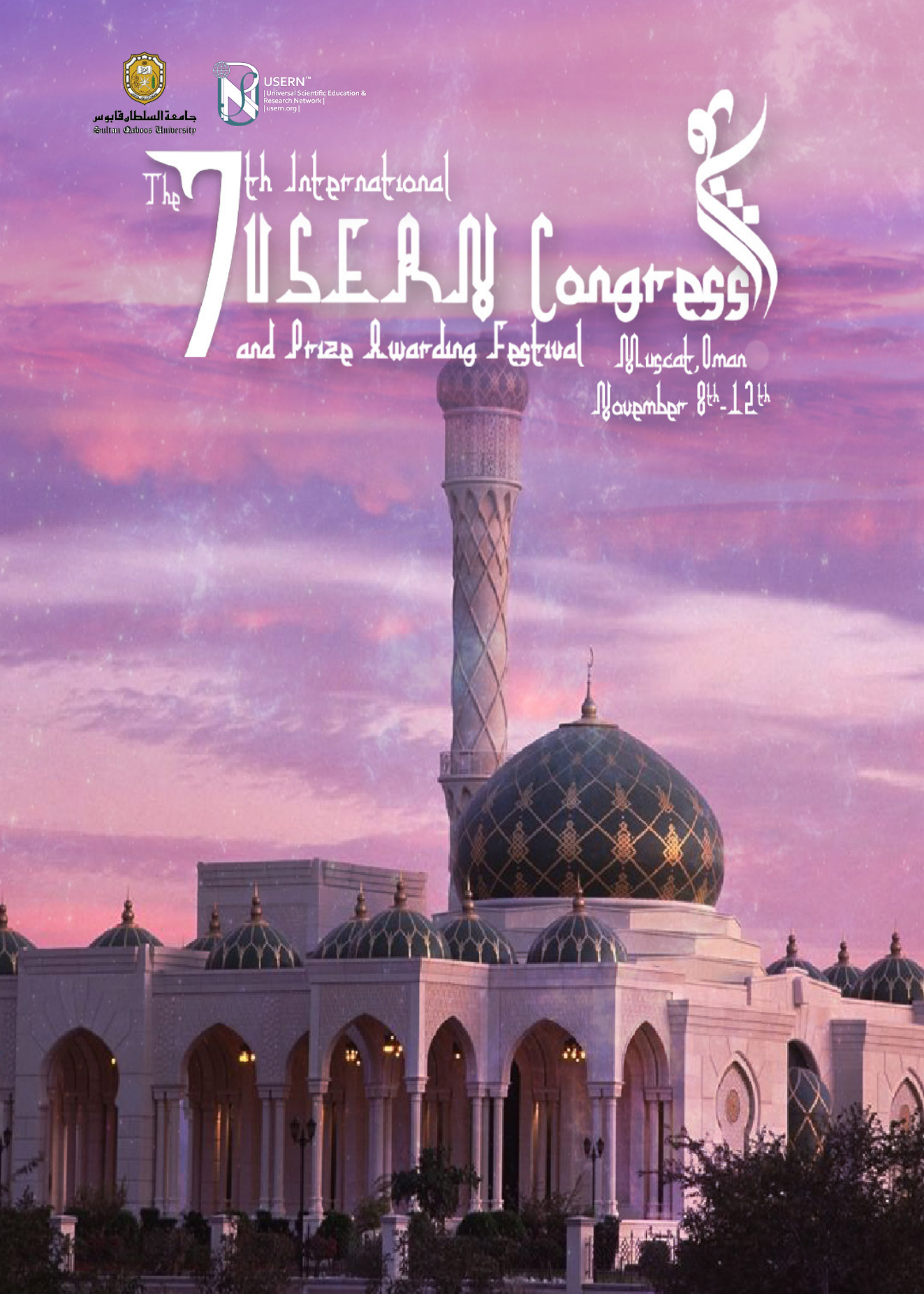
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Elisabete Weiderpass (Sweden)
Ralf Weiskirchen (Germany)
Scott Weiss (USA)
John J. Wiens (USA)
Eske Willerslev (Denmark)
Stephen E. Williams (Australia)
Christopher Wlezien (USA)
Kin-Lu Wong (Taiwan)
Nathan D. Wong (USA)
Dongrui Wu (China)
William K. Wu (Hong Kong)
Mahmoud Yaghoubi (Iran)
Masayoshi Yamaguchi (USA)
Muhhwa Yang (Taiwan)
Otto Orlean Yang (USA)
Peidong Yang (USA)
Guihua Yu (USA)
Jiaguo Yu (China)
Salim Yusuf (Canada)
Jeffrey M. Zacks (USA)
Hassan Ali Zamani (Iran)
Mostafa Zandieh (Iran)
Hamid Reza Zare (Iran)
Mohammad Reza Zarrindast (Iran)
Witold A. Zaton´ski (Poland)
Jianhua Zhang (China)
Chaohui Zhang (China)
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Support and Resource Development

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Milad Akbarzadehmoallemkolaei
Mahsa Keshavarz-Fathi
Kosar Zolfaghari
Sepideh Razi
Amir Hossein Loghman
Mohammad Ali Tahmasbi Nejad
Mona Mirbeyk
Alireza Sarkar Lotfabadi
Alireza Bagheri
Danial Nejadmasoom
Kawthar Mohamed
Azin Eslami
Niloufar Yazdanpanah
Heliya Ziaei
Ali Jaberipour

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Fatemeh Rostami
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Homa Dareini
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Elahe Meftah
Rezvan Hosseinzadeh
Reza Farzam
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Fatemeh Ghazvinian
Maryam Sadat Tonekaboni
Sadaf Sadaf Alvandipour
Nazanin Abbasi
Negar Azami
Sara Hanaei
Saboura Ashkevarian

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Sunny Okechukwu Abarikwu (Nigeria)
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Amanuel Godana Arero (Ethiopia)
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Araks Ulikhanyan (Armenia)
Aram Pascal Abu Hejleh (Germany)
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Chunfeng Xiao (China)
Dalia Sabaliauskiene (Lithuania)
Dharmagat Bhattarai (Nepal)
Esra Hazar (Turkey)
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Faten Attig Bahar (Tunisia)

Gabriela Crispim Baiocchi (Brazil)
Giulia Grancini (Italy)
Irene Ling (Malaysia)
Kseniia Minakova (Ukraine)
Laila Rahmah (Indonesia)
Lamin Ndow (The Gambia)
Leander Marquez (Philippines)
Lindelwa Mmema (Kingdom of Eswatini)
Luis Alejandro Boccalatte (Argentina)
Maria-Bianca Gegea (Romania)
Mariya Ivanovska (Bulgaria)
Marwa Al-Habsi (Oman)
Md. Shahidul Islam (Bangladesh)
Mickael Essouma (Cameroon)
Mujtaba Shaw (India)
Musa Joya (Afghanistan)
Niyoosha Yoosefi (Canada)
Orsolya Cseprekal (Hungary)
Piotr Rzymski (Poland)
Rangarirai Makuku (Zimbabwe)
Sara Makka (Lebanon)
Sarah Cuschieri (Malta)
Shadrack Oriama (Kenya)
Sila Kaya (Ireland)
Tiago Ribeiro (Portugal)
Zalina Kudzoeva (Russia)

