzo Botanical Research Institute, USA**

According to the Precision Medicine Initiative, precision or personalized medicine (PM) is "an emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle for each person." PM has the potential to transform not only medical therapeutic strategies but also the preventive healthcare system. It provides effective, tailored therapeutic and preventive strategies based on the genomic, epigenomic, proteomic, and microbiomic profiles of an individual. Preventive PM facilitates earlier detection of diseases via an enhanced use of existing biomarkers and the detection of early omics events in disease development. Such an approach predominantly focuses on pro-active actions rather than just reactive. So, it prevents or postpones the need for more severe and less tolerable treatments. Therefore, preventive PM can increase patients' quality of life and decrease healthcare costs.

**Aleksandr Krasnok**

## Anomalies in Light Scattering: Recent Breakthroughs and Nascent Advanced Applications

- **Research Assistant Professor/Core Facility Director , CUNY Advanced Science Research Center, Photonics Initiative**

Scattering of light is a ubiquitous process, which has driven the curiosity of human minds for thousands of years, from ancient Greek philosophers to modern physicists. For a scattering process to occur, electromagnetic waves need to interact with matter. Wise tailoring of the light-matter interaction in structured materials lies at the center of today's experimental physics and technology, both in classical and quantum regimes. Hence, deep insight into the basics of scattering theory and understanding the peculiar features of electromagnetic scattering is necessary for the correct interpretation of experimental data, understanding of the underlying physics, and advanced applications. Recently, a broad spectrum of exceptional scattering phenomena attainable in suitably engineered structures has been predicted and demonstrated, including bound states in the continuum (BIC), exceptional points in PT-symmetrical non-Hermitian systems, coherent perfect absorption, virtual perfect absorption, and nontrivial lasing.
In this talk, I will discuss these unusual scattering phenomena with a focus on their application in quantum optics. I will provide a unified description of such exotic scattering phenomena and show that their origin can be traced to the fundamental properties of the underlying S-matrix. I will show that, on the other hand, these insights provide a powerful approach to tailor unusual scattering regimes for various advanced applications. Lastly, I will discuss future research directions in this fascinating and promising research area.

Daniel Sauter

## Guanylate-Binding Proteins 2 and 5 Reduce SARS-CoV-2 Infectivity

- **Institute of Molecular Virology, Ulm University Medical Center, Meyerhofstrasse, Germany**

Coronaviruses are covered by so-called spike proteins that act as tiny anchors and mediate viral entry into new target cells. Like many other viral pathogens, coronaviruses exploit cellular proteases that act as molecular scissors and activate these anchors at just the right time. Several viruses depend on proteases that are only expressed in specific cell types and thus spread only locally in infected individuals. In contrast, the spike protein of SARS-CoV-2 harbors a poly-basic motif that can be cleaved by the ubiquitously expressed cellular protease furin. This feature distinguishes SARS-CoV-2 from closely related bat and pangolin viruses that represent potential precursors. Notably, the acquisition of a poly-basic cleavage site can significantly impact viral spread and pathogenicity. For example, highly pathogenic avian influenza A viruses harbor a poly-basic furin cleavage site, while their lowly pathogenic counterparts do not.

Here, we identify guanylate-binding proteins 2 and 5 (GBP2/5) as two host factors that suppress the activation of SARS-CoV-2 spike by targeting furin. In the presence of GBP2 and GBP5, the maturation of spike is impaired, and newly formed viral particles harbor an increased amount of inactive spike precursor proteins. Consequently, SARS-CoV-2 particles that are produced in the presence of GBP2 and GBP5 are less infectious and spread only poorly. Vice versa, knock-down of *GBP* increases viral replication in lung cells, the primary target cells of SARS-CoV-2. In line with an inhibition of furin, GBP2 and GBP5 fail to inhibit the activation of a bat coronavirus spike protein, which naturally lacks a furin cleavage site. Accumulating evidence suggests that furin is particularly important during direct cell-to-cell spread of SARS-CoV-2. In agreement with this, we demonstrate that GBP2 and GBP5 reduce SARS-CoV-2 spike-mediated cell fusion. In a translational approach, we also demonstrate that inhibition of spike maturation by exogenous furin inhibitors suppresses SARS-CoV-2 replication in cell culture.

In summary, we here identify a mechanism of antiviral immunity that hampers the spread of SARS-CoV-2 by reducing the maturation of newly formed viral particles by the host protease furin. Our findings provide important new insights into the mechanisms of spike maturation and may help to uncover new targets for therapeutic approaches in the fight against COVID-19.

Giulia Grancini

## Hybrid Perovskite Solar Cells: a game changer for near future

- **Professor of Chemistry, University of Pavia, Italy**

The development of low-carbon technologies for energy generation, storage and management is key to our energy future. Within the Photovoltaics (PVs) framework, the last decade has been facing a revolution with the advance of a breakthrough technology which can radically transform the energy sector: perovskite solar cells. The term “perovskite” refers to a natural oxide mineral composed of calcium titanate, and to the class of compounds that share its unique crystal structure. The perovskites that hold such PV revolution are a group of human-made versions discovered in 2009 by Japanese scientist Tsutomu Miyasaka and colleagues. These perovskites can absorb sunlight better than silicon using solar devices which are at least a hundred times thinner than silicon.

Perovskite have been matured in terms of conversion efficiency, nowadays beyond 25%, exceeding those of CIGS and CdTe and approaching those of crystalline Si cells[1]. As opposed to Si solar cells, perovskite solar cells are processed with low-temperature and low-cost solution-processes and less invasive methods[2]. They can be indeed processed by simply mixing two inexpensive salts, lead halides and organic halides. This solution forms an ink, which can be applied in an ultrafine, uniform layer by using inkjet printing at room temperature. The film deposited is very thin — around 500 nanometers or about 1/100th the thickness of a human hair — and it is enough to absorb a large fraction of the sunlight needed to generate electricity. This results in lightweight and flexible body bearing thin and soft absorber film with modulable transparency, which bring their use in bifacial power generation devices, a field where existing Si and CIGS cannot apply without extra cost of fabrication. While a silicon factory costs roughly $300 million to $400 million to build, a perovskite factory could cost less than $100 million. This is due to low cost processing, such as using big printers instead of expensive and high temperature manifacturing methods.

As a consequence, perovskite solar cells offer a major portability, offering large room for portable, sustainable energy source in rural areas in developing countries.

However, presently, the technology is still not mature for industrialization. Silicon cells last 25 years, while perovskite cells have yet to be sufficiently proven under such environmental stressors as moisture and heat. Many strategies, as the ones I will present are now revolutionizing this intensely investigated field, making perovskite durable.[3,4]

Interestingly, for perovskite solar cells, the device can have high stability, exceeding Si and GaAs, in applications in space satellites, thanks to thin film absorber and intrinsic defect tolerant properties of perovskites, in addition to their lightweight and flexibility.

In this talk I will discuss the enormous potential of this class of materials used in advanced solar cells, presenting their current main limitations, actual challenges and the strategies to bring perovskite cells an active player in the near future PV scene.

Louis Jacob

# Epidemiology of Health Behaviors and Chronic Conditions in Low- and Middle-Income Countries

- **Resident in Physical Medicine and Rehabilitation, University of Versailles Saint-Quentin-en-Yvelines,France**

The prevalence of adults aged ≥65 years and people with disability is increasing in the world. A significant proportion of elderly and individuals with disability are living in low- and middle-income countries (LMICs), highlighting the major burden associated with ageing and disability in this part of the world. In the meantime, LMICs are facing major societal, economic and ecological changes that can have a long-term impact on the physical and mental health of younger individuals. In this context, it is of particular importance to better understand the epidemiology of health behaviors and chronic conditions in LMICs. Unfortunately, the majority of previous epidemiological studies have been conducted in high-income countries, and the findings of these studies may not be extrapolated to LMICs. Thus, the goal of this ongoing project is to investigate health behaviors and chronic conditions in developing countries. For this purpose, several surveys have been used: the Study on Global Ageing and Adult Health (SAGE), the World Health Survey (WHS) and the Global School-based Student Health Survey (GSHS). These surveys have been conducted in multiple countries, allowing the investigation of specific associations across countries of different income levels and/or different regions of the world. The analysis of these databases has resulted in the publication of several studies. These studies have showed that unhealthy behaviors (e.g., secondhand smoking, sedentary behavior) are frequent in LMICs, while the prevalence of chronic conditions (e.g., depression, physical multimorbidity) is high in different age groups (e.g., adolescents, older adults). Taking together, these results clearly implicate that measures aiming at the reduction of the prevalence of these unhealthy behaviors and these chronic conditions in LMICs are urgently needed.

Mauro Scalercio

## The Idea of Science in Early Modern Age

• **Post Doc, Instituto de Filosofía, Universidad de Buenos Aires, Buenos Aires, Argentina**

The idea of modernity is often associated with that of scientific revolution. Francis Bacon, Galileo Galilei, René Descartes among others tried to elaborate a stronger foundation of scientific knowledge. One of the most interesting foundation of modern science is that of Giambattista Vico (1668-1744). He criticise Descartes' system, maintaining that the principle "*cogito ergo sum*", may found conscience but not science. Moreover, according to Vico, Cartesian foundation is inherently dogmatic. Vico elaborates another principle: *verum et factum converturtur*, i.e. man may only know what he makes. While in his first works Vico applies *verum/factum* principle to mathematics, in his masterpiece *The New Science* (1744) he applies it to society. The aim of this lecture is to show how this late development of Vico's philosophy may constitute the foundation of a modernity that differs from that of Descartes. The originality of Vico's philosophy lies in his idea to integrate deductive and inductive methods in an historical synthesis.

Vittorio Limongelli

## Ligand Binding Free-Energy and Kinetics Calculation

- **Professor of Computational Biology & Pharmacology, Institute of Computational Science (ICS), Faculty of Biomedical Sciences, University of Lugano USI,Switzerland**

Predicting the thermodynamic and kinetic properties of the binding process of a drug to its molecular target is of primary relevance to shed light on its mechanism of action and develop new medications [1]. In this talk I illustrate how this information is obtained using the Funnel Metadynamics (FM) method [2], which permits *the identification of the ligand binding mode and the accurate estimation of the absolute protein-ligand binding free energy*. Using our method, no prior information is required on the ligand binding mode and since both the ligand and the target structure are fully flexible, target's conformational changes and ligand induced-fit effects are taken into account. In addition, the presence of alternative binding modes and the role of water molecules are elucidated and using a customized protocol it is possible to retrieve the ligand unbinding kinetic constant (*koff*) and the rate-determining state [3]. I discuss the paradigmatic case of benzamidine/ trypsin and other pharmacologically relevant systems like ligand binding to GPCRs, p38 MAP kinase and DNA G-quadruplex [4-6]. I introduce the Funnel-Metadynamics Advanced Protocol (FMAP) [7] that makes use of a graphical user interface (GUI) to guide the even inexpert investigator in the preparation of the input files for the FM simulation and the analysis of the results. In the last part of the talk, I briefly discuss a very recent work in which we report the first multiscale representation of drugs binding to their molecular targets [8]. This study marks an important advance in ligand binding investigations with expected impact on future drug design studies.

Xavier Moya

## Advanced Functional Materials for Sustainable Energy Applications

- **Research Fellow, Department of Materials Science & Metallurg, Royal Society University, Cambridge, UK**

Research on phase transitions in advanced functional materials is widespread and continues to grow. Scientific interest aside, they are attractive for a wide range of current and future technologies that include computation, medical instrumentation, and energy conversion and storage.

During this talk, I will present my work on ferromagnetic, ferroelectric and ferroelastic phase transitions that permit large thermal changes to be driven by changes in magnetic field, electric field or stress field. The resulting magnetocaloric, electrocaloric and mechanocaloric (barocaloric and elastocaloric) effects promise new cooling technologies that are energy efficient and environmentally friendly.

Hans D. Ochs

## Personalized Medicine for Primary Immune Deficiencies (PID)

- **Professor of Pediatrics, University of Washington School of Medicine, Seattle, USA**

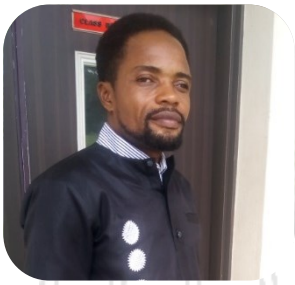
Attempts to treat the specific cause of human disease dates back centuries: Citrus fruit as source of vitamin C for Scurvy, UV light for producing Vitamin D in the skin to prevent rickets, apples spiked with nails to treat anemia. However, true personalized Medicine required the understanding of the molecular basis of genetic diseases and the capability to develop biologics that can correct these deficits effectively and safely.

**Replacement of missing/defective gene product**: enzymes (enzyme replacement with PEG-ADA); inhibitor of an enzyme (C1 esterase inhibitor caused hereditary angioedema, substitution with concentrated inhibitor); cell surface checkpoint modulators (CTLA-4 haploinsufficiency resulting in loss of inhibitory immune function, restored with CTLA-4 fusion protein [abatacept]; LRBA prevents lysosomal degradation of CTLA-4 and biallelic deficiency of LRBA causes reduced CTLA-4 in Treg and conventional T cells).

**Correction of deficient interacting proteins by pharmacologic doses of the binding molecule:** (transcobalamin deficiency, corrected by B12 injections; XMEN disease due to MAGT1 deficiency corrected with Mg++; high dose of IFNg in AD IFNgR1 mutations resulting in overexpression of mutated dimer and low expression of normal IFNgR1)

**Inhibitors of immune functions**: lymphoproliferation due to lack of apoptosis (ALPS, mutations in FAS, FASL, caspase8/10 - M-Tor inhibitor rapamycin); autoinflammatory disorders with single gene defects resulting in periodic fevers, characteristic skin lesions respond to IL-1 targeted treatment (anakinra, canakinumab, rilonacept), TNF inhibitors (infliximab, adalimumab), Il-6R blockade (tocilizumab), kinase-inhibitors (ruxolitinib, tofacitinib). GOF mutations in signaling/ gene-transcription (STAT1/3, CARD 11, PIK3CD) resulting in bacterial, fungal, viral infections, autoimmunity, lymphoproliferation including lymphoma (rapamycin, kinase inhibitors (including the PI3Kδ inhibitor, *PI3Kd inhibitor Leniolisib).*

*Interference with the release of neutrophils and lymphocytes from the bone marrow caused by AD GOF mutations in the chemokine receptor CXCR4 resulting in WHIM syndrome. Tx with the CXCR4 antagonist, Plerixafor, releases sequestered cells from the marrow, correcting neutropenia.*



**Stephen E. Kekeghe**

## Science Without Borders: Rethinking the Art and Humanity in Modern Medical Practice

- **Scholar of Literature and the Medical Humanities, Department of English, Ajayi Crowther University, Oyo, Nigeria**

The relationship between the humanities and medical science has been fluid right from the evolvement of human society. This is given the fact that health is a very significant aspect of humanity which cuts across every facet of the society. Given the dealings with human beings and their health conditions, which is the primary focus of medical science, scholars of medicine and the humanities, believe that medicine is a dual discipline— it deploys both artistic, humanistic tools and bio-scientific, pathological knowledge for its success. For instance, language, innovation, creativity and character analysis, which are central features of the art and humanities are commonly deployed in medicine— from the interactive and diagnostic strategies in the consultative process, to the clinical art of surgery and medicalisation, the instrument of the humanistic discipline are potently deployed. A good physician and care-giver uses language carefully to humanise the patient through the deployment of humour, euphemism and metaphorical instances. All of these are necessary to light up the inner world of the patient, which is the first stage to recuperation. This article, which reviews the intersection between the medicine and humanities, is supported by some structured interviews with some 21st century physicians randomly selected across the globe. The researcher, however, does much of deep, philosophical probing, identifying the artistic and humanistic constituents of medical science as it is necessary to humanise the medical profession in the 21st century.

**Anna Blakney**

## Self-Amplifying RNA Vaccines for the Prevention of SARS-CoV-2 Infection

- **Marie Skłodowska-Curie Post-Doctoral Research Fellow, Imperial College London, UK**

The COVID-19 pandemic has expedited an RNA vaccine renaissance- due to the rapid production of new RNA vaccines, with as little as 65 days from development to a Phase I clinical trial, and scalable manufacturing, with approximately 1 million doses per liter, RNA is a versatile platform to confront both outbreaks and seasonal infections. Self-amplifying RNA (saRNA) offers advantages over messenger RNA as its self-replicating properties enable dose minimization as low as 1 µg in humans. However, like all nucleic acids saRNA requires a delivery vehicle to promote cellular uptake and protect it from degradation. In this presentation, Dr. Blakney will talk about various formulations of saRNA vaccines and the preclinical development of the COVID-19 vaccine developed by the team at Imperial College London, which is currently in a combined Phase I/II clinical trial in the UK.

**Helena Lee**

## Proof of Concept for Oral Levodopa Treatment in Rescuing Retinal Morphology and Visual Function in a Murine Model of Human Albinism

- **University of Southampton, UK**

There is a paucity of treatments for oculocutaneous albinism (OCA), a condition characterised by pigment deficiency, abnormal retinal development, and significant visual disability. L-DOPA, a signalling molecule which is essential for normal retinal development, is deficient in OCA. Residual plasticity of the developing retina in young children with albinism has been demonstrated, suggesting a post-natal window for therapeutic rescue. In this study, we investigate if post-natal retinal morphology and visual function in OCA can be improved through oral Levodopa supplementation, if administered during the critical period of neuroplasticity. Methods:The effects of a 28-day course of oral L-DOPA treatment administered to OCA mice from birth (n=11) and 28 days (n=10) of age on retinal morphology and function were investigated using optical coherence tomography (OCT) and electroretinography (ERG), respectively. 336 examinations were obtained at 4, 5, 6, 8, 12 and 16 weeks of age. Generalised linear mixed regression modelling was used to analyse group differences. Results:We observed significant increases in retinal nerve fibre layer (z=2.01, p=0.044), outer nuclear layer (z=1.97, p=0.049) and photoreceptor end tips (z=3.43, p=0.001) OCT thickness measurements, significant increases in ERG A-wave ($\chi$2 (9, N=420) = 91.97, p<0.0001)) and B-wave ($\chi$2 (9, N=420) = 121.24, p<0.0001) amplitudes and significant reductions in A-wave latencies ($\chi$2 (9, N=420) = 47.92, p=0.01) recorded from OCA mice treated with L-DOPA from birth, compared to untreated mice. Interestingly, we did not observe any significant effects on ERG amplitudes or latencies in OCA mice treated with L-DOPA from 28 days of age. Conclusions:We have demonstrated that abnormal retinal development, morphology and visual function can be rescued post-natally using oral L-DOPA supplementation, but only if administered during the critical period of neuroplasticity.

**Emily S. Finn**

## Functional Connectome Fingerprinting: Identifying Individuals and Predicting Behavior Using Patterns of Brain Functional Connectivity

- **PhD of Neuronal Function Underlying Higher Cognitive Processes, National Institute of Mental Health, USA**

Neuroimaging studies typically collapse data from many subjects, but brain functional organization varies between individuals. This variability is believed to underlie trait-like differences between people, such as cognitive ability, personality, and risk for mental illnesses. In this project, I have proven that individual patterns of functional brain connectivity are stable enough within subjects and unique enough across subjects to serve as a "fingerprint"; in other words, they enable identification of individuals from a large group. Features of these patterns also relate to high-level cognitive abilities such as intelligence and sustained attention, in such a way that a model can take in patterns of brain connectivity from a never-before-seen individual and generate a prediction of their cognitive ability.

Didier Snoeck

## Self-healing Concrete with Superabsorbent Polymers for a Sustainable Future

- **Postdoctoral Research Fellow of the Research Foundation-Flanders (FWO-Vlaanderen), Department of Structural Engineering and Building Materials, Magnel Laboratory for Concrete Research, Ghent University, Belgium**

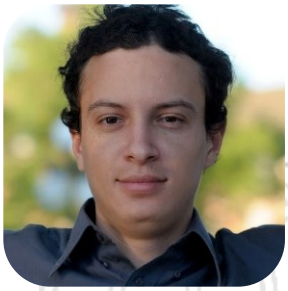
Concrete is an excellent material to take up compressive forces. However, due to the low tensile strength, concrete is very brittle. When tensile forces are acting, the concrete may crack. This cracking leads to the ingress of water, and with that, to the ingress of potentially harmful substances. In this way, the durability of concrete is endangered. If you do not repair it in time, the costs will rise sky high. But, how can we solve this? Using a self-healing concrete is the solution but it needs to be improved. A novel self-healing material was design using synthetic microfibers and superabsorbent polymers. The microfibers are used to limit the crack width, leading to strain-hardening cementitious materials. Next, water can be provided by the use of superabsorbent polymers, which are extracting moisture from the environment, even when not being exposed to rain. This moisture is used to promote and stimulate autogenous healing and leads to a complete regain in mechanical properties. The material is able to visually heal itself perfectly and was studied using various high-tech equipment. To a certain degree the autogenous healing capability of cementitious materials is maintained during subsequent loading cycles. The superior self-sealing and self-healing capacity improves the reliability and the lifetime of structures, reducing the overall repair and maintenance costs. In this way, an innovative smart self-healing cementitious material which is reliable and independent from the conditions is acquired. The smart cementitious material with superabsorbent polymers may thus be an excellent material to use in future building applications.

## Farshid Noorbakhsh

## System Biology

- **Associate Professor of Immunology, Tehran University of Medical Sciences, Tehran, Iran**

Reductionist approach to biological systems has dominated biology for the last hundred years. This has been part of a more general reductionist approach in empirical sciences, whereby scientists try to understand the structure and function of complex entities by studying their simpler constituents. Reductionist approach has been highly successful in recognizing elements that give rise to complex biological systems including cells, organs and organisms. However, there is a growing belief in the scientific community that reductionist methods are not sufficient to reach a thorough understanding of “emergent properties” of complex systems. Systems biology is an approach to biological systems which tries to combine data derived from reductionist methods with computational and mathematical analyses to reach a more comprehensive understanding of biological phenomena. This approach is highly dependent on new technologies which can perform “high-throughput” analyses on biological entities. In contrast to classical “low-throughput” research methods which are limited to studying individual genes, transcripts, proteins or metabolites, high-throughput methods used in systems biology enable the researcher to examine numerous biomolecules in parallel, giving rise to the so-called “omics” studies; e.g. genomics, transcriptomics, proteomics, metabolomics, etc. Data produced by these methods will then be analyzed using various bioinformatic, mathematical and computational tools to generate a “system-level” picture of physiological and/or pathological processes. In this workshop we intent to familiarize ourselves with major concepts as well databases and tools that are used in systems biology studies. We will also go through some examples that elucidate potential applications of systems biology in medical sciences.



Amine Harbi

## Apuleius' Philosophy Of Curiosity In Education: Building An Education Of Philosophy

- **Assistant Professor of Social Sciences and Humanities, Souk Ahras University, Souk Ahras, Algeria**

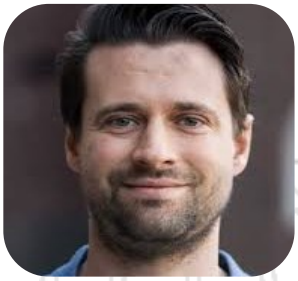
Is the availability of cooked, seasoned, and digested information an obstacle to curiosity? Is eating "fast knowledge" makes you feel full although you had nothing of the nurturing food necessary for an examined life, worth living? Does this intro sound like a fishy personal development ad that is trying to take advantage of your time, energy and money?
This paper/presentation will explore the concept of Curiosity in Apuleius's philosophy by tackling the lack of curiosity in our "information" age. This lack of curiosity does lead in many cases to a total disinterest in philosophy, hence the infamous and pejorative "to philosophize". We are increasingly witnessing the emergence of new philosophies of education but what seems lacking is the education of philosophy, not as a complicated discursive speculation but as love for wisdom. Apuleius is a philosopher that might have a word to say on this topic in our times. His way of teaching wisdom through comic literature is a powerful method combining Plato's depth and Aristophanes' wit. His concept of Curiosity might help educators in kindling the curiosity that makes the philosophers reexamine their lives, and carry that light of knowledge and love of wisdom for a lifetime and beyond.

Alireza Shamshirsaz

## Multidisciplinary Approach to Fetal Surgery

- **Associate Professor of Fetal surgury/Maternal Fetal Medicin, Department of Maternal Fetal Medicine, Texas Children's Fetal Center, USA**

A multidisciplinary approach in medicine is that all respective services that are involved in a patient's care come together and provide their own expertise in an open and professional manner. Each individual discipline/service must give their own perspective and present the pros and cons for a treatment and management plan. After all aspects are taken into consideration, weighing the risks and benefits, a unified voice and management plan is presented to the family. This approach is most appropriate for fetal surgery as most often any congenital anomaly will involve multiple services prenatally and postnatally and if applicable fetal intervention.



**Ricardo Vinuesa**

## The Role of Artificial Intelligence in Achieving the SDGs. Sustainable Cities

- **Associate Professor, KTH Engineering Mechanics, Stockholm, Sweden**

The emergence of artificial intelligence (AI) and its progressively wider impact on many sectors requires an assessment of its effect on the achievement of the Sustainable Development Goals. Using a consensus-based expert elicitation process, we find that AI can enable the accomplishment of 134 targets across all the goals, but it may also inhibit 59 targets. However, current research foci overlook important aspects. The fast development of AI needs to be supported by the necessary regulatory insight and oversight for AI-based technologies to enable sustainable development. We propose the use of AI tackle SDG 11 on sustainable cities, by means of high-fidelity simulations and deep learning. The employed machine-learning tools include convolutional neural networks, generative models and deep reinforcement learning, and they significantly outperform traditional methods for these tasks.

## Sander van der Linden

## A Psychological Vaccine Against Misinformation

- **Associate Professor of Social Psychology in Society, Department of Psychology, University of Cambridge AND Yale University**

Much like a viral contagion, false information can spread rapidly from one mind to another. Moreover, once lodged in memory, misinformation is difficult to correct. Inoculation theory therefore offers a natural basis for developing a psychological 'vaccine' against fake news. I'll provide evidence that the theory of psychological inoculation can be leveraged within the context of fake news and misinformation. For example, in a series of randomized empirical studies we show that it is possible to pre-emptively "immunize" people against disinformation by pre-exposing them to severely weakened doses of the techniques that underlie its production. This psychological process helps people cultivate cognitive antibodies in a simulated social media environment. During the talk, I'll showcase an award-winning real-world intervention ("Bad News") we developed and empirically evaluated in 15 languages—with governments and social media companies—to help citizens around the world recognize and resist unwanted attempts to influence and mislead.

Daniel King

## Global Challenges in Addressing Unhealthy Digital Technology Habits

- **Department of Psychiatry/Psychology, Flinders University, Australia**

Globally, there is growing recognition of the harms generated by overuse of digital entertainment technologies, including problematic gaming and gaming disorder. In its most serious form, problematic gaming is recognised by the World Health Organisation as gaming disorder (GD) in the International Classification of Diseases (ICD-11). Research suggests that some individuals, particularly adolescents, are more vulnerable than others to developing unhelpful gaming habits that can progress to addiction in the absence of protective countermeasures. Public health recommendations have included delaying gaming involvement and restricting screen time during early developmental periods of life. However, the high accessibility and affordability of gaming and other digital technologies across home, work, and school domains has often made such recommendations difficult to apply in practice. There is also increasing demand for clinical interventions, including specialised individual and group-based treatments. This talk will summarise some of the current research and guidelines on treatment and prevention for gaming-related issues, including some critical reflections on what measures appear to be most effective for different groups. Addressing gaming-related problems effectively requires the sustained effort and collaboration of multiple areas of influence including families and peers, schools, health providers, government bodies, and the industries that provide online content. Humanity's increasing reliance on immersive digital technologies is likely to generate psychological, social, and cultural challenges across the developed world for the foreseeable future.

**Yunlong Zhao**

## Development of Scalable Ultrasmall Nanowire Transistor Probes for High-Resolution Brain-Machine Interface

- **Lecturer in Energy Storage and Bioelectronics, Senior Research Scientist, Advanced Technology Institute, University of Surrey, Guildford, Surrey, UK**

New tools for intracellular electrophysiology that push the limits of spatiotemporal resolution while reducing invasiveness could provide a deeper understanding of electrogenic cells and their networks in tissues, and push progress towards high-resolution human–machine interfaces. Although significant advances have been made in developing nanodevices for intracellular probes, current approaches exhibit a trade-off between device scalability and recording amplitude. In this project, we address this challenge by combining deterministic shape-controlled nanowire transfer with spatially defined semiconductor-to-metal transformation to realize scalable nanowire field-effect transistor probe arrays with controllable tip geometry and sensor size, which enable recording of up to 100 mV intracellular action potentials from primary neurons. Systematic studies on neurons and cardiomyocytes show that controlling device curvature and sensor size is critical for achieving high-amplitude intracellular recordings. In addition, this device design allows for multiplexed recording from single cells and cell networks and could enable future investigations of dynamics in the brain and other tissues.

**Fabien Lotte**

## Towards Reliable Brain-Computer Interaction with High Quality User Training

A Brain-Computer Interface (BCI) is a system that enables users to send commands to an application using their brain activity only. A prominent type of BCI is mental task-based BCI, with which users send commands by performing mental tasks, e.g., imagined movements or mental subtraction, that are recognized by the BCI. For instance, a BCI can be used to move a cursor on a screen left or right by imagining left or right hand movements, respectively. BCIs have proven promising for a wide range of applications, including communication and control for motor impaired users, gaming targeted at the general public and stroke rehabilitation, to name a few. Despite this promising potential, BCIs are still scarcely used outside laboratories for practical applications. The main reason is arguably their low reliability. Currently, most of BCI research aims at improving BCI reliability by improving brain signal processing and classification algorithms. However, another key element of the BCI loop should be considered to improve their reliability: the users themselves. Indeed, being able to control a BCI is a skill that needs to be learned and trained. Not only should the machine be able to recognize the user's brain signals, but this user should also produce clear and distinct brain activity patterns. Some users can do so with various performances, some others not at all. An additional promising direction to improve the reliability of BCIs is thus to improve BCI user training. Unfortunately, why some users managed to learn to control BCIs whereas some other do not, or how to favor this learning, is still poorly understood. Moreover, we could show that the current user training approaches are both theoretically and experimentally inappropriate. In this talk, I will thus describe our ongoing work to understand, model and optimize BCI user training. I will present what we know about the main factors influencing this BCI user training, as well as how we can make this training better, for instance by providing multimodal, motivating or personalized feedback. I will also illustrate the importance of such a training in two practical applications of BCI research: for BCI-based post-stroke rehabilitation and to enable a tetraplegic user to participate in a BCI-controlled video racing competition.

## Serge Brand

## Mindfulness-Based Stress Reduction (MBSR); Basic Mechanisms and Applications

- **Professor of Psychology and Psychotherapist, University of Basel: Psychiatric Clinics and Department of Sport, Exercise and Health, Switzerland**

Compared to meditation techniques, Progressive Muscle Relaxation or Autogenic Training, Mindfulness-Based Stress Reduction (MBSR) is a young intervention technique to improve self-control, awareness, calm and a relaxed mind. The aims of the lectures are: 1. Providing a brief overview of the underlying psychological and physiological mechanisms to explain as to why MBSR may have a beneficial effect on psychophysiological processes. 2. Providing an overview, for which individuals with psychological, somatic or psychiatric issues MBSR is rather or rather not indicated.

**Haleh Ashraf Talesh**

## A Good Mentor not Only Makes You a Better Researcher but a Better Human Being.

- **Cardiac Primary Prevention Research Center (CPPRC), Cardiovascular Diseases Research Institute, Tehran University of Medical Sciences, Tehran, Iran**

The word “mentor” was inspired by the character of Mentor in Homer's Odyssey, where Mentor was the counselor of Odysseus and became the trusted guardian and instructor of his son, Telemachus.

Although good mentorship is a prerequisite for success in any medical specialty, in a field like cardiology (my discipline), it is not possible to become a great cardiologist without a great mentor. This may be because of the large diversity of the specialty and the large numbers and varied types of procedures that are integral to the practice of cardiovascular medicine.

In my lecture, I will mention types of mentors that can be instrumental for a mentee and how to choose a mentor according to my personal experience. I think a good mentor not only makes you a better researcher but a better human being. Although this appeared to be routine advice, I have come to realize the importance and the gravity of these words as I have progressed through my training in cardiovascular medicine. Finally, I believe that a mentor-mentee relationship is defined as a “dynamic reciprocal relationship environment between a mentor and a beginner, aimed at promoting the development of both”

Sławomir Sztajer

## Cognition and Religious Thought

- **Employee of the Department of Comparative Research, Adam Mickiewicz University, Poznań, Poland**

The presentation addresses the issue of cognitive technologies and tools that play a role in religious cognition. Contrary to popular opinion, religious belief is not based merely on mental representations and processes inside the brain. To a considerable degree, it emerges through the interaction between brain processes and the external environment. I argue that religious thought can be explained in terms of extended and distributed cognition. Religious concepts, conceptual structures and beliefs are 'anchored' in external structures including material artefacts and social interactions. The extended cognition approach to religious thought helps to explain the origin, distribution, and maintenance of religious representations.

Sudhir Gupta

## Regulatory CD8+ T cells (CD8 Treg) in Health and Disease

- **Professor of Medicine, Pathology & Laboratory Medicine, and Microbiology & Molecular Genetics, University of California at Irvine, USA**

After 4 decades, there is a renewed interest in regulatory CD8+ T cells (CD8 Treg). CD8+ T cells appear to play a role in immune homeostasis and autoimmunity. CD8 Treg regulate the proliferation of both CD4+ and CD8+ T cells, differentiation of naïve CD4+ to effector memory CD4+ ($T_{EM}$) and CD45RA+ terminally differentiated effector memory CD4+ T cells ($T_{EMRA}$), and in suppressi.ng induced CD4 Treg (regulators of regulatory T cells). CD8+ Treg cells mediate their regulatory effect, at least in part, by soluble mediator (s) including against IL-10 and MIP1β and not due to direct cytotoxicity/apoptosis of T cells. Cognate receptor, CTLA-4 may also be involved in CD8 Treg activity. CD8 Treg also inhibit differentiation of naïve T cells to T follicular helper ($T_{FH}$ ) cells, B cell proliferation, and differentiation of B cells to antibody secreting cells and immunoglobulin production. We have further defined cell surface phenotype of CD8 T reg. CD8 Treg are altered in common variable immunodeficiency, selective IgM deficiency, several autoimmune diseases, and human aging.

Surapati Pramanik

## Neutrosophic Numbers: History and Basic Notions

• **Assistant Professor of Mathematics, Nandalal Ghosh B.T. College, West Bengal, India**

This paper deals with neutrosophic numbers. It tries to explain the emergence of neutrosophic sets and neutrosophic numbers from an historical perspective. It appears that neutrosophic sets were bound to appear in dealing with uncertainty, inconsistency and incompleteness. Smarandache reflected and popularized neutrosophic sets mainly in philosophical circles. This paper also scans the basic definitions of neutrosophic numbers, score functions, accuracy functions, certainty functions, and ranking of neutrosophic numbers. Lastly, a survey of variants of neutrosophic numbers and related matters is presented.

Tigran Davtyan

## Herbal Blended Essential Oil Formulation Development for the Treatment of COVID -19

- **Chief scientists , Rhea Pharmaceutical Singapore and Armenia**

Main protease (Mpro): It is also named as chymotrypsin-like protease (3CLpro). Mpro cleaves most of the sites in the polyproteins and the products are nonstructural proteins (nsps) which assemble into the replicase-transcriptase complex (RTC). The crystal structure of Mpro in complex with an inhibitor N3 was downloaded from the PDB database with code of 6LU7 [1]. The target is prepared both for small molecule docking and peptide/antibody docking.

Papain-like protease (PLpro): PLpro cleaves the nsp1/2, nsp2/3 and nsp3/4 boundaries. It works with Mpro to cleave the polyproteins into nsps. The crystal structure of PLpro in complex with peptide inhibitor VIR250 was downloaded from the PDB database with code of 6WUU [2]. As the inhibitor is bound to the interface of dimer in the crystal structure, the dimer form of the target is prepared for small molecule docking. For peptide/antibody docking, both the dimer form and the monomer form are provided on the server.

Helicase (Nsp13): The helicase catalyzes the unwinding of duplex oligonucleotides into single strands in an NTP-dependent manner. It is also an ideal target to develop anti-viral drugs due to its sequence conservation in all CoV species. The structure of helicase was built based on 6JYT, the helicase structure of SARS-CoV [3] with sequence identity as 98.5%. Two sites were described as ADP binding site and nucleic acid binding site by comparing the structure with its homolog ATP-dependent helicase from Saccharomyces cerevisiae with PDB code of 2XZL [4]. Thus we defined two sites for small molecule docking: the ADP binding site (ADP site), and the nucleic acids binding site (NCB site) and prepared the target structure. Helicase is also provided for peptide or antibody docking.

Nonstructural protein 12/7/8 (nsp12/7/8, RNA-dependent RNA polymerase, RdRp): Nsp12 is the polymerase which bounds to its essential cofactors, nsp7 and nsp8. It is important in replication and transcription of the viral genome. The structure of RdRp in complex with RNA and triphosphate form of Remdesivir (RTP) was downloaded from PDB database with code of 7BV2 [5]. Thus we defined two sites for small molecule docking: the RTP binding site (RTP site), and the RNA binding site (RNA site) and prepared the target structure. For peptide or antibody docking, four structures were provided: the complex form of nsp12/7/8, and the single chain of nsp12, nsp7, and nsp8.

Umberto Crisanti

## The Art and Science of Cognitive Behavioural Therapy (CBT)

- **Psychotherapist and CBT Supervisor, Canterbury, UK**

The term Cognitive Behavioural Therapy (CBT) identifies a family of interventions that are widely recognized as the set of psychological treatments with the most extensive empirical support [1]. However, CBT identity has not been static over time, in fact it has been through several distinct reviews, additions and waves. For example, with the arrival of the most recent "third wave", new models and interventions such as Acceptance and Commitment Therapy, Compassion Focused Therapy, Mindfulness-Based Cognitive Therapy, and several others have been included. The metaphor of a "wave" suggested to some that previous generations of work would be washed away, but that was not the intent and that was not the result [2]. These waves can instead be both distinct and cumulative, creating a metaphorical sea swell when working together, while each maintaining its origin and direction.

This exposes CBT psychotherapists and their clients to a curious paradox: on one hand we are using objective data - evidence based approaches. Yet on the other hand, it is the subjective identity, data and experience of the psychotherapist that steers the course of which wave to ride in each moment, that is, which elements of evidence-based interventions are pursued in each therapeutic liaison. We form our identities between potentially problematic interactions between the old and new brain. As we navigate the two, we see the inseparability of art and science in CBT, the interplay between subjective and objective. Developing people's metacognitive awareness and understanding of themselves and others will enable us to become more compassionate and be able to choose to steer our own course.

## Walter Willett

## Creating a Path for Healthy, Sustainable Diets

- **Professor Of Epidemiology And Nutrition, Department Of Nutrition, Department Of Epidemiology, Harvard School Of Public Health, USA**

The world is facing a health crisis due to increasing rates of obesity and diabetes, and the consequences will accumulate over the coming decades. Simultaneously, climate change is accelerating and is already having devastating effects; these changes will undermine the ability to produce adequate healthy food for the world's growing population. A rapid shift away from fossil fuels to green energy is essential, and adoption of diets that largely plant-based must play an important role; this will have major benefits for both human and planetary health. The traditional diets of the Mediterranean region have been shown to promote excellent health and have been sustainable over thousands of years; they can serve as an example that is also enjoyable and satisfying.

Wayne Slater

## What Classical and Modern Rhetorical Theory Offers Thinkers, Researchers, and Problem Solvers in the Sciences and Arts?

- **Associate Professor of Teaching and Learning, Policy and Leadership, University of Maryland., USA**

The claim that classical and modern rhetoric is an intellectual tool useful in explaining the sciences and arts is grounded in a specific epistemological vision: an argument that science and art are just ways of knowing. This claim resides on a fundamental distribution of influence and power in relation to the domains of knowledge. In accordance with this distribution of influence and power, rhetoric constructs a knowledge of science and art, different though not inferior: knowledge of science and art insofar as science and art are persuasive communication. Rhetoric highlights the texts, tables, and visuals of the sciences and arts. In effect, it makes their parsing and comprehensibility central. This is its role in science and arts disciplined inquiry as one discipline among many integrated in a common effort, an alliance of equally formidable intellectual entities: history of the sciences and arts; philosophy of the sciences and arts; and sociology of the sciences and arts. This presentation is intended as a tribute to the durability and flexibility of the rhetorical tradition with the application of its canons to the texts, tables, and visuals of the sciences and arts to scaffold understanding, dialogue, and communication.

Wojciech Krysztofiak

## Logical Processing and Language Taboos

- **Lecturer of Logic and Philosophy, Institute of Philosophy and Cognitive Science, University of Szczecin, Poland**

Each discourse is governed by an inferential mechanism enabling its deductive and hermeneutical processing. The participants in the processes of developing narratives within various spaces of discourse form statements forbidden from different points of view. The sides of the ideological wars accuse each other of offending utterances and forbid the opposite party to articulate some statements classified by them as blasphemy, offense or hate speech. Even logically valid inference acts are often stigmatized in the ideological exchange by the value of blasphemy or offense, which makes them unacceptable to the conflicted parties. History knows many examples of intellectuals who were given the death penalty for uttering forbidden sentences. Therefore the following question arises: is there a logical narrative processing mechanism that triggers in the mind the rejection of logically correct inferences judged to be forbidden?

The lecture will present in a sketchy way a theory describing the logical mechanism of information processing in the environment of forbidden sentences determined by various taboo functions.. Its subject of research are the structures of discourse deduction that evolve over time, transforming due to formal shapes. The elements of these structures are sets of taboo functions, sets of penalty functions and sets of logical consequence operators indexed by taboo functions. Formal concepts, which are defined on the basis of the presented theory, make it possible to describe in a precise language of mathematical logic, among others, phenomena occurring in the processes of developing discourse, such as: ideological wars and conflicts, freedom of deduction and finally terrorization of discourse.

The main idea of the lecture is to show, among other things, that terrorist behaviors inspired by various ideologies (especially religious ideologies) that strongly penalize breaking taboos also have their mental etiology in the hardware, logical structures of the mind responsible for information processing. The realization of this fact by religious communities and appropriate changes in educational techniques regarding the interpretation of cultural texts may contribute to reducing the intensity of ideological wars in our world.

Using the phrase of the Polish Nobel laureate Olga Tokarczuk, we can appeal to educators to teach young people to process content from the point of view of a "sensitive narrator", i.e. one who rejects the taboo functions.

## Amer M. Burhan

**Deciding, Moving and Feeling: What Fits in The Box!**

- **Endowed Chair in Applied Mental Health Research, Associate Professor, Psychiatry at Univ. of Toronto, Adjunct Research Professor, Psychiatry at Western Univ, Canada**

## Tokameh Mahmoudi

**HIV cure approaches from bench to bedside**

- **Associate Professor of Biochemistry, Erasmus MC, Rotterdam (Erasmus MC), the Netherlands**

## Alireza Ahmadvand

**Working in the Interdisciplinary Areas of Public Health Research and Education: Promises and Perils**

- **Senior Lecturer in Primary Care, School of Medicine, Griffith University, Gold Coast, QLD, Australia**

## Shuji Ogino

**Only Trans-Inter-Multidisciplinary Approach Can Solve Complex Problems in Medicine, Public Health, and Earth**

- **Professor of Pathology & Epidemiology, Harvard Medical School & Harvard T.H. Chan School of Public Health; Chief of Molecular Pathological Epidemiology Program, Brigham & Women's Hospital; Associate Member, Broad Institute of MIT & Harvard, USA**

## Amir Qorbani

**Microscopy with UV Surface Excitation (MUSE) for Slide-free Rapid Examination of Surgical Pathology Specimens**

- **Assistant Professor of Bone & Soft Tissue Pathology, UCSF , California, USA**

## Jan Nouwen

**Education and Training during a Pandemic**

- **Chairman of Research Master Programs, Coordinator of Research & Global Health Education, Trainer sub-specialty of Infectious Diseases, Erasmus MC, Rotterdam (Erasmus MC), the Netherlands**

## Emmanuelle Jouanguy

**Genetic predisposition to infections**

- **Assistant professor, Necker Medical School, Laboratory of Human Genetics of Infectious Diseases, Inserm U980, France**

## Carolina Prando

**Transdisciplinarity in the Clinic and Research of Inborn Immunity Errors**

- **Researcher, Department of Genomics and Bioinformatics, Instituto de Pesquisa Pelé Pequeno Príncipe, Curitiba, Brazil**

## Massimo Capaccioli

**The Push of Ulysses for the Construction of the Future**

- **Emeritus Professor, Faculty of sciences, University of Naples Federico II, Italy**

## Alejandro Cabezas-Cruz

**The promising and challenging future of probiotic vaccines.**

- **INRAE, French National Research Institute for Agriculture, Food and Environment, France**

## Monica Lakhanpaul

**Cooperation, collaboration and communication- necessary ingredients for community based research**

- **Professor of Integrated Community Child Health, Pro Vice Provost South Asia, Co Director CHIP (Childhood Infections and Pollution Consortium), UCL Great Ormond Street Institute of Child Health, Faculty of Population Health Sciences, London, UK**

## Jiu Yao Wang

**The Impact of Environmental Factor on the Allergic Disorders in Children**

- **Professor of Pediatrics, Director, Center for Allergy and Immunology Research (ACIR), College of Medicine, National Cheng Kung University, Tainan, Taiwan**

## Ş. Dilek GÜVEN

**Nurse and Nursing for Humanity (Nursing is art and science)**

- **Assistant Professor, Dr. Nevşehir Hacı Bektaş Veli University, Semra and Vefa Küçük, Faculty of Health Sciences, Nursing Department, Fundamentals of Nursing,Turkey**

## Serena Sanseviero

**Distance Learning and the New Frontiers of Knowledge on the Web**

- **Guest Lecturer In Visual Communication And Design Of Communication, University G.D Annunzio Cdl In Design, Corradino D Ascanio Salerno Area, Italy**

## Orkideh Behrouzan

**Mental Health and Society**

- **Senior Lecturer in Anthropology, Director of Studies for MA in Medical Anthropology, SOAS University of London, UK**

## Nasim Annabi

**Clinical Applications of Microengineered Elastic Hydrogels**

- **Assistant Professor of Chemical and Biomolecular Engineering, University of California, Los Angeles, USA**

Amirhossein Takian

**Evidence-informed policy making for sustainable health development**

- **Chair, Department of Global Health & Public Policy, Tehran University of Medical Sciences, Tehran, Iran**

Mojtaba Sedaghat

**Knowledge Transfer and Exchange Strategies: What are the evidences?**

- **School of Medicine, Tehran University of Medical Sciences, Tehran, Iran**

Parvin Pasalar

**The Key to Be Successful in University! What to Do or Not to Do!**

- **Professor of Biochemistry, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran**

Ehsan Rezaei

**The History of Epidemics**

## Shahriar Nafissi

**Professor of Neurology, Tehran University of Medical Sciences, Tehran, Iran**

## Hamidreza Namazi

**Assistant Professor of Medical Ethics, Tehran University of Medical Sciences, Tehran, Iran**

## Azarakhsh Mokri

**Assistant Professor of Psychiatry, Tehran University of Medical Sciences, Tehran, Iran**

## Reza Majdzadeh

**Professor of Epidemiology, Department of Epidemiology and Biostatistics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran**

## Farnoosh Faridbod

**School of Chemistry, University of Tehtan, Tehran, Iran**

## Azim Mirzazadeh

**School of Medicine, Tehran University of Medical Sciences, Tehran, Iran**

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**Assistant Professor of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran**

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MohammadHossein Nekoofar

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Mahnaz Arshad

School of Dentisty, Tehran University of Medical Sciences, Tehran, Iran

Mehrzad Mehdizadeh

School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Mohammad Jalili

School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

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5th Tehran, Iran 2020
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# The 5th International USERN Congress And Prize Awarding Festival

# USERN Congress Meet the Experts Sessions

Nima Rezaei

Professor Nima Rezaei gained his medical degree (MD) from Tehran University of Medical Sciences and subsequently obtained an MSc in Molecular and Genetic Medicine and a PhD in Clinical Immunology and Human Genetics from the University of Sheffield, UK. He also spent a short-term fellowship of Pediatric Clinical Immunology and Bone Marrow Transplantation in the Newcastle General Hospital. Professor Rezaei is now the Full Professor of Immunology and Vice Dean of International Affairs, School of Medicine, Tehran University of Medical Sciences, and the co-founder and Deputy President of the Research Center for Immunodeficiencies. He is also the founding President of Universal Scientific Education and Research Network (USERN). Prof. Rezaei has already been the Director of more than 50 research projects and has designed and participated in several international collaborative projects. Prof. Rezaei is an editorial assistant or board member for more than 30 international journals. He has edited more than 30 international books, has presented more than 500 lectures/posters in congresses/meetings, and has published more than 800 articles in the international scientific journals.

Bahram Mobasher

He is professor of Physics and Astronomy at University of California Riverside.
He has been seriously involved in the Great Observatories Origins Deep Survey (GOODS) and The Cosmic Evolution Survey (COSMOS) projects. He has also been leading parts of the new HST treasury project to survey the core and outskirt of the Coma cluster.

Ajith Abraham

Prof. Abraham is the current Director of Machine Intelligence Research Labs (MIR Labs), which has members from more than 100 countries.
Dr. Abraham's research and development experience includes more than 27 years in the industry and academia. He received the M.S. degree from Nanyang Technological University (NTU), Singapore, and the Ph.D. degree in Computer Science from Monash University, Melbourne, Australia. He works in a multi-disciplinary environment involving machine (network) intelligence, cyber security, sensor networks, Web intelligence, scheduling, data mining and applied to various real world problems.

Azarakhsh Mokri

Prof. Azarakhsh Mokri is professor of psychiatry in Tehran University of Medical Sciences.
He is a professional lecturer who has presented several speeches in psychology, psychiatry. His inspirational talks has attracted many juior students during the past few years.
He was also one of the most cooperative lecturers in USERN events such as mTalks and anniversaries as well.
He has published several book, mostly titling his major research and clinical interest “Quitting Addiction”.

Hans Ochs

Prof. Hans Dieter Ochs is an immunologist and pediatrician. He is Professor of Pediatrics, Division of Immunology, Department of Pediatrics, University of Washington School of Medicine, Seattle.
His clinical interests focus on the use of intravenous and subcutaneous immunoglobulin in patients with antibody deficiencies and the in vivo analysis of antibody production using bacteriophage Phi X 174. He and his collaborators contributed to the identification of several genes associated with Primary immunodeficiency diseases located on the X chromosome, including CD40L, Wiskott–Aldrich syndrome protein, Bruton’s tyrosine kinase, and FOXP3.

Abass Alavi

Prof. Abass Alavi is an Iranian-American physician-scientist specializing in the field of molecular imaging, most notably in the imaging modality of positron emission tomography (PET).
In August 1976, he was part of the team that performed the first human PET studies of the brain and whole body using the radiotracer [18F]Fluorodeoxyglucose (FDG).
He holds the position of Professor of Radiology and Neurology, as well as Director of Research Education in the Department of Radiology at the University of Pennsylvania. Over a career spanning five decades, he has amassed over 2,300 publications and 60,000 citations, earning an h-index of 125 and placing his publication record in the top percentile of scientists.

# USERN Congress Workshops

## Serge Brand

**Professor of Psycology and Psychotherapist, University of Basel: Psychiatric Clinics and Department of Sport, Exercise and Health, Switzerland**

The workshop provides a brief overview of two popular relaxation techniques, namely Progressive Muscle Relaxation (PMR) and Imagination (IM). The theoretical background will be short; the emphasis of the workshop is to learn the basics of these two techniques. At the end of the workshop, participants know why and how PMR and IM work, and they have learned the basic skills.

**Basic Relaxation Techniques (Progressive Muscle Relaxation; Imagination)**

## Benjamin Sovaccol

**Professor Of Energy Policy, Science Policy Research Unit (SPRU), University Of Sussex Business School, UK**

Researchers today need to secure funding, collaborate, share data, publish results, commercialize research, and demonstrate impact. Early career researchers in particular are faced with multiple pressures around these challenges. This presentation will help scholars, especially early career researchers, gain an understanding of how to design their research more effectively, and how to improve your chances to get your work published. Using examples from the energy and climate social sciences field, it will bring attention to the importance of clearly articulating research questions, objectives, and designs. It will provide a framework for conceptualizing novelty. It will suggest codes of practice to improve the quality and rigor of research. It will provide guidelines for improving the style and communication of results. It will lastly discuss what academic (and non-academic) impact are and propose ways to enhance it. In doing so, the presentation will give you first-hand insights into successful research methodologies, what journal editors (and reviewers) look for, as well as advice on how to successfully promote your work.

**Research Design and Codes of Practice for Maximizing the Impact of Social Sciences**

## Lisa Bosman* & Katey Shirey**

*** Assistant Professor of Industrial Engineering, Purdue University, Indiana, USA**
**** eduKatey STEAM Education Consultant, Knowles Teacher Initiative Senior Fellow**

The purpose of this presentation is to introduce participants to bioengineering and bio-inspired design as a way to increase the entrepreneurial mindset through integrated STEAM (science, technology, engineering, art, math). Bioengineering provides a relevant and engaging learning space to explore how holistic assets can support innovation, deepening the need for interdependence between academic disciplines including connections between the arts, science, and engineering. It is proposed that this transdisciplinary approach can strengthen access and equity within the engineering pipeline. We present six integrated STEAM transdisciplinary learning lesson plans, all of which can be used within the K-16 learning environment. This presentation concludes with helping advocates make a case for integrated science learning experiences that capitalize on and leverage bioengineering to grow the entrepreneurial mindset and strengthen scientific literacy.

**Bioengineering as a Vehicle to Increase the Entrepreneurial Mindset**

## Tommaso Dorigo

**First Researcher of Experimental Particle Physics, Italian Institute for Nuclear Physics (INFN), Member of the CMS Experiment at CERN, Padua, Italy**

"While general Artificial Intelligence may be far in the future, application-specific Artificial Intelligence is everywhere, from cellphones to autonomous driving. In the past decade, research in fundamental physics has started to exploit for its special use cases the potential of new machine learning tools and technology, improving the sensitivity of measurements and apparata. The ensuing studies and those very special needs have been bringing new ideas to the fore in computer science, putting the focus on problems whose solution will positively impact society. In this presentation such interplay will be elucidated with examples drawn from research in particle physics."

Artificial Intelligence For Physics Research And Physics Research For Artificial Intelligence

## Shahin Akhondzadeh

**Professor of Clinical Neuroscience, Tehran University of Medical Sciences, Tehran, Iran**

Scientific Writing

## Linda Versteeg-Buschman

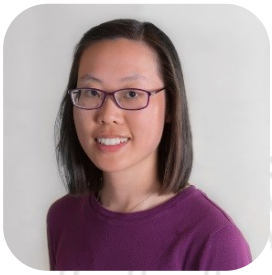
**Sr. Acquisition Editor at Elsevier, Elsevier B.V. Registered Office, Amsterdam, The Netherlands**

Publishing Books With Elsevier

## Amirhossein Takian

**Department of Global Health & Public Policy, Tehran University of Medical Sciences (TUMS), Tehran, Iran**

How to Write a Professional Motivation Letter and Resume?



## Shirin Moossavi* & Deborah Chan**

*** CIHR Postdoctoral Fellow, Department of Physiology and Pharmacology and Biomedical Engineering, University of Calgary, Canada**
**** Registered nurse and current Master of Science in Public Health Student, McGill University, Canada**

Critical Thinking For Transformative Research

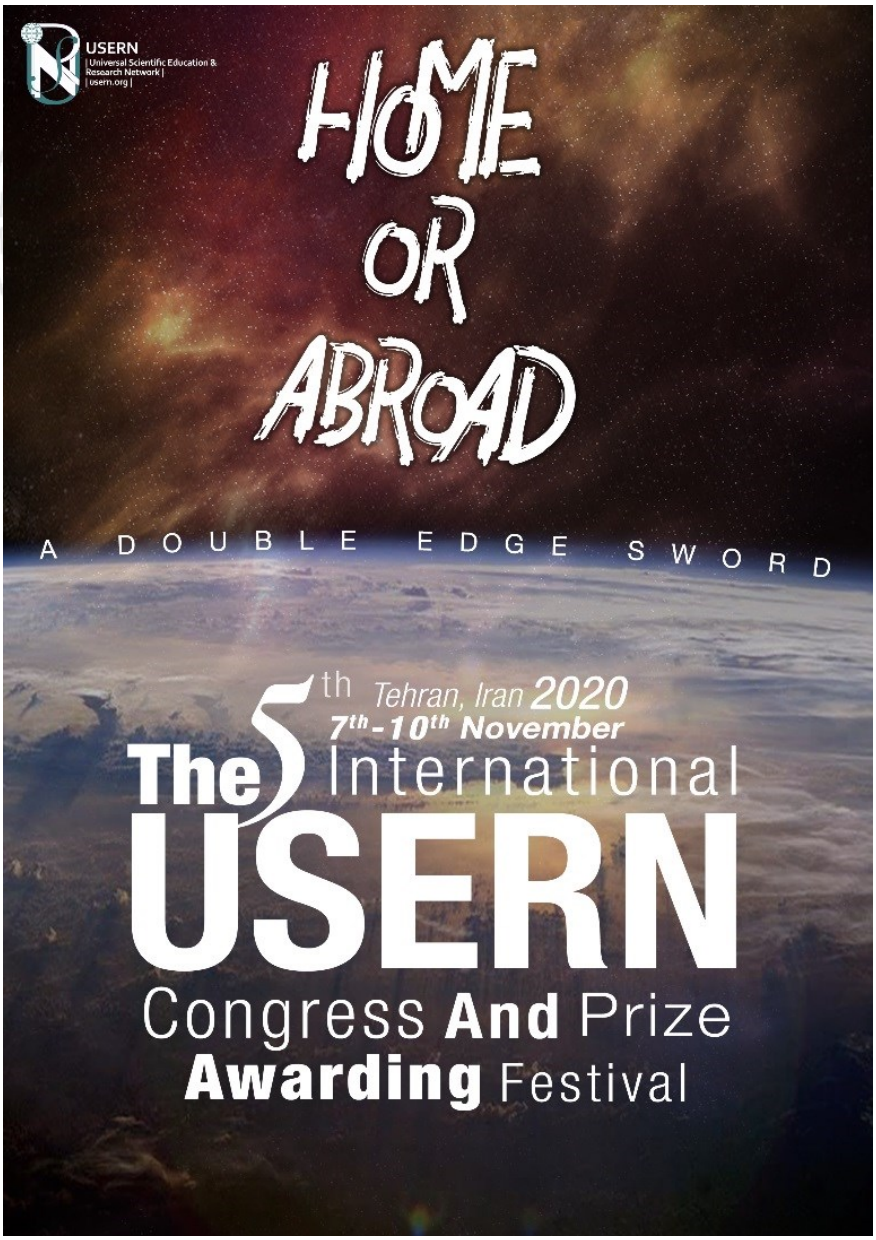
## Alexander Leemans

**Associate Professor of Medical Imaging, Image Sciences Institute, University Medical Center Utrecht, the Netherlands**

Investigating the Brain with Explore DTI

# USERN Congress Panel Discussions

## Home or Abroad: a Double Edge Sword

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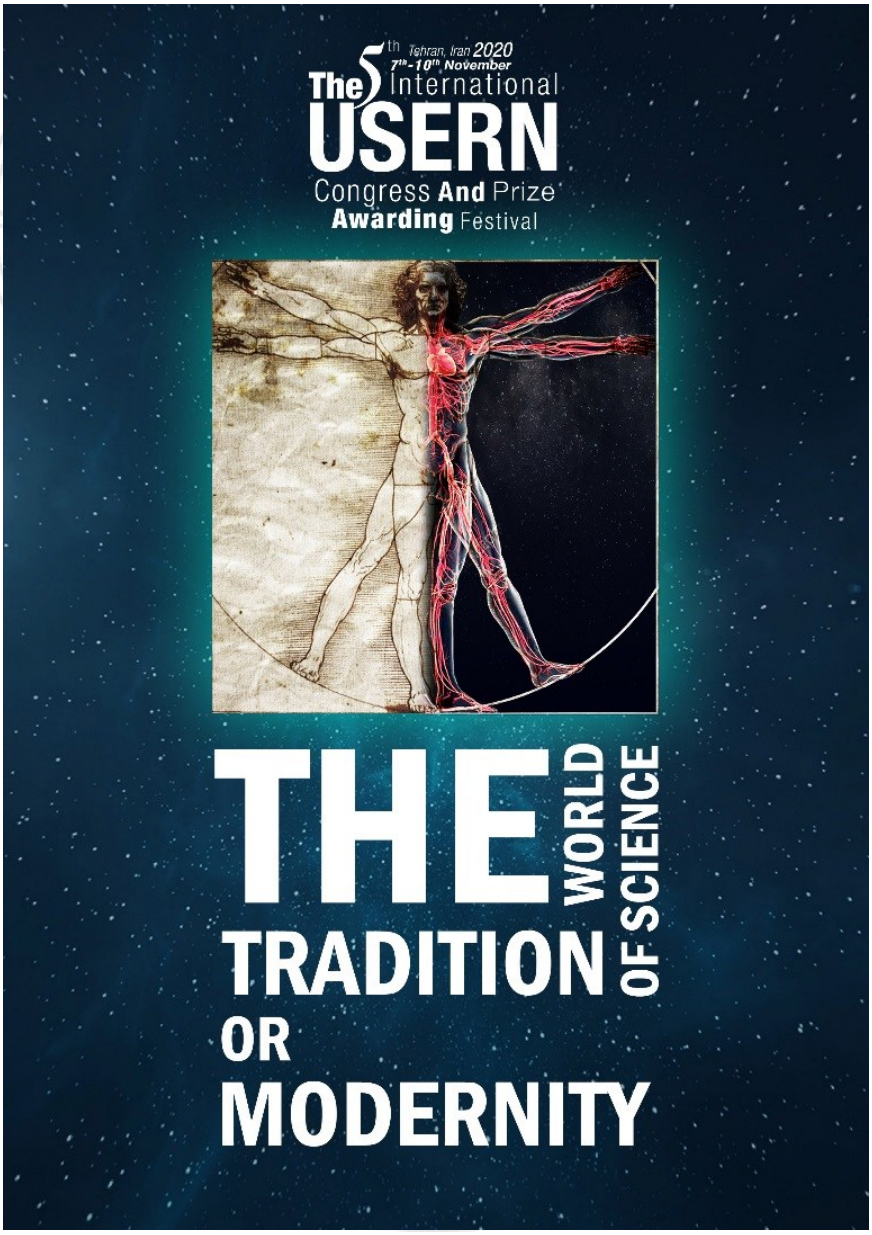
## The World of Science: Tradition or Modernity?

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# USERN Junior Talks (UJTs)

Leila Jahanshahlu

**Monoclonal antibodies as a potential anti-COVID-19**

Leila Jahanshahlu*, Nima Rezaei
**School of medicine, Zanjan University of Medical Sciences, Zanjan, Iran*

Coronavirus disease 2019 (COVID-19) is expanding rapidly, which made it as one of top priorities for scientists to develop novel treatment strategies. Researchers are racing to develop treatments based on antibodies to block and/or neutralize the coronavirus in affected patients. Initially, the genetic and structural similarity of the virus to severe acute respiratory syndrome coronavirus (SARS-CoV) created the potential for understanding disease pathogenesis. Researchers have published reports of specific monoclonal antibodies against to COVID-19 (B38, H4, 47D11) and hope that this method is effective. As well as studies on patients who are plasma therapy, the patient's condition shows improvement. The evidence for these studies is very promising and demonstrates the potential of monoclonal antibody therapy as a therapeutic approach and prevention of covid-19 infection.

Heliya Ziaei

**COVID-19 Effects on the Dental Setting: Which points should be considered?**

Heliya Ziaei
*School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran*
*Universal Scientific Education and Research Network (USERN), Tehran, Iran*

Coronavirus disease (COVID-19), which was first diagnosed in China in late 2019, has become a global concern due to its high transmissibility and lack of definite treatment and management. This viral infection can be transmitted via respiratory droplets and aerosols and also close contact with the patients. Besides, saliva samples can show positive results in laboratory tests in COVID-19 patients because the presence of this virus in saliva has been proven, especially in the initial days of the infection. Body fluids such as saliva, blood, and conjunctiva can be the main transmission routes in the dental clinic. Most dental procedures are high aerosol-generating in nature, such as scaling and root planning, working with high-speed handpieces, usage of 3-way air-water syringes, etc. Dentists and oral healthcare workers are highly predisposed to be infected because they have a close face-to-face relationship with the patients. This transmission between dentists and patients makes it crucial to implement precautionary interventions to reduce the transmission rate during the pandemic. Accordingly, high standard infection control protocol and precise triage of the clients to the dental centers should be considered. Postponing non-emergent dental procedures is mandatory during the pandemic. Teledentistry, as a sub-branch of telemedicine, is a facilitative modality for patient selection in dentistry, which can help the health system and policymakers to reinforce infrastructures for this health subgroup. During quarantine, teledentistry has the privilege to prevent isolation feeling in certain groups of patients, including geriatrics. This study sought to present an overview of the latest guidelines and disciplines for dental practitioners, the most effective preventive measures, and the usage of teledentistry during the outbreak.