USERN Interest Groups

Animal Models Integrated Network (AMIN)
Applications of Cochrane Evidence in Everyday's Life Group (ACEELG)
Association of Nuclear Medicine and Molecular Imaging (ANMMI)
Association of Science and Art (ASA)
Bioinformatics And Systems Biology Association (BASBA)
BioMedical Visualization Association (BMVA)
Brain Cancer research Core (BCRC)
Cancer Biology Signaling Pathway Interest Group (CBSPIG)
Cancer Immunology Project (CIP)
Clinical Psychology and Psychotherapy Studies (CPPS)
Clinical Reasoning Association (CRA)
Committee of Climate Change and Health (CCCH)
Complementary and Integrative Medicine Interest Group (CIMIG)
Computational Biology and Chemistry Group (CBCG)
Dietitians and Nutrition Experts Team (DiNET)
Digital Health Network (DHN)
Early Childhood Education, Development, and Intervention research group (ECEDI)
Epilepsy, Sleep Disorders, and Brain Electrophysiology Research Network (ESDBERN)
Food Science and Nutrition Group (FSANG)
Fuzzy Logic Lab Interest Group (FLLIG)
Gastrointestinal Pharmacology Interest Group (GPIG)
G-Quadruplexes as INnovative ThERApeutiC Targets (G4_INTERACT)
Health and Art (HEART)
History of Medicine Network (HiMedNet)
Immunogenetics Research Network (IgReN)
Immunology Board for Transplantation And Cell-based Therapeutics (Immuno_TACT)
ImmunologyToday, Immunology (ImmunologyToday)
Innovation and Creativity Research Association for Transforming Education (I_CREATE)
Integrated Science Association (ISA)
Intelligent Big Data Analysis in Medicine (IBDAM)
Interdisciplinary Neuro Brain Research and Education Network (INBREN)
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 Stem Cell (INSC)
International Neurosurgery Group (ING)
Iranian Association of Magnetic Resonance in Medicine (IAMRM)
Medical Genetics Network (MeGeNe)
Medical Humanities Association (MHA)
MetaCognition Interest Group (MCIG)
Microbial Toxin's Physiology Group (MTPG)
Molecular Immunology Interest Group (MIIG)
Multiple Sclerosis research group (MSRG)
Nano-encapsulation in the Food, Nutraceutical, and Pharmaceutical Industries Group (NFNPIG)
Nanomedicine Research Association (NRA)
Network of Dermatology Research (NDR)
Network of Empirical, Gustatory and Olfactory Aesthetics (NEGOA)
Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA)
Network of Interdisciplinarity in Neonates and Infants (NINI)
NeuroImaging Network (NIN)
Neuroscience Research Group (NRG)
Neurosurgical Research Network (NRN)
Nutritional Health Team (NHT)
One Health Association (OHA)
Persian Medicine Network (PMN)
Pharmaceutical Association for Research and Manufacturing (PhARMa)
PhytoPharmacology Interest Group (PPIG)
Primary Immunodeficiency Diseases Network (PIDNet)
Primordial Prevention of Non Communicable Disease Group (PPNCDG)
Rayazi Bioinformatics Research Group (RBRG)
Regenerative Medicine Group (REMED)
Scientific Union of Community Health (SUCH)
Society for Developing Electronic Learning in Medical Sciences (SoDELiM)

Space Biology and Astrobiology Research Team (SBART)
Systematic Review and Meta-analysis Expert Group (SRMEG)
Systems Artificial Intelligence Network (SAIN)
Tissue Engineering Hub (TEHUB)
Tissues and Biomaterial Research Group (TBRG)
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)

USERN Anthem Vocals

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

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 the peaceful and humanitarian promotion of education and research, universally. It comprises of top 1% of 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 600 top scientists, including nineteen Nobel/Abel Laureates, among the advisory board members of USERN.

The theme of the Congress this year will be "Contemplate the Universe, Discover Science", emphasizing the important role of looking carefully at all phenomena around us and thinking deeply in science! The gathering of senior and junior scientists in the context of the 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 Nobel 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 time 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.

Respecting the USERN slogan of "Science Without Borders" and in order to eliminate the geographical border of science, the USERN Congress and Prize Awarding Festival is to be held annually hosted by a scientific center worldwide. Proudly, to date, we have organized the previous USERN Congresses and Festival in Iran (Tehran), Ukraine (Kharkiv), Italy (Reggio Calabria), Hungary (Budapest), Iran (Tehran), and Turkey (Istanbul), respectively; all highly welcomed by the international academic population.

Now, here as we are standing on the verge of the seventh official international event of this network, the USERN Congress and Prize Awarding Festival 2022, let us express our gratitude to your presence, and together witness the propagation of Science without Borders.

Nima Rezaei, MD, PhD
Founding President of USERN
USERN Congress Chair and Secretary-General of the USERN Prize 2022

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"

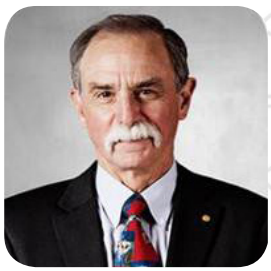
Klaus von Klitzing | **1985 Nobel Prize in Physics**

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 his research in chemical kinetics



"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

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

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

In-Person Scientific Program
Muscat, Oman

Day 1: November 8, 2022 Muscat, Oman

09:00 – 09:30 Muscat Time Opening Session

Nima Rezaei
USERN President

Maha Al-Khaduri
Assistant Dean for Training and Community Service, SQU, Oman

09:30 – 10:30 Muscat Time IFPPP

Break
10:30 – 11:00 Muscat Time

11:00 – 11:30 Muscat Time Keynote Lecture

Immune Control of Spillover and Zoonosis: The Lesson of COVID-19. *Andrea Cossarizza ,Italy*

11:30 – 12:00 Muscat Time Senior Talks

Chairs: Maha Al-Khaduri, Oman; Zahid Al Munthri, Oman

AI in breast cancer screening Oman Experience. *Zahid Al Munthri, Oman*

Reified networks simulating the effect of different culture types on mistake handling and organizational learning. *Natalie Samhan, the Netherlands*

Luncheon / Poster presentation
12:00 – 13:00 Muscat Time

13:00 – 14:00 Muscat Time Junior Talks 1

Integrated Sciences
Chairs: Tommaso Dorigo, Italy; Jan Treur, the Netherlands; Fabien Lotte, France

14:00 – 15:30 Muscat Time Special Panel: AI as an Integration Factor

Modelling Synchrony and Behavioral Adaptively in Brain, Body and Social World: An Integrative AI Approach
Panel Chair:
Jan Treur, the Netherlands

15:30 – 19:30 Muscat Time

Virtual Lectures (Biological Sciences)

Day 2: November 9, 2022 Muscat, Oman

08:30 – 09:00 Muscat Time

Virtual Nobel Talk

09:00 – 10:00 Muscat Time Senior Talks

Chairs: Andrea Cossarizza, Italy; Siham Al Sinani, Oman; Joseph Firth, England

Educational program evaluation. *Siham Al Sinani ,Oman*

Issues of climate justice: a new trend in social work. *Ahmed Thabet Helal Ibrahim, Oman*

Indigenous knowledge of wild foods and medicines among the Tagoui communities in the Nuba mountains, Sudan. *Othman Mohammed Othman, Oman*

Follow-up of children referred to developmental disorders center of Ziaian hospital, Tehran, Iran from March 2018 till May 2021. *Golnaz Ghazizadeh Esslami, Iran*

Health care associated infections in children: the importance of infection prevention and control in a health care setting. *Mehrnaz Olfat, Iran*

Break
10:00 – 10:30 Muscat Time

10:30 – 12:00 Muscat Time Special Panel: AI for Society

Introduction
Tommaso Dorigo

Challenges in autonomous driving
Alice Plebe

Interpretability
Edouard Oyallon

AI for fundamental physics
Pietro Vischia

Luncheon / Poster presentation
12:00 – 13:00 Muscat Time

13:00 – 14:15 Muscat Time Junior Talks 2

Cancer
Chairs: Yahya Al Farsi, Oman; Andrea Cossarizza, Italy; Sara De Biasi, Italy

14:15 – 15:30 Muscat Time Junior Talks 3

Infections: COVID-19
Chairs: Abdullah Balkhair, Oman; Nima Rezaei, Iran; Jianing Fu, USA

15:30 – 19:30 Muscat Time

Virtual Lectures (Physical and Chemical Sciences)

19:30 – 21:00 Muscat Time Symposium (NIAID, MENAT, CDC)

Future Preparedness for Pandemics (Chair: Mohamed H. Sayegh)

Welcome remarks:

Mohamed H. Sayegh, Senior Scientific Advisor to the Director, NIAID, NIH

Heather Burke, Regional Director, MENA Office, US Centers for Diseases Control and Prevention (CDC)

NIAID Speaker: Alicen Spaulding, Senior Advisor and Team Lead, PREMISE, NIAID, NIH

CDC Speaker: Martin Cetron, Director, Division of Global Migration and Quarantine (DGMQ), CDC

MENAT Speaker 1: Nawal Al Kaabi, Chief Medical Officer, Sheikh Khalifa Medical City, Abu Dhabi

MENAT Speaker 2: Ziad Memish, Senior Infectious Disease Consultant and Director, Research & Innovation Centre, King Saud Medical City, Ministry of Health, College of Medicine, AlFaisal University, Kingdom of Saudi Arabia

Day 3: November 10, 2022 Muscat, Oman

08:30 – 09:00 Muscat Time

Welcoming to the UN Day of Science for Peace and Development

09:00 – 10:00 Muscat Time

USERN Prize Festival

Break
10:00 – 10:30 Muscat Time

10:30 – 12:00 Muscat Time Junior Talks 4

Integrated Medicine
Chairs: Andrea Cossarizza, Italy; Khalid Al Rassadi, Oman; Mirjana Dimitrievska, Switzerland

Luncheon / Poster presentation
12:00 – 13:00 Muscat Time

13:00 – 14:45 Muscat Time

USERN Laureates Lectures
Chairs: Tommaso Dorigo, Italy; Nima Rezaei, Iran
Keynote Lecture: USERN 2022 Laureate in Formal Sciences
Keynote Lecture: USERN 2022 Laureate in Physical and Chemical Sciences
Keynote Lecture: USERN 2022 Laureate in Biological Sciences
Keynote Lecture: USERN 2022 Laureate in Medical Sciences
Keynote Lecture: USERN 2022 Laureate in Social Sciences

14:45 – 15:30 Muscat Time

Closing Session
Chairs: Nima Rezaei, Iran; Maha Al-Khaduri, Oman
Concluding Remarks
Announcement of the USERN 2023 Host

15:30 – 19:30 Muscat Time

Virtual Lectures (Medical Sciences)

Virtual Programs

November 8, 2022
Biological Sciences

GMT	Subject
12:30 – 12:50	Translational Application of Microfluidic Cell Sorters *Majid Ebrahimi Warkiani, Australia*
12:50 – 13:10	The Urgent Need to Use Magnesium Based Materials forEnhancing Health of Planet Earth and its Inhabitants *Manoj Gupta, Singapore*
13:10 – 13:30	Intravenously Injected NanoLigand Carriers Efficiently and Safely Deliver Nucleic Acid Medicines to Brain Parenchymal Cells *Moein Moghimi, UK*
13:30 – 13:50	From chemistry and physics to biology and medicine: how hard sciences can contribute to shape the nanomedicine approach against cancer *Valentina Cauda, Italy*
13:50 – 14:10	From Quantum to Biology: Can Quantum Mechanics Explain the Respiration? *Paulo Roberto Bueno, Brazil*
14:10 – 14:30	Gut-brain neuropeptides as novel targets to develop medications for alcohol use disorder *Mehdi Farokhnia, USA*
14:30 – 14:50	Members of Immunoregulatory lymphocyte Club-Old and New *Sudhir Gupta, USA*
14:50 – 15:10	Immunomodulatory biomaterials for treatment and regeneration *Mohammad Mahdi Hasani-Sadrabadi, USA*
15:10 – 15:30	The Use of Brain Organoids dor Understanding Alzheimer Pathogenesis *Kenneth Kosik, USA*
15:30 – 15:50	Louis Pasteur - The great hero: deciphering between the legend and the reality *Jean-Marc Cavaillon, France*
15:50 – 16:10	Planetary Health: a MUST in Medical Education *Jan Nouwen, The Netherlands*
16:10 – 16:40	Healthy Longevity: Prevent Premature Death Around the Globe *Reza Malekzadeh, Iran*

November 9, 2022
Physical and Chemical Sciences

GMT	Subject
12:30 – 12:50	Synthesis of bio-based polymers from ethylene and plant oils by catalysis *Kotohiro Nomura, Japan*
12:50 – 13:10	Shifting from pedology to soil system science *Genxing Pan, China*
13:10 – 13:30	Soil and Earth. The fate of the civilization *Artemi Cerdà , Spain*
13:30 – 13:50	Multicomponent High-Entropy Cantor alloys for the next generation of new materials *Brian Cantor, UK*
13:50 – 14:10	Development and optimization of innovative and sustainable processes for The extraction of oil and proteins from alternative sources *Francisco J Barba, Spain*
14:10 – 14:30	Last call for archaeology: Integrated science for humanity *Derya Yilmaz, Turkey*
14:30 – 14:50	Design of photo switchable ligands to allow the optical control of biological activity *Rossella Castagna, Spain*
14:50 – 15:10	Manipulative Nano-Biotechnology for Personalized Health Wellness *Ajeet Kaushik, USA*
15:10 – 15:30	Billions of years of Earth history guide our search for life beyond our solar system *Timothy Lyons, USA*
15:30 – 16:00	Light, Matter and Neutrinos *Constantinos Vayenas, Greece*
16:00 – 16:60	Anaxagoras on Mind *Stavros Baloyannis, Greece*

November 10, 2022
Medical Sciences

GMT	Subject
12:30 – 12:50	Advances in screening and early detection of cancer *Masakazu Toi, Japan*
12:50 – 13:10	The role of multi-omics study in the prevention and treatment of allergic disorder in children *Jiu-Yao Wang, Taiwan*
13:10 – 13:30	Cartography of the human brain with diffusion MRI *Alexander Leemans, The Netherlands*
13:30 – 13:50	Convergent and divergent finding of monogenic Tregopathies and restoring by targeted therapies *Safa Baris, Turkey*
13:50 – 14:10	What causes mental illness? Exploring Bronfenbrenner's ecological systems and the origins of mental disorders *Umberto Crisanti, UK*
14:10 – 14:30	Science and faith to improve care of Peruvian patients with severe Primary Immunodeficiencies *Juan Carlos Aldave Becerra, Peru*
14:30 – 14:50	Is Xenotransplantation the Future of Organ Transplantation? *Reza F. Saidi, USA*
14:50 – 15:10	In search of explaining Alzheimer disease *George Perry, USA*
15:10 – 15:30	The winner's curse - or how positivity bias undermines the scientific method *Matthias Von Herrath, USA*
15:30 – 15:50	Importance of understanding mindsets and local context when introducing new health interventions *Gary Darmstadt, USA*
15:50 – 16:10	How a clinical observation made by an astute Pediatrician 85 years ago started the journey of the Wiskott-Aldrich syndrome to fascinate generations of scientists across the spectrum of medical specialties *Hans Ochs, USA*

November 11, 2022
Social Sciences

GMT	Subject
12:30 – 12:50	The Role of Indigenous Wisdom in Scientific Revolutions *Ryan Maboloc, Philippine*
12:50 – 13:10	Temporal conceptions of the social and personal future in Spanish high school students *Delfín Ortega-Sánchez, Spain*
13:10 – 13:30	Avoiding dogma to improve the success rate of translational research *Rafael Franco, Spain*
13:30 – 13:50	Sustainable development at higher university level:incorporating sustainability thinking in research and scientific discussions *Anet Režek Jambrak, Croatia*
13:50 – 14:10	A way forward for teaching in universities of the future? A review of science leading to High Impact Learning that Lasts (HILL model) *Filip Dochy, Belgium*
14:10 – 14:30	Does looking back help us to tackle the future *Ute Römling, Sweden*
14:30 – 14:50	Movement as personality trait indicator - what can kinesiology offer to the psychology of individual differences? *Milos Milosevic, Serbia*
14:50 – 15:10	Using comics to explore transdisciplinarity in Islamic civilization *Amine Harbi, Algeria*
15:10 – 15:30	My story and the history of the case study Mona Lisa: the book - Is the Louvre Mona Lisa Leonardo's second version? *Salvatore Lorusso, Italy*
15:30 – 15:50	Creative thinking: art in relation to the concept of universe and reality *Paola Lopreiato, UK*
15:50 – 16:10	Interdisciplinary Science is Needed to Solve Complex Problems of Human Beings *Shuji Ogino, USA*
16:10 – 16:30	Ensuring the Future via Sustainable Development: Questions and Lessons *Laszlo Rosivall, Hungary*