## Mahdi Mohammadi

**How Artificial Intelligence can help in a pandemic situation?**

Mahdi Mohammadi
*Imam Khomeini International University, Qazvin, Iran*

"Healthcare is one of the most important fields AI is going to transform. Last year we announced our work on diabetic retinopathy. This is a leading cause of blindness, and we used deep learning to help doctors diagnose it earlier. And we've been running field trials since then at Aravind and Sankara hospitals in India, and the field trials are going really well. We are bringing expert diagnosis to places where trained doctors are scarce," - Sundar Pichai, The Chief Executive Officer(CEO) of Alphabet/Google, 2018 Google I/O conference.

The word Artificial Intelligence is widely heard nowadays. So, what is the mystery? Can it be used in healthcare affairs? Regarding what Pichai said, Artificial Intelligence is changing the future of Medicine.

At a glance, (AI) in healthcare is the use of to emulate human in the analysis of complicated medical data. Specifically, AI is the ability of computer algorithms to approximate conclusions without direct human input. What distinguishes AI technology from traditional technologies in health care is the ability to gain information, process it, and give a well-defined output to the end-user. AI does this through.

Due to the mentioned context, How AI can be a global pandemic game-changer? Are there any AI solutions for this outbreak situation that humanity has faced in COVID-19?

"AI diagnosis for predicting the likelihood of COVID-19 without testing" is a viral topic in AI discussion forums and scientific societies. There are significant numbers of researches, such as the COVID Symptom Study, which are trying to investigate which symptoms known to be associated with COVID-19 were most likely to be associated with a positive test.

The researchers are working on building and deploying mathematical models that can predict whether an individual is likely to have COVID-19 based on their age, sex, and a combination of four key symptoms: loss of smell or taste, severe or persistent cough, fatigue, and skipping meals.

Obviously, the advantages of AI are known in tech-communities that are using AI to improve healthcare standards. At last, these were why we need AI in various fields, especially in the COVID-19 global pandemic for three main phases: 1) Diagnosis, 2) Risk stratification, and 3)Treatment suggestions.

## Mostafa Kamali

**COVID19, The Earth Restart button**

Mostafa Kamali
*Faculty of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*

The outbreak of coronavirus disease (COVID19) in mid-December 2019 in Wuhan, China poses a challenge to the world. Although coronavirus is more commonly known as a fatal virus that affects the human respiratory system, it seems to have deeper effects on humanity. What sets the SARS-COV-2 virus apart from other microorganisms that similarly involve the lungs and endanger human lives? Can the Coronavirus be considered as a trigger to start the Earth restarting process? If we consider the major extinction events as the big restarts that have occurred on earth, is there any connection between the coronavirus and the sixth mass extinction? In this article, we're going to look at the Coronavirus, not as a cause for pneumonia, but as an earth restart button.

Parinaz Sedighi

**Research in COVID-19, A Symbol of Science to Society in Medicine**

Parinaz Sedighi
*Student Research Committee, Hamadan University of Medical Sciences, Hamadan, Iran*
*Universal Scientific Education and Research Network (USERN), Tehran, Iran*

Introduction: Coronavirus disease 19 (COVID-19) that is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first defined in December 2019 in Wuhan, China. Since then, the infection has spread worldwide and the World Health Organization (WHO) announced the pandemic on 11 March 2020. While WHO declared the infection as a public health emergency and international concern, various researches have been conducted across the world about different aspects of the disease on society and human lives. The rapid emergence of articles about prevention, treatment, social complications, and many other aspects of COVID-19 demonstrated the importance of novel science to global health.

Main Text: Researches about different perspectives of the COVID-19 pandemic have emerged rapidly and increased our knowledge to encompass various challenges like difficulties about prevention and treatment, social distancing, virtual learning, and emotional distress. The approach to disease has changed a lot along the time, for example, we thought that hydroxychloroquine can help to treat the infection but later researches demonstrated that there is no significant improvement with this drug. Also, we were expecting that by the summer spread of infection will be limited but there was no significant decrease in the rate of transmission. The other wrong belief was acquired immunity after infection acquisition and ideas about herd immunity that has changed since we found that COVID-19 may not create acceptable long term immunity. Also, in the first months of the pandemic, we thought that children might not be affected by COVID-19; however, later we found that children are affected and they present some different manifestations such as multisystem inflammatory syndrome. All these changes in the approach to disease along with new researches showed us how much scientific experience can help to revise previous wrong information and improve global health, therefore, in any area of science we should not prejudice the old information and we should always be critical thinkers. During the COVID-19 pandemic, social health literature has improved, which means that if scientists report the results of their researches in general language they can assist to increase public knowledge about health. Before the appearance of the novel coronavirus, results of new researches usually were published with a delay, also applying the new science in medical practice always has been accompanied by hesitation. The new challenge with COVID-19 thought us that we can proceed much faster in various areas of science. Electronic learning (E-learning) and virtual learning have been popularized nowadays which showed a potential for rapid information exchange worldwide.

Conclusion: The COVID-19 pandemic, besides its destructive effects on health, economy, and many other aspects of human life, thought us some new points. It was a trigger for development of E-learning and global spread of new science between specialists. Also, knowledge translation for the general population along with new researches leads to rapid implantation of new science in society. Translating verified knowledge for the general population can lead to better outcomes in terms of infection control but people must be aware of two important points. First, people should be immunized against misinformation and know the reliable sources of information since the inaccurate news can endanger their health and cause emotional distress. Second, people should not lose their trust in medical researches and instructions as they change rapidly. These alterations demonstrate the positive effects of scientific experience on our life and avoiding previous errors.

Zahra Kolahchi

**Intravenous Immunoglobolin Therapy in COVID-19**

Zahra Kolahchi*, Sara Ekrami Nasab, Hesan Jelodari Mamaghani, Maryam Keyfari Alamdari, Hanye Sohrabi, Nima Rezaei
**Students' International Committee of Medical Schools (SICoMS), School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*

Since the outbreak of the novel coronavirus disease (COVID-19), the therapeutic and management options to reduce the burden of the COVID-19 disease are under investigation. In line with the previous experiences in respiratory syndromes outbreaks, intravenous immunoglobulin (IVIG) has been shown to be effective in several COVID-19 patients. Some possible mechanisms through which IVIG appears effective are controlling the hyperreactivity of the immune system and neutralization of the virus antigens. Although further studies are yet to be performed, reports of the COVID-19 cases suggest an early administration of IVIG in combination with low molecular weight heparin and antiviral therapy to dampen the fever and impede the progression of the disease to the severe stage.

Faezeh Soveyzi

**The role of herbal medicine in COVID-19**

Faezeh Soveyzi
*Tehran University of Medical Sciences, Tehran, Iran*

Due to the fact that no vaccine or drug has been approved for the treatment of Covid-19, herbal medicine with a wide history of anti-viral effects may play a role in supplement therapy of this disease.
Ginkgo biloba is one of the herbal peptides/proteins and Ginkgolic acids (GA) are taken from it. Some of Both enveloped and non-enveloped viruses would be affected by the lethal properties of GA by inhibiting the synthesis of protein and DNA.So due to GA's antiviral effects, it might be used in acute phase of Covid-19 infection.Among the bioflavonoids that found in most plants Quercetin could be mentioned due to antiviral and inhibitory effects on SARS-CoV 3CLpr. 3CLpr in SARS-CoV and Covid-19 are similar so it is expected that Quercetin has anti-Covid19 effect too. The interesting thing is that Quercetin has the potential to bind with spike proteins and ACE-2. Since the Coronavirus protease plays an important role in pathogenesis and virus spread, inhibiting such enzymes may be another important way. Aloe-emodin is an agent which is taken from the Aloe plant could be used as a crucial protease inhibitor.

Samin Sirous

**Management of dental emergency patients during COVID_19**

Samin Sirous
*School of Dentistry, Islamic Azad University of Isfahan (khorasgan), Isfahan, Iran*

Introduction: The human coronaviruses, have the potential of binding to the host cell receptors and infecting the cells by injecting their RNA genome directly or use the endocytic pathway. A novel of highly contagious corona virus was identified in late 2019, which scientists have named this as the seventh member of the human corona virus. Dentists, patients, and dental staff are highly in the danger of exposure to pathogen microorganisms through the contact of maxillofacial mucous with the infected blood, and infected patient respiratory secretions.
This literature focuses on emergency dental practices during the Covid-19 disease pandemic.
Method and Materials: An electronic data search was conducted through PubMed and Google scholar. The search period time was divided into two categories based on the information needed. The articles then selected through three steps study.
Results: Dental infectious control must be strictly done, due to the high chance of fronting dental staff with the infection. Personnel self-hygiene and hand care may be considered as the most important role in infection control in dental practices. The transmission routes of SARS-CoV-2 have a high similarity with SARS disease. There is some special infectious control consideration which is highly recommended to be done during the virus pandemic.
Conclusion: It is mandatory to avoid all elective dental procedures during the Covid-19 pandemic. In cases of dental emergency all protective protocols must be considered focusing on virus transmission route block and dental staff is mandatory to have adequate information on disease.

Mobina Fathi

**Broca's aphasia**

Mobina Fathi
*Student Research Committee, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran*

The syndrome called Broca's aphasia is also known as motor or non-fluent aphasia, People with Broca's aphasia have difficulty saying anything, often pausing to search for the right word. The inability to find words is called anomia (literally meaning "no name"). Interestingly, there are certain "overlearned" things Broca aphasics can say without much hesitation, such as the days of the week and the American Pledge of Allegiance. The hallmark of Broca's aphasia is a telegraphic style of speech, in which mainly content words (nouns, verbs, and adjectives carrying content specific to the sentence) are used.
In contrast to the speech difficulties in Broca's aphasia, comprehension is generally quite good. However, more difficult questions demonstrated that people did not have completely normal comprehension abilities. If the person was told "The lion was killed by the tiger; which animal is dead?" or "Put the cup on top of the fork and place the knife inside the cup," he had difficulty understanding. This was probably related to the fact that he generally had trouble with the function words "by" in the first example and "on top of" in the second example. It all shows how much important our ability of speaking is.

## Kawthar Mohamed

**A sui generis journey**

Kawthar Mohamed
*School of Medicine,Tehran university of medical sciences, Tehran, Iran*
*Universal Scientific Research and Network(USERN), Manama, Bahrain*

We are going through a surprising journey that doesn't resemble any other journeys you experienced before.
Just think about it there's a hidden world inside your body. Thousands of cells and molecules are working in a synchronized way just to make you what you are.
This presentation is not able to talk about the whole story in this limited time. As a result, we will only talk about a very brief topic which is our eyes, and specifically the iris. Hope you enjoy this journey!

## Haniah Yavarpour-Bali

**Direct conversion of somatic cells towards oligodendroglial lineage cells: A novel strategy for enhancement of myelin repair**

Maryam Nakhaei-Nejad, Maryam Ghasemi-Kasman, Azadeh Yazdi

Oligodendrocyte precursor cells (OPCs) are considered as the main cell source for myelination in the central nervous system. Following demyelination, proliferation, migration, and differentiation capability of endogenous OPCs remarkably increase leading to remyelination in damaged areas. Despite the beneficial impacts of resident OPCs for myelin repair, the capacity of endogenous repair is low and insufficient. Therefore, several strategies have been developed to improve endogenous myelin repair. Although stem cell therapy has been introduced as a promising strategy for neurodegenerative disorders, but several limitations such as cell rejection, teratoma formation, and ethical concerns have hampered the extensive application of stem cells in clinic. In recent years, direct conversion of fully differentiated somatic cells into desired cells in the lesion area has opened a new era in regenerative medicine. In addition to direct reprogramming of somatic cells to neurons, recent evidence have also demonstrated that somatic cells, including fibroblasts and astrocytes, can be directly reprogrammed to OPC-like cells by overexpression of some specific transcription factors, microRNAs, or application of small molecules. Interestingly, induced OPCs differentiated to myelinating oligodendrocytes that could effectively ensheath the host axons. In the present review article, the current advancements in direct conversion of somatic cells towards oligodendroglial cells have been discussed both in vitro and in vivo.

Melika Lotfi

**Is multiplex genome modification of astrocytes a novel candidate therapy of chronic ischemic stroke in the rat?**

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Introduction: Stroke is an enervating injury to the brain happening. The most common type is hemorrhagic There are no definitive FDA-approved treatments for chronic ischemic stroke without any side effects. Therefore the search for new therapies is vital. The main goal of this hypothesis is to improve the complications of chronic ischemic stroke in induced SDrat model by intraluminal suture MCAo utilizing combining cell and gene therapy. Based on the Stroke Treatment Academic Industry Roundtable, stroke is one of the most complex illnesses. Therefore, we offer to make a new version of astrocytes by making some changes in their multiple functions.
Description: A gene profile including IL-38 which is the most modern anti-inflammatory agent , BRAG-1 as an anti-apoptotic gene, complementary scaffold RNAs for theirs expression by deadCas9(dCas9), complementary scaffold RNAs of LZK and MST-1 for theirs deletion and, dCas9 gene. LZK is responsible for astrogeliosis. So it may be beneficial to omit LZK. The inhibition of MST-1 can help in preventing hypoxic death of cells with BRAG-1 and natural angiogenesis of astrocytes by secreting VEGF. The last gene, dCas9 gives us the opportunity of simultaneous activation and suppression of different genes by extended single guide RNAs or scaffold RNAs with the least off-targets. Moreover, astrocytes have a crucial role in the regulation of plasminogen activation in CNS by providing a surface for tissue plasminogen activator and fibrinolysis which prepare the ischemic area with the inhibition of LZK for the natural migration of NSC which can enhance motor function improvement.
Discussion and conclusion: In conclusion due to the using of dCas9 it is not expected to have some off-targets but if there are some side effects it is possible to switch it off by anti-CRISPR proteins.

Homa Pourriyahi

**Suicide: Is there a way out?**

Homa Pourriyahi
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With the increasing rates of depression and suicidal behavior in our community, it felt vital to learn about ways to prevent or treat these ideations; but upon study, it was indisputable that the medications regularly used in the treatment of depression have serious limitations, namely delayed onset of therapeutic effect and low rates of efficacy; so what can we do in the face of psychiatric emergencies like suicide?
This is when rapid-acting antidepressants come into play.

Mohammad Javad Kamali Ashtiani

**Why are most scientific presentations boring?**
Mohammad Javad Kamali Ashtiani

Giving presentations is a vital key to professional success in academic environment. A good talk can advertise your work, advertise you, and connect you with other scientists. Also, through a wonderful presentation the audience would read (and cite) your papers. Furthermore, an effective scientific presentation is of great significance in connection between science and society. One of the most important reason of the gap between science and society is absence of pleasant presentation which is necessary for everyone who is in scientific environment. Every scientist has had the pleasure of hearing sleep-inducing, data-laden presentations which almost all of them were boring. While there may be a great point in even the most boring presentation, this point can get lost in the overall dullness of the delivery. No one wants to be the person giving the boring talk, right? So why do many scientific presentations induce sleepiness in the audience? This question was a motivation to write this essay.
However, a good talk is not easy to deliver, and it is rare to see a talk that could not be improved. I base my opinions, strong as they may be, on giving more than hundred talks and listening to thousands of them, some better than others (both given and heard). There are couple of reasons which makes presentations boring such as: a) Lack of a scenario through the presentation and they do not follow a story or trajectory. b) Lack of proper start and end. c) Lack of interaction with audience, d) Ugly slides. e) Bad time management, and etc. Giving presentation is a kind of skill which everyone can achieve it by practice and enhance it according his/her creativity. As I said this essay based on my personal experiences so do not treat this as a consensus from the scientific community. I bring some tips that using them can improve your presentation skills. My advice on scientific presentations applies mostly to talks at scientific meetings, but works equally well for lectures, seminars, thesis defenses, and job talks.

Negar Moradian

**Digital health and the challenges of health system transformation**
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As we enter the technology era of health care, emerging health innovations offer significant opportunities to improve the quality of clinical practice and clinical research. In light of “digital health”, we see multiplying numbers of web platforms and mobile health applications, often brought by new unconventional players who produce and offer services in non-linear and non-hierarchical ways, by multiplying access points to services for people. Through this context, new challenges have been emerged, which questions whether healthcare systems can cope with new data regulation and governance, new businesses and economic models or not. Countries must put in place adequate responses so that public health, increasingly focused on emerging technology, can benefit all.

Fatemeh Afsharchi

**Education and entertainment via animation**

Fatemeh Afsharchi
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It might seem like education and entertainment don't have much in common. one aims to educate and cultivate knowledge and the other aims to amuse. But the path of education and entertainment do in fact meet and overlap to create a hybrid called edutainment (education + entertainment). Edutainment can come in many different forms; mainly movies and games and of course animation!
Japanese animation is a perfect example of an elevated form of entertainment which I will be further examining in my presentation.

Marziye Rezaei

**Temporomandibular Disorders (TMD): Heritable or not?**

Marziye Rezaei
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The aim of this Talk is to review the literature on candidate genes for temporomandibular joint disorders (TMD). Mandibular disorders are one of the most common birth defects in humans, although the etiological factors are largely unknown. Temporomandibular disorder (TMD) is a musculoskeletal problem that associated with pain and reduces function in the TMJ and it causes chronic orofacial pain. The molecular mechanisms are complicated and doubtful.Temporomandibular disorders (TMD) have different reasons such as environmental factors and perhaps heritable genetic component, although the exact causes of temporomandibular disorders(TMD)are unknown but there is controversy for genetic pathogenesis of temporomandibular disorders (TMD). Several reports show a familial interference in the signs and symptoms of TMD. PubMed and google scholar were searched using the keywords for studies related to the topic that published(limiting the search to English language and humans). Candidate genes for TMD include genes for individual variations in pain perception, gender and ethnicity, proinflammatory cytokines, female hormones, breakdown of extracellular matrix, folate metabolism, syndromic forms of TMD, serotonin activity and metabolism, T cell receptor pathway, catecholamine activity and metabolism, glutathione activity, ANKH gene and major histocompatibility complex. A total of 17 articles were first identified, 9 of which were considered relevant to the topic. Many gene polymorphisms were shown to be associated with a higher or lower risk of TMD($p$ value$<0.05$).This new understanding of the pathophysiology of TMD can lead to a different treatment and drug approach by identifying the subjects at higher risk for this pathology and expression of the genes that enhance such risk. Most of the studies on genetic variation contributing to TMD has an immune-inflammatory perspective. Studies showed different results about the effects of genetic on tempromandibulardisorders(TMD),some of them approve and others don't .Studies about this subject are not complete and they are limited. By increasing of the sample size, more studies should be done.

## Moein Azizi

**The advantages and disadvantages of clear aligners compared with fixed orthodontic appliance**

Moein Azizi
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*Dental Students' Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran*

With the increasing demand of orthodontic treatments in adult, clear aligner therapy (CAT) has increased because of its superior comfort and esthetics, while its advantages and disadvantages remains unclear. The aim of this review was to investigate the advantages of this relatively new technique compared with braces.
A comprehensive search of PubMed, Embase and Scopus was conducted. Recent reviewed articles and other scientific literatures answering our main objective were compiled.
CAT offers better oral health, less pain, lower incident of white spot lesions, root resorption and gingivitis. Whereas braces are better at producing adequate occlusal contacts, controlling teeth torque and retention.
Both CAT and braces have their own advantages, nevertheless, further research are needed to assess this progressive technique.

## Fatemeh Kamali

**Does coffee effect on oral health or not?**

Fatemeh Kamali

Coffee is one of the most popular drinks in the world. Most of us have interesting to drinking coffee but how much do we know about the effects of coffee?
We know that coffee has good and bad effects but in this presentation we want to take e look at the effects of coffee on the mouth.

## Parisa Bayat

**Evaluating an aesthetical smile**

Parisa Bayat
*School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran*

Face is the quickest recognized physical section of people. An aesthetical smile has ever been an attractive and desirable element. We know that evaluating beauty is always subjective. But some factors are proven to be very important in a perfect smile. Beside psychological and emotional aspects of smiles, in a smile analysis, we should look at all the factors that compose a smile; like the shape of a smile, the size, the smile line, and the position of teeth, lips, and gums when a smile is produced. In this presentation we take a quick look at these factors.

Mahshad Saie

**Fluoride in society: Myths and facts**

Mahshad Saie
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Despite six decades of research about fluoride and recognition of its role as the cornerstone of oral health, questions and debates regarding its pros and cons have risen. This presentation will tackle some concerns about fluoride as well as give a brief review of its benefits.
Fluoride is used for dental carries reduction; it remineralizes the tooth structure and creates fluorapatite, which is less susceptible to cariogenic elements. After a tooth decay has been established, fluoride will help impair the progression of the lesion. High concentrations of fluoride can also interfere with cariogenic bacterial metabolism. It has also been demonstrated that optimal fluoridation levels may lower overall bone fracture risk. In general, fluoride is used and delivered in two forms: systematic (community-based, supplements) or topical (toothpastes, oral rinses and professional application). Of all methods tested so far, fluoridated water is by far the most successful method to deliver fluoride in a community-based manner. Other methods are also recommended for preventive measurements. However, the limitations of the anti-caries effect of fluoride need to be considered. Fluoride does not interfere with the factors responsible for caries, namely bacterial accumulation and sugar use. Also, for it to have an anti-bacterial effect, it should have a remaining concentration above 10 ppm in the oral cavity. The latter is achieved via topical methods. Concerns regarding fluoride usage are mainly targeted towards systematic fluoride intake (water, salt and milk fluoridation). Fluorosis has been seen as a concern when it comes to water fluoridation. If high systemic concentrations of fluoride are used, it can cause fluorosis; which is a degenerative and progressive disorder that adversely affects several organs including teeth, bones, thyroid, kidney, liver, lung and brain. Water fluoridation may result in development of dental fluorosis but most of it is mild and not considered to be of aesthetic concern, thus, the benefits of this method outweigh its cons. Also, the existing literature has shown there is no clear association between water fluoridation and overall cancer incidence or mortality. In conclusion, fluoride can be extremely beneficial, especially for prevention of dental caries; but it should be used and administered in safe levels.

Sanaz Rahimi

**Why everyone should start a startup**

Sanaz Rahimi

The new world of businesses has taken on new perspectives. This leads to greater efficiency and dynamism of businesses and the economy.
The main question is how to maintain prosperity in the field of business in the current economic conditions and at the same time create a good labor market?
The author suggests a model by mentioning examples from the main body of Iranian business.

Sanam Alilou

**The Relationship between Pre-procedural Lipid Profile and Peri-procedural Myocardial Injury in Patients Undergone Elective Percutaneous Coronary Intervention**

Mohsen Maadani, Nima Sari Sarraf , Sanam Alilou*, Parham Sadeghipour, Ali Zahedmehr, Ata firouzi, Mahmood Sheikh Fathollahi, Kamran Aeinfar, Seyyed Isa Hashemi Ghadi, Mohammad Javad Alemzadeh-Ansari, Alireza Rashidinejad, Zahra Hosseini, Farshad Shakerian, Reza Kiani, Majid Maleki, Abbas Zavarehee , Maryam Zolfaghari , Reza Zolfaghari
**Student Research Committee, School of Medicine, Iran university of Medical Sciences, Tehran, Iran*

purpose: Along with technological progress in coronary intervention, peri-procedural myocardial injury is known to be a predictor of post procedural cardiovascular morbidity and mortality following a percutaneous coronary intervention. However, the correlation between lipid profile levels and PMI is still unclear. In this study, We planned to evaluate the effect of pre-procedural lipid profile levels including Low-density lipoprotein, high-density lipoprotein, and triglyceride on patients undergoing elective coronary intervention.
Methods: This prospective study was conducted on 977 consecutive patients with a diagnosis of CAD who underwent elective PCI. Cardiac troponin was used to assess perioperative myocardial injury. Samples for serum lipid profile were collected 12-14 hours pre-procedurally. The peak of cardiac troponin was collected 1, 6, and 12 hours post procedurally, and the correlation between cardiac troponin value and perioperative lipid profile was studied.
Results: There were no statistically significant differences in terms of lipid profile categories across troponin levels (P>0.05). Patients with troponin≥5 times of upper limit normal had significantly lower ejection fraction than patients with troponin<5 times of upper limit normal (P=0.011). Patients with 2 and 3 vessel disease were more likely to have troponin≥5 times of upper limit normal (P<0.001). Multivariable logistic regression analysis revealed the lack of association of lipid profile categories with post-procedural troponin elevation.
Conclusions: Our study demonstrated that lipid profile was not associated with perioperative myocardial injury. However, low ventricular ejection fraction, and number of vessel disease could be as predictors of post procedural cardiac troponin elevation.

Mohammad Hossein Jadidinezhad

**The secrecy of successful people: why someone's hit all success?**

Mohammad Hossein Jadidinezhad

Why are some people always successful in all fields?
To be able to answer this question, we must take a deep look at the personality and intellectual patterns of successful people. In this presentation, we get acquainted with the models of people who, while winning the Olympiad medal, were able to become the first student in the Kharazmi Festival, the entrance exam, student festivals and even becoming the first student in the university; Earn honor.
What is the difference between these people and others?

MohammadMostafa Aghamohseni

**Intraoral mesenchymal stem cells for periodontal tissue regeneration**

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Introduction: Periodontal disease is a chronic inflammatory condition of the periodontium that is characterized by irreversible destruction of the tooth attachment and its surrounding bone. The disease state, if left untreated, can lead to progressive loss of gingival tissue, periodontal ligament, and supporting alveolar bone, ultimately resulting in an aesthetically and functionally compromised dentition. The pathogenesis of periodontal disease involves a complex interaction between the host's immune response to microbial colonization and modifying host factors, including tobacco smoking and genetic susceptibility.

The ultimate goal of periodontal therapy relies on the achievement of complete restoration of all components of the periodontium to their original architecture and function. Numbers of different procedures have been described. To describe the latest trends, the principles of these different treatment approaches include the use of graft materials to compensate for the bone loss incurred as a result of periodontal disease.

Materials and methods: this review has been done by searching in electronic databases including PubMed and current released articles and using" dental stem cells"," stem cells, and periodontology", and "regenerative medicine" as keywords.

Results: Dental-tissue-derived mesenchymal stem cell-like populations are among many other isolated and characterized stem cells residing in specialized tissues. There has been a considerable amount of research conducted to assess the regenerative capacity of PDLSCs in a range of dental and craniofacial defects in various animal models. It is evident from these studies that implanted PDLSCs generate cementum and periodontal ligament-like structures similar to native periodontal complex. In a very early study, autologous re-implantation of extracted dental roots lined with PDL cells in minipigs resulted in the formation of connective tissue, resembling PDL, and mimicking the orientation of the fiber bundles, within four weeks of implantation.

Conclusion: To date, extraoral and dental-tissue-derived stem progenitor cells have been used for tissue engineering studies in small and large animal models to assess their potential in preclinical applications. While there may be an overwhelming body of evidence to support the notion that MSCs can be used for periodontal regeneration, there are several main objectives that need to be addressed before the development of effective cellular-based therapies for regenerative dentistry.

## Zahra Souri

**HDAC expression in uveal melanoma**

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Purpose: Histone deacytylases (HDACs) can be a target for therapy in oncology. We determined the expression of HDACs in Uveal Melanoma (UM) to see whether expression differed between low and high risk tumors and whether their expression is related to survival.
Methods: The expression of nine HDAC's was determined using an Illumina HT12V4 array in 64 primary UM. Tumors were divided into BAP1-positive or -negative based on immune-histochemical nuclear staining. Survival status was determined using Kaplan-Meier analyses, using the time period between enucleation and death (mean 83 months).
Results: High risk BAP1-negative UM (n =30) showed a higher expression of HDAC4 (P =0.003) and HDAC8 (P ≤0.001), and a decreased expression of HDAC11 (P ≤0.001) compared to BAP1-positive UM (n =25). When analyzing survival, we found that a high HDAC8 (P =0.002) and low HDAC11 (P =0.002) expression were associated with a lower overall survival.
When we looked at HDAC inhibition on three uveal melanoma cell lines, the pan-HDAC inhibitor Quisinostat reduced cell survival after 48 hours.
Conclusion: As HDAC's are being used as targets for cancer therapy, we studied the expression of a range of them in UM and identified upregulated expression of two of these epigenetic regulators in high risk BAP1-negative tumors, and a down-regulated expression of one (HDAC11). Our findings indicate that pan-HDAC inhibitors differentially affect different HDACs, and may specifically be useful for those with BAP1-negative tumors.

## Hadi Mohammadi

**Growth Mindset vs. Fixed Mindset: Does It Really Matter?**

Hadi Mohammadi

Since the launch of Carol Dweck's book Mindset, teachers have been fascinated by the growth mindset vs the fixed mindset. But does it really matter?
I'll get to that question soon, but first, let's look at what mindsets are a Mindsets are beliefs. In this case, they refer to beliefs about your own and other people's abilities all about.
People with a fixed mindset believe that their (and others') abilities are fixed. Put another way, some people are smart, and other people are not. The same applies to other abilities such as being sporty, musical, creative or artistic.
People with a growth mindset believe that their abilities can be developed. Put another way, they believe they can learn to be smarter, more creative etc.

Kiarash Saleki

**Engineering a novel immunogenic chimeric vaccine to deviate specific immune system responses in atherosclerosis via robust Immunoinformatics approaches**

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Background: Atherosclerosis is significantly modulated via inflammatory reactions rather than mere accumulation of oxidized (ox-) LDL. Recent studies have highlighted highly prevalent bacteria, including Streptococcus pneumoniae, Helicobacter Pylori, Chlamydia pneumoniae, and Porphyromonas gingivalis are heavily involved in atherosclerosis. Therefore, immunizing against bacteria that affect atherosclerosis by deviating the immune responses from Th1 to Th2 has been suggested as a robust treatment approach.

Methods: In silico design is an essential tool for vaccine evaluation prior to experimental studies. A thorough survey was conducted on the mentioned bacteria and 9 prominent proteins, including PSP A, CAG A, CBP A, Urease B, HSP 60, HSP 65, Omp2, gingipain, and Momp were selected. CTL and MHC-I prediction were carried out via CTLpred server while, Immune Epitopes Database (IEDB) MHC-II epitope prediction tool was used for Th2 epitope prediction.

Then, a chimeric DNA was synthesized from dominant epitopes of the mentioned immunogenic antigens. To intensify immune stimulation, adjuvant and IL-10 inducer sequences were also assembled to the sequence. The chimeric DNA structure, its mRNA, and deduced protein were analyzed by related Bioinformatics software. Afterward, the three dimensional (3D) structure was predicted by MODELLER (SaliLab, UCSF). The structure was refined manually using MODELLER as well as via GalaxyRefine server. In addition, validation of the predicted protein was evaluated by Ramachandran plot statistics and the B cell epitopes on the surface of the predicted model were mapped. Finally, we used GROMACS to build and simulate a system of our TLR4-Vaccine complex in a blood-like (150mM NaCl) solution. Following energy minimization as well as NVT and NPT equilibration, We performed a 100ns-long simulation of the system, and analyzed RMSD and RMSF of the complex.

Results. A 629-amino acid vaccine was built. The refined structure showed an ERRAT score of over 80 (80.9%), validating the structure. All physicochemical properties reached desired levels. The protein half-life was long enough. Ramachandran plot of the final structure showed approximately 90% of residues were located in the most favorable and partially allowed regions. During MD simulation of the minimized system, after a while, RMSD for the TLR4-vaccine complex backbone stabilized. This remained as the MD simulation progressed, indicating the complex structure reached a stable state in blood. RMSF did not show any prominent spikes, demonstrating that the complex did not unfold in blood.

Conclusion. Here, we engineered a novel multi-epitope chimeric protein via in silico techniques with physiochemically and immunologically favorable characteristics. The present study paves the path for future efforts in combatting atherosclerosis.