November 12, 2022
Formal Sciences

GMT	Subject
12:30 – 12:50	2022: The International Year of Basic Sciences and its role for Sustainable Development through health literacy *Amirhossein Takian, Iran*
12:50 – 13:10	Modeling and controlling turbulent flows through deep learning *Ricardo Vinuesa, Sweden*
13:10 – 13:30	Set theory, arithmetic and their ontological foundations: a new program of generalization of arithmetic *Wojciech Krysztofiak, Poland*
13:30 – 13:50	Promises and controversies in translational applications of Brain-Computer Interfaces and Neurofeedback *Fabien Lotte, France*
13:50 – 14:10	Science and technology to help people to see better *Pablo Artal, Spain*
14:10 – 14:30	Multi-Attribute Group Decision Making based on CRITIC-EDAS Strategy using Geometric Aggregation Operator in Pentapartitioned Neutrosophic Set Environment *Surapati Pramanik, India*
14:30 – 14:50	Artificial Intelligence in the Management of Cerebrovascular Diseases *Ashkan Mowla, USA*
14:50 – 15:10	AI-Engineered smartphone-enabled diagnostics and frameworks with applications in infertility and infectious diseases *Hadi Shafiee, USA*
15:10 – 15:30	Event understanding in humans and machines *Jeffrey M. Zacks, USA*

Congress Special Panels

November 8, 2022
14:00 - 15:30 Muscat Time

AI as an Integration Factor

Modelling Synchrony and Behavioral Adaptivity in Brain, Body and Social World: An Integrative AI Approach
Jan Treur, Sophie Hendrikse, the Netherlands

November 9, 2022
10:30 - 12:00 Muscat Time

AI for Society

Opportunities and Challenges for Society from Artificial Intelligence
Tommaso Dorigo, Italy

Artificial Intelligence for Fundamental Physics Research
Pietro Vischia

The Promise and the Reality of Autonomous Vehicles
Alice Plebe

Interpretability of Artificial Intelligence Methods
Edouard Oyallon

Junior Oral Presentations

November 8, 2022
Junior Talk 1 (Integrated Science)
Chairs: Tommaso Dorigo, Italy; Jan Treur, the Netherlands; Fabien Lotte, France

Climate Protection and the Humanitarian Sector
Fiona Morrison, Berlin, Germany

A Study of Relation Between Perception and Design
Mohammad Sedaghati Jahromi, Shiraz, Iran

On Being a Truth-seeker
Saba Mirikermanshahi, Kermanshah, Iran

A Journey Through Time, Between the Peloponnesian War and the Ukraine War
Amir Reza Mazandarani, Tehran, Iran

Human creativity, the only area artificial intelligence cannot take over... or can it?
Seyedeh Saba Sajadi Tabar, Tehran, Iran

Panoptic medical AI
Zahra Shahbazi, Kermanshah, Iran

Reviewing Telemedicine: The necessity of launching TeleVisit application
Zahra Momenzadeh, Pécs, Hungary

Preception and Attitudes of Undergraduate Medical and Nursing Students Towards Simulation-Based Interprofessional Education
Mohammed Al-Harrasi, Oman

November 9, 2022

Junior Talk 2 (Cancer)

Chairs: Yahya Al Farsi, Oman; Andrea Cossarizza, Italy; Sara De Biasi, Italy

Cancer Vive
Sahel Noorikoloori, Tehran, Iran

Cancer Vaccines; Promising Tools to Fight Cancer
Mohadeseh Pourashouri, Tehran, Iran

The link between hypoxia-induced metabolic alterations and chemoresistance in breast cancer
Hana Tahmouresi, Tehran, Iran

Immunonutrition in colorectal cancer surgery
Negin Jarrah, Tehran, Iran

Immunotherapy for ocular tumors
Marzieh Pirzadeh, Babol, Iran

DCLK1, a promising colorectal cancer stem cell marker, regulates tumor progression and invasion through miR-137 and miR-15a dependent manner
Sepideh Razi, Tehran, Iran

Smart photodynamic therapy for cancer: with focus on novel photo sensitizers and nanotechnology-based strategies
Kosar Zolfaghari, Tehran, Iran

November 9, 2022

Junior Talk 3 (Infections: COVID-19)

Chairs: Abdullah Balkhair, Oman; Nima Rezaei, Iran; Jianing Fu, USA

Vaccine hesitancy in the COVID-19 pandemic era: lessons learned for future preparedness
Niloufar Yazdanpanah, Tehran, Iran

COVID-19 and pulmonary bullae: A multicenter prospective study
Mohammad Reza Fattahi, Tehran, Iran

Prevalence of Dizziness, Tinnitus and Headache among COVID-19 Patients at Sultan Qaboos University Hospital
Nazik Ahmed, Muscat, Oman

Don't confuse perimenopausal symptoms with Long COVID-19
Nazanin Abbasi, Yazd, Iran

The Effect of COVID-19 Infection on Drug Abusers Presented to Sultan Qaboos University HospitalEmergency Department, Oman
Firas Al-Majrafi, Muscat, Oman

Strategies for reinforcing communicable diseases surveillance system in Iran
Mohammadreza Mirzaee Goodarzi, Tehran, Iran

Investigating antibiotic resistance patterns in strains causing urinary tract infections in Semnan, Iran
Zeynab Zahedi, Semnan, Iran

November 10, 2022
Junior Talk 4 (Integrated Medicine)
Chairs: Andrea Cossarizza, Italy; Khalid Al Rassadi,Oman;
Mirjana Dimitrievska, Switzerland

Medicalization: A Comparison Between Different Perspectives
Navid Ravan, Shiraz, Iran

The wounded caregiver: surgeons' self-compassion fatigue
Azar Ghasemi, Kermanshah, Iran

The fragrant mind
Mehdi Azhdari, Tehran, Iran

The Impact of Animal-Assisted Therapy (AAT) on Children's Fear and Anxiety in the Healthcare System
Mahshad Naserpour, Tehran, Iran

Neuropsychiatric implications of Toll-like receptors; Beyond expectations
Kiarash Saleki, Babol, Iran

Artificial Intelligence-Assisted Diagnosis of Metastatic Oral Cancers based on Imaging Examinations
Mohammad Ali Tahmasbi Nejad, Tehran, Iran

The Effect of Nanomaterials on Embryonic Stem Cell Neural Differentiation
Ramyar Rahimi Darehbagh, Iran

Insulin Improves Reproductive Ability in mouse model of aging by Restoring ovarian follicular reservation
Fatemeh Sodeifian, Tehran, Iran

Prevalence and Characteristics of Sleep Disorders Following a Cerebral Concussion:
A Survey of Belgian, French and Swiss Patients
Mohammad Hossein Khosravi, Wallonia, Belgium

Outcomes of misoprostol use in first and early second trimester miscarriages
at Sultan Qaboos University Hospital: a 5 years retrospective study
Bushra Al Khalili, Bahla, Oman

Junior Poster Presentations

November 8, 2022
Poster Presentation

Biodegradable packaging
Joana Kochendörfer, Berlin, Germany

The privatization of resources/raw materials
Judith Nora Fischer, Berlin, Germany

A Base-Mediated Intramolecular Hydroalkoxylation for Synthesis of [1,4]Oxathiepino[5,6-b]quinolones
Maryam Sadat Tonekaboni, Tehran, Iran