Taraneh Goudarzian

**Design and Evaluation of a Topical Wound Healing Gel Formulation of Myrtus communis Fruit**

Taraneh Goudarzian*, Fatemeh Ghorbani Bidkorbeh, Arash Mahboubi, Mohammad Kamalinejad
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Background: Wound management is one of the rising issues of healthcare systems all over the world due to the vast economic, psychological and social impact that acute and chronic wounds have on societies. Formulating topical dosage forms with minimum cost and maximum efficacy alongside the importance of collaboration between pharmacists and other professionals involved in patient care and wound management is a necessity to achieve the goal of bringing science to society in order to create a life with higher quality for patients.
Utilizing herbal medicine since the era of ancient civilizations has proven the importance of natural therapeutic formulations in skin care. Myrtus communis, which grows in various parts of its natural habitat as 21 wild populations in Iran, has been used for centuries in herbal medicine for treatment of a variety of ailments. 1,8-cineol as the main compound of Myrtus communis has shown anti-inflammatory, anti-oxidant, anti-microbial and also significant wound healing properties and therefore could be used as a wound healing agent in a topical dosage form. The present research was undertaken with the aim to formulate and evaluate a topical wound healing gel containing Myrtus communis aqueous extract.
Methodes: Fruits of Myrtus communis were collected from FirouzAbad, Fars province, Iran and then authenticated at the school of pharmacy, Shahid Beheshti University of Medical Sciences. The extraction process consisted of several steps – drying, filtration, extraction, and concentration by heat. The gel formulation was designed by using aqueous extract of Myrtus communis fruit in 6% w/v concentration and was carried out by using various polymer bases (different concentration of high, medium and low molecular weight Chitosan, Carbopol 934, Carbopol 940). The physiochemical parameters of mentioned formulations were determined.
Results: The best results were obtained from the gel prepared with medium molecular weight chitosan and acetic acid. In addition to better physiochemical qualities, this gel formulation is preferable due to the notable wound healing, anti-bacterial and biocompatible properties of chitosan polysaccharide. The amount of phenolic content was also measured as 11.63±0.14 µg GAE/mg.
Conclusion: This study revealed that the formulation containing 6% w/v Myrtus communis aqueous extract with medium molecular weight chitosan as the polymer base has shown comparatively better stability and physiochemical qualities than other formulations. Aside from significant wound healing and anti-microbial effects of Myrtus communis aqueous extract the biocompatible, biodegradable and wound healing properties of chitosan demonstrate potential for use as an agent in the management of wounds. In conclusion this formulation of Myrtus communis extract could be suggested as a natural, safe and beneficial topical treatment for non-infected wounds that would bring science to society in the form of an effective and affordable pharmaceutical product.

Marzieh Hadian

**Approaches to confronting the Biological Epidemic; Prevention Tools with an Emphasis on COVID-19: A Systematized Review**

Marzieh Hadian
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Background: The World Health Organization has identified COVID-19 as a public health emergency and is urging governments to stop the virus transmission by adopting appropriate policies. In this regard, the countries have taken different approaches to cutting the chain or controlling the spread of the disease. Now, the questions are what are these approaches? And, what tools should be used to implement each? In addition, what is the impact of each? Objective: The aim of this study was to determine the approaches to biological epidemics and related prevention tools with emphasis on COVID-19 disease. Data sources: For this purpose, database including ISI web of science, PubMed, Scopus, science direct, Ovid, ProQuest, and for gray studies, the reliable websites such as WHO website, the published reports of the involved countries on the credible websites, as well as the Worldometer website were evaluated. were used from 1 December 2019 to 30 May 2020. Methods: The present study was a systematize review of publications relating to prevention strategies for covid-19 disease. The study was carried out based on the PRISMA guidelines and CASP for articles and AACODS for grey literature. Results: The study findings showed that in order to confront the COVID-19 epidemic, in general, there are three approaches of "mitigation", "active control" and "suppression" and four strategies of "quarantine", "isolation", "social distance" as well as "lockdown" in both individual and social dimensions to deal with epidemics that the choice of each approach requires specific strategies and has different effects when it comes to controlling and inhibiting the disease.
Conclusion: Though, the use of different approaches to control and inhibit biological epidemics depends on numerous variables, but regardless of these requirements, global experience suggests that some of these approaches are ineffective. The use of previous experiences in the world, along with the current experiences of countries, can be very helpful in choosing the accurate approach for each country in accordance with the characteristics of that country and lead to the reduction of possible costs at the national and international levels. Key finding: The only way to control the disease is to change your behavior and lifestyle. In addition to prevention strategies, use of masks, observance of personal hygiene principles such as regular hand washing and non-contact of contaminated hands with the face, as well as observance of public health principles such as control of sneezing and coughing, safe extermination of personal protective equipment, etc. Have not been included in the category of prevention tools; However, it has a great impact on controlling the epidemic, especially the new coronavirus epidemic.

**Nanotechnology in Cryopreservation**

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One of the most important applications of cryobiology is in the field of reproductive medicine. Now a days freezing of embryos and gametes is become so common all over the world in ART (Assisted reproduction techniques) clinics. A long-term method to store living cells with the use of cryoprotectants (CPAs) at -196°C is cryopreservation. Currently, this method is considered as one of the most common methods for preserving biological samples, such as biological molecules, cells, tissues and organs. In the course of cryopreservation, the process of freezing and thawing leads to cryo-injuries to cells. For instance, formation of intracellular and extracellular ice may disrupts the cell membrane and causes osmotic shock via fluctuation of the salts concentration inside the cells. CPAs are compounds which are used to protect cells from chilling injuries and reduce damages. Two types of CPAs are available : (a) non-permeating membrane, some prevalent example of which are antifreeze proteins (AFPs) and sugars that cannot diffuse the cell membrane; (b) membrane permeating, which can permeate the membrane freely, are dimethyl sulfoxide (DMSO), ethylene glycol (EG) and glycerol (G). Although CPAs are used as preserving reagents, they can be toxic and have negative effects on cell function. Therefore, main limitations in conventional cell cryopreservation, are the cytotoxicity of the high concentrations of cryoprotective agents, osmotic stress caused by adding and removing of the protectants, uncontrolled formation and growth of ice during freezing process, ice recrystallization due to not rapid enough warming rate during rewarming process and so on.

New horizons in cryobiology could be explored by nanotechnology, which has revolutionized multiple fields of science. Nanotechnology has been more and more widely applied in the research of cryopreservation field. Nanoparticles are particles of less than 100 nm in diameter that exhibit a role in heat transfer enhancement, nucleation and the improved CPA performance because of their special characteristics, including quantum size effect, surface effect, small size effect and macroscopic quantum tunneling effect. There are different approaches for using nanotechnology in the field of cryopreservation. The two main approaches are using nanoparticles in CPA solutions and during cooling and thawing process. A few studies have found that the addition of nanoparticles into CPA solution improves the quality of cryopreservation for biological material. The incorporation of nanoparticles into cryoprotectant solutions can change heat transfer coefficient and viscosity, ice formation and devitrification temperature. The metallic nanoparticles increase thermal conductivity and cooling rate. The thawing process is equally critical to cryopreservation. Magnetic nanoparticles can be manipulated via the external magnetic field. Magnetic nanoparticle-based approach provides a rapidly and uniformly heating of cryopreserved bulk tissue samples or biomaterials, which has been able to minimize the damages during thawing process.

In conclusion, the major challenges and limitations of cryopreservation technique could be overcome by using nanotechnology.

Negar Sadat Ahmadi

**Effective altruism: The most good you can do!**

Negar Sadat Ahmadi
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Effective altruism is both an idea and a kind of lifestyle that is spreading in the world as a valuable and important movement. It emerged in the fourth quarter of the twentieth century, largely through the intellectual efforts of Peter Singer, an Australian moral philosopher and philanthropist.

Effective altruism states that in order to live morally, it is not enough to respect the rights of others and not to oppress and persecute them, but to give them as much compassion as possible or in other words as much good as possible.

Improving the condition of humans and other creatures and reducing their suffering is the only thing that has ultimate value or intrinsic desirability and other values such as truth, freedom, equality, etc. have only instrumental values. It means they are valuable only because they are a means to achieve the intrinsic value.

In order to achieve this goal, everything can and should be done, except one thing: acting immorally, that is, the only limiting factor in this way is morality itself.

In this way, we should try to love everyone as much as we do ourselves and our families and we should remind ourselves that no one is more important than the other. Although in order to achieve this ultimate goal, we must discover our own existential capacities for these altruistic actions.

We, as humans, sometimes assume that we have no power but this is not the case, we can literally change the world although it may not be completely idealistic. We must focus on the good that each of us can do, not on the matters beyond our control. In this presentation, we aim to introduce some tips to do the most good you can do, to make a difference in the world, and finally to join the rest of the other altruists in the world!

Fatemeh Sodeifian

**The Roots of Suicide**

Fatemeh Sodeifian
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Why do people become suicidal? Is there a brain abnormality that drives specific individuals to think suicidal thoughts? Why do males generally choose violent means of committing suicide, whereas females overdose typically? Is there a specific brain chemical aberration that accounts for these phenomena? Is there a genetic predisposition to suicide? Are there any biological markers or of suicidal individuals? Several studies have reported genes and neurotransmitters involved in this behavior. Neurotransmitter systems are shown to have altered function in suicide and attempted suicide. These neurotransmitter systems include the serotonergic, noradrenergic, and dopaminergic systems and the hypothalamic-pituitary-adrenal axis. This lecture aims to review the latest findings of the neurobiology of suicidal behavior.

**The think of spiderweb**

Gilda Khandan
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Perception means interpreting sensory information to make sense of it. Millions of years ago, a few spiders abandoned their traditional spinning method and adopted a new strategy. In 2008, Japiasu led twelve species of spiders to make the transition again, and they succeeded. How did they find out that there is another way to overcome hunting? In 2017, an article in the journal Animal Perception was published by Japiaso and laland, who claimed that the spider's web is an adjustable part of the sensory system but may even be part of the spider's perceptual system. The spider's web is not part of the neural network, but Japiasu describes it as part of the animal's perceptual system.

Suppose you want to solve a sudoku puzzle. You need to be able to do the logical thinking and analysis that is definitely part of your perceptual system. But at the same time you find that you cannot memorize all the numbers that may be in the cells of the table. So write down the table of probable numbers next to each cell. Do you accept organizing data on paper as part of the perception process? Or is organizing the data itself not part of the perceptual process, although it helps to understand or solve the problem? The different parts of the spider web do not have exactly the same patterns.

The central and eccentric areas or the areas that are closest to a support have slightly different patterns. How does the spider know how far or close to the center of the web the part it is weaving is? Does he keep all the information in his mind? Maybe the answer is yes. Maybe not. Perhaps the spider transmits information to its web as it weaves the web, and then, in the next round when it reaches the same area of the web, reads the previous information and learns how to complete this part of the web. So if the spider uses its web to record and retrieve information, are we allowed to consider the web as part of the animal's perceptual system? As Japiaso and Laland say. Or is the thread just a tool that serves the perceptual system but is not a part of it?

Even those scientists who are skeptical of extended perceptions agree that this exchange of information between the spider and the weasel is more conducive to further work and research, but that the results need to be interpreted more carefully.

**An easy way to diagnose depression**

Maryam Ghorbani
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Depression is the leading cause of disability in the world. In the world, more than 264 million person struggle with depression. Depression is the second leading cause of death among 15- to 29-year-olds.

There is a difference between depression and sadness. For example, being sad gets better over time, but in depression, one is unable to do anything over time.

Depression can have a lot of different symptoms: a low mood, loss of interest in things you'd normally enjoy, changes in appetite, feeling worthless or excessively guilty, sleeping either too much or too little, poor concentration, restlessness or slowness, loss of energy, or recurrent thoughts of suicide. If you have at least five of those symptoms, according to psychiatric guidelines, you qualify for a diagnosis of depression. And it's not just behavioral symptoms. Depression has physical manifestations inside the brain. First of all, there are changes that could be seen with the naked eye and X-ray vision. These include smaller frontal lobes and hippocampal volumes. On a more micro scale, depression is associated with a few things: the abnormal transmission or depletion of certain neurotransmitters, especially serotonin, norepinephrine, and dopamine, blunted circadian rhythms, or specific changes in the REM and slow-wave parts of your sleep cycle, and hormone abnormalities, such as high cortisol and deregulation of thyroid hormones.

there are very effective treatments. Medications and therapy complement each other to boost brain chemicals. In extreme cases, electroconvulsive therapy, which is like a controlled seizure in the patient's brain, is also very helpful. Other promising treatments, like transcranial magnetic stimulation, are being investigated, too.

The Beck Depression Inventory (BDI, BDI-1A, BDI-II), created by Aaron T. Beck, is a 21-question multiple-choice self-report inventory, one of the most widely used psychometric tests for measuring the severity of depression and internal consistency for the BDI ranges from .73 to .92 with a mean of .86.

## Mohaddeseh Hasanzadeh

**Effectiveness of cognitive-behavioral therapy on childhood obesity, Narrative Review**

Mohaddeseh Hasanzadeh
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Obesity means an accumulation of excessive or abnormal fat that can increase the risk of health consequences during childhood and adolescent , including diabetes ,cardiovascular risk factors, muscular skeletal problems and developmental delays , or sleep disorders , unfortunately, childhood obesity leads to obesity in adulthood and therefore will be associated with an increased risk of poor health in the future. A review of various studies concluded that cognitive-behavioral strategy improves adherence and reduces dropout in adolescents. Therefore, it seems that the integration of cognitive skills in CBT (cognitive-behavioral therapy) treatments improves their effectiveness and CBT programs are one of the most effective treatments for childhood obesity. The CBT program we reviewed here is a successful intervention Improves food consumption pattern by improving the quality of the diet and provides nutritional advice to teens According to previous findings, self-efficacy is the main predictor of eating habits. Also, empirical evidence indicates that self-efficacy increases physical activity and with CBT, the actual involvement of physical activity is improved.

## Salman Garavand

**Investigate environmental behaviors: correlation between environmental values and ecological behavior**

Salman Garavand
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Environmental problems are one of the significant challenges in Iran's country due to environmental policies has. With the increasing population, the rate of changes in the environment intensifies, especially if the community does not know how to protect the environment; the problem will be increased. The role of human resources in supply production was changed and, therefore, due to human behavior, the quality of the environment has been significant variations over time. Environmental scientists believe people have to be more vigilant because the biosphere is in a more dangerous situation. The study was focused on human behavior's influence on the future of the planet. Regard to environmental psychologist's studies, four values altruistic and biospheric (self-transcendent) vs. egoistic and hedonic (self-enhancement) have an essential role in the environment. Environmental values are measured by a short version of the Schwartz's value scale (1992) developed by de Groot and Steg (2008), and ecological behavior is measured by Farj and Martinez (2006). The standard questionnaires have been done by 206 students, the faculty of agriculture at Lorestan University. Although results revealed people with self-transcendent and self-enhancement make an effort to preserve environmental, and both scales had a significant correlation in question, "I subscribe to an ecological publication." Individuals who strongly endorse self-transcendent value tend to have pro-environmental actions like concern about environmental problems and trying to buy products in recyclable containers. Finally, as regards the strong correlation between personality values and environmental action, it could be concluded which environmental problems are rooted in individual behaviors, and for protecting these resources, invest in individual behaviors should be considered.

Ehsan Kaviani

**Relationships patterns between central auditory processing disorders and language disorders and learning disabilities**

Ehsan Kaviani

Introduction: Central auditory processing disorders often present with language disorders, sensory integration dysfunction, and learning disabilities (LD) so in this study, a multimodal assessment of children with LD was used to identify certain problem areas. Phylogenetic analyses established the nature of the relationship among these areas and grouped them according to shared problem areas and multimodal assessment of children with LD was used to identify certain problem areas.
Methods: This review article is about Relationships patterns between central auditory processing disorders and language disorders were extracted from Science Direct, Pro quest and Pub med Data Bases.20 articles had been selected according to inclusion criteria from 2012 to 2019 and 5 of them had been deleted by exclusion criteria.
Results: these results are three-fold. First, language disorders is a critical feature of performance on CAPD tests and the current diagnostic criteria for CAPD make a clinical separation of the two disorders problematic. Second, stimulants appear to be a useful treatment for the symptoms of both language disorders and CAPD. Third, CAPD tests may be a useful measure of language disorders, LD and response to stimulants.and suggest that a multimodal perceptual approach is useful for enhancing diagnosis of and choosing interventions for these children.
Conclusion: Pediatric central auditory processing disorder (CAPD) is frequently comorbid with other childhood disorders. However, few studies have examined the relationship between commonly used CAPD and language and in this study majority of children presented with deficits involving both the visual and auditory modalities, as well as problems with motor abilities and concentration skills and indicated that this population has specific areas of sensory processing that are unique to children with SLI and that differ significantly in their sensory responsiveness from typical children and children with other conditions like Autism and Attention Deficit Hyperactivity Disorder and suggest that a multimodal perceptual approach is useful for enhancing diagnosis of and choosing interventions for these children

Amirhossein Foroughi

**Artificial Intelligence, The Dark Side**

Amirhossein Foroughi
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Today, the boundaries of technology have expanded far beyond what is imagined. If in the past, it was only possible to manipulate people's photos by various graphic software and show the viewer something untrue, today we are faced with a more dangerous technology that can wonderfully imitate your face and voice.
Deepfake, a combination of the words deep learning and fake, is a new technology based on artificial intelligence that creates fake but realistic images and videos that can impress any viewer.

Azin Golmoradizadeh

**Telerehabilitation, Virtual Therapists, and Acquired Neurologic Speech and Language Disorders**
Azin Golmoradizadeh

Introduction: Telerehabilitation (telerehab) offers cost-effective services that potentially can improve access to care for those with acquired neurologic communication disorders. Telerehabilitation can be clinic-based or home-based for the purposes of this study the sessions performed under telerehabilitation were set up from a remote location in the same building with the room where the subjects trained. However, technical tests were performed (as described in section 2C) to gauge the system performance over geographically longer distance.so This article reviews the evidence related to acquired neurologic speech and language disorders in adults. Research studies have used telerehab systems to assess and treat disorders including dysarthria, apraxia of speech, aphasia, and mild Alzheimer disease.
Method: This review article is about Telerehabilitation, Virtual Therapists, and Acquired Neurologic Speech and Language Disorders were extracted from Science Direct, Pro quest and Pub med Data Bases. 20articles had been selected according to inclusion criteria from 2011 to 2019 and 5 of them had been deleted by exclusion criteria.
Results: These studies have highlighted the possibility that severity of impairment and aetiology may have an effect on the administration of telerehabilitation language assessment protocols. Furthermore, anecdotal accounts of difficulties in administering language assessment via telerehabilitation also demonstrate the need for research into the effects of severity of aphasia
Conclusions: Results suggest that severity Speech and Language Disorders may influence the ability to assess some language parameters via telerehabilitation of Acquired Neurologic. Further research should use larger sample sizes to confirm these results and to refine the telerehabilitation technology to enable these parameters to be adequately assessed. Additionally, clinician satisfaction with telerehabilitation assessment should be qualitatively researched so as to widen clinician acceptance of this method.

## Nasirudin Javidi

**Indicators of Sensory and Intellectual Thinking And its Relationship with Mental Health and Health-Promoting Lifestyle: New Model of Optimal Thinking**

Mostafa Ghanei, Nasirudin Javidi*, Khodabakhsh Ahmadi, Mohammad Javad Ahmadizadeh, Abbas Ebadi

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Introduction: According to the cognitive-behavioral approach in psychotherapy, human emotions, behaviors, and actions arise from their thoughts. If positive thoughts are healthy and growing, human functioning will be healthy and harmless. If the style of thinking is destructive, negative and contradictory, the person will experience negative emotions and his performance will be undesirable.

Methods: The method of this research was mixed-method. In the qualitative part: Sensory and intellectual thinking indices were extracted (from database of Web of Sciences, PubMed, ScienceDirect, Elsevier, SID, EBSCO). In the quantitative part: a tool for measuring levels of thinking was Designed and its relationship with mental health and lifestyle was investigated. There were 313 participants in this study. The research tools included: Tools for measuring levels of thinking (TMLT), General Health Questionnaire (GHQ), and health-promoting lifestyle questionnaire (HPLP).

Results: The results showed that mental health is inversely related to sensory thinking and directly related to intellectual thinking. Also, those who have a health-Promoting lifestyle have a rational type of thinking and have higher mental health. These people also have better decision-making skills and no cognitive error. This type of thinking is considered desirable thinking.

Conclusion: If the person's level of thinking is rational, he will have a more desirable performance because he has developed thinking. People with sensory thinking consider only one dimension in decision making, but those with rational thinking look at the issue from different dimensions. Sensory thinking has cognitive errors but rational thinking does not have errors and bias in judgment.

## Kimiya Vakili

**PTSD and Fear Extinction Memory**

Kimiya Vakili

*School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran*

The ability to move on after a life tragedy depends on the suppression of the original fear memory. Any impairment in this process can lead to several emotional disorders like post-traumatic stress disorder (PTSD). Fear extinction memory is a memory that is known to suppress the original fear memory. However, the formation and storage of fear extinction memory is still a mystery. It has been shown that a neural population in basolateral amygdala (BLA) can be responsible in this regard. In this presentation, we will discuss the role of this neural population in the development of fear extinction memory.

Maedeh Farhoush

**Particle Physics in the Early Universe**

Maedeh Farhoush
*Amirkabir University of Technology, Tehran, Iran*

The universe had a beginning in 13.8 billion years ago from Big Bang. The Big Bang model describes the evolution of our universe from a state of extreme pressure and energy density when it was very much smaller than it is now. In the early stage of the Big Bang, most of the energy was in the form of radiation. Later, with cooling from the expansion, the universe transformed from radiation domination to matter domination. In today's universe, ordinary matter contributes 5% of the mass-energy, and dark matter and dark energy respectively contribute 27% and 68%. We have already entered an era dominated by dark energy since the accelerated expansion of the cosmos.

We can describe epochs after the Big Bang by decreasing temperature and creating particles. The first fraction of seconds is called the Plank epoch. The laws of physics, as we know them, did not apply during this era. Next, Cosmologists believe a process called inflation that happened in the fraction of a second after the Big Bang and the cosmos exponential expanded.

As the universe cooled, the four fundamental forces in nature emerged: gravity, the strong force, the weak force, and the electromagnetic force. One second after the Big Bang, the universe was made up of fundamental particles, including quarks, electrons, photons, and neutrinos. The universe continued to expand. Three minutes after the Big Bang, protons and neutrons began to come together to form the nuclei of simple elements. The temperature of the universe was still incredibly high for creating atoms by merging electrons, protons, and neutrons.

380,000 years after the Big Bang, The temperature of the cosmos had cooled. Electrons began to combine with hydrogen and helium nuclei. As a result, photons are no longer in thermal equilibrium with matter, and the universe became transparent. Recombination lasts for about 100,000 years, during which the universe is becoming more and more transparent to photons. The cosmic microwave background (CMB) we observe today is evidence of the early universe. The temperature of the cosmic microwave background is now only 2.73 K.

This project is performed to study the evolution of the universe from the Big Bang and the first seconds to cosmic microwave background. Therefore the history of the universe will be explained, and then the interaction between the particles and formation of first nuclei and atoms will be investigated. In the end, we will understand that all of these consecutive epochs after the Big Bang led the universe to today's ages.

Maryam Azimi

**Evaluation of immunomodulatory effects of exosomes in Multiple sclerosis**

Maryam Azimi, Hussein Baharlouyi
*Iran University of Medical Sciences*

According the National multiple sclerosis (MS) Society there are 1 million people living with MS. This condition is an immune process that causes inflammation and damage to the myelin which insulates nerve fibers. When this happens, the Central Nervous System's signaling pathways are disrupted; and therefore, it is unable to correctly communicate messages. This can lead to a wide variety of neurological symptoms. There's currently no cure for MS, but it's possible to treat the symptoms with medicines and other treatments. Treatment for MS depends on the specific symptoms and difficulties the person has. It mainly includes treating relapses of MS symptoms or reducing the number of relapses.

Mesenchymal stem cells (MSCs) are an example of tissue or 'adult' stem cells. They are 'multipotent', meaning they can produce more than one type of specialized cell of the body, but not all types. MSCs make the different specialized cells found in the skeletal tissues. For example, they can differentiate – or specialize – into cartilage cells, bone cells and fat cells. These specialized cells each have their own characteristic shapes, structures and functions, and each belongs in a particular tissue. Mesenchymal stem cells (MSC) have been shown to prevent inflammation and neurodegeneration in animal models of MS. Therefore, we aimed at evaluating the suppressive efficacy of MSCs and their released exosomes in relapsing-remitting MS (RRMS) patients. The present study found MSC derived exosomes as an effective cell-free therapy to prevent MS severity in vitro. These findings also introduce MSC-derived exosomes as an alternative of therapeutic MSCs, providing a novel approach for treating MS. However, considerable issues remain to be resolved and further investigations need to be done to validate this approach in a large-scale application, hopefully moving toward an effective module that can 216 be translated to the clinic.

Nima Beheshtizadeh

**The challenges of Calcium Phosphate-based Bone Scaffold Fabricating via Additive Manufacturing**

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Calcium phosphate bone scaffolds are now at the center of the researchers' attention for bone tissue engineering applications due to their biological and physical properties and similarities to the natural bone composition. Bone tissue engineering, as engineering other tissues, demands a rate of correlating with the natural tissue. Bone scaffolds should have appropriate pore size and porosities to be efficient in bone tissue growth and some metabolic activities such as vascularization, oxygen delivery, growth factors, and cell nutrition, whereas increasing the porosity volume causes the decrease in the compressive strength and can enhance the likelihood of crack propagation on the fabricated scaffolds.

Additive Manufacturing techniques are facilitator methods in bone tissue scaffold fabricating while possessing some significant challenges, divided into material-related and machine-related. The majority of the procedure's challenges and limitations are mainly related to the properties of the material being fabricated, including rheology control, composition ratio, sintering parameters, and shrinkage and residual stress.

Sima Amidifar

**Let7b miRNA is new treatment of endometriosis (Systematic Review)**

Sima Amidifar

Background: Endometriosis (EMS) is a common gynecological disease that defined by the growth of endometrial tissue outside of the uterus. EMS is a considered a multifactorial disease known for estrogen and chronic inflammation dependence. Lack of certain etiology for this disease has been suggested by various treatments, some of which have been associated with many complications. The aim of this study was to evaluate new treatments with minimal complications for this disease. therefore, we will discuss the therapeutic role of Let7b miRNA.Let7b is a tumor suppressor and regulator of cell cycle and also has a pleiotropic role in EMS pathophysiology.

Method: We searches articles in the PubMed, google scholar, Science Direct databases between 2010 to October 2019.About 35 articles were found; of these, 10 articles related to our study that were investigated.

Result: Let7b has role in EMS pathophysiology through affecting oestrogen signaling, inflammation, growth and proliferation. The therapeutic role of Let7b in EMS is decreased of endometriotic lesion size through reduce expression of promotor genes that including ER-α, KRAS4A, KRAS4B and aromatase. KRAS up-regulated in the EMS and triggers EMS through increases proliferation and invasive in EMS.Let7b regulates KRAS expression through binding to one or more of Let7b complementary sites and cause decrease of KRAS4A and KRAS4B.ER-α and aromatase has role in pathophysiology of EMS through oestrogen signalling.ER-α is Let7b target and lead to reduces oestrogen signaling and increased aromatase inhibitor that cause reduce local production and activity of oestrogen. also Let7b regulate inflammation through target gene Tol like receptor-4(TLR-4) that cause regulate M1 macrophages response and suppressed other inflammatory markers.

Conclusion: Results show that Let7b treatment dose reduce inflammation, oestrogen signaling, KRAS and aromatase. So, local treatment EMS with Let7b is a promising therapy for EMS through affecting multiple pathways. important point of this treatment is the treatment of EMS without systemic side effects. So. We hope Let7b be can one of the new treatment of EMS.

Farbod Ghobadinezhad

**Natural Killer cell-derived extracellular vesicles as living therapeutic boxes for cancer immunotherapy**

Farbod Ghobadinezhad
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Natural Killer (NK) cells are part of the innate immune system and represent the first-line defense of the immune system in the control of tumor growth and metastasis diffusion. These cells able to kill tumor cells without prior sensitization that it property makes NK cells different from other major lymphocyte subsets. Recent studies have shown a promising role of NK cell-based therapies in the treatment of hematological malignancies but data have shown that these type of adoptive cell transfer is insufficient in a large variety of solid tumors. This insufficiency is due to the low pH of the tumor microenvironment, low infiltration of NK cells, and other tumor evasion strategies. Extracellular vesicles (EVs) are released by live cells and are known to contain specific proteins, depending on the cell type of origin. NK cells -derived EVs are contain cytotoxic proteins and tumor targeting receptors that are naturally found on the surface of NK cells which makes them novel tools in targeting tumors. Considering that EVs have high extravasation capacity and are less affected by the hypoxic environment of the tumor, NK-derived EVs may therefore sidestep deficiencies of NK cell therapy of solid tumors. NK cells -derived EVs can interact with target cells via receptor/ligand interaction and facilitate, endocytosis or be taken up via phagocytosis or micropinocytosis. Recent studies have shown that NK cells -derived EVs have cytotoxic effects on a large variety of solid tumors in a dose- and time-dependent manner. These EVs contain NKG2D and DNAM-1 which are important activator receptors on the surface of NK cells. NK cells -derived EVs also deliver regulatory miRNAs to cancer cells. These EVs are also shown to contain FasL, a death receptor on the surface of NK cells. The resent studies suggest that NK cells -derived EVs can synergistically enhance the efficacy of NK cell-based therapies. EVs are suitable nano vehicles for drug delivery and therefore using NK cells -derived EVs could permit usage of lower doses of chemotherapeutic agents, thus evading the systemic cytotoxicity followed with standard chemotherapy. In conclusion, existing literature suggests that NK-EVs can be promising as a co-delivery drug in immunotherapy of cancer therapy.

Paria Fadaee Heydarabadi

**New generation pharmacy**

Paria Fadaee Heydarabadi
*Student Research Committee, Mazandaran University of Medical Sciences, Sari, Iran*

How much money does the health care system spend on treating mild diseases? How much time is lost? How much energy is wasted?
The given solution is to take the pressure off the emergency rooms. What's the substitute? Pharmacists!
They can first educate people on the healthy life style and help with outpatient illnesses in pharmacies. The issue is that, are pharmacists educated for this aim? According to statistics, no. Well, what's the solution? Proper training for pharmacists and promoting rational use of drug.

Fatemeh Bourbour

**Nutrients in prevention, treatment, and management of viral infections; special focus on Coronavirus**

Fatemeh Bourbour
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Background: The coronavirus disease 2019 (COVID-19) is a pandemic caused by coronavirus with mild to severe respiratory symptoms. This paper aimed to investigate the effect of nutrients on the immune system and their possible roles in the prevention, treatment, and management of COVID-19 in adults.
Methods: This Systematic review was designed based on the guideline of the Preferred Reporting for Systematic Reviews (PRISMA). The articles that focussed on nutrition, immune system, viral infection, and coronaviruses were collected by searching databases for both published papers and accepted manuscripts from 1990 to 2020. Irrelevant papers and articles without English abstract were excluded from the review process.
Results: Some nutrients are actively involved in the proper functioning and strengthening of the human immune system against viral infections including dietary protein, omega-3 fatty acids, vitamin A, vitamin D, vitamin E, vitamin B1, vitamin B6, vitamin B12, vitamin C, iron, zinc, and selenium. Few studies were done on the effect of dietary components on prevention of COVID-19, but supplementation with these nutrients may be effective in improving the health status of patients with viral infections.
Conclusion: Following a balanced diet and supplementation with proper nutrients may play a vital role in prevention, treatment, and management of COVID-19. However, further clinical trials are needed to confirm these findings and presenting the strong recommendations against this pandemic.

Mohammad Sedaghati Jahromi

**Can You grow new brain cells? Yes!**

Mohammad Sedaghati Jahromi

Can we adults grow new brain cells? This is a process we call neurogenesis. Some years ago the scientists believed that we as adults cannot grow new brain cells. Now, the research has shown adult brain can generate new nerve cells. This is one of the most exciting portion of brain. This is Hippocampus. The scientists knew that this part is important for learning, memory and emotion. Recently, they understood this is one of the masterpiece structures of adult brains. In this part, new brain cells can be generated. This is why I am interested in sharing these research to all individuals.

Helia Mojtabavi

**Exploring Children's Concepts of an Ideal Treatment Environment; Analyzing the Pediatric Patients' Paintings Using Visual Grounded Theory**

Helia Mojtabavi
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Little is known of the child's perspective of the illness, due to a lack of adequate communication between the pediatric population and the health care workers. Our objective is to understand this perspective by means of analyzing children's drawings who have had a prior history of any kind of illness. To do so, we are willing to analyze the paintings received from over one thousand patients younger than 18 years old from all over the globe. The analysis would be done using visual grounded theory methodology. We used the paintings sent to the International Festival of Pediatric Patients' Paintings (IFPPP), which is as the annual festival started from 2015 with a mission to improve the mental health of sick children by encouraging them to bring their potentially traumatic experiences of hospital environment into drawings. After five years of this festival and awarding over two hundred patients each year, we are planning to use this remarkable database to cast light on the child's mental health-driven from the paintings, in addition, to come up with strong evidence to implement art therapy in more children hospitals. We hypothesize that children's conceptualization of their illness alongside analyzing their written inputs experience unlocks the child's perception of the disease and guides us to their possible mood disorders. More importantly, this can inspire us to re-design hospitals in a more child-friendly manner by decoding children's desired atmosphere from the perceptual space of their paintings.

Mojdeh Sarzaeim

**Dancing through MS disability**

Mojdeh Sarzaeim
*School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*

Multiple sclerosis (MS) is a potentially disabling disease of the brain and spinal cord (central nervous system). In MS, the immune system attacks the protective sheath (myelin) that covers nerve fibers and cause communication problems between your brain and the rest of the body. According to the most recent findings, 1 million people in the United State are living with MS and also 2.3 million people have been diagnosed globally. The rate of MS is estimated between 57 to 78 cases per 100000. The incidence of MS is also higher in cold climates. Multiple sclerosis (MS) is the most widespread disabling neurological condition of young adults (less than 40 year old) around the world. The good news is that many people living with MS don't develop severe disabilities. Most have normal or near-normal lifespan.

MS disease is affecting both the sensorimotor and cognitive systems. The typical pattern of cognitive impairment includes reduced speed of information processing, decreased phonological and semantic speech fluency, deficits in verbal and visual episodic memory, as well as attention and executive dysfunctions. And the typical pattern of primary functional impairments reported in these patients are loss of balance and mobility which are characterized by increased swaying in quiet stance, delayed responses to postural perturbations, and reduced ability to move toward their limits of stability.

Malaksima Ayadilord

**A study of the association between neuropsychological performance and allergic rhinitis in young females**

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**Department of Immunology, Faculty of Medicine, Birjand University of Medical Sciences, Birjand, Iran*

Background: Allergic disorders may have a bidirectional causal association with mental complications. To evaluate the associations between neuropsychological performance tests and quality of life with the presence of allergic rhinitis (AR) in young women.
Methods: A diagnosis of AR was confirmed by an expert allergist. The presence and severity of depression, anxiety, stress, insomnia and sleepiness were evaluated using validated questionnaires. Cognitive abilities and quality of life were evaluated using standard instruments.
Results: Among 181 female young participants, the prevalence of AR was 26.5% respectively. The AR group had higher scores than the control group for depression, anxiety, insomnia, and lower scores for quality of life. The control group scored similarly as the women with allergy for most of the cognitive ability tests. AR were more likely than healthy individuals to have anxiety [odds ratio (OR)=1.86; 95%CI: 1.02-3.4].
Conclusion: There was a high prevalence of psychiatric disorders such as anxiety, depression and sleep problems among AR women, and a decreased quality of life, that may be related with it.

Elham Khalili

**Hyperdense middle cerebral artery sign and its application in the diagnosis and prognosis of stroke**

Elham Khalili
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Stroke is a major public health problem, and one of the main causes of mortality and morbidity. Hyperdensity of the middle cerebral artery (MCA) on brain computed tomography (CT) is an early sign of ischemic stroke and indicates occlusive thrombus within the MCA. We conducted a systematic literature search of PubMed and Scopus. Studies included randomized clinical trials, clinical trials, observational studies, and review articles. We review the incidence, diagnostic and prognostic value, long-term prognosis in patients with ischemic stroke, differential diagnosis, and other important points. Accumulation of erythrocytes, fibrin, and cellular debris leads to this sign. Hyperdense MCA sign (HMCAS) is the most predictive of MCA occlusion. HMCAS is a reliable predictor of poor short-term prognosis in patients with acute stroke. Symptomatic intracranial hemorrhage (sICH) is a severe outcome of IV rt-PA therapy after acute ischemic stroke. HMCA sign can predict increased sICH rates. Pseudohyperdense MCA sign appears without intraluminal thrombosis. The differential diagnosis of HMCAS differentiates it from a pseudohyperdense MCA sign. These differential diagnoses include increased hematocrit, increased serum density due to substances such as cocaine, hyperdensity of vascular wall such as in vascular wall calcification, infection, tumor, or contusion. Additional imaging with MRI can help to identify these situations.

Niloofar Deravi

**Quercetin enhances chemotherapeutic effect of doxorubicin against human breast cancer cells while reducing toxic side effects of it**

Niloofar Deravi
*Student Research Committee, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran*

Background: Doxorubicin (Dox) is an efficient drug for breast cancer chemotherapy, however, its toxic side effects on non- tumor tissues, especially on myocardial cells, sometimes limit its clinical application. Therefore, it is necessary to develop a new drug, which can be combined with Dox to potentiate the anti-tumor effect of Dox at a lower concentration and attenuate the toxic side effects of it. Quercetin (Que) has anti-tumor activity in addition to its protective effects on various cells. By preparing human non-tumoral MCF-10A mammary cells, human breast cancer MCF-7 and MDA-MB-231 cells and human myocardial AC16 cells, here, we wanted to evaluate whether Que might represent such an agent and investigate its possible mechanisms of potentiating the anti-tumor effect of Dox at a lower concentration.
Method: human non-tumoral MCF-10A mammary cells, human breast cancer MCF-7 and MDA-MB-231 cells and human myocardial AC16 cells, were cultured and hence, treated with different concentrations of Que. Cell viability was measured via MTT assay. Cell apoptosis analysis was conducted. Protein expressions were investigated via Western blotting. Intracellular Dox accumulation was detected using flow cytometry.
Results: The results showed that Que could increase intracellular accumulation of Dox in breast cancer cells through down-regulating the expression of efflux ABC transporters including P-gp, BCRP and MRP1, which can effectively eliminate cancerous cells including breast cancer stem cells (BCSCs), thereby potentiating the anti-tumor effect of Dox. Furthermore, Que attenuated the cytotoxicity of Dox to non-tumoral MCF-10A mammary cells and myocardial AC16 cells.
Conclusion: Therefore, Que could be used as a novel agent combined with Dox in breast cancer therapy, which could potentiate the anti-tumor effect of Dox at a lower concentration and attenuate the toxic side effects of it.

Marziyeh Pirzadeh

**The role of aryl hydrocarbon receptor, H. pylori, tryptophan, and arginine and their cooperation in gastric cancer**

Marziyeh Pirzadeh
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Several risk factors are involved in gastric cancer initiation and development. Among those, H. pylori is one of the strongest causative agents of gastric cancer. Multiple virulence factors are involved in its pathogenicity. We reviewed an interesting immunological cycle with the cooperation of H. pylori, AHR, TRY, ARG and the metabolites of these two amino acid in gastric cancer. Aryl hydrocarbon receptor is a ligand activated transcription factor playing different roles in cells. It has different kinds of exogenous and endogenous ligands. Tryptophan metabolite, kynurenine, interacts with AHR and this interaction can lead to immune suppression and subsequently gastric cancer. There are some related metabolites which induce oxidative stress that results in H. pylori induced gastric cancer. On the other hand, H. pylori may down regulate AHR and AHRR expression which leads to more inflammatory cytokine production. Although there are several receprical connections but these correlationas come with some contradications which needs more investigations to be done for a better clarification.

Azadehsadat Razavi

**Interaction of platelets and T cells in cancerous tissue**

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T cells, as the main immune cells in fighting against cancer, usually overwhelm by many factors. These factors are from tumor microenvironment (TME) to other cells effects. The main hurdle is TME features limited T cells function. TME is characterized by hypoxia, insufficient nutrition and accumulation of acidic metabolic waste products, which are not favor of T lymphocytes. Beyond this, T cells express T cell receptors (TCRs) on their surface to attach to tumor antigens. By binding to tumor cells, T cell may turn to exhausted form or enter to dysfunctional state because of expression of inhibitory receptors and a transcriptional state distinct from that of functional effector or memory T cells. Additionally, one of the seemingly insignificant immune cells effected on T cells is platelet, which known as the main source of transforming growth factor β (TGFβ). Interestingly, the concept of cross-talk between platelets and T cells have been considered as a reason for preventing tumor growth. Of note, platelets not only inhibit T cells activation over recognition of tumor antigens process, but also it is not far beyond the expectation that recruited them in the same way. There is a hypothesis that suggested platelets promote malignancy by dampening host immunity especially T cells.

Sepideh Sargoli

**Art meets science**

Sepideh Sargoli
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From the time of birth on Earth, human beings have made small and simple discoveries that were very beneficial to human life. The more time passed, the human discoveries expanded and helped human intellectual and functional mutations. One of these discoveries was the discovery of the sky and astronomical phenomena. The aesthetic value of astronomy is undeniable, and the wonders of the universe are manifest through science and scientific methods, without which the universe was incomprehensible. Astronomy is a science mixed with art. Art can be constructed as a guide to understand and appreciate the scientific sense and values, and to put us at a point where art thinking affects science or brings us to scientific art. Stars, nebulae, neural tissue, chemical structure of materials, the structure of the human eye, each follow a particular pattern and they cannot withstand the formation of patterns. This makes us reasonably or experimentally look at how these patterns are formed.
In this paper, I tried to illustrate the connection between astronomical phenomenon and the physical nature of a chemical in order to promote astronomy, in the form of an artwork. This is a parallel way to promote astronomy and build a work of art to better understand the beauty of the integration of science and the arts.

Shabnam Zahirian

**The Biological Effects of Childhood Trauma**

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Trauma in childhood is a grave psychosocial, medical, and public policy problem that has serious consequences for its victims and for society. Chronic interpersonal violence in children is common worldwide. Developmental traumatology, the systemic investigation of the psychiatric and psychobiological effects of chronic overwhelming stress on the developing child, provides a framework and principles when empirically examining the neurobiological effects of pediatric trauma.
Despite the widespread prevalence of childhood trauma, less is known about trauma's biological effects in children as compared to adults with child trauma histories; and even less is known about how these pediatric mechanisms underlie trauma's short-term and long-term medical and mental health consequences. This article focuses primarily on the peer-reviewed literature on the neurobiological sequelae of childhood trauma in children and adults with histories of childhood trauma.

Alaleh Jamali

**Brain-computer interfaces**

Alaleh Jamali
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Humans controlling machines with their minds may sound like a science fiction, but it's becoming a reality through brain-computer interfaces. BCI technology allows a human brain and an external device to talk to one another to exchange signals. It gives humans the ability to directly control machines, without the physical constraints of the body. BCI can provide major medical benefits in the military and civilian worlds. For instance, amputees could directly control sophisticated prosthetic limbs. And implanted electrodes can improve memory for people dealing with Alzheimer's disease, stroke, or head injuries.

Think of a BCI as a bridge between your brain and an external device. As of today, we mostly rely on electroencephalography (EEG) a collection of methods for monitoring the electrical activity of the brain to do this. But, that's changing. By leveraging multiple sensors and complex algorithms, it's now becoming possible to analyze brain signals and extract relevant brain patterns. Brain activity can then be recorded by a non-invasive device and no surgical intervention needed. In fact, the majority of existing and mainstream BCIs are non-invasive, such as wearable headbands and earbuds.

Most BCI technologies are still in the early stages of development and are actively being researched and funded. Monkey Driving Wheelchair and implanted chip in rat have shown that transferring data is possible from a brain to another one. As a result of some of these experiments in labs, we can predict that in the near future we will be able to download information to our minds and exchange our memories and knowledge.

# Poster Presentations

Shahrbanoo Pahlevanynejad

**Evaluation of Bedsore self-care applications for elderly**

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Background and Aim: The World Health Organization defines mobile health as the provision of health care services by mobile devices such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices. Maintaining the health of the elderly in the modern world is an important and fundamental matter. The world is getting older, and family members have the greatest role to play in supporting and caring for the elderly. Bedsores are not only a common disease but also a major global problem, which, despite significant advances in treatment over the past century, is still the most common cause of hospitalization for the elderly. The purpose of teaching technology to patients is to make it possible for the sufferer to personally control and treat the disease as much as possible by using the mental and practical information obtained from mobile applications. The purpose of this paper is to evaluate the self-care applications of the elderly in the field of bedsores.

Material and Method: This study is a review study. From searching for keywords related to the mobile app's adaptive category, the apps available based on the information provided in the Google Store, the App Store, the bedsores on Apple, and other sites are reviewed and tailored to the application's criteria. Approximately 10% of the existing applications were evaluated.

Results: In this study, 12 applications were examined with searches and criteria for entering the study. More than half of these programs can provide similar features and only provide general instructions and guidelines for bed sores and prevent its complications for the elderly. However, a small number of these programs are equipped with the ability to accurately measure the necessary parameters in the diagnosis, which helps the program to control the disease by the elderly. The highlight of the program was the simple design for easy use, which is an important feature in designing programs for the elderly.

Conclusion: Recently, efforts have been made to develop new IT management models for chronic diseases. In particular, mobile health interventions have positive effects on the management of chronic diseases. Among the latest technologies for such mobile health interventions, smartphones are one of the most promising tools with a wide user base and easy to use. Older people are more eager to use new technologies such as mobile phones because they stay at home. Chronic disease management programs combined with mobile technology offer the potential to shift the focus from the hospital to the daily lives of patients, which changes health behavior.

Ali Faramarzi

**The effect of ultraviolet radiation caused by metal halide lamp fracture on eye and skin**

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Background: Before world-class standards of safety are developed, the mass production of low-power bulbs has been flowing through without any specific pattern. While assessing and controlling the dangers of radiation from these lamps to humans and the environment is vital and inevitable. This study aimed to investigate the effect of ultraviolet radiation due to metal halide lamp fracture on the eye and skin of women exposed to ultraviolet radiation using objective data.
Methods: A field study was conducted by a survey. A total of 218 women at the time of breaking the lamp were attending the wedding ceremony and 106 of them had an incidence of the severe eye or skin symptoms. Data were collected using a questionnaire with four sections of demographic factors, ocular, and skin symptoms that were exposed to radiation, and systemic poisoning with sodium and mercury. Data were analyzed using IBM SPSS Statistics, version 20, and reported in descriptive statistics.
Results: The results of the epidemic survey indicated that 106 women (48.6%) of 218 who presented at the site of the incident suffered ocular and skin lesions and have been poisoned with ultraviolet radiation. According to reports, 72.2% of the injured people referred to an eye or emergency physician for the diagnosis and treatment of symptoms, and 69.1% of patients with a diagnosis of ophthalmologists had drug treatment.
Conclusion: Due to the dangers of ultraviolet radiation emitted by metal halide lamps, especially at the time of injury and the breakage of the external arc of the lamp, it is necessary to reconsider the use of these lamps, especially in public places.

Niloufar Yazdanpanah

Anosmia: A Missing Link in the Neuroimmunology of COVID-19

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Just before the 2020s began, a novel coronavirus, SARS-CoV-2, brought for humans a potentially fatal disease known as COVID-19. The world has thoroughly been affected by COVID-19, while there has been little progress towards understanding the pathogenesis of COVID-19. Patients with a severe phenotype of disease and those who died from the disease have shown hyper inflammation and were more likely to develop neurological manifestations, linking the clinical disease with neuroimmunological features. Anosmia frequently occurs early in the course of COVID-19. The prevalence of anosmia would be influenced by self-diagnosis as well as self-misdiagnosis in patients with COVID-19. Despite this, the association between anosmia and COVID-19 has been a hope for research, aiming to understand the pathogenesis of COVID-19. Studies have suggested differently probable mechanisms for the development of anosmia in COVID-19, including olfactory cleft syndrome, post-viral anosmia syndrome, cytokine storm, direct damage of olfactory sensory nerves (OSNs), and impairment of the olfactory perception center in the brain. Thus, the observation of anosmia would direct us to find the pathogenesis of COVID-19 in the central nervous system (CNS), and this is consistent with numerous neurological manifestations related to COVID-19. Like other neurotropic viruses, SARS-CoV-2 might be able to enter via the olfactory epithelium and induce innate immune responses at the site of entry. Viral replication in the non-neural olfactory cells indirectly causes damage to the olfactory receptor nerves, and as a consequence, anosmia occurs. Further studies are required to investigate the neuroimmunology of COVID-19 in relation to anosmia.

Amir Siahmansouri

**Endocrinologic profile, what does it say to us about prognosis and clinical condition of covid-19 patients?**

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Background: Covid-19 pandemic, the common issue has involved people all over the world, as affects different parts of society, it targets different organs in the body, too. Endocrine system involvement is an important one. This article introduces endocrinologic markers as a supplementary tool for monitoring of covid-19 patients to provide better health services to the community. Search method: PubMed, Google Scholar, and Science Direct databases were searched in English with 4 keywords from December 2019 up to August 14, 2020. A total of 27 articles were selected based on inclusion criteria and exclusion criteria. Results: Hypothalamic-Pituitary-Adrenal axis: studies on SARS-CoV had detected the virus in the hypothalamus and pituitary gland in autopsy which is reasonable because either hypothalamus or hypophysis express ACE2. On the other hand, some parts of amino acid sequences of virus mimic ACTH structure and may body make autoantibodies against ACTH that results in ACTH deficiency. Interestingly in one study authors observed hypocortisolism in about 40% of patients. In further investigation, they thought about 80% of patients had central hypocortisolism. Disturbance in ACTH secretion associates with a rise in inflammatory cytokines. In SARS-CoV, cortisol increment was associated with the severity of lymphopenia. Recently one study published in The Lancet journal has declared a rise in serum cortisol concentration is related to increase mortality from covid-19. Aldosterone: renin- independent hyperaldosteronism could represent the severity of covid-19. Hypocalcemia: hypocalcemic patients (especially calcium level lower than 2.0 mm/l) had a deteriorated clinical course and the incidence of septic shock, organ failure, and mortality are higher. Thyroid hormones: Patients with SARS CoV-2 in ICU could develop a low T3 syndrome, with a bad prognosis. Consistently with SARS-CoV studies, levels of T3 & TSH significantly were lower in deaths caused by covid-19. Notably low T3 level was reported to be related to disease intensity. Blood glucose: studies designed on SARS CoV showed increasing levels of FPG is associated with increased mortality and hyperglycemia is an independent predictor of mortality. Gonadal hormones: LH levels increase and lower testosterone: LH ratio might be a marker of Leydig cell insufficiency and a predictor of potential male infertility. Conclusion: Considering the possibility of late endocrinologic consequences of covid-19, including subclinical hypothyroidism, partial adrenal insufficiency, diabetes mellitus, sterility, and hypothalamus-pituitary axis disorder, it seems important to monitor the level of endocrinologic parameters for better health care surveillance that hopefully removes some burden from society.

Negin Ziamiavaghi

**PLGA suitable nanoparticle for preparing medicinal vaccines**

Negin Ziamiavaghi

Background: New standard treatments for prostate tumors include surgery, radiation therapy or hormone therapy. Due to the side effects of these methods, much attention has now been paid to immunotherapy.
Vaccination is one of the methods can activate the patient's immune system by detecting tumor-associated antigens (TAAs). The use of dendritic cells (DCs) loaded with tumor lysates is one of the methods of vaccination.
There are only a few tumor-specific antigens in the whole tumor cell lysate (TCL). Therefore, TCLs have poor immunogenicity and Their uptake by antigen presenting cells (APCs) is poor. Therefore, biodegradable nanoparticles have been used as adjuvants and antigen delivery carriers to activated dendritic cells to improve their immunogenicity. PLGA is one of the numerous generally used biodegradable polymers for drug delivery purposes.
Methods: LNcap cell line was cultured. The cell membrane was destroyed by freeze-thawing and the supernatant was centrifuged to collect cancer antigens. PLGA nanoparticles were prepared by double emulsion-solvent evaporation method. Cancer antigens and Poly I: C were added to the nanoparticles. The nanoparticles were lyophilized and coated with a thin layer of gold. A vacuum current of 5–10 kV was generated and the morphology and particle size were tested by Field Emission Scanning Electron Microscopy (FESEM) .
Results: According to the results of FESEM, no solvent or excess material was left at the particles surface and all the nanoparticles had a spherical shape with a smooth surface. These nanoparticles had the standard specificity for injection into the target cells.
Conclusion: According to this study, PLGA nanoparticles are suitable for the production of pharmaceutical vaccines, because of their physical and chemical properties such as flexibility, ability of ligand attachment to the surface and drug protection within their structure.

Niloofar Etemadi

**Recent Advances on 3D Printed Poly(caprolactone) in Tissue Engineering**

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Introduction: Three-dimensional (3D) printing is a versatile technique that plays a growing role in biomedical engineering and regenerative medicine. This technique has remarkable capability in creating 3D scaffolds and complex structures with micron-size precision and accuracy with homogenous distribution of cells within it for tissue engineering and employing a variety of biomaterials. Therefore, materials can be developed to derive some of their properties via their structural organization rather than their intrinsic constituents. Being printable, materials should have specific properties, such as rheological, suitable swelling, viscosity characteristics, and short-term stability. The designed scaffolds should exhibit proper mechanical properties, good cellular behavior, and porosity. Among various types of biomaterials, polycaprolactone (PCL) polyester apart from being biocompatible and biodegradable; qualifies to an appreciable level due to its easy availability, cost-efficacy, and suitability for modification in hard and soft tissue engineering. Its adjustable physicochemical state, biological properties, and mechanical strength lead to withstand physical, chemical, and mechanical pressures without significant loss of its properties.
Methods: In this review, the last decade published studies on the application of 3D printed scaffolds fabricated by PCL and its hybrids (synthetic polymers, natural polymers, ceramics) in various fields of medicine such as hard and soft tissue engineering, regenerative medicine, and stem cell culture were investigated. Moreover¬, the choice of the 3D bioprinting method depends on factors, such as surface resolution, cell density and viability, and the materials used, which will influence the final bioprinted construct.
Results: Various studies have revealed that although 3D printed scaffolds were challenging in the construction of scaffolds in soft and hard tissue engineering, this technique was developed based on biomaterials and cells, that are being used for tissue repair and regeneration. Moreover, using PCL as a based biomaterial result in more flexibility in soft tissues and appropriate mechanical strength for hard ones. Furthermore, PCL has been adopted in many biomedical applications and a number of devices fabricated with PCL already have FDA approval.
Conclusion: Three-dimensional printing technology is very promising to overcome the major challenges in tissue engineering. Therefore, to access the coordination of mechanical properties between porous scaffolds and target tissue, scientists have proposed the use of 3D printing for ideal construction. Also, significant properties of PCL; such as longer degradation time makes it popular for hard tissue replacement, load-bearing tissues by enhancing stiffness, and for soft tissues by decreasing its molecular weight and degradation time.

Maryam Zahiri

**Study of changes in concentration and effect of pm2.5 on mortality due to lung cancer in Ahvaz 2011- 2017**

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Background: Air pollution is one of the biggest problems today, especially in developing countries, which seriously threatens human health. PM2.5 is a major component of air pollution in urban areas which can pass through the nose and throat and can penetrate the deepest part of the lungs and lead to a series of health problems.
Methods: Data related to particulate matter were received from the Environmental Protection Agency in Ahvaz. Temperature data and pressure data were obtained from the Meteorological Organization. This data entered annually in separate rows on an Excel spreadsheet. Validation of this data has been done by Aphekom method. The following operations are performed on this data, respectively:
1-Temperature and pressure correction and unit adaptation to the model
2-Initial processing
3-Secondary processing
4-Primary filtering secondary filtering
5-quantifying of mortality due to PM2.5
Results : The results indicated that the lowest PM2.5 concentration is related to 2017 is (47.53 µg /m3) and the highest PM2.5 concentration is related to 2011( 76.08 µg /m3) and the average concentration of PM2.5 is 55.86 µg /m3 and is almost five times higher than the guidelines of the World Health Organization. The highest number of deaths from lung cancer attributed to PM2.5, 21people in 2011 and the lowest number of deaths were 14 people in 2015.
Conclusion: as we know, this pollutant has caused many destructive effects and mortality to the residents of Ahvaz. For this purpose, the authorities in this field are required to provide preventive and applicable solutions to reduce the concentration of particulate matter and protect the citizen's heath.

Mohammad Mehdi Mehrabi Nejad

**Microstructural white matter alterations and personality traits: A diffusion MRI study**

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Personality traits refer to a set of independent patterns of behaviour, cognition, and emotion. The Big-Five of Personality (NEO-FFI), is one of the most generally recognized taxonomies of personality. The current structural and functional correlates of personality are divergent and inconsistent in some cases, which necessitate further investigation of it. Herein, we aimed to investigate the white matter (WM) microstructural correlates of personality traits using diffusion MRI connectometry. Overall, the main findings of this study were located in different parts of the corpus callosum (CC) and middle cerebellar peduncle (MCP), highlighting the significant role of WM local connectome in the CC and MCP in the regulation of personality traits. Future studies need to validate our results.

Bita Moudi

**Study of Some Cell Growth and Apoptosis Biomarkers and Histomorphology of the Liver for the Detection of HBV-Related Hepatocellular Carcinoma: An Immunohistochemical Study, Stereology, qRT-PCR, and Electron Microscopy**

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Background: Hepatocellular carcinoma is the third leading cause of cancer-related death worldwide and late diagnosis is the main cause of death in HCC patients. In this study expression patterns of p53, Ki-67, HepPar-1, Arg-1, AFP, HSP70, GPC3 and GS and their relationships with pathogenesis of HCC in Iranian patients were investigated. Alao, the current study assessed liver tissue elements by stereological technique in patients with hepatitis B-related cancer and compare the results with control and only hepatitis B group.
Methods: The expression of p53, Ki-67, HepPar- 1, Arg-1, AFP, HSP70, GPC3 and GS were determined by immunohistochemistry and quantitative real-time PCR (q-PCR) methods, using core liver fine-needle aspiration biopsies from 121 cases including patients with HBV alone, HCC without HBV, HBV+HCC and 30 normal tissues as control group. Also, needle liver biopsies were analyzed by stereological method using systematic uniform random sampling method. Haematoxylin and eosin stained sections were used. The numerical density of hepatocytes, hepatocyte volume, numerical density of Kupffer cells, volume density of the connective tissue in the portal space, and volume density of the connective tissue were assessed.
Results: HSP70, GPC3 and GS were expressed in higher levels in HBV-related HCC samples compared to HBV alone group. The results showed that the labeling index of HSP70, GPC3 and GS are correlated with immunohistochemical and molecular expressions of HSP70, GPC3 and GS. The sensitivity and specificity of the panels with 3, 2 and 1 positive markers, regardless of which one, were 21.6% and 100%, 51.3% and 100% and 93.4% and 80.5% respectively. p53 and Ki-67 were expressed in higher levels in HBV-related HCC samples compared to HBV alone group. The results showed that the labeling index of p53 and Ki-67 are correlated with immunohistochemical and molecular expressions of p53 and Ki-67. The sensitivity and specificity of the panels with 2 and 1 positive markers, regardless of which one, were 34.8% and 97.9%, and 96.5% and 86.4% respectively. Arginase-1 showed a significantly higher sensitivity for diagnosis of HBV-related HCC compared to HepPar-1 ($P<0.001$). When at least 1 marker was positive, the sensitivity and the specificity, were 84.3%, 82.4%, respectively, and the sensitivity and negative were significantly higher compared to the both 2 positive combination. Quantitative analysis of liver samples indicated that there were statistically significant differences in the numerical density of hepatocytes, hepatocyte volume, numerical density of Kupffer cells, volume density of the connective tissue in the portal space, and volume density of the connective tissue between control and hepatitis B-related cancer and hepatitis B groups.
Conclusions: The current study demonstrated an association between HSP70, GPC3 and GS expressions and HBV-related HCC in our population. It was concluded that HSP70, GPC3 and GS expressions could be useful biomarkers for increasing the specificity and sensitivity of HCC diagnosis to acceptable level. Also, results indicated an association between p53 and Ki-67 expressions and HBV-related HCC. It was concluded that and Ki-67 expressions could increase significantly in HBV-related HCC patients. Ki-67 was more specific and less sensitive and combination of two test can increase the specificity and sensitivity to acceptable level. Arg-1 has a higher sensitivity and specificity in diagnosis of HBV-related HCC when compared with HepPar-1. When, both markers being positive, the specificity of this combination were fairly higher. These 2 markers are recommended as the most effective panel for fine-needle aspiration specimens in the diagnosis of HCC. Quantitative, stereological technique is simple and reliable for evaluating HCC in chronic hepatitis B. It is useful for assessing the liver tissue parameters. Stereology is recommended for the diagnosis of people prone to cancer in patients with chronic hepatitis B.

Mehrangiz Ghabimi

**The relationship between mental health and patience in pregnant women hospitalized in the maternity ward of Ali Ibn Abitaleb Hospital in Zahedan**

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Introduction & aim: Mental health is necessary to maintain the permanence of social, occupational and educational performance of society and its provision is the main purpose of mental health programs in society. Patience is one of the moral concepts that has been emphasized in Islamic ethics. What comes to mind from this word is a state of mind that occurs to certain people during times of distress, calamity, and affliction. Therefore, the aim of this study was to determine the relationship between mental health and patience in pregnant women hospitalized in the maternity ward of Ali Ibn Abitaleb Hospital in Zahedan.

Materials and Methods: This research is a descriptive-analytical cross-sectional study conducted in 1398. The study population consisted of 82 pregnant women hospitalized in the maternity ward of Ali Ibn Abitaleb Hospital in Zahedan. Data through demographic information, Mental Health Standard Questionnaire (GHQ) which has 28 questions and includes 4 subscales of physical symptoms, anxiety and insomnia. Social dysfunction. Depressive symptoms. Also standard questionnaire. The level of patience was designed by Khormaei et al. This questionnaire contains 25 questions that include excellence, patience, satisfaction, perseverance, and procrastination in five components. Independent inferential T test, onova, Pearson correlation coefficient were analyzed in SPSS software version 21.

Results: The results showed that the mean age of pregnant women was 26.23 2 2.4. 36.58% of them were primiparous women. 24.39% of them mentioned the history of abortion. Also 41.64% of them were undergraduates. The average length of hospital stay in these patients is 2.31. The mean score of mental health was 104.87 42 5.42 and the mean score of patience was 64.03 6 6.54. There was a significant relationship between age and endurance component ($p < 0.005$). Duration of hospitalization with anxiety There was a significant relationship between insomnia ($p < 0.005$) and a history of abortion with a subset of depressive symptoms. There was also a significant relationship ($p < 0.005$) and there was a direct relationship between the mean score of mental health and patience. ($p < 0/005$)

Conclusion: The results of the present study showed that the score of mental health and patience was good. Also, age was related to the endurance component. So that with increasing age, endurance of pregnant women increases. Also, length of hospital stay with anxiety and insomnia. There was a suspicion that anxiety and insomnia increased with increasing hospital stay. Pregnant women with a history of miscarriage were more depressed than other women. Also, pregnant women with higher mental health scores compared their patience. Therefore, appropriate measures can be taken in the form of training workshops for pregnant women at the time of receiving prenatal care in health centers to increase the mental health of these people so that pregnant women can see the effects of it during and after childbirth Use it.

Mahnaz Jamee

**Unusual Cutaneous Manifestations in Two Iranian Siblings with Combined Immunodeficiency: The Importance of Multidisciplinary Approach**

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Background: Combined immunodeficiencies (CIDs) are a group of monogenic inborn errors of immunity (IEIs) characterized by T- and B- cell dysfunction leading to recurrent infections, lymphoproliferation, predisposition to malignancy, and autoimmune phenomena. The latter mainly affects endocrine, hematologic, and gastrointestinal systems. Herein, we described two siblings with CID who developed autoimmune childhood bullous pemphigoid lesions.