Comparison between Two Kinds of Online Educational Interventions on Knowledge-Attitude and Practice of Prosthodontists about the Role of Intra-Oral Appliances in Management of Obstructive Sleep Apnea
AmirHossein Vakili Razlighi, Tehran, Iran

Explore the Demographic and Clinical Profile of Patients Receiving Electroconvulsive Therapy at tertiary care hospital in Oman: A Cluster Analysis
Alkhatib Al Saadi, Muscat, Oman

Use of Simulation in Interprofessional Team-based Learning to Develop Teamwork Skills in Acute Emergencies for Undergraduate Medical and Nursing Students at Sultan Qaboos University
Fatma Al Yaqoubi, Muscat, Oman

Evaluation of Anticancer Effect of Colchicum autumnale L. Corm on Breast Cancer Cell Model
Shiva Falahian, Amol, Iran

Investigating the causes of infertility and new methods in its diagnosis and treatment; a systematic review study
Amirhassan Dehghan Nayeri, Tehran, Iran

Is there a link between multiple sclerosis and pregnancy in terms of tendency, reproductive characteristics, and disability? A secondary data analysis of nationwide MS registry of Iran
Sajjad Ghane Ezabadi, Yazd, Iran

Targeting Ras/Raf/MAPK pathway in neurodegeneration: Phytochemical approaches
Mohammad Mehdi Gravandi, Kermanshah, Iran

November 9, 2022
Poster Presentation

Respiratory symptoms in adult patients who have recovered from COVID-19 at Sultan Qaboos University Hospital
Nasser Al-khamisi, Muscat, Oman

Semi-quantification of serum SARS-CoV-2 IgG in COVID-19 patients recovered from mild and severe infection
Jamila Abdullah Al-Zadjali, Muscat, Oman

Evaluation of renal complications in hospitalized patients with COVID-19
Atousa Moghadam Fard, Tehran, Iran

Herbal cure for SARS-CoV-2
Ghazal Mohammadbeigi, Tehran, Iran

Mesenchymal Stem Cell-Derived Exosomes: A Potential Therapeutic Candidate for Regenerative Medicine-Based Treatments for COVID-19
Mehregan Babamohamadi, Tehran, Iran

The Role of Hormone Therapy on Immune Response Mechanisms in Treating SARS-COV-2 Infection
Mahshid Babamohammadi, Kermanshah, Iran

Frequency of asthma exacerbation among influenza vaccinated patients compared to non-vaccinated asthma patients
Zalkha Al-Kharusi, Muscat, Oman

Dusty Air Pollution is Associated with an Increased Risk of Allergic Diseases in Southwestern Part of Iran
Reyhaneh Dehdari, Bushehr, Iran

Improvement of Immunotherapy in Pediatric Leukemia
Maryam Sadeghi, Tehran, Iran

Targeted Protein Degradation for the Treatment of Parkinson's Disease
Roshanak Amirian, Kermanshah, Iran

Insomnia in patients recovered from COVID-19 infection at a tertiary care hospital
Amira Alabri, Muscat, Oman

USERN Keynote Lectures (UKLs)

Amine Harbi

Using Comics to Explore Transdisciplinarity in Islamic Civilization

Souk Ahras University, Souk Ahras, Algeria

It is generally accepted among scholars and historians that transdisciplinarity was at the heart of the scientific and the learning experiences in Islamic civilization. To be a polymath was the standard for a scientist and if one had to specialize in a specific field or discipline it was necessary for him or her to have, at least, a generalist's knowledge of other disciplines. Looking at the universe through disciplines as different as mathematics, medicine, poetry and music nourished a transdisciplinary way of thinking science. Our project aims at creating a collaborative Manga series focusing on transdisciplinarity in Islamic Civilization. Comics, and especially Manga, are a powerful medium that could kindle young people's interest in transdicplinarity as it was understood and lived for centuries in Islamic Civilization. The past experience of transdicplinarity in Islamic Civilization, presented through a fun medium that is Manga, could also help incite curiosity about epistemological approaches that are different from our own. As we rush toward the destruction of nature, and thus of our universe, learning how to look at the universe and to think science differently could be started by revisiting previous human civilizations who saw the universe as a feast for the spirit and not as a commodity for the ego.

Anet Režek Jambrak

Sustainable Development at Higher University Level: Incorporating Sustainability Thinking in Research and Scientific Discussions

Faculty of Food Technology and Biotechnology, University of Zagreb, Zagreb, Croatia

Sustainable development is nowadays important topic. In the year 2022., there was highest reading of CO2 level (417 ppm) in the history of humans on Earth. Global Sustainable Development Goals issued in the 2030 Agenda for Sustainable Development, by United Nations, are important drivers how to drive our industry, operations, living, education, thinking etc. Sustainable development is a topic of national and international scientific programs and requires coordination of many levels. Most of all and above all, requires the rapid implementation of improvements in the "eco-efficiency", energy and efficiency.

Education at higher university level is important as students are future employees and drivers of the future. There is need to educate and discuss with our students, how, where and what is important in sustainability. The most important points are impact to the environments, economy and society and how to produce, coordinate and valorise some processes or smart industry, in order to be in line with sustainable development goals and critically think in research and development. The example can be in cooperation and interdisciplinary partnership.

In biotechnical and technical sciences, focus can be on education and possible application of nonthermal and advanced technologies in processing, as "cleaner technologies" required for improvement "eco-efficiency" through the life cycle of a product or system. Industry 4.0 and elements of digitalization also should be in the scope of education, with the aim of improving agri-food processing, and in collaboration with small and medium size enterprises.

By teaching modules and participating in the research activities students must gain knowledge of the energy and environmental parameters and applications of sustainable processing and be able to critically evaluate the advantages and disadvantages of particular techniques.

Students that are future employees can apply this knowledge through projects and at workplace at national and EU level, and beyond. Knowledge and skills would include applying the latest research findings and applying sustainable techniques in (industrial) practice, the ability to implement sustainable techniques in existing plants in the process industry, optimizing and designing the processing plan and process parameter.

In addition, there is need of enhancing the environmental and generally responsible social awareness of students and teachers, in the future. It is therefore essential to assess all the adverse impacts of the production process, the utilization of raw materials and the distribution system on the environment for the purpose of sustainable development, the competitiveness of economies and more.

Artemi Cerdà

Soil and Earth, The fate of the civilization

Soil Erosion and Degradation Research Group, Department of Geography, Valencia University, Valencia, Spain

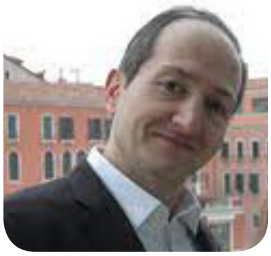
Soil is the basis sphere of the Earth System. Soil contains water, minerals, organic matter, and life. The soil system regulates the carbon cycle and then the climate, the nitrogen cycle, and the erosional and hydrological cycles. Degrade the soil and the Earth system will collapse. The humans are degrading the soils with the abuse of the resources by agriculture, grazing, housing, infrastructures construction. This will end sustainability of our civilization. The past, present and future of the soil sphere will be reviewed in this talk.

Jean-Marc Cavaillon

Louis Pasteur - The great hero: deciphering between the legend and the reality

French National Research Agency (ANR), Paris, France

In 2022, we are celebrating the bicentenary of Louis Pasteur's birth. Louis Pasteur is the most internationally known French scientist. He discovered molecular chirality, and he contributed to the understanding of the process of fermentation, helping brewers and winemakers to improve their beverages. He proposed a process, known as pasteurization, for the sterilization of wines. He refuted the concept of spontaneous generation and established the germ theory of infectious diseases that allowed Joseph Lister to develop his antiseptic practice in surgery. He discovered the anaerobic life, the concept of antibiosis and undertook a bacteriological war against rabbits. He solved the problem of silkworm disease, although he had refuted the idea of Antoine Béchamp, who first considered it was a microbial infection. He created four vaccines (fowl cholera, anthrax, pig erysipelas, and rabies) in the paths of his precursors, Henri Toussaint (anthrax vaccine) and Pierre Victor Galtier (rabies vaccine). He generalized the word "vaccination" coined by Richard Dunning, Edward Jenner's friend. Robert Koch, his most famous opponent, pointed out the great ambiguity of Pasteur's approach to preparing his vaccines. Analysis of his laboratory notebooks has allowed historians to discern the differences between the legend built by his hagiographers and reality. In this presentation, we will revisit his career, his undeniable achievements, and tell more about a hero who made every effort to build his own fame.



Tommaso Dorigo

Artificial Intelligence for Detector Design: A New Frontier in Science and Technology

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

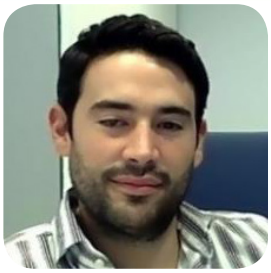
Recent progress in computer science is empowering us to produce models of some of the most complex instruments we ever constructed: particle detectors. The complete simulation of the data collection procedures, the interaction of radiation with matter, and the inference extraction, along with a careful definition of the goals of the scientific endeavor, today allow machines to scan the very high-dimensional parameter space of design choices, finding solutions humans cannot conceive by themselves, and producing large gains in the performance of the instruments. This technology may be used for fundamental research as well as for industrial and medical applications. In this presentation I will describe the current status of these studies and their future prospects.

Filip Dochy

A way forward for teaching in universities of the future? A review of science leading to High Impact Learning that Lasts (HILL model)

European Academy of Science (Academia Europeae) & High Impact Learning Academy, London, UK

One of the biggest concerns that has come to the fore in the field of education recently is whether colleges and higher education institutions offer educational programs that provide their students with the basic skills and competences necessary to meet the requirements of the globalizing and rapidly changing world and the accordingly changing labour market.
Science shows that educating students through mainly lecturing shows very weak effects.
Also, current generations of youngsters seem to learn differently than older pre-internet generations.
In this contribution, we illustrate these facts and present a way forward that leads to teaching with a much stronger impact and higher retainment of knowledge and skills. We take a look at the High Impact Learning model (HILL model) (www.highimpactlearningthatlasts.com) and its seven building blocks. We explore their meaning and their practical value. Moreover, we try to exchange our ideas on how HILL can operate as a catalyst in university training programs. We discuss the key role of feedback in High Impact training programs, creating long lasting impact for learners and organisations.
Finally, we show our experience with successful European High Impact Learning practices and our reviews of American studies on High Impact practices. The most common effects of High Impact practices were increased student engagement and motivation, higher academic achievements, higher graduation rates and retention and increased critical thinking. In addition, these show to have primarily competence/skills development-focused effects with their features of developing transformative learning, leadership skills, student and faculty/peer/community interaction, critical thinking, time management and job-readiness skills.



Francisco J. Barba

Development and Optimization of Innovative and Sustainable Processes for The Extraction of Oil and Proteins from Alternative Sources

Department of Preventive Medicine and Public Health, Food Science, Toxicology and Forensic Medicine, Faculty of Pharmacy, Universitat de València, València, Spain

Although many actors and industrial sectors could help addressing the limitations of the current approach to the traditional food system, researchers are called upon to contribute innovations capable of creating a better and more nutritious diet and a sustainable food system. By 2050, feed demand will require a 70% increase in food production. On the other hand, people need foods that can deliver functional compounds that contribute to the prevention of noncommunicable diseases. In addition, there is a growing need to better understand how biomass can be sustainably valued, what biomass flows are in the economy and how the increased pressure on natural resources can be adjusted with environmental and economic sustainability in Europe and around the world.

The tragedy in Ukraine has exposed the risks and dangers of dependence on global supply chains for essential products, not only because of their lack of security but also because they can seriously compromise the geopolitical decision-making process at the national and regional levels and thus directly impact the formulation of policies necessary to counter the threats to world peace. From a food point of view, a major challenge to the food security of many nations is about to develop because Ukraine and Russia are the main exporters of grains and grain products, in particular oil6. These facts highlight the great need to obtain oil from sustainable and economically profitable sources using innovative, efficient and ecological processes. In addition, in the case of protein sources, over the last years there has been a growing interest in the search for alternative sources, which are sustainable and that in turn have a high nutritional value with an adequate content of essential amino acids. In response to this demand for the development of new protein sources, the European Union has launched numerous European calls related to this topic. In this sense the use of microalgae, insects and agri-food side streams could be an alternative to the growing needs of the population for both oil and protein, being able to meet at the same time, on the one hand, the objectives of valorization of existing resources and on the other hand the supply of nutrients necessary for an adequate and sustainable diet.

In this sense, this presentation aims to evaluate the impact of different innovative technologies (e.g. supercritical fluids, pulsed electric fields and accelerated extraction with solvents) on the recovery of nutrients and bioactive compounds from alternative sources (insects and microalgae) as well as by-products of the agri-food industry.

Rafael Franco

Avoiding dogma to improve the success rate of translational research

Department of Biochemistry and Molecular Biomedicine, Faculty of Biology, Universitat de Barcelona (UB), Barcelona, Spain
CiberNed, Network Center for Neurodegenerative diseases, National Spanish Health Institute Carlos III, Madrid, Spain

Scientific production is soaring, but while the amount of available data is extremely high, the production of new knowledge is scarce. This is due to the high global investment in research, the high number of scientists around the world, and the pressure to publish for more research funding and for promotion. In this scenario dogma appears as a brake in translational research. Two examples will be given, one is autophagy, defined in a 2010 Science paper as "a process of self-cannibalization" (10.1126/science.1193497), is "sold" as seminal target to cure almost everything both inhibiting and boosting. The number of papers on autophagy until 2000 was 928, and since then 68,242 (source PubMed). The second example is the dogma that protein aggregation is the key process to be targeted to combat Alzheimer's disease. Unfortunately, such an approach has not been successful despite all efforts and billions of dollars spent trying to show that any intervention that decreases aggregation would be beneficial. However, the dogma has gone to Parkinson's whose field of translational research is following the same steps followed in Alzheimer's. The number of articles per year on "protein aggregation and Alzheimer's", which was 139 in 2000, has stabilized at around 1,400; the number of papers per year on "protein aggregation and Parkinson's" has gone from 52 in 2000, to 471 in 2015 and 852 in 2021 and continues to rise (source PubMed). The paper leaves two open questions: Is dogma leading to more translational research success? Are approvals of new medicines conditioned by dogma?

George Perry

In Search of an Explanation for Alzheimer's Disease

Department of Neuroscience, Developmental and Regenerative Biology, University of Texas at San Antonio, San Antonio, Texas

For nearly four decades, our research has focused on dissecting the cytopathology of Alzheimer's disease (AD) with the goal of developing an explanation leading to an effective therapy. We have used oxidative stress as a window to view and understand AD. Oxidative damage to sugars, proteins, lipids and nucleic acids increases in neuronal cytoplasm. The same neuronal compartment has increased redox-active iron and copper, which can catalyze oxidative damage, and likely derive from mitochondrial debris (in and outside lysosomes) including cytochromes, mitochondria specific prosthetic groups and mtDNA. Mitochondria show altered axonal transport, size distribution, energetics, fusion/fission, and degradation in AD that correlate with the extent of oxidative damage suggesting they are the origin. Surprisingly, amyloidβ and tau are quantitatively associated with reduced neuronal oxidative damage. Copper sequestration by amyloidβ blocks copper mediated oxidation of lipids and vitamin C indicating amyloidβ can be a protective response rather than the initiator of AD. Instead of being bound to amyloidβ, iron is present as 10nm magnetite crystals with super-paramagnetic properties and as a covering to amyloid fibers. Not just amyloidβ, but also tau, may be protective responses induced in AD to maintain neurons with altered balance for decades. While these studies put oxidative stress at the center of AD, they also highlight a complexity of multifaceted alterations that is homeostatic and requires a deeper level of understanding before an explanation can lead to an effective cure.