Case presentation: P1 was a 32 months male who was born at term to consanguineous parents. In his early months of life, he developed generalized eczematous lesions and recurrent episodes of oral candidiasis. He also suffered from protracted non-bloody diarrhea, food allergy, failure to thrive, and recurrent otitis media. When he was 16 months old, laboratory evaluation revealed pancytopenia, thrombocytosis, and increased level of C-reactive protein (CRP). The serum level of IgM and IgE was increased but IgG and IgA were in normal ranges. Flow cytometry showed low CD4+ T cells and CD19+ B cells but normal natural killer (NK) cells. The specific antibody titers to diphtheria and tetanus were not protective. The Nitro blue tetrazolium (NBT) test was normal. The sputum smear and culture for Bacillus Calmette-Guérin (BCG) and quantitative polymerase chain reaction (PCR) for HIV were negative. According to the European Society for Immunodeficiency (ESID) criteria, the diagnosis of CID was established. He received extended-spectrum antibiotics and amphotericin B and then prophylaxis with fluconazole and trimethoprim-sulfamethoxazole. The signs and symptoms were further controlled by intravenous immunoglobulin substitution for about one year.

He was referred to our hospital with a six months history of progressive bullous lesions. The lesions involved the face, trunk, palms, and soles, although the mucous membrane was intact. The bullae had a thin roof and easily ruptured within 24 hours. In the histopathologic examination, spongiotic epidermal reaction and subepidermal blisters associated with perivascular and interstitial infiltration of eosinophils and smaller numbers of neutrophils and lymphocytes were observed. In direct immunofluorescence test (DIF), linear deposition of IgG and C3 along the dermo-epidermal junction was found, which was compatible with childhood bullous pemphigoid. The methylprednisolone and azathioprine were added to the regimen which resulted in a remarkable improvement of skin lesions and also feeding conditions. However, two weeks later he re-admitted to the intensive care unit (ICU) and eventually died due to fulminant sepsis.

One week after his pass away, his sibling (P2) presented with papulopustular and bullous rashes on the entire trunk and limbs, similar to her sibling's lesions. She had long been under treatment for occasional eczematous lesions by a dermatologist. She also suffered from developmental delay, allergy to cow's milk, recurrent oral candidiasis, and episodes of respiratory tract infections since infancy. Eventually, basic immunologic workup revealed an underlying CID and treatment with IVIg continued. She is now well and in a relatively stable health condition.

Conclusion: Cutaneous lesions may be the first or predominant presentation in patients with IEIs. This may emphasize the undeniable role of a multidisciplinary approach to such patients and also the importance of considering skin disorders, particularly when they are extensive, recurrent, or refractory to treatment and associated with other warning signs of IEIs.

Amin Orash

**Silk Fibroin as a Biomaterial in Corneal Tissue Engineering: A Review**

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Introduction: The cornea is a critical part in the eye's structure. The cornea has dome shaped architecture which must be able to provide two important roles to protect eye from chemical and mechanical injuries, transmit light into different proportion of eye as well. The cornea consist of three cell layers and two membranes which have specific influence in vision. The epithelium is the outermost layer, stroma is middle's layer and endothelium is innermost layer which are separated by bowman's membrane (epithelium and stroma layers) and decement membrane (stroma and endothelium layers). The cornea suffer from different types of disease including hereditary issues, mechanical or chemical damages and low vision of the elderly populations. Corneal disorders are the one of the most important eye's problems which make over 10 million people who are suffer from lack of proper replacement because of immune rejections, insufficient and shortage of transplant tissue and it is highly cost. Over recent years, scientists found that tissue engineering is a promising development to provide alternative replacement with high range of applicability. Tissue engineering by applying growth factors as a signaling, host cells and different types of scaffolds provides transplant tissue for specific demands. For this purpose, a range of materials have been studied to ease corneal regeneration. It is admitted that corneal tissue is organized by lamellar collagen fibrils. As a result of this the most favorable candidate to provide the better place for corneal regeneration is collagen because of native corneal nature, but collagen has low mechanical strength as well as high cost. Use of biological macromolecule such as silk fibroin (SF), apart from being a biocompatible and biodegradable polymer, is cost efficient, readily available and an easy to modify polymer. According to previous reports, SF has a noticeable properties which are appropriate for corneal tissue engineering (CTE) such as biocompatibility, Biodegrability, mechanically strength, transparency and efficient influence on corneal cells, so these make SF a good candidate in order to reach this purpose.
Methods: We reviewed articles that focused on the different studies to evaluate potential of SF as a biomaterial for corneal usage on the specific corneal cells published in medical journals.
Results: SF is presently a capable material with an enormous variety of tissue engineering applications. SF has appropriate biological properties and physiochemical state that allow it to withstand mechanical, chemical and physical insults without significant loss of its properties. This paper reviews the recent progress of using SF in CTE.
Conclusion: According to the finding of this study, SF is a promising material with appropriate physical, chemical, mechanical and biological behavior to act as a suitable structure for corneal cells. This material enables corneal cells to have acceptable regeneration in corneal's damage.

Mahsa Keshavarz-Fathi

**Promoter Methylation of JAK2 in Juvenile Systemic Lupus Erythematosus**

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Introduction: The pathogenesis of systemic lupus erythematosus (SLE) is multifactorial which is affected by both genetic and epigenetic alterations. Recently, many studies have assessed the methylation status of the genes responsible for autoimmunity in adult patients. Besides, the methylation status of the long interspersed nucleotide element-1 (LINE-1), interleukin-32 (IL-32), and CD70 have been evaluated in the juvenile forms of autoimmune diseases as well. Due to the substantial role of inflammatory cytokines in the pathogenesis of SLE in both pediatric and adult SLE, studies to assess the alteration of molecules involved in cytokine signaling can elucidate the pathogenesis of juvenile SLE (JSLE). Janus kinases (JAKs) are the cytoplasmic portion of the cytokine receptors, and by binding the cytokines to their receptors can affect signal transducer and activator of transcription (STAT) to regulate gene expression. JAK2 is one of the members of this family whose expression increases in SLE, which leads to the enhanced downstream signaling of inflammatory cytokines. We conducted this study to understand if the methylation status of the JAK2 promoter altered in juvenile SLE (JSLE).

Methods: Twenty-five pediatric patients with SLE and 24 healthy controls without any history of autoimmune and inflammatory diseases were included. Peripheral blood samples were obtained and DNA extraction was performed. The promoter methylation was assessed by using the bisulfite conversion system and real-time quantitative multiplex methylation-specific PCR (QM-MSP). The relative unmethylation level of each DNA sample compared to a fully converted methylated human plasmid DNA was calculated and the mean unmethylated levels of the promoter in the cases and healthy controls were compared.

Results: The JAK2 promotor in the peripheral blood samples of the patients with JSLE was significantly hypomethylated. The mean unmethylated level of the promoter was higher in the JSLE group compared to the control group (0.75±0.90 vs. 0.43±0.45, respectively; P-value: 0.026).

Conclusions: According to the results of our study, hypomethylation of the JAK2 promoter occurs in juvenile SLE. Hypomethylation of the JAK2 promoter leads to increased JAK2 expression, which subsequently leads to the increased downstream signaling of inflammatory cytokines. This could be used as a basis for developing novel approaches for the diagnosis and treatment of JSLE.

Mohammad Malekan

**HIF-1α as a prognostic marker for colorectal cancer progression and metastasis**
Mohammad Malekan

Background: Colorectal cancer (CRC) is a major public health concern and the third most common cancer after lung and breast cancer worldwide. Also, this malignancy is the fourth cause of cancer-related deaths globally. The objective of this study is to investigate the HIF1 serum levels and HIF-1α gene expression as a prognostic marker for CRC progression and metastasis.
Method: In this prospective cohort study conducted during 2018-2019, 50 new cases were diagnosed with CRC (stage II, III) and 50 healthy individuals undergoing routine check-ups in our clinics assigned as patients and control groups, respectively. HIF-1α levels in serum were detected by enzyme-linked immunosorbent assay (ELISA) in the patient group before and after surgery, at the time of discharge, and one month and three months after surgery; and in the control group on the day of routine check-ups. Tumor sections were obtained on the day of surgery, and HIF-1α mRNA and gene expression were detected using real-time quantitative polymerase chain reaction. The p-value of less than 0.05 was considered statistically significant.
Results: CRC patients and control group with a mean age of 52.4 (±13.87) and 52.32 (±13.46) years, including 52% of females, participated in this study. It was indicated that the expression of the HIF-1α gene in cancerous tissues was 7.31 times of healthy tissues ($p<0.001$), which was significantly higher in men ($p= 0.003$). Also, before surgery, the mean protein level of patients was higher than post-surgery ($p<0.001$), discharge ($p<0.001$), one month after surgery ($p<0.001$), three months after surgery ($p<0.001$), as well as control group ($p<0.001$). Generally, HIF-1α gene expression and the mean of protein level was elevated in stages II and III compared to stage I; these differences were not statistically significant ($p>0.05$). Also, the expression of the HIF-1α gene and serum protein level in patients with liver metastasis was slightly higher than patients without liver metastasis, but not significant ($p>0.05$).
Conclusions: This study demonstrated that HIF-1α gene expression was substantially higher in the cancerous tissues in comparison to the normal tissues. Moreover, gene expression levels were decreased considerably before the surgery to three months after the surgery. Hence, it seems that the HIF1 serum level and HIF-1α gene expression could be considered as a potential prognostic factor for CRC progression and metastasis.

Sara Hanaei

**Therapeutic Efficacy of Specific Immunotherapy for Glioma: A Systematic Review and Meta-analysis**

Sara Hanaei
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Although different immunotherapeutic approaches have been developed for treatment of glioma, there is a discrepancy between clinical trials limiting their approval as common treatment. So, current systematic review and meta-analysis was conducted to assess survival and clinical response of specific immunotherapy in patients with glioma. Generally, 7 databases were searched to find eligible studies. Controlled clinical trials investigating efficacy of specific immunotherapy in glioma were found eligible. After data extraction and risk of bias assessment, the data were analyzed based on level of heterogeneity. Overall, 25 articles with 2964 patients were included. Generally, mean overall survival did not statistically improve in immunotherapy (MD=1.51; 95% CI=-0.16-3.17; P=0.08); however, it was 11.16 months higher in passive immunotherapy (95% CI=5.69–16.64; P<0.0001). One-year overall survival was significantly higher in immunotherapy groups (HR=0.69; 95% CI=0.52-0.92; P=0.01). As the hazard rate in immunotherapy approach was 0.83 of the control group, 2-year overall survival was significantly higher in immunotherapy (HR=0.83; 95% CI=0.69-0.99; P=0.04). 3-year overall survival was significantly higher in immunotherapy as well (HR=0.67; 95% CI=0.48-0.92; P=0.01). Overall, median progression free survival was significantly higher in immunotherapy (SMD=0.323; 95% CI=0.110-0.536; P=0.003). However, 1-year progression free survival was not remarkably different between immunotherapy and control groups (HR=0.94; 95% CI=0.74-1.18; P=0.59). Specific immunotherapy demonstrated remarkable improvement in glioma patients' survival and could be a considerable choice of treatment in the future. Despite the current promising results, further high-quality randomized controlled trials are required to approve immunotherapeutic approaches as the standard of care and the front-line treatment for glioma.

Ghazaleh Lotfi

**Potent Poly (ADP-ribose) Polymerase (PARP) inhibitors: Large-scale virtual screening and molecular docking studies**

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Introduction: DNA damage continually has been occurred due to erroneous DNA replication, production of reactive oxygen species, and exposure to ultraviolet radiation. The repair of damages causes increase in the survival of injured cells. Therefore, DNA repair is the opposite goal for cancer cells that undergo DNA damage in response to chemotherapy or radiatin. Poly (ADP-ribose) polymerase (PARP) is a family of proteins found in the cellular nucleus and involved in many cellular processes including DNA repair. Consequently, PARP inhibitors have been considered as a potential agent in anticancer therapy by an effect on the death of cancer cell. PARP inhibitors are under clinical trials and there are no FDA approved drugs targeting PARP. Also, resistance has been reported with PARP inhibitors by increased tumor expression of PARP. Thus, the effort for finding novel PARP inhibitors with improved potency, selectivity and, bioavailability is forcible to improve the life quality of humans. Here, we combined pharmacophore-based virtual screening and docking studies to identify several new PARP inhibitors.

Methods: The crystal structure of human PARP10, catalytic fragment in complex with PARP inhibitor Veliparib, (PDB code: 5lx6) was obtained from Protein Data Bank (www.rcsb.org). A proper pharmacophore model was designed via Ligand Scout 3.12 based on the most critical area on the PARP active site. Then the pharmacophore model was applied for virtual screening of the ZINC database (over 35 million purchasable compounds) via ZincPharmer.

Results and Discussion: The crucial interactions between the selected compounds from the ZINC database and the PARP active site were precisely investigated in detail by molecular docking studies. Finally, six ligands were selected by limiting the binding free energies less than -7 kcal.mol$^{-1}$ and having an appropriate orientation in the active pocket.

Conclusion: Herein, a combined computational approach including structure-based virtual screening on the ZINC database and docking studies were used to identify new PARP inhibitors. Most active compounds with the appropriate positions in the active site of the enzyme were identified as anticancer candidates. These compounds can be used and optimized for future drug development.

Amir Saremi Ronizi

**The most effective main criteria in the development of international health tourism in Iran**
Amir Saremi Ronizi

Introduction & Objective: Health tourism is one of the new fields of tourism that is recognized as an important part of profitable and competitive industries in the world and allows health policy makers and health centers to use their potential in providing health services to others. Countries take advantage and make money for the country. In this study, we intend to review the global competition criteria and development strategies in global health tourism with the aim of providing a new model for the development of health tourism in Iran.
Materials and Methods: Considering the need for scientific and promotional research in this field, the present study was conducted with the aim of providing solutions to achieve a desirable model for the development of health tourism in Iran. The method of this scientific research is extension with the nature of reviewing library resources and has been reviewed and analyzed using data analysis extracted from 180 surveys conducted by a group of private sector activists and experts in the field of health and tourism.
Conclusion: The most effective main criteria in the development of health tourism in Iran according to global indicators were identified as the importance of medical infrastructure, communication with tourists, including travel management and quality. Among the solutions presented in this study, increasing the participation of the private sector, establishing hospitals and clinics for health tourism, branding and development of markets in the Iranian health tourism can be mentioned.

Rojin Adabdokht

**Professionalism in dentistry**
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Over the years professionalism in health care has had several definitions, many of which are very ambiguous. Since the word “professional” is widely used among almost every occupation, it is important to be able to define who a professional dentist is. Definition of professionalism can include individual, interpersonal, or societal dimensions. Given the complexity of the construct, clarification of what constitutes professionalism would be of value for dental education.
Superficially, a dental professional can be defined as ‘a person who has the training to do the job [within dentistry] competently. Recently more comprehensive definitions have been proposed, based on the notion that dental professionalism is a moral contract between the profession and society that is underpinned by a set of values, behaviors and relationships. How To be professional used to indicate how we ought to act in almost all aspects of our working lives. Revalidation represents a shift from ‘ought’ to ‘must’. In this survey it was tried to find the most comprehensive definition of dental professionalism. Ten most relevant articles were found from pub-med and google scholar databases.
Ultimately, dental professionalism can be defined as the commitment to the oral health and well-being of individuals and society through ethical practice, reflective learning, self-regulation and high personal standards of behavior and professionalism in dental education is defined by six values of competence, fairness, integrity, responsibility, and service-mindedness.

Sanam Mohandesnezhad

**Engineered Hybrid Scaffolds for Bone Tissue Engineering**

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Background: Biomaterial and technique selection play a key role in scaffold preparation in tissue engineering. An ideal scaffold for bone tissue engineering should have properties including biocompatibility desirable biodegradability, bioactivity, osteoconductivity and osteoinductivity. Various polymers (natural and synthetic) can be used in composition with wide variety of bio-ceramics for bone regeneration purpose. Also, different techniques have been used for preparing scaffold in bone tissue repair and regeneration. Electrospinning and 3D printing have been considered as two new and widely used techniques in this regards. Each of these techniques has its own advantages and disadvantages.
Materials and methods: Electrospinning method is able to provide nanofibrous structure with a desirable surface topography for cellular activity. However, beside the desirable properties of obtained scaffold by electrospinning, the limitations of this method especially in providing 3D micro porous scaffold with high porosity percentage, limit its wide usage in tissue regeneration. On the other hand, 3D printing allows the user to prepare scaffold with the desired geometry, structure and mechanical strength. Therefore, combination of electrospinning and 3D printing seems to be a promising hybrid method to obtain a suitable scaffold with optimal nano and micro features with enhanced mechanical properties. This hybrid technique in scaffold preparation brings together the advantages of these two most effective techniques and reduces their limitations.
Conclusion: Electrospinning and 3D printing combination provide suitable 3D multiphasic structure with required properties for bone tissue engineering. Suitable material selection for each technique and optimize various parameters play an important role in achieving the scaffold with the desired features.

Maedeh Mohammad Salehi

**Preparation and characterization porous nanostructured metal-organic framework Fe3O4@MIL-100 for curcumin delivery**

Maedeh Mohammad Salehi

In recently, researches about new drug delivery systems are on the rise. These researches has provided a good basis for the use of new carriers, including the porous metal- organic framework (MOF) and magnetic nanoparticels in targeted drug delivery systems. The purpose of this study was to synthesize the Superparamagnetic Fe3O4@MIL-100(Fe) core-shell nanostructure microspheres framework. In this experimental study, iron oxide nanoparticles were first synthesized. Then, a solution of iron chloride and benzene tricarboxylic acid were made. Subsequent curcumin loading tests were synthesized in the framework and the curcumin release rate was measured in external conditions. At the end, various tests such as SEM, IR ,TGA were used to examine the synthesized framework.The results showed the successful synthesis of iron oxide nanoparticles and synthesis framework.The in-vitro release of curcumin from MIL-100@Fe3O4 Was investigated. Curcumin was efficiently released from magnetic carriers into environment under acidic pHs.

Sadaf Mohandesnezhad

**Therapeutic LbL Coatings on Dental Implants**

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Background: Metal substrates are widely used option to provide stability, structural support and excellent processability in the field of bone injuries. Implant surface modification is necessary for increasing biocompatibility, osteointegration, etc. Surface properties and topography have a considerable effect on biofilm formation, which causes inflammation around the implant.
Materials and methods: There are a wide variety of biomaterials (polymers and ceramics) that can be used as implant coatings. Among all of the osteoconductive biomaterials, Hydroxyapatite (HA) has attracted much attention in implant coating cases. Bacteria attachment and proliferation create the biofilm around the implant, which finally led to implant rejection. Controlled release of short term pain management and long term inflammation mitigation related drugs play a crucial role in the success rates of dental implants. The desired materials and drugs can be placed on the implant in the form of layer by layer (LbL) films with controlled degradation rate. There are several implant coating techniques. The selection of these techniques has a direct connection with used materials and drugs in the coating process. As a widely used technique and an attractive low-cost approach, electrochemical deposition have had a considerable impact on the achievement of several compositions and nanoporous architecture. A multilayer coating with bioactive/antibacterial properties will bring us closer to the goal of producing an ideal implant for bone fractures treatment.
Conclusion: The success of dental implants depends on two factors: soft tissue closure and good osteointegration. Material selection of implant and coatings play a key role in antibacterial properties, cell attachment and osteointegration differentiation of related stem cells or osteoblasts.

Seyed Behnam Jazayeri

**Calcium and vitamin-D status in granulomatosis with polyangiitis**

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Background: 25-Hydroxyvitamin D (25(OH)D) is the major circulating form of vitamin D that has a major role in regulation of calcium in serum. Studies have incriminated vitamin-D deficiency to be associated with the pathogenesis of many autoimmune diseases such as multiple sclerosis, systemic lupus erythematosus, and rheumatoid arthritis. On the other hand, there are several studies running around the world to discover the probable role of this hormone in granuloma-forming diseases. Nevertheless, the role of this hormone in the activity of granulomatosis with polyangiitis (GPA) has not yet been explored.
Methods: A case-control design was used. All patients diagnosed with GPA at Amira'lam hospital, between April 2013 and April 2020 who met the ACR 1990 criteria were included as cases. Controls were non-GPA patients who were admitted during the same period and were matched for age and sex. Level of 25 (OH) D, calcium, phosphorus, alkaline phosphatase (ALK.P) of the patients were measured in both groups.
Results: The study included 24 cases (15 male and 10 female) with a mean age of 49.8 ± 16.6 years and 24 controls (19 male and 6 female) with a mean age of 46.8 ± 15.9 years. Two groups were similar regarding age (P value=0.53) and sex (P value=0.21) . There was no significant difference between cases and controls regarding serum 25(OH)D level (P value=0.84), phosphorus (P value=0.11) and ALK.p (P value=0.85). However, GPA patients had significantly higher levels of calcium in their serum (P value<0.001).
Conclusion: GPA patients are at higher risks of hypercalcemia with normal 25 (OH) D levels. therefore, close monitoring of patients' calcium levels is suggested. More studies with larger sample sizes are required to assess the active form of Vit D (1,25 OH vitD) and urine calcium as well, to show the full puzzle of ca-Vit D metabolism in GPA patients.

**Contribution of non-human primate models to the development of vaccines against SARS-CoV-2 infection**

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COVID-19 is thought to be the second most widespread infectious disease and also,The high fatality of aged cases caused by SARS-CoV-2 was a need to explore the possible age-related phenomena with non-human primate models;so,Identification of a suitable nonhuman primate (NHP) model of COVID-19 remains challenging. we characterized severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in three NHP species: Old World monkeys Macaca mulatta (M. mulatta) and Macaca fascicularis (M. fascicularis) and New World monkey Callithrix jacchus (C.jacchus). Infected M. mulatta and M. fascicularis showed abnormal chest radiographs, an increased body temperature and a decreased body weight. Viral genomes were detected in swab and blood samples from all animals. Viral load was detected in the pulmonary tissues of M. mulatta and M. fascicularis but not C. jacchus. Furthermore, among the three animal species, M. mulattashowed the strongest response to SARS-CoV-2, including increased inflammatory cytokine expression and pathological changes in the pulmonary tissues. Collectively, these data revealed the different susceptibilities of Old World and New World monkeys to SARS-CoV-2 and identified M. mulatta as the most suitable for modeling COVID-19.

Studies showed ,Viral replication of nasopharyngeal swabs, anal swabs and lung in old monkeys was more active than that in young monkeys for 14 days after SARS-CoV-2 challenge. Monkeys developed typical interstitial pneumonia characterized by thickened alveolar septum accompanied with inflammation and edema, notably, old monkeys exhibited diffuse severe interstitial pneumonia. Viral antigens were detected mainly in alveolar epithelial cells and macrophages.SARS-CoV-2 caused more severe interstitial pneumonia in old monkeys than that in young monkeys. Rhesus macaque models infected with SARS-CoV-2 provided insight into the pathogenic mechanism and facilitated the development of vaccines and therapeutics against SARS-CoV-2 infection.

Investigations showed the ability of adenoviral delivery of codon-optimised SARS-CoV strain Urbani structural antigens spike protein S1 fragment, membrane protein, and nucleocapsid protein to induce virus-specific broad immunity in rhesus macaques. Researchers immunised rhesus macaques intramuscularly with a combination of the three Ad5-SARS-CoV vectors or a control vector and gave a booster vaccination on day 28. The vaccinated animals all had antibody responses against spike protein S1 fragment and T-cell responses against the nucleocapsid protein. All vaccinated animals showed strong neutralising antibody responses to SARS-CoV infection in vitro. These results show that an adenoviral-based vaccine can induce strong SARS-CoV-specific immune responses in the monkey, and hold promise for development of a protective vaccine against the SARS causal agent.

Sareh Saeed

**A review on importance of occupational therapy in social and wellbeing in life**

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Introduction & Objective: Life consists of meaningful daily activities or jobs; When we could't participate in daily work due to injury, illness, disability or social and environmental conditions; occupational therapy is used by activating self-care, productivity and leisure jobs and enhances well-being. We know that jobs are not inherently positive, but employing people in jobs that meet their needs and match their values promotes well-being. Therefore, occupational therapy can make a huge contribution to society by using our special knowledge. Hence the feeling of the need for studies on the importance of occupational therapy in social and well-being in life.
Method: This review study was conducted by searching in google scholar search engine and PubMed, SID, Scopus database with the keywords occupational therapy, welfare, professional work and their English equivalents during the years 2000 to 2020. In this study, intervention articles have been used.
Result: Occupational therapy's importance to society will be manifested when we focus unambiguously on well-being; extend our efforts beyond enhancing the abilities of individuals whose lives are already impacted by illness, injury, or impairment; and address the opportunities for achieving well-being through occupational engagement of all those whose capabilities—their opportunities to do what they have the abilities to do—are inequitably constrained. Skills to help increase the opportunities available to individuals to achieve well-being job careers, with the structural factors that shape their lives; Recognize occupational therapy as an important social profession and be valuable in terms of your commitment to ensuring that all people have the opportunity to participate. Especially in jobs that have the right to contribute to the well-being and well-being of their communities.
Conclusion: By reviewing various articles, we find that although today occupational therapy with new paradigm of the meanings to some extent to the well-being of people with mental, physical and psychological problems; He has dealt with his three main attitudes, which are self-care, , productivity and leisure; But this study is not comprehensive because; Some people feel deprived not only because of psychological problems but also because of poverty, stigma and deprivation. Work engagement is basically important for the well-being of all people, especially for all the deprived, marginalized and vulnerable people whose job opportunities Unrighteousness is limited. Therefore, the existence of occupational therapy is very significant not only as a profession but also as a client-centered view and holistic approach to promote health and well-being through engagement with the appropriate job.

Maliheh Abedi

**Epidemiology of animal bite in Iran during a 20-year period (1993–2013): A meta-analysis**

Maliheh Abedi, Amin Doosti-Irani, Fatemeh Jahanbakhsh, Amirhossein Sahebkar

Background: Rabies is a fatal disease that still kills 2–6 people a year in Iran. A meta-analysis was conducted in order to generate accurate data on animal bite exposure, and to estimate the incidence of animal bite across the country. Materials and methods: Major national and international electronic databases were searched using the keywords “animal bite,” rabies, prevalence, incidence, and Iran. Web of Knowledge, PubMed, Scopus, Ovid, and ScienceDirect were used as international databases, and the national databases included Science Information Database, MagIran, and IranDoc. Descriptive cross-sectional studies addressing the incidence of animal bite were selected and screened by two authors, and pre-specified data were extracted. The population of provinces or cities of studies was extracted from the Statistical Centre of Iran. The overall incidence of animal bite in Iran was estimated using a random-effects model with 95% confidence interval (CI). Study quality was assessed using the STROBE recommended checklist.
Results: A total of 34 studies were selected for the meta-analysis out of 1215 retrieved studies. The number of animal bites in the studies during 1993–2013 was 230,019 cases. The overall estimated incidence rate of animal bite in Iran was 13.20/1000 (95%, CI 12.10, 14.30) and the mean age of people was 26.23 (SD = 5.02) year. The incidence rate of animal bite among males (14.90/1000) was much higher than females (4.55/1000), and was higher in rural areas (17.45/1000) compared with urban areas (4.35/1000). The incident rate was highest among students compared with other reported occupations. The incidence rate of dogs was 10.40/1000 followed by cats, cows, wolves, jackals, and foxes. Domestic animals had a higher incidence rate than stray and wild animals. The incidence rate of animal bite during spring was 4.90/1000; however, the incidence rate in other seasons had no significant difference. In the retrieved studies, the highest incidence rate of animal bite was found in the West Azerbaijan
Province (146.83/1000).
Conclusion: The current study is the first comprehensive analysis of the published animal bite studies in Iran. Accurate data on animal bite incidence may lead to more effective policy-decisions towards more efficient resource allocation to primary health care for reducing rabies case. Such information is a primary and major necessity for rabies control program in the country. Animal bite reduction can significantly minimize the risk of rabies infection, thereby reducing public health costs for the expensive post-exposure treatment.

Gulnara Nasrullayeva

**PID patients with Interleukin-12 receptor β1 (IL-12Rβ1) deficiency**

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Introduction: Interleukin-12 receptor β1 (IL-12Rβ1) deficiency is a rare Primary Immune Deficiency (PID) disease described by predisposition to pathogenic mycobacteria in otherwise healthy individuals. Symptoms of the disease usually appear after Bacille Calmette-Guérin (BCG) vaccination. Only with presence of IL-12Rβ1protein, cytokine IL-12 stimulates the differentiation of naive T cells into Th1 cells and stimulates macrophages to secrete interferon IFN-γ.

Methods: In immunology laboratory of Azerbaijan Medical University we investigated 2 patients from consanguineous families with suspected IL-12Rβ1 deficiency disease: 3-year-old girl and 8-year-old boy. Patients were examined by anamnesis, clinical symptoms, CBC, blood chemistry and immunological analysis. X-ray examination and ultrasound investigation were also used. The exact diagnosis was made after genetic analysis by Sanger sequencing.

Results: the main clinical symptom was determined to be repeated enlargement and inflammation of lymph nodes which appeared after 2 months of the BCG vaccination in the girl patient followed by enlargement of the axillary lymph nodes and the lymph nodes at the base of the ear, abdominal, neck. Biopsy of lymph node showed tuberculosis. Indirect test for M. tuberculosis infection T-SPOT test was positive.

There was also Hepato-splenomegaly. The patient tested negative for leukemia and thalassemia. In immunological analysis B lymphocyte deficiency, normal levels of T lymphocytes and serum immunoglobulins were detected. The genetic analysis showed A homozygous deletion in IL-12Rβ1protein 1and c.587_603del causing p.R196fs. This frame-shift deletion is expected to result in the complete loss of IL12RB1 protein.

The similar clinical symptoms started in the boypatient at the age of 3. Ultrasonography of the abdomen showed multiple enlarged lymph nodes. Tests for Malaria,Brucellosis, oncology were negative. Homozygous mutation was found in *İL-12 Rb1 gene:C.1073 G> C, p.Trp358x*.

Both parents are heterozygous for the mutation. The immunotherapy with interferon and IVIG alongside antimicrobial therapy has improved the quality of life of both patients and the levels of INF-γ increased.

Conclusion: The patients with severe local and general reactions to BCG vaccination, continued enlargement of lymph nodes, the presence of recurrent inflammatory processes in lymph nodes and respiratory system should receive an early immunological examination. Genetic analysis is necessary for timely and accurate diagnosis. Long term therapy with recombinant IFN-γ helps avoid complications and improved the quality of patient's life.

Zahra Alidoosti Shahraki

**A new strategy to develop high quality virtual education during the coronavirus crisis (The role of teaching assistant and mentoring program)**

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Introduction: All over the world, one of the most important challenges of coronavirus crisis, is sudden change in education, which if not considered, will have serious educational and social consequences. To better adaptation of students tward E-learning, it is needed to make education more innovative. Given the unprecedented nature of the COVID-19 pandemic, there are few studies on the role of teaching assistant (TA) and mentoring programme, as well as appropriate strategies in e-learning in critical situations.
Methods: In this study, we developed a new multidimensional tele-learning plan to make e-learning more effective by creative methods. All students participating in the cardiovascular and respiratory physiology course (n = 109) were included in this study. These students were divided into two groups. Mentoring programme (and a pyramidal connection between teacher and students) were implemented for one group (n=54). This group divided into smaller groups of six students with a mentor in each one. Also, for both groups, the following methods were implemented with the aim of increasing students 'motivation and quality of learning, as well as developing students' skills:
Providing clinical cases related to the physiology course (and some related to the COVID-19)
Applying an undergraduate TA as an academic advisor for students
Reviewing the lessons together at the end of each week with a summary prepared by TA
Taking self-assessment tests during the semester based on the principle of mutual trust between teacher and students
And constantly receiving feedback from students and improving teaching methods
Results: The effectiveness of the activities on the following items was evaluated by examining pre-term grades, self-assessment, mid-term and end-semester grades, and using questionnaires:
Satisfaction with learning, improving students' grades, motivation to study and improve interest in learning, encouraging deeper thinking, learning the lessons more deeply, learning research methods, increasing referral to scientific resources, Improving problem-solving skills, Improving teamwork skills, motivation to review and consolidate learning, establishing continuous communication between students and teacher in cyberspace, engaging students with lessons in virtual education, reducing stress due to new educational condition, forming friendly groups by a mentor for scientific exchange, students' expectations of a mentor in virtual education.
Discussion and Conclusion: The results show that applying a teaching assistant and mentoring programme is a very effective solution to improve teaching methods in e-learning and create an effective cycle between students and teachers to improve efficiency of educational system especially during coronavirus crisis.