Jeffrey M. Zacks

Event Understanding in Humans and Machines

Department of Psychological & Brain Sciences, Washington University in Saint Louis, St. Louis, United States

Everyday activity is continuous, dynamic, and high bandwidth—yet we seem to have the subjective experience of a modest number of meaningful events that stand in structured relations to each other. In this talk, I will describe a theory that relates the subjective experience of events to computational mechanisms of prediction error monitoring and memory updating. Briefly, Event Segmentation Theory proposes that perceivers maintain a working memory representation of the current event and use it to guide predictions about what will happen in the near future. When prediction error spikes, they update their model. Data from individual differences, neuropsychology, and neuroimaging suggest that this mechanism is functionally significant for memory and that it can be impaired by neurological injury or disease. Computational modeling indicates that this mechanism can enable human-like event understanding. New results indicate that it is possible to improve the encoding of event structure and that this may improve subsequent memory. Such results have implications for technology design and for the remediation of memory disorders in conditions including healthy aging, Alzheimer's disease, and post-traumatic stress disorder.

Juan Carlos Aldave Becerra

Science and Faith to Improve Care of Peruvian Patients with Severe Primary Immunodeficiencies

Hospital Nacional Edgardo Rebagliati Martins, Lima, Peru

Medical science has a limit against death. Patients with severe Primary Immunodeficiencies are at increased risk of life-threatening disease complications and death.
I am pleased to share with the audience our experience in the application of Christian faith to achieve more comprehensive medical care for patients and families affected by severe Primary Immunodeficiencies in a developing country.

Kotohiro Nomura

Synthesis of Bio-Based Polymers from Ethylene and Plant Oils by Catalysis

Department of Chemistry, Tokyo Metropolitan, University, Hachioji, Japan

Polyolefins (polyethylene, polypropylene etc.) are widely used in our daily life and have been produced from fossil oil (petroleum), and olefin polymerization in the presence of catalysts is the core technology in chemical industry. Study concerning synthesis of new materials (polymers), especially ethylene copolymers with olefins (obtained by simple chemical process in industry), that have never been used by the conventional catalysts, has been considered as the fascinating goal. This is not only because the material properties in the resultant polymers can be modified by incorporation of two different olefins (monomer), but also because the resultant polymer can be recycled as polyethylene (resource unification, simplification for better material/chemical recycling as well as for reducing the waste). More recently, many researchers focus on design and development of renewable polymers by precise chemical (polymerization) techniques. Development of polyolefins derived from hydrocarbon-rich molecular biomass (vegetable oils and fatty acids), most abundant and low cost molecular biomass, has thus been recognized as an attractive subject, however, almost no successful examples have been reported due to a difficulty of incorporation of these sterically encumbered olefins (plant oils).
We herein introduce successful synthesis of "bio-based polyolefins" by polymerization of ethylene with plant oils (terpenes, inedible plant oil), especially limonene, β-pinene and with myrcene. These polymers can be prepared by the ethylene copolymerization by our original catalysts, called nonbridged half-titanocenes. In this lecture, I wish to introduce the background and how we can reach the goal for the purpose including the detailed synthesis and the promising material properties displayed. In particular, ethylene/myrcene copolymer displays promising tensile and elastic properties. The study has been considered as an important subject for establishment of circular economy.

Laszlo Rosivall

Sustainable Development: What Is It Indeed That We Are Supposed to Preserve After All?

Semmelweis University, Budapest, Hungary
Avicenna International College, Budapest, Hungary

Our Goal should be to pass on at least as much of our world to the next generation as we have inherited.
The Situation: At least eleven islands in the northern part of Solomon Islands have completely disappeared in recent decades or are still being eroded. Glaciers, icebergs are melting and disappearing as I speak! The size of the land is decreasing, the biodiversity is decreasing, pests and weeds that have not been seen in Hungary so far are appearing, outcompeting the indigenous species... Behind the beautiful slogans are dubious events, wars, genocides. Should this be passed on and preserved?!
The Ultimate Goal / object of sustainable development: man. In contrast to the usual themes of energy, water, the atmosphere, the economy, biodiversity, and so on.
Suggestion: let us preserve man himself! But, what a man!? Human behaviour is almost impossible to change. Inequality has always been in existence, is does exist and I am afraid it will exist! Should we really preserve this?! There has never been tolerance and it will never be! So, should we really preserve this?! Selfishness, greed, preying on the others has always been and will always be! Should we really preserve this?! There has always been exploitation and it will always be?! Shall we keep it like that?! We've always had wars; it is still there, and it will always be there! Should we then really preserve this?!
The real meaning of the idea of sustainable development is to protect mankind! To do this, may I recommend the following:
• Earth, wildlife, vegetation, climate: the ultimate goal of energy conservation is to further improve human well-being and quality of life. However, it is not enough to protect the Earth, the fauna, the flora, the climate, the energy sources, we need to do a lot more!
• The accelerated social, scientific, and technical developments of the 21st century requires special and extremely rapid adaptation on the part of individuals and communities. So, we have to move on and move fast, but always mindful of the eventual back draws and possible side effects.
• The forced globalisation and windfall profits, the brainwashing effect of the globalised media has been causing serious damage to the mindsets of new generations that need to be protected and shielded from it.
• Selfishness, lack of love, superficial, vague human relationships, violence, hatred, and self-destruction are among those that need to change for good.
• What is needed is a healthy body and a healthy soul, positive human relationships, a community that provides protection and security, a family, and a society. This is impossible without proper education, guidance, and a well-adjusted moral compass.
We recommend that our countries, our communities, and even USERN set an example in promoting and achieving these goals by placing special emphasis on the development of education, upbringing, morality and tolerance, the formation of sustainable development!

Alexander Leemans

Cartography of the Human Brain with Diffusion MRI

PROVIDI Lab, University MedicalCenter Utrecht, the Netherlands

Understanding how the brain functions requires knowledge of the architectural configuration of the underlying fiber pathways. Studying the organization of this 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. 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. Similar to cartographers creating land maps, diffusion MRI scientists develop brain fiber tractography methods to chart the intricate network of brain connections in vivo and non-invasively. 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.

Timothy W. Lyons

Billions of Years of Earth History Guide Our Search for Life Beyond Our Solar System

Department of Earth and Planetary Sciences, University of California Riverside, California, USA

Life and life-sustaining environments, including oceans, have existed on a dynamic Earth for more than four billion years despite the multitude of challenges that come with stellar, solar system, and planetary evolution. Each of our many past planetary states, or alternative Earths, was associated with a particular atmospheric composition, and those atmospheres contained gases such as oxygen and methane that were produced by early life. Using ancient Earth to understand when and how these biosignature gases accumulated is allowing us to select targets and techniques for exploring the many Earth-like planets beyond our solar system.
This presentation is about the co-evolution of life and its environments on Earth over billions of years, touching on key evolutionary innovations, the steps and dynamics of biospheric oxygenation, potential tectonic controls, and nutrient cycling—among other first-order patterns and controls. The focus will be on biosignatures emphasizing early Earth and its relevance in the search for life on exoplanets. Among the many lessons learned, early Earth has taught us about false negatives—that is, the possible absence of detectable atmospheric biosignatures above an ocean brimming with life. Both false negative and false positive scenarios drive us to challenge traditional approaches and seek nontraditional solutions.

Majid Ebrahimi Warkiani

Translational Application of Microfluidic Cell Sorters

University of Technology Sydney (UTS), Sydney, Australia

Micro/nano-fluidics, a technology characterized by the engineered manipulation of fluids at the micro/nano-scale, has shown considerable promise in point-of-care diagnostics and clinical research. Micro/nano-fluidic 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 micro/nano-fluidic 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.