Sara Makke

**Metacognitive Skills Training Effect on Cognitive Function in TBI patients (A Systematic Review)**
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Metacognition is considered to be upon the higher level cognitive skills. It intersects with executive function mainly tracked by the dorsolateral prefrontal cortex circuits. Patients suffering from traumatic brain injury experience several neuropsychiatric and cognitive sequelae and a difference in insight as reported by their caregivers and family members. Metacognitive skills training (MST) might be upon the cognitive rehabilitation approaches that helps connect the dots between micro-networks underlying brain functional understanding as it results in higher cognitive function as literature and trials show. To better decrease rehabilitation resistance, metacognitive training can be necessary. To investigate this conviction, a qualitative systematic review of trials has been done aiming to know whether (MST) has an effect in the cognitive function in traumatic brain injury patients post injury.

Saboura Ashkevarian

**Biomedical applications of enzyme-mimetic nanomaterials: current challenges and future directions**
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Todays, nanomaterials are used in many medical applications, such as medical imaging, drug delivery, and antimicrobial coatings. Like natural enzymes, nanoparticles can exhibit enzyme-like activity and can be used in energy and industry-related applications. Recently, nanomaterials with enzyme-mimetic catalytic activity have found new medical applications, such as disrupting biofilms, protecting against neurodegeneration and preventing tumors. Here we study the catalytic activity of the nanomaterials that have recently been studied for potential therapeutic use and, we discuss current challenges and future directions for using these nanomaterials as new platforms for the development of sustainable, cost-effective and safe drugs.

Mohammad Reza Fattahi

**The accuracy of various types of urinalysis in terms of predicting intra-abdominal injury in emergency trauma patients; a diagnostic accuracy study**

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Introduction: Given the importance and prevalence of trauma patients in emergency department (ED) and the questioning of urinalysis value in predicting intra-abdominal injury, this study was conducted to evaluate the accuracy of various types of this test.

Method: This is a diagnostic accuracy study in which adult abdominal trauma patients were included. Data gathering were performed retrospectively until sample size completion. Using a pre-prepared checklist. Required data were recorded including demographic characteristics, diseases confounding urinalysis, trauma mechanism, important associated injuries, vital signs, etc. Accuracy of urinalysis (including macroscopic microscopic and dipstick) results were compared with findings of patients' enhanced computed tomography (CT) scan findings that was considered as the gold standard, reported by radiologist.

Results: Totally, 152 multiple trauma patients with the mean age of 37.9±17.7 years were enrolled (90.8% male), of whom 66 (43.42%) patients had hematuria and the CT scan was abnormal in 30 (19.73%) cases. There was a significant correlation between gross hematuria and abnormal CT scan (p=0.000) as opposed to microscopic or dipstick hematuria (p>0.05). Based on the findings the highest sensitivity is for dipstick and microscopic equally and highest specificity, PPV, NPV, PLR, NLR and accuracy are for gross test.

Conclusion: Microscopic hematuria and dipstick had not significant correlation with abnormal CT scan findings and cannot predict the intra-abdominal injuries in multiple trauma patients. But, macroscopic hematuria could be valuable in this regard.

Arefeh Basiri

**The role of microfluidic devices in point-of-risk conditions such as COVID19**

Arefeh Basiri
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Microfluidic devices are instruments with micro-channels filled by minimal amounts of fluid which can be body fluids or solutions containing cells or cell parts to diagnose diseases. Also, they called lab-on-a-chip. A microfluidic device offers many benefits than traditional tests include the much smaller sample sizes and reagent volume requirements. These items tend to costly or difficult to isolate in large quantities. Moreover, multiple analytes can be processed simultaneously because of the reduced space required for each circuit. These devices provide a quick result of the test along with high accuracy. In point-of-risk conditions such as the rapid outbreak of COVID19 around the world, a microfluidic device could help by the rapid diagnosis of the disease and prognosis of more efficient therapy. For the detection of viral RNA, traditional molecular techniques could integrate with microfluidic chips which everybody can perform the test without any special facilities. Also, for the prognosis of more efficient therapy, cell, tissue or organ models of the infected part of the body can be used to investigate the pathogenesis of the disease or drug screening and discovery to find the best treatment for the disease. Therefore, microfluidic devices have great potential in point-of-risk conditions by playing an essential role in the fast detection of the disease and choosing the best therapeutic strategy.

Parva Namiranian

**How Consistent is Iranian Traditional Medicine Principles with today's knowledge?**

Parva Namiranian

Iran, has been the land of great scholars. This applies either to the territory of ancient Iran or the current geographical area of Iran. Avicenna is a well-known physician, philosopher, and astronomer who has also written astonishing works on alchemy, psychology, physics, mathematics and logic. His Canon of medicine used to be taught as a teaching book in western universities till 17th century. He and some other Iranian scholars founded and contributed to Iranian Traditional Medicine (ITM). This school of medicine has six basic pillars and believes that deviation from these principles causes diseases. These six principles are: foods and drinks, climate and weather, sleep and wakefulness, movement and rest, mental movement and repose, evacuation and retention. Each of them are described and explained in details in remaining manuscripts of these scholars. Although all of the details are not needed to or may not be used in today's life, there is an increasing body of evidence about every item confirmed by modern medicine and many of the recommendations of ITM are applicable in this era. In some countries the name of the field has been changed to lifestyle medicine and it is taught at universities in the format of residency program. It should be noted that change of lifestyle according to some of the recommendations related to ITM, has the potential to prevent many diseases or help the patients heal faster.

## Ahmad Mousavi

**Effect of Green Coffee Supplementation on Androgens Level in Women with Polycystic Ovary Syndrome: A Randomized Clinical Trial**

Ahmad Mousavi

The present study was aimed at determining the effect of green coffee supplementation on androgens level in women with Poly-Cystic Ovary Syndrome (PCOS) through double-blind Randomized Clinical Trial (RCT). Each patient (n=17) in the treatment group received one green coffee capsule (400mg) and the control group (n=17) received one placebo for six weeks. Then, the levels of free testosterone, dihydrotestosterone, and androstenedione; lipid profile; glycemia and insulinemia indices; and anthropometric indices before and after the intervention were determined and compared. The results showed green coffee supplements reduced testosterone level (P=0.038). There was no significant difference in general characteristics of the participants, including education, occupational status, age of illness, and metformin usage. At the beginning and the end of the study, there was a significant decrease in triglyceride (P=0.007) and total cholesterol level (P=0.035) in the green coffee group in comparison with the placebo group. However, no significant difference in anthropometric data including weight, Body Mass Index (BMI), waist circumference, and waist-to-hip ratio was observed. Moreover, no significant difference was observed in fasting blood glucose, insulin levels, insulin resistance index, LDL, HDL, dihydrotestosterone, and androstenedione. The results of the clinical trial showed that supplementation of 400 mg green coffee a day for six weeks significantly reduced free testosterone, triglyceride, and cholesterol levels. Therefore, green coffee might help to improve Poly-Cystic Ovary Syndrome (PCOS).

## Aida Valizadeh

**Creation a new algorithm like Pascal' triangle to diagnosis of Skin lesions**

Aida Valizadeh
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Skin lesions can show themselves in a variety of ways. The skin examination begins with taking a history then Recognize pattern(s) basic such as shape (linear, annular, polycyclic, aciform, serpiginous, grouped (herpetiform and zosteriform), agminate (collected together into clusters or masses), reticular (netlike)),anatomical site(generalized, localized, bilateral, unilateral, symmetrical, asymmetrical), size, depth, color, symptoms, signs, sun-exposed and other spatial relationship of the primary lesion are important in describing skin lesions and note arrangement of them. Data mining methods and analysis is an appropriate tool for knowledge early diagnosis of this disease. And to help health care to solve problems in the diagnosis and treatment of skin diseases based on examine the existing data patterns of patients with Skin lesions. This study was performed on 98 patients and 18 types of Skin lesions were examined. All records were entered into Excel software, and clustering algorithms as a tool of data mining which examine the existing epidemiological data. Two algorithms are used for the implementation purpose. We develop SI algorithm by making a triangle like Pascal' triangle with this difference we use sequence instead of numbers and we use integrating the string and we enter i instead of 1at ithe row. Let Dn ={1,2,...,x1,1,2,...x2,...,1,2,...,xn,s}be a set of n as Recognize pattern. We show Dn be a database, equal integrating the string all of the sequence at the row. Then specified symmetric locations for each diagnosis by a binarization process and selected most likely incident. The accuracy achieved from the decision tree c4.5 which was 97.13% and by this patients may be categorized for the treatment purposes. Data mining techniques are helpful in describing the distribution of skin lesions and early diagnosis.

Samin Salehi

**Evaluating the effect of hypertonic saline in ICU patients with Generalized edema: A Randomized Clinical Trial**

Samin Salehi
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Edema is an accumulation of fluid in the interstitial space. Patients with generalized edema usually respond to a combination of sodium restraint and administration of diuretic, especially loop diuretics, regimens. In some situations, like increased intracranial pressure, hypertonic saline could be used in order to translocate the fluid from interstitial to intravascular space and facilitate fluid removal by diuretics. Our study aimed to evaluate the addition of 5% NaCl solution to loop diuretic in urine volume and management of ICU acquired edema.

All ICU patients with 2+ edema or more in Imam Hossein Hospital in Tehran were recruited. Patients were randomly allocated on two groups of intervention and control. The control group received furosemide ampoule 20 mg in 50ml NaCl 0.9% three times daily as a 30-minute IV infusion for 48 hours. Subjects in intervention arm of the study received same dose of furosemide in 50ml NaCl 5%.

Based on defined inclusion and exclusion criteria, 28 patients, 14 in each group, were recruited. Two groups were similar in demographic and baseline laboratory characteristics. The urine volume increased significantly in the intervention group after 24 hours (5075(1400-5500) vs 3900 (2700-5200) ml; $p < 0.001$). this difference was not significant after 48 hours. About edema, in 6 and 4 subjects edema resolved in the intervention and control groups respectively ($p < 0.001$)

Our findings suggest that the administration of HSS as an adjunct to loop diuretics could provide a safe and effective treatment for increasing urine output and decreasing pitting edema in patients with generalized edema.


The 5th International
USERN
Congress And Prize
Awarding Festival
17th- 14th November
Post Congress Program
Isfahan & Shiraz
2020
7th-10th November
Allergy
Stabilization
RESEARCH
USERN
Universal Scien
Research Netwo
usern.org

# USERN: 5-year Evolutionary Progress since the First Inception

# Recent Publications about USERN

# Universal Scientific Education and Research Network (USERN): Twinkling Stars Unite to Make the World Glow

Acta Medica Iranica, Vol. 56, No. 1 (2018)

# Universal Scientific Education and Research Network (USERN): Twinkling Stars Unite to Make the World Glow

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**USERN: the twilight of the 2nd year and the dawn of the 3rd year**

Universal Scientific Education and Research Network (USERN) stepped in the 3rd year of activity, this month with the resolution of New Year, 2018. USERN, officially announced two years ago, was formed to mean the science without borders via professional scientific research and education activities. USERN was established as an independent, non-governmental, non-profit organization and network for peaceful scientific executions and policy-making (1-4).

What USERN has done, during a 2-year period, was more than what expected for a 5-year period! Four hundred events in total were organized by USERN in such short period of time, all following the slogan of "Science without Borders."

**Scientific communications**

USERN is honored to host more than 300 members from world top 1% scientists, including fourteen Nobel and Abel Laureates, as Scientific Advisory Board in different disciplines of science (5). More than 5800 academic members from more than 60 countries, in all twenty-one fields of science, have already registered via usern.org within the first two years of the USERN inauguration. This has been hopefully a forward step in removing the age and scientific-level border in science, through gathering seniors and juniors in USERN context.

A total number of fifty MOUs have already been signed between USERN and a number of national and international academic/scientific centers.

Thirty-one offices have already been labeled as USERN offices in different countries. This was another forward step in removing the geographical borders in science through creating peaceful scientific collaborations worldwide!

**USERN: the twilight of the 2nd year and the dawn of the 3rd year**

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**Scientific research and educational activities**

More than 60 interest groups have been accredited to continue their activities (6). They published more than 260 scientific papers under the affiliation of USERN with more than five hundreds of citations and h-index of 12 (Figure 1). The USERN collaborating centers for such scientific output were from Iran, USA, UK, Sweden, France, Germany, Austria, Australia, Canada, and Italy, as top 15 countries.

Considering this outstanding achievement in just 2 years, this has been absolutely possible only through teamwork and gathering all fields of science under one umbrella; and therefore removing the field border of science!

Thirty-six USERN Talks, inspirational Talks (iTalks), and miniature Talks (mTalks) have already been organized, which were highly welcomed by the delegates. USERN Talks/iTalks are part of USERN scientific activities, where scientists could share their scientific and personal experiences with USERN members. Moreover, the educational activities of USERN in 2017 included 13 scientific workshops in addition to two spring schools and one summer school (Modern Technologies in Science), which quite progressed in opening new insights for juniors.

**The greatest USERN gatherings: USERN congress and prize awarding festival**

USERN congresses have been recognized as unique events so far (7). The first one was held during Nov 8th-10th 2016, in Tehran, Iran. USERN is also humbled by the enormous hospitality and great organization, received during 2nd Congress and Festival in Kharkiv, Ukraine on Nov 8th-10th, 2017. USERN was proud not only because of the one-of-a-kind collaboration of Kharkiv Academia, and the huge number of students attending the fascinating lectures, or the third International Festival of Paintings for Pediatric Patients (IFPPP) festival or the incredible constellation of multidisciplinary scientists among speakers and USERN laureates, but also due to the whole will and fortune the growing USERN society in expecting for its future (8-11). The 3rd USERN congress has already been agreed to be organized in Italy in November 2018.

The USERN prize is an international award, which would be annually bestowed to top junior scientists or researchers less than 40 years of age in five scientific fields of Formal sciences, Physical sciences, Biological sciences, medical sciences and social sciences. USERN Prize awarding festival is held on November 10th, the World Science Day for Peace and Development. USERN Laureates of 2016 and 2017 have already been announced and awarded (12). USERN Laureates 2017 were 3 female scientists and 2 male scientists from USA, UK, Italy, Spain, and Slovenia (13-16).

**Acknowledgements**

USERN is pleased to acknowledge the efforts of all USERN advisors, members, especially the junior team of Support and Resource Development Division, including Armin Hirbod Mobarakeh, Seyedeh-Sanam Ladi Seyedian, Arya Aminorroaya, Saboura Ashkevarian, Farnaz Delavari, Sara Hanaei, Ali Jaberipour, Mahsa Keshavarz-Fathi, Mona Mirbeyk, Sasan Paryad-zanjani, and Farzaneh Rahmani who made this initiative possible. Also, special thanks to all those who have devoted their times to USERN, for their company, cooperation, and inspiration.

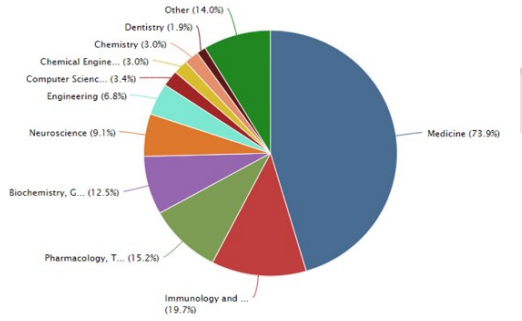


**Figure 1.** USERN documents by subject area (n=264)

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# Universal Scientific Education and Research Network (USERN): Step Strong in Scientific Networking

Acta Medica Iranica, Vol. 57, No. 1 (2019)

# Universal Scientific Education and Research Network (USERN): Step Strong in Scientific Networking

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**USERN: A Star is Born**

January 1st 2019 marked the 3rd Universal Scientific Education and Research Network (USERN) anniversary, a non-profit scientific network to mean "science without borders" (1-4). Three years ago on January 1st 2016, USERN held the 1st meeting of USERN Advisory Board members, looking up to the group of about 30 of world's top 1% scientists to build the scientific network envisioned as the main goal in its statute (5, 6). Never did we think that in three years the USERN Advisory Board would reach the number 370 among them 13 Nobel Prize and 2 Abel Prize laureates (7). The annual USERN Congress and Prize Festival is a known identity among international scientific community and has been held since 2016 each year, hosted with various universities/countries, with more integrity and impact (8).

**USERN: Making an Impact**

USERN is a growing family of >370 members of the advisory board, >8200 members, >40 offices, and >70 active interest groups and the number are still counting (7) (Figure 1). In an attempt to realize scientific collaboration, USERN validates proposals for research interest group establishment through advisory board members with the same scientific interest (9). This is not always easy, as junior researchers often face difficulty to write practical research and educational goals.

USERN's policy in cross-validating interest group proposals, and monthly evaluation of interest group performance, has more or less payed off. More than 440 research papers with USERN affiliation and an H-index of 21 for USERN in only three years, talk themselves as a proof of this success (Figure 2). The fact that USERN is a non-profit, non-governmental organization, makes this scientific achievement even more impressive (10).

**USERN: Plus Education?**

USERN is by definition, an educational network. Education, as USERN defines it, is the process of receiving or giving systematic instructions to prepare individuals to be functional in learning and generating knowledge and spreading wisdom. In less than 3 years, USERN has proudly designed, organized, and conducted more than 500 scientific events in the form of USERN workshops, focused group discussions (FGD), meeting with experts (USERN Expert Express Event: UEEE), and USERN talks.

USERN Talks are inspiring presentations intended to convey critical information and cutting edge knowledge from the world's most renowned scientists, activists and leaders. USERN talks are perhaps to the oldest format of USERN scientific events, before USERN iTalks and USERN miniature talks (mTalks) were introduced. USERN mTalks are sessions of consecutive, thematic, short lectures of 12 and 6 minutes delivered by senior scientists and juniors/students, respectively, which are accompanied by art performances.

Conceived by USERN scientific education department in 2018, USERN mTalks offer junior scientists a free podium to represent topics from their life passion in science, and improve their presentation skills in the most innovative and engaging way they can. Speakers at USERN mTalks enter an annual selection process, rated by audience and experts of the topic. The finalists of USERN mTalk contest in 2018, recently held a joint performance with selected junior artists, as the opening event in USERN 3rd Anniversary celebration at the Avicenna hall of the Tehran University of Medical Sciences on January 1st 2019 (Figure 3).

**USERN: Social Responsibility**

The Health and Art (HEART) group is undisputably the oldest USERN interest groups and perhaps the most exotic one. With the 1st International Festival of Painting for Pediatric Patients (IFPPP) held in Tehran in 2015, the HEART held its first successful international event a year before the 1st USERN Congress and Prize Festival. Continued by the 2nd, 3rd, and 4th IFPPP festivals in Budapest, Kharkov, and Reggio Calabria, the IFPPP festivals have returned each year stronger than ever.

IFPPP is not what HEART does all through the year, the toy-sharing and book-sharing campaigns, the international village of games and art and recently the HEART band, a music group of pediatric patients, are among other significant activities of HEART (11).

USERN is dedicated to make science borderless for all and USERN Advisory Board members have been the walking-talk of this goal. The 2018 USERN Congress and Prize Festival was unique in its own way as USERN Prize Laureates each received part of their travel expenses, from USERN Advisory Board Travel Grants. Top 1% scientists, members of USERN Advisory Board delivered in a significant way to make it possible for 5 USERN Prize Laureates and 4 delegates to attend USERN Congress 2018 and post scientific Course, on November 10-14th in Reggio Calabria, Italy (12).

**USERN: Struggling to Build a Network**

Entering the 4th year of our activity in USERN we look back into our strengths and weaknesses. A remaining concern in USERN is to strengthen the networking element and build a self-growing platform of scientific collaborations. USERN envisions part of this goal in the hands of USERN Junior Ambassadors (UJAs). UJAs are official members of USERN Organizing Committee and are selected from potential applicants from different countries for a 1-year term. UJAs' primary mission is to realize USERN networking goals, introduce USERN platform, and propagate USERN goals within the scientific community of their home countries (13). UJAs are USERN representatives to extend USERN publicity and goals all over the world.

**Final Word**

USERN believes in excellence and teamwork, and continues to make a living example of scientific excellence and world-scale collaborations. Several talented, young students have joined USERN organizing committee during these years, many of whom have shown tremendous qualifications and evolved into becoming USERN Deputies, Managers, and Consultants. We look forward to the challenges that 2019 is bringing us, and to the 2019 USERN Congress in Budapest.

**Acknowledgement**
We would like to acknowledge all USERN Organizing Committee, former or current, for their dedication to science without borders and their magnificent job in promoting USERN over these years.

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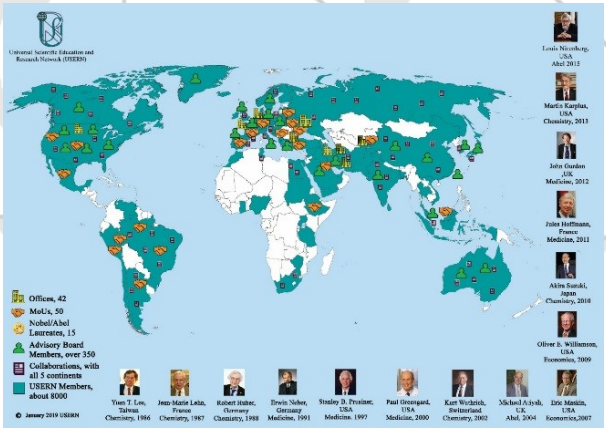


**Figure 1. USERN map, Jan 1st 2019.**

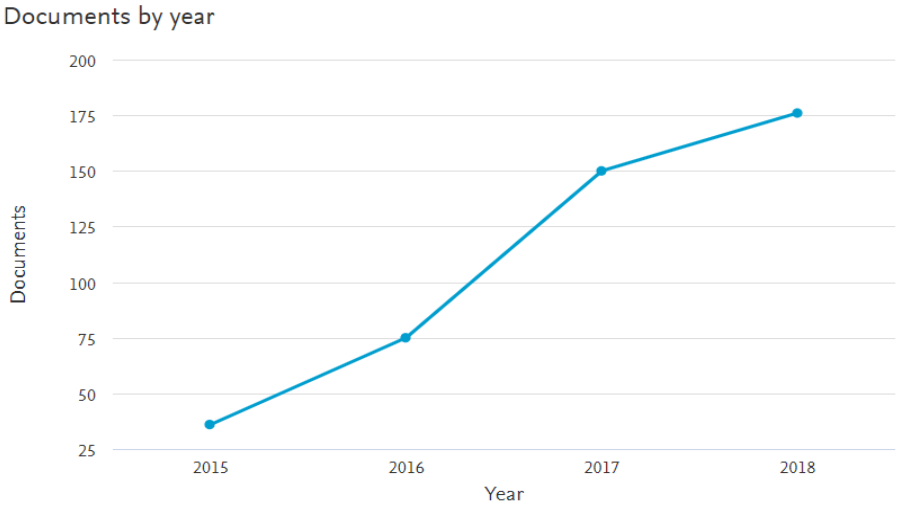


**Figure 2. USERN scientific output.**

**Figure 3. The group photo of 3rd USERN Anniversary, Jan 1st 2019, Avicenna Hall, Tehran University of Medical Sciences.**

# U100: An Innovative USERN Platform for Education and Research without Borders

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## U100: An Innovative USERN Platform for Education and Research without Borders

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*27. Institute of Translational Medicine, International Nephrology Research and Training Center, Faculty of Medicine, Semmelweis University, Budapest, Hungary*
*28. University of Washington and Seattle Children's Research Institute, Seattle, WA, USA*
*29. Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran*

"Two heads are better than one" or "too many cooks spoil the broth"! This is the old dispute of two doctrines in scientific production. Two schools that has each addressed a countless number of questions in the history of science: the collaborators and the solos. Here in the Universal Scientific Education and Research Network (USERN) we relate to the former school, introducing the "U100", a collaborative platform for research among at least 100 scientific centers around the globe (Figure 1).

Scientists can contribute to building the future by educating the talented youngsters which is made possible by networking the major role players. Modern education defends the figure of the teacher as a facilitator of the learning process. Learning should, therefore, be the result of a collaborative process between teachers and students. So must behave research too: turn into a collaborative process to build knowledge, covering all fields of cooperation, erasing borders. Collaborative research is a growing trend with outstanding merits and can entail any research-related activity, from sharing skills, techniques and knowledge, to exchange programs and cooperative projects. Collaborative research provides us with access to unique study populations and facilities, and means to publish multi-center and multi-national papers that are proved to reach higher cite scores and impact (1,2). Last but not least, learning about different nationalities and the way they solve common problems can be a source for formation of novel ideas, an opportunity offered only through international interactions (3).

Despite the considerable advantages of multi-national collaborative endeavors in science, there remain several challenges to tackle. To begin with, many institutions do not have the required framework to foster these collaborations (4). There might be significant challenges in establishing a clear and effective communication between collaborators and the outpouring amount of data and ideas might confuse the responsible side to integrate the results and write the final paper/report. These confusions usually result in a collaborative project taking longer than a non-collaborative one (5).

These shortages, along with the compelling need for cooperative scientific projects, highlight the need for an organization to identify, assess and allocate research resources and facilitate communications that result in multi-national and multi-center research initiatives.

USERN was established on January 1st, 2016 to promote professional scientific research and education worldwide (6-9). USERN is honored to have over 10,000 members from all five continents with thirteen Nobel and two Abel laureates and more than 350 world top 1% scientists as Advisory Board members (10). USERN members are involved in more than 80 active research interest groups and the numbers are still counting.

After four years of active scientific diplomacy and establishment of more than 50 USERN Offices and 60 USERN Memorandums of Agreement (MOU), USERN announces the inauguration of “U100”, an innovative platform for scientific exchange, education and Research activities without border across the globe. U100 is USERN's next step towards the goal of making sciences borderless, this time tackling the border between countries and between academia. U100 marks the collaborative network of at least one-hundred universities and institutes from thirty-five countries under the brand name of USERN. Members of U100 have agreed on expanding collaborations in scientific programs, exchanges and training of young researchers, sharing the best-practice, and co-organizing meetings, workshops and expert committees, based upon mutual interests and benefits. U100 members are universities and institutes working

in all fields of science, including formal, physical, chemical, biological, medical, and social sciences.

U100 envisions an outstanding environment for reciprocal scientific exchange all around the world by removing the borders between countries and disciplines and focusing on junior scientists in collaborative activities. It is U100's mission to (1) ease the communication between different institutions, (2) support voluntary collaborative projects between members, (3) promote international collaborative projects, (4) advocate benefits for all collaborative members, and (5) raise awareness of the importance of international collaborations.

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8. Rezaei N. Universal Scientific Education and Research Network (USERN): Twinkling Stars Unite to Make the World Glow. Acta Med Iran. 2018;56(1):1-3.
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10. Universal Scientific Education and Research Network (USERN) [Available from: https://usern.tums.ac.ir/.

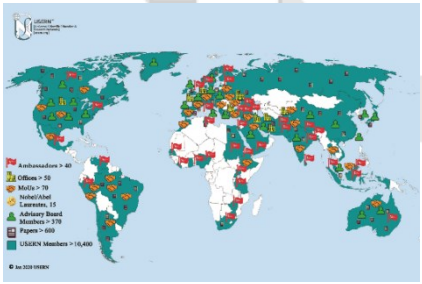
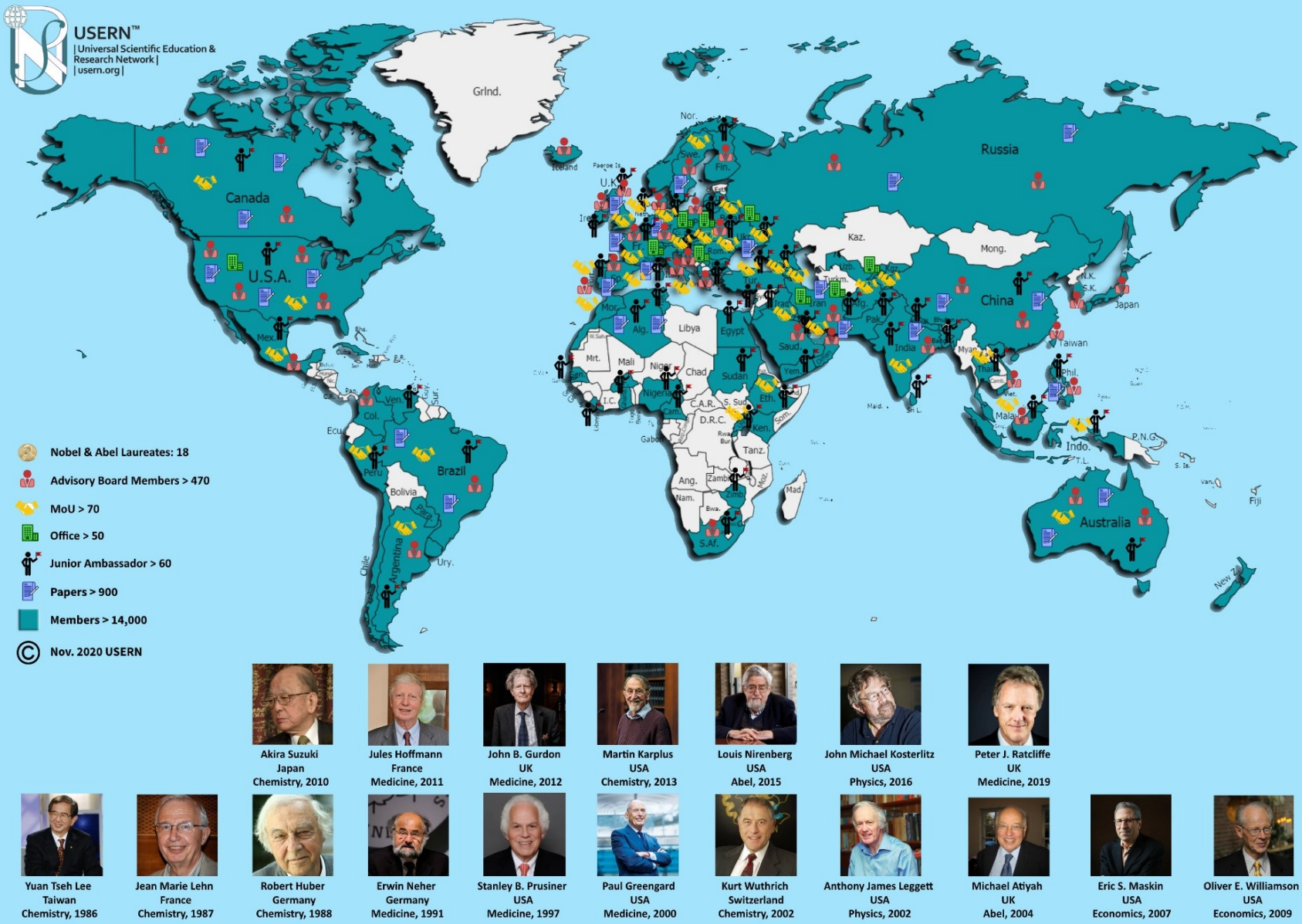



Figure 1. The map of USERN network. (2019)

# USERN Map

November 2020






Akira Suzuki
Japan
Chemistry, 2010



Jules Hoffmann
France
Medicine, 2011



John B. Gurdon
UK
Medicine, 2012



Martin Karplus
USA
Chemistry, 2013



Louis Nirenberg
USA
Abel, 2015



John Michael Kosterlitz
USA
Physics, 2016



Peter J. Ratcliffe
UK
Medicine, 2019



Yuan Tseh Lee
Taiwan
Chemistry, 1986



Jean Marie Lehn
France
Chemistry, 1987



Robert Huber
Germany
Chemistry, 1988



Erwin Neher
Germany
Medicine, 1991



Stanley B. Prusiner
USA
Medicine, 1997



Paul Greengard
USA
Medicine, 2000



Kurt Wuthrich
Switzerland
Chemistry, 2002



Anthony James Leggett
USA
Physics, 2002



Michael Atiyah
UK
Abel, 2004



Eric S. Maskin
USA
Economics, 2007



Oliver E. Williamson
USA
Economics, 2009

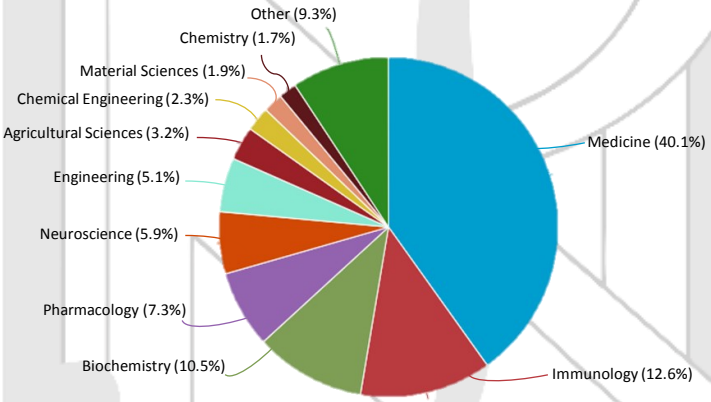
# USERN Scientometrics

November 2020

# USERN Scientometrics 2020

USERN has tried diligently to promote its scientific activities in 2020. The following charts represent the output of USERN scientific activities in these year:

| | H-index | Documents | Citations |
|---|---|---|---|
| Scientometrics | 37 | 900 | 9102 |



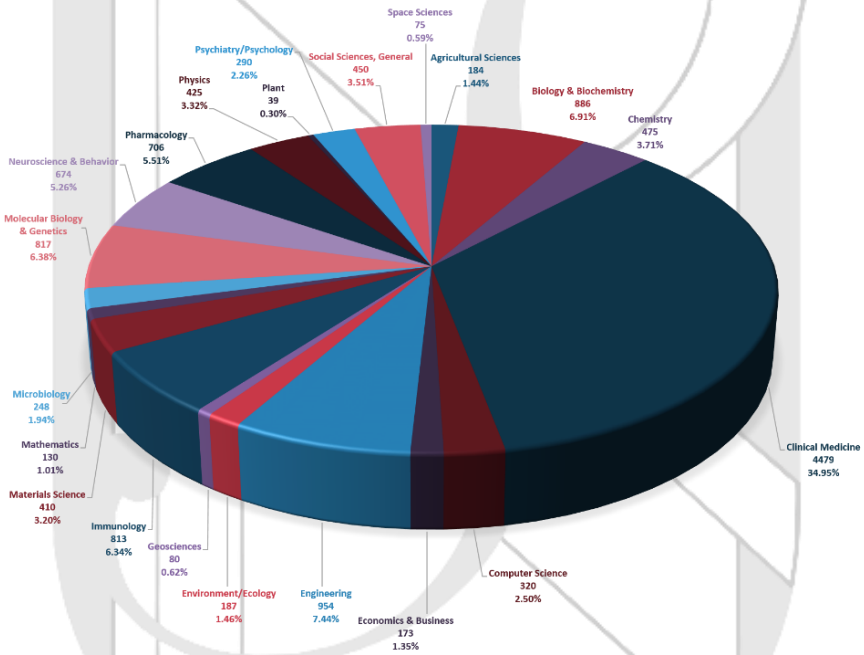

USERN Documents By Subject Area (November 2020)

# USERN Members

November 2020

# USERN Members 2020

Members are importance to USERN; as they are the representative of USERN popularity among academic people.
Proudly, USERN has more than 14000 members from all 5 continents, in 21 different branches of science. The major of expertise in the majority of USERN members is Clinical medicine. The following table shows diversity of USERN Member's major. Engineering, Biology & Biochemistry, and Pharmacology are the next most popular majors among USERN members:




PRIZE
PRIZE

# USERN Memorandum of Understanding (MoUs) and Offices Worldwide

## Memorandum of Understanding (MoUs)

Since the beginning of its establishment, and in order to promote universal scientific education and research, USERN has signed several Memorandum of Understanding (MoUs) with scientific research centers and universities worldwide.

To date, USERN has signed 72 MoUs with international institutes.

1. Marmara University, Marmara University Hospital, Division of Pediatric Allergy/Immunology, Istanbul, TUREKY
2. Belarusian State Medical University, Minsk, BELARUS
3. Belarusian National Research Center for Pediatric Oncology, Hematology and Immunology, Minsk, BELARUS
4. Tajikistan National Medical Center, Dushanbe, TAJIKESTAN
5. University of Strasbourg, Strasbourg School of Medicine, Strasburg, FRANCE
6. Medical University of Vienna, Center for Pathophysiology, Infectiology and Immunology, Vienna, AUSTRIA
7. Ludwig Maximilian University of Munich, University Children's Hospital Munich, Munich, GERMNAY
8. Universidade de Santiago de Compostela (USC), Santiago de Compostela, SPAIN
9. Hannover Medical School, Department of Immunology and Rheumatology, Hannover, GERMNAY
10. Seattle Children's Research Institute, Seattle, USA
11. Kharkiv National Medical University, Kharkiv, UKRAINE
12. Medical University of Graz, Institute of Health Technology and Prevention Research, Weiz, AUSTRIA
13. Brigham and Women's Hospital, Laboratory of Nanomedicine and Biomaterials, Boston, USA
14. Malaysian Society of Allergy and Immunology (MSAI), Kuala lumpur, MALAYSIA
15. Jimma University, Jimma, ETHIOPIA
16. Semmelweis University, International Nephrology Research & Training Center, Institute of pathophysiology, Budapest, HUNGARY
17. Ukrainian Association of Pediatric Immunology, Kiev, UKRAINE
18. Rare Immune Disease, Kiev, UKRAINE
19. Shupyk National Medical Academy of Postgraduate Education, Kiev, UKRAINE
20. V. N. Karazin Kharkiv National University, Kharkiv, UKRAINE
21. Necker Medical School, Laboratory of Human Genetics of Infectious Diseases, Paris, FRANCE
22. International Patient Organization for Primary Immunodeficiencies, Oxford, UK
23. Maribour University, Faculty of Medicine, Maribor, SLOVENIA
24. Maribor University, Faculty of Natural Sciences and Mathematics, Maribor, SLOVENIA
25. Maribor University, Maribor, SLOVENIA
26. Alma Mater Europaea (ECM), Ljubljana, SLOVENIA
27. Ljubljana University Medical Centre, Ljubljana, SLOVENIA
28. Europian School of Genetics in Medicine, Bertinoro, ITALY
29. Institute of Genetic and Biomedical Research (IRGB), Institute of Neurogenetics and Neuropharmacology, Sardinia, ITALY
30. Children's hospital Philadelphia, Philadelphia, USA
31. STEM Fellowship, Vancouver, CANADA
32. University of South Florida, South Florida, USA
33. Hospital Nacional Edgardo Rebagliati Martins, Lima, PERU
34. Instituto de Pesquisa Pele Pequeno Principle, Curitiba, BRAZIL
35. Latin America Society for Immunodeficiencies (LASID), Sao Paulo, BRAZIL
36. Rocket Pharmaceuticals, The Alexandria Center for Life Sciences, New York, USA
37. University of São Paulo, Institute of Biomedical Sciences, Sao Paulo, BRAZIL

38. Brazilian Group for Immunodeficiency (BRAGID), Sao Paulo, BRAZIL
39. Sister María Ludovica Children's Hospital, La Plata, ARGENTINA
40. Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, BRAZIL
41. Al-Sabah Hospital, Department of Pediatrics, Kuwait, KUWAIT
42. Great Ormond Street Institute of Child Health, University College London, London, UK
43. Mexican Foundation for Girls and Boys with Immunodeficiencies, Mexico City, MEXICO
44. Medical College of Wisconsin, Wisconsin, USA
45. Brain Connectivity and Cognition Lab, Miami, USA
46. Kharkiv Polytechnic Institute (KhPI), Kharkiv, UKRAINE
47. Erasmus University Medical Center Rotterdam, Rotterdam, NETHERLANDS
48. Institute of Biomedicine and Pharmacy Russian-Armenian University, Armenia, YERVAN
49. Armenian Association of Molecular Immunology and Allergology, Armenia, YERVAN
50. Karolinska Institutet, Department of Laboratory Medicine, Lennart Hammarstrom Research Group, Stockholm, SWEDEN
51. University of Gothenburg, The Queen Silvia Children's Hospital, Gothenburg, SWEDEN
52. Monash University, Monash Clinical and Imaging Neuroscience, Melbourne, AUSTRALIA
53. Ludwig Boltzmann Institute for Rare and Undiagnosed Diseases & CeRUD Vienna Center for Rare and Undiagnosed Diseases, Vienna, AUSTRIA
54. Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, INDIA
55. Pinjab University (PU), Chandigarh, INDIA
56. Arabkir Medical Center, Yerevan, ARMENIA
57. Akkon University for Human Sciences, Institute for Research in International Assistance (IRIA), Germany, BERLIN
58. University of Coimbra, Center for Biomedical Law, Coimbra, PORTUGAL
59. University of Coimbra, Faculty of Medicine, Coimbra, PORTUGAL
60. Faculty of Dentistry, Thammasat University, Bangkok, THAILAND
61. Astana Medical University, Nur-Sultan, KAZAKHSTAN
62. Naba-Alhayat Foundation for Medical Sciences and Healthcare, Najaf, IRAQ
63. Association of Medical Schools in Europe (AMSE), Berlin, GERMANY
64. Moroccan Association Hassanian for Health and Environment (AMHES), Rabat, MOROCCO
65. Scenarium Group, GmBH, Berlin, GERMANY
66. Makerere University, College of Health Sciences (MAKCHS), Kampala, UGANDA
67. Azerbaijan Medical University, Baku, AZERBAIJAN
68. ManRos Therapeutitics, Roscoff, France
69. Care-for-Rare Foundation, Munich, Germany
70. MCM-DAV-College for Women, Chandigarh, India
71. University of Pavia, Pavia, Italy
72. Universitas Brawijaya, Malang, Indonesia

## USERN Offices

USERN offices worldwide are being stablished all around the world as a symbole for conducting scientific activities with actual and practical commitment to USERN statute. Notably, although these offices are not the properties or profits of USERN network, through adopting USERN symbol in their offices and scientific works, senior scientists would present their companionship with USERN and also their commitment to support junior researchers.

Proudly, since the beginning of the year 2016, 50 independent scientific USERN offices have been stablished.

1. USERN CMC Office, Children's Medical Center, Tehran University of Medical Sciences, Tehran, IRAN; December 25th 2016
2. USERN Dushanbe Office, Tajikistan National Medical Center, Dushanbe, TAJIKISTAN; January 25th 2016
3. USERN SSRC Office, Students' Scientific Research Center, Tehran, IRAN; January 30th 2016
4. USERN RCI Office, Research Center for Immunodeficiencies, Tehran, IRAN; February 4th 2016
5. USERN Basir Office, Basir Eye Health Research Center, Tehran, IRAN; February 7th 2016
6. USERN PPNCD Office, Research Institute for Primordial Prevention of Non-Communicable Disease, Isfahan, IRAN; February 17th 2016
7. USERN Roscoff Office, ManRos Therapeutitics, Roscoff, FRANCE; March 25th 2016
8. USERN Munich Office, Care-for-Rare Institute, Munich, GERMANY; April 8th 2016
9. USERN Boston Office, Harvard Medical School, Children's Hospital-Boston, Boston, USA; August 16th 2016
10. USERN Khrakov Office, Kharkiv National Medical University, Kharkiv, UKRAINE; December 16th 2016
11. USERN Tabriz Office, FAKT group, Medical Research and Development Complex, Tabriz, IRAN; January 1st 2017
12. USERN Ahvaz Office, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, IRAN; January 1st 2017
13. USERN Yazd Office, Shahid Sadoughi University of Medical Sciences, Yazd, IRAN; January 1st 2017
14. USERN Kerman Office, Kerman University of Medical Sciences, Kerman, IRAN; January 1st 2017
15. USERN Amol Office, Amol University of Special Modern Technologies, Amol, IRAN; January 1st 2017
16. USERN NRC Office, NeuroScience Research Center, Tehran, IRAN; January 1st 2017
17. USERN IUMS Office, Student Research and Technology Coordinator Center, Iran University of Medical Sciences, Tehran, IRAN; January 1st 2017
18. USERN Birjand Office, Birjand University of Medical Sciences, Birjand, IRAN; January 1st 2017
19. USERN Shiraz Office, Shiraz University of Medical Sciences, Shiraz, IRAN; January 1st 2017
20. USERN Rasht Office, Guilan University of Medical Sciences, Rasht, IRAN; January 1st 2017
21. USERN Bonn Office, Wachsbleiche, Bonn, GERMANY; February 1st 2017
22. USERN Maribor Office, Faculty of Natural Sciences and Mathematics, University of Maribor, Maribor, SLOVENIA; February 28th 2017
23. USERN AIC Office, Avicenna International College, Budapest, HUNGARY; February 30th 2017
24. USERN IAUM office, Islamic Azad University of Mashhad, Faculty of Medicine, Mashhad, IRAN; March 13th 2017
25. USERN Isfahan Medical University Office, Isfahan University of Medical Sciences, Isfahan, IRAN; July 23rd 2017
26. USERN Zahedan Office, Zahedan University of Medical Sciences, Sistan va Balouchestan, IRAN; October 21st 2017

27. USERN Zanjan Office, Zanjan University of Medical Sciences, Zanjan, IRAN; March 18th 2018
28. USERN Mazandaran Office, Mazandaran University of Medical Sciences, Mazandaran, IRAN; April 23rd 2018
29. USERN Arak Office, Arak University, Arak, IRAN; May 20th 2018
30. USERN Hamadan Office, Hamadan University of Medical Sciences, Hamadan; IRAN, May 21st 2018
31. USERN Kurdistan Office, Kurdistan University of Medical Sciences, Sanandaj; IRAN, May 25th 2018
32. USERN Ziaeian Hospital Office, Ziaeian Hospital, Tehran, IRAN; September 16th 2018
33. USERN Booali Medical Diagnostics Laboratory Office, Booali Medical Diagnostics Laboratory, Qom, IRAN; October 21st 2018
34. USERN Tivan Office, Tivan Entrepreneurship Club, Tehran, IRAN; November 1st 2018
35. USERN Abadan Office, Abadan University of Medical Sciences, Abadan, IRAN; November 14th 2018
36. USERN Nursing School (TUMS) Office, Tehran University of Medical Sciences, Tehran, IRAN; November 21st 2018
37. USERN Dentistry School (TUMS) Office, Tehran University of Medical Sciences, Tehran, IRAN; December 30th 2018
38. USERN Nano Home Office, ISV Company, Qom, IRAN; April 20th 2019
39. USERN PGBSRI Office, The Persian Gulf Biomedical Sciences Research Institute, Bushehr, IRAN; April 27th 2019
40. USERN Amirkabir Office, Amirkabir University of Technology, Tehran, IRAN; June 12th 2019
41. USERN HUMS Office, Hormozgan University of Medical Sciences, Bandarabbas, IRAN; June 20th 2019
42. USERN Alborz Office, Alborz University of Medical Sciences, Karaj, IRAN; July 20th 2019
43. USERN Ardabil Office, Ardabil University of Medical Sciences, Ardabil, IRAN; August 20th 2019
44. USERN SBMU Office, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, IRAN; October 2nd 2019
45. USERN Shahrekord Office, Shahrekord University of Medical Sciences, Shahrekord, IRAN; December 1st 2019
46. USERN Fasa Office, Fasa University of Medical Sciences, Fasa; IRAN; September 2nd 2020
47. USERN Jahrom Office, Jahrom University of Medical Sciences, Jahrom; IRAN; September 21st 2020
48. USERN Babol Office, Babol University of Medical Sciences, Babol; IRAN
49. USERN Mashhad Office, Mashhad University of Medical Sciences, Mashhad; IRAN
50. USERN FNRC Office, Functional Neurosurgery Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran


UNIVERSAL
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NETWORK
2020

# USERN Prize

# 2016 USERN Prize Laureates

USERN 2016 Laureate in Formal Sciences

**Lucas Jopa** — **USA**

Technology for Nature

USERN 2016 Laureate in Physical and Chemical Sciences

**Jamshid Aghaei** — **Iran**

Evaluating Technical Benefits and Risks of Renewable Energy Sources Increasing Penetration in Electrical Networks

USERN 2016 Laureate in Biological Sciences

**Morteza Mahmoudi** — **USA**

Defining the Biological Identity of Nanotherapeutics for High Yield Cancer Therapy

USERN 2016 Laureate in Medical Sciences

**Alexander Leemans** — **The Netherlands**

Processing and visualization in Diffusion Imaging

USERN 2016 Laureate in Social Sciences

**Floris de Longe** — **Belgium**

Expectations Sharpen the Visual Response

# 2017 USERN Prize Laureates

USERN 2017 Laureate in Formal Sciences

**Manlio de Domenico** — **Spain**

Multilayer Structure and Dynamics of the Physical World: Modeling the Complexity of Systems

USERN 2017 Laureate in Physical and Chemical Sciences

**Maria Magdalena Titirici** — **UK**

The Design of Efficient and Low Cost Electrocatalysts Without the Use of Critical Metals

USERN 2017 Laureate in Biological Sciences

**Valentina Cauda** — **Italy**

Hybrid Immune-Eluding Nanocrystala as Smart and Active Theranostic Weapons Against Cancer-TorjaNanoHorse

USERN 2017 Laureate in Medical Sciences

**Lucina Qazi Uddin** — **USA**

Brain Dynamics and Flexible Behaviour in Autism and ADHD

USERN 2017 Laureate in Social Sciences

**Matjaz Perc** — **Slovenia**

Transition Towards Cooperation in Human Societies

# 2018 USERN Prize Laureates

USERN 2018 Laureate in Formal Sciences

**Jacob D. Biamonte** — **Russia**

Quantum Enhanced Machine Learning

USERN 2018 Laureate in Physical and Chemical Sciences

**Xavier Moya** — **UK**

Barocaloric Materials foe Environment-Friendly Solid State Refrigeration

USERN 2018 Laureate in Biological Sciences

**Alex Fornito** — **Australia**

Maps, Models, and Modifiers of Brain Changes in Psychosis

USERN 2018 Laureate in Medical Sciences

**Gian Paolo Fadini** — **Italy**

Circulating Stem Cells in Diabetic Complications (Remediation)

USERN 2018 Laureate in Social Sciences

**Igor Grossmann** — **Canada**

Wisdom- Towards the Social and Behavioural Science of Sound Judgment

# 2019 USERN Prize Laureates

USERN 2019 Laureate in Formal Sciences

**Lucas Lacasa** — **UK**

Brifging Signal Processing and Network Science

USERN 2019 Laureate in Physical and Chemical Sciences

**Giulia Grancini** — **Italy**

Multidimentional Ferroelectric Hybrid Perovskites for Advanced Optoelectronics

USERN 2019 Laureate in Biological Sciences

**Ajeet Kaushik** — **USA**

Nanobiotechnology for Personalized Healthcare

USERN 2019 Laureate in Medical Sciences

**Eugenia Morselli** — **Chile**

Mechanisms of Hypothalamic Authophagy in Obesity

USERN 2019 Laureate in Social Sciences

**Benjamin Sovaccol** — **Denmark/UK**

Social Justice in an Era of Climate Change and Energy Scarcity

# Statute of Universal Scientific Education and Research Network (USERN)

## Article I. Name and Purpose

***Section I. Name***

The network shall be known as "universal scientific education and research network".The official acronym for the network shall be "USERN".

***Section II. Purpose***

Here by in this agreement we define USERN as follows:
USERN is organized exclusively for advancement of authentic, ethical and professional scientific research and education and consequently advancement of science for non-military purposes and public good. In this definition, "Science is a systematic study of nature and manners of an object and the natural universe that is established around measurement, experiment, observation and formulation of laws." USERN is to be established as an independent, non-governmental, non-profit organization and network for peaceful non-military scientific executions and policy making.

***Section III. Vision***

Members of this agreement believe that USERN will one day become a reliable network of universally validated resources including ideas, facilities, human, financial and educational resources in order to launch and facilitate authentic, ethical and professional scientific research intended to improve universal science policy making and human life.

***Section IV. Mission***

Our mission is to provide scientific and technical infrastructure in order to universally:

**IV i.** Validate and improve ideas, facilities, human, financial and educational resources and determine their scientific credibility and reliability
**IV ii.** Connect and share ideas, facilities, human, financial and educational resources considering their scope and their grades and establish their collaboration
**IV iii.** Take a leading role in the scientific world through making universal science policies that will be established and executed for the promotion of human life.

## Article II. Organizational Structure

***Section I. Governing structure***

Governance and management shall be separated in USERN. The Policy Making Council is responsible for overall policy and direction of the network; and delegates responsibility of operations to the Executive Director and managers (staff). In addition, the Advisory Board provides non-binding strategic advice to both Policy Making Council and staff in a number of matters.

***Section II. USERN initiation***

The first President of USSERN would be the founder responsible for establishment of USERN statute and structure. His term of presidency would start after establishment of first Policy Making Council comprised of at least 3 members in each different sub-branches of science.

***Section III. Financial structure***

USERN shall be established as a non-profit network and therefore, all financial resources, including network incomes shall belong to the network and would be expended in the network in order to proceed with scientific missions. The stockholders and members of USERN shall not financially benefit from USERN as salary or any personal pension. Decision making on incomes and expenses of network shall belong to the Policy Making Council with a three-quarter vote for any decision on network expenses. The fiscal/financial year of the USERN shall start January 1st through December 31st.

## Article III. Advisory Board

***Section I. Role***

The Advisory Board is responsible for providing non-binding strategic advice to both Policy Making Council and staff in a number of matters and dissolving disputes in the network. In addition, they can strengthen the brand name of USERN via its advertisement and dissemination. Advisory Board shall advise the Policy Making Council on strategic matters and its members have the privilege of attending all USERN Policy Making Council meetings and participating in discussions. Advisory Board members shall be categorized and sorted into one of the different fields of science and they can elect their representatives in Policy Making Council with their votes.

***Section II. Composition***

The Advisory Board shall have unlimited number of members who are outstanding in their field of study and met the eligibility requirements, including top 1% scientists based on the ESI, Nobel Laureates, Abel Prize Laureates, Copley Medal Recipients and USERN prize winners.

Clause I. Any scientist nominated by at least three Advisory Board members could be potentially voted by Policy Making Council (a three-quarter vote) to be included in the Advisory Board.

***Section III. Resignation***

Resignation from the Advisory Board must be in writing and received by the President.

***Section IV. Duration of Advisory Board membership***

Any renowned scientist could potentially become the member of Advisory Board at the initiation of fulfilling the Advisory Board membership criteria. The Advisory Board list would be updated in 3-year intervals to include new members of Advisory Board.

***Section V. Termination of membership in Advisory Board***

The membership of any Advisory Board member shall be terminated following disrespect to USERN statute and/or guiding principle at any time by a majority of the vote (a three-quarter vote) of the Policy Making Council members. The Advisory Board member would also have the right to terminate his/her membership through sending formal request to the USERN President.

## Article IV. Policy Making Council

***Section I. Roles***

The Policy Making Council is responsible for overall policy and direction of the network, setting policy, and providing a strategic executive plan. The board shall include at least one representative of each field of science, the President, and the Executive Director as a non-voting member. They would be also responsible for nominating and electing the President.

***Section II. Composition***

The Policy Making Council members would be elected from among Advisory Board members who have fulfilled their membership for at least three consecutive years and have gained the majority of the vote of the Advisory Board in each major branch of science.

***Section III. Term***

All board members shall serve a 3-year term, but are eligible for re-election for another consecutive term. They can be re-elected after 3 years interval.

***Section IV. Decision-making***

The Policy Making Council has the right to and is responsible for making decisions for all issues of the network, except for the main structure of the network including vision, mission, and the concept of Policy Making Council and Advisory Board. Issues regarding establishing a new activity shall arise from Advisory Board members, Policy Making Council members or Executive Director. These decisions should be discussed in a board meeting and be approved by the majority of the vote (50% + 1 vote) of the board members. Any issues regarding the Policy Making Council itself should be approved by the majority of the vote (50% + 1 vote) of the Advisory Board. Establishing any clause or defining a new part in the statue shall be discussed by the Policy Making Council and be approved by at least a three-quarter vote of the Advisory Board members.

***Section V. Removal***

The membership of a Policy Making Council member shall be terminated from the board by the majority of the vote (a three-quarter vote) of the remaining board members due to not fulfilling his/her duties or poor performance or being proven inconsistent or performing incompatible activities and operations with those of USERN at any time

Clause: In case of removal or resignation of a Policy Making Council member, the new representative of the respected field shall be elected by the Advisory Board.

## Article V. President

***Section I. Role***

President is responsible for:

Scheduling and setting agendas of Policy Making Council meetings.

Leading discussions at meetings; Following agendas and observing all rules of order.

Coordinating any board activity outside of the meetings.

Overseeing the hiring and evaluating the performance of the Executive Director.

Ensuring the board performs its job well and evaluates its own performance.

To be the official representative of USERN.

***Section II. Eligibility***

A President shall be elected by the majority of the vote (50% + 1 vote) of the Policy Making Council members. A Policy Making Council member shall be nominated for President of the Policy Making Council.

***Section III. Terms***

The President shall serve a 3-year term, but could be eligible for re-election for another consecutive term. They can be re-elected after 3 years interval.

## Article VI. Membership

***Section I. Eligibility for membership***

Application for membership shall be open to any scientist who has the following conditions:

- Supports the purpose statement, vision and mission in Article I, Sections III and IV.
- Accepts this statute and the guiding principles.
- Is not involved in any militia or terrorist groups.
- Completed the membership application.

***Section II. Annual dues***

The amount required for annual dues of regular membership is free.

Clause 1: In the case of other types of membership, the annual dues of the respective members would be assigned by a three-quarter vote of the members in the Policy Making Council.

***Section III. Rights of members***

Each member shall be eligible to use the resources available in the network according to the rules and regulations of USERN.

***Section IV. Resignation***

Any member may terminate his/her membership through contacting USERN authorities; and their resignation would be open through usual membership application. USERN authorities would terminate the membership of members who do not comply with principles of USERN statues; and readmission of these members would be dependent on the decision of respective authorities.

***Section V. Expulsion or suspension***

A member shall be suspended or removed from the network due to disrespecting USERN statute and/or guiding principle upon approval of President or Executive Director.

## Article VII. Staff

***Section I. Role***

The basic duties of USERN staff shall be managing the entire USERN approved activities, adopt the plan of activities according to strategies developed by the Policy Making Council and is subject to the direction and control of the Policy Making Council.

***Section II. Composition***

It shall comprise the Executive Director, managers and the respective management divisions as follows:

**II i. Support and Resource Development Division**

This division is responsible for:

Providing infrastructures for communication of Policy Making Council members, Advisory Board members and staff members.

Maintenance and development of technical aspects of USERN network.

Development of all resources of USERN via advertisement, dissemination, member recruitment and fundraising.

Enforcing rules and regulations of USERN on members and other elements in the network and taking disciplinary actions.

**II ii. Scientific affairs division**

This division is responsible for establishing scientific steering councils for each major branch of science. Any sub-division (including associations, interest groups, networks and etc) shall be supported by at least one of the Advisory Board members and shall be approved by the majority of the vote (50% + 1 vote) of the scientific steering councils for each major branch. Members of each branches of science can be nominated to be members of the respective scientific steering council and they shall be elected by votes of the members of that branch.

Clause:The membership of scientific steering council is not limited to the Advisory Board members. The criteria for membership of scientific steering council in each major branch of science would be established by the Policy Making Council.

**II.ii.1. Roles of scientific affairs**

Scientific steering councils are responsible to provide:

Scientific guidelines and educational materials and to define scientific processes for each research line for different fields.

Scientific measures and guidelines for determining scientific credibility and reliability and to classify and grade elements in the network.

Establishment of random supervisory councils which are responsible for making decision about disciplinary actions and supervision of educational and research projects.

*Clause I*: The Policy Making Council may create management committees as needed.

**II iii. The Executive Director**

**II.iii.1. Roles**

The responsibilities of Executive Director shall include carrying out the organization's goals and policies. The Executive Director will attend all board meetings, report on the progress of the network, answer questions of the board members and carry out the duties described in the job description. The board can designate other duties as necessary. Main duties of the Executive Director include:

- Hiring, firing, and supervising the staff according to the policies and strategies defined by the Policy Making Council.
- Managing and evaluating programs and operations according to the policies and strategies defined by the board.
- Identifying, acquiring, and managing resources according to the policies and strategies defined by the board.

- Preparing an annual budget according to board decisions on annual activities.
- Proposing policies and strategic initiatives to the board. Supporting the board in its work.
- Promoting the organization in the community.
- Supervising the infrastructures of staff including managing committees.

**II.iii.2. Eligibility**
The President could nominate an Executive Director from either the board or staff members. The Executive Director then shall be elected by the majority of the vote (50% + 1 vote) of the Policy Making Council.

**II.iii.3. Term**
The Executive Director shall serve a 3-year term, but could be eligible for re-election for another consecutive term.

**II.iii.4. Removal**
The authorities of Executive Director could be assigned to another candidate in case of board decision, not respecting USERN statute or poor performance.

**Section III. Appointment**
New members and current staff members shall be appointed by the Executive Director and upon approval of the President of the Policy Making Council.

**Section IV. Resignation**
Resignation from the staff must be in writing and received by the Executive Director.

## Article VIII. Amendments and Validity

The statute and network policies would be reviewed in 3-year intervals and may be amended according to the inputs of Advisory Board and by approval of both Policy Making Council and President. The principles of statute except for vision and mission and basic structure of network may be amended when necessary by a three-quarter vote of the Advisory Board. Proposed amendments must be submitted to the President to be sent out with regular board announcements.

## Article IX. USERN Prize

***Section I. Definition of USERN Prize and eligibility criteria***
USERN prize is an international award, established by the USERN, which would be annually bestowed to junior scientists or researchers less than 40 years of age for any novel advancement or achievement in scientific education, research, or serving the humanity in five scientific fields including formal sciences, physical sciences, biological sciences, medical sciences, and social sciences.
The eligible candidates would either apply for the prize independently or be nominated by the Advisory Board members or any senior scientist in the respective field.

***Section II. The objectives of awarding USERN prize***

The USERN prize shall be awarded annually for the following purposes:

- Promoting universal peace in the scientific world.
- Developing international scientific communication in order to globalize the scientific world.
- Introducing creative and diligent junior scientists to the scientific world.
- Motivating and encouraging junior researchers and scientists in their field and promoting their universal scientific status in order to promote their scientific efforts.
- Identifying powerful young minds, who could potentially cooperate in USERN scientific programs and projects in the future.
- Encouraging and promoting the interdisciplinary fields in universal scale.
- Promoting hopefulness, self-confidence, and effort-value among young scientists.
- Informing the academic world about the importance of valuing science and scientific efforts.

***Section I. The awards for USERN prize laureates***

The prizes for the winners will include:

- USERN prize statute and medal.
- Financial grant for the best scientific work promotion.
- The travel grant for attending the festival, including attending the meetings and conferences, flight ticket, accommodation, and attending the social programs.
- The winners in each field will be offered a one week scientific visit to a number of top institutes worldwide with free accommodation, supported by the respective host which will be credited for one year.

***Section II. Jury for evaluation of candidates***

The jury shall comprise of at least 10 Advisory Board members in each major branch of science who would be responsible for evaluation and ranking of candidates according to defined criteria of selection and principles of ethics. The Policy Making Council members of each field shall annually nominate at least 10 Advisory Board members of each five major branches in order to form the jury. The Advisory Board members could also nominate candidates for receiving the USERN prize that would be then evaluated by the respective board.

***Section III. Selection criteria***

The Policy Making Council shall be responsible for establishing and announcing the selection criteria for awarding USERN prize. Any amendments in principles of evaluative criteria shall be based on a majority of the vote of Policy Making Council members (a three-quarter vote) in each major branch of science. The eligible candidates would be evaluated according to their best scientific work or achievement and their scientific resume. The proposed works would be scored according to their contribution in research, education, and serving the humanity.

***III i. Evaluation of the best scientific work of each candidate***

All the proposed works in each of five scientific fields would be evaluated and judged together, irrespective of their aspect (research, education or serving the humanity). The evaluative criteria for assessment of the best scientific work would include Novelty, Significance, Rationality, Design of the project, Leadership, Teamwork, Productivity, Extent of the project, Interdisciplinarity, Multidimensionality, commitment to principles of Ethics, and Impact on human subjects.

***III ii. Evaluation of the candidate's scientific resume***

The scientific resumes would be evaluated in different aspects including educational, research, executive, and other backgrounds. The evaluation criteria for assessment of candidates' resume in each aspect shall include:

- Educational background: educational achievements in the past 10 years, number of studied academic fields, highest academic educational degree, teaching experiences, conducting educational projects or proposing new educational curriculum, and educational impact on human subjects.
- Research background: published articles or books and their impact on science and human life considering their citation number, the H-index of candidate, the submitted patents considering the productivity, impact on science and human life, interdisciplinarity and extent of research projects.
- Executive background: the number and extent of executive projects, impact of conducted projects on science and human life.

* This statute was written in 9 articles and 34 sections and overall has 5 clauses.
* This statute has been signed by more than 100 top 1% scientists on November 10th, 2016.