Masakazu Toi

Advances in Screening and Early Detection of Cancer

Kyoto University Hospital, Kyoto University, Kyoto, Japan

Molecular characterization and diagnosis have made great progress in the last decade. These advances have made it possible to assess the risk of developing diseases, especially cancers. In fact, we recommend prophylactic risk reduction and intensive screening programs to cases with a genetically high-risk of developing cancer. We also categorize common risks are also into subgroups according to risk grade and consider different screening programs for each subgroup of risk strategy. The global trend is the practice of individualized preventive care and preemptive medicine. On the other hand, early detection of diseases by images has also made great progress. Various new diagnostic modalities with high performance are engaged in cancer practice and further new modalities are under development. In addition, the development of a diagnostic system that combines imaging and molecular blood tests is underway. We are now conducting research on next-generation early detection platforms equipped with artificial intelligence as well. We will touch on these recent advances particularly in breast cancer research and diagnosis field.

Mehdi Farokhnia

Gut-Brain Neuropeptides as Novel Targets to Develop Medications for Alcohol Use Disorder

Clinical Psychoneuroendocrinology and Neuropsychopharmacology Section, Translational Addiction Medicine Branch, National Institute on Drug Abuse Intramural Research Program (NIDA IRP) and National Institute on Alcohol Abuse and Alcoholism Division of Intramural Clinical and Biological Research (NIAAA DICBR), National Institutes of Health (NIH), Baltimore and Bethesda, USA

Given the heterogeneity of individuals with alcohol use disorder (AUD) and the limited number of FDA-approved pharmacotherapies, there is a critical need to study novel targets and to develop more/better medications for AUD. Alcohol is a unique drug because it not only has pharmacological actions in the periphery and in the central nervous system, but also is a source of calories, impacts metabolism, and is consumed as a palatable drink. Recently, there has been a growing interest in understanding the role of gut-brain neuropeptides in AUD and testing these pathways as novel pharmacotherapeutic targets. In a series of preclinical and clinical studies, we have examined the effects of alcohol intake, by different doses, time periods, and routes of administration, on two gut-brain neuropeptides: ghrelin and glucagon-like petide-1 (GLP-1). Given the close interaction observed between alcohol and these neuropeptides, we have also started to test whether pharmacological manipulation of these system may reduce alcohol use. Ghrelin administration in humans increases alcohol self-administration and modulates brain activity during reward anticipation. Blockade of the ghrelin receptor is safe and appears to reduce cue-elicited alcohol craving. Genetic variation at the GLP-1 receptor is differentially associated with brain functional connectivity, particularly in the salience and default mode networks, in individuals with low versus high severity of alcohol use. Analysis of postmortem brain tissues shows higher GLP-1 receptor gene expression in the hippocampus and prefrontal cortex in individuals with AUD than controls. Administration of long-acting GLP-1 analogues, semaglutide and liraglutide, consistently reduces alcohol intake in rodent models, providing support for testing such medications in randomized placebo-controlled clinical trials. Collectively, existing evidence demonstrate the role of gut-brain neuropeptides, particularly ghrelin and GLP-1, their potential as novel pharmacotherapeutic targets for AUD.

Milos Milosevic

Movement As Personality Trait Indicator - What Can Kinesiology Offer to The Psychology of Individual Differences

Faculty of Physical Education and Sports Management, Singidunum University, Belgrade, Serbia
Faculty of Sport and Physical Education, University of Belgrade, Serbia
Integrated Science Association (ISA), Universal Scientific Education and Research Network (USERN), Belgrade, Serbia

The aim of this presentation is informs the scientific community about research and investigation of the relationship between motor and psychological characteristics, i.e. about examinations of different dimensions of muscle force production as a physiological correlate of personality traits as well as evaluation of the value of measuring movement properties as indicators for objective assessment of personality characteristics. Although the underlying assumption of trait theories is that numerous tendencies for behaving in a certain way can be described through a limited number of personality traits that are largely an expression of the peculiarities of the nervous system functioning, most influential personality inventories assess personality traits based on self-assessment. This practice is especially questionable when the respondents because of subjectivity or lack of ability can't give valid self-assessments themselves or in competitive situations, such are entrance exams or job interviews are not motivated to give honest answers about their insights. That is why numerous dimensions of muscle force such as maximal force, rate of the force development, endurance in force and similar are explored as potential physiological correlates of personality traits such as Aggressiveness, Extraversion, Neuroticism, Negative Valence, Openness, Positive Valence, Conscientiousness, Mental toughness, Machiavellianism, Psychopathy, Narcissism, Empathy and so on. The second line of the research refers to the possibility of estimating the pace of early cognitive development using a battery of motor tests. In this presentation, the most interesting preliminary results of all mentioned research will be presented. The potential for deeper integration of sports and psychological sciences, as well as the possible future implications of such studies for both disciplines will also be analyzed.

Paola Lopreiato

Creative Thinking: Art In Relation To The Concept Of Universe And Reality

Centre for Advanced Inquiry in Interactive Arts (CAiiA-HUB), The Planetary Collegium, University of Plymouth, Plymouth, United Kingdom

Art, what is it indeed this desire, this human practice? Why does it have such great importance in the lives of many? Is it something that directs our lives, our consciousness to a special destination? The creative act of an artist is a profound reason for being in something that still has to be investigated, the reality of a world, a world to which art belongs inexorably.
The artwork for the observers becomes the medium that enables communication with their minds. Exhibitions are the occasion for the artist to reflect, recognize and perhaps understand people's individuality in a new way, strong and unexpected.
Art is a way to close a circuit, between the rational mind and unconscious, finally enabling communication; it is from where the new consciousness of the self flows, providing an inner vision of unexplored territories.

Reza F. Saidi

Is Xenotransplantation the Future of Organ Transplantation?

Department of Surgery, SUNY Upstate Medical University, Syracuse, New York, United States

The increasing life expectancy of humans has led to a growing numbers of patients with chronic diseases and end-stage organ failure. Transplantation is an effective approach for the treatment of end-stage organ failure; however, the imbalance between organ supply and the demand for human organs is a bottleneck for clinical transplantation. Therefore, xenotransplantation might be a promising alternative approach to bridge the gap between the supply and demand of organs, tissues, and cells; however, immunological barriers are limiting factors in clinical xenotransplantation. Thanks to advances in gene-editing tools and immunosuppressive therapy as well as the prolonged xenograft survival time in pig-to-non-human primate models, clinical xenotransplantation has become more viable. In this review, we focus on the evolution and current status of xenotransplantation research, including our current understanding of the immunological mechanisms involved in xenograft rejection, genetically modified pigs used for xenotransplantation, and progress that has been made in developing pig-to-pig-to-non-human primate models. Three main types of rejection can occur after xenotransplantation, which we discuss in detail: (1) hyperacute xenograft rejection, (2) acute humoral xenograft rejection, and (3) acute cellular rejection. Furthermore, in studies on immunological rejection, genetically modified pigs have been generated to bridge cross-species molecular incompatibilities; in the last decade, most advances made in the field of xenotransplantation have resulted from the production of genetically engineered pigs; accordingly, we summarize the genetically modified pigs that are currently available for xenotransplantation. Next, we summarize the longest survival time of solid organs in preclinical models in recent years, including heart, liver, kidney, and lung xenotransplantation. Overall, we conclude that recent achievements and the accumulation of experience in xenotransplantation mean that the first-in-human clinical trial could be possible in the near future. Furthermore, we hope that xenotransplantation and various approaches will be able to collectively solve the problem of human organ shortage.

Christopher Ryan Maboloc

The Role of Indigenous Wisdom in Scientific Revolutions

Ateneo de Davao University, Visiting Professor for Global Justice, American University of Sovereign Nations

Accounts of scientific knowledge are usually Eurocentric. This includes our understanding of the natural world, how science transformed truth into meaning by experimentation to serve the goals of human society, and our view on human nature. What is overlooked is the fact that prior to the discovery of the New World, there exists indigenous systems of knowledge that inspired the natives in many parts of the world, including the Philippines, to survive for centuries despite a history of conquest and the absence of modern technology. The logic of discovery is based on a methodology that is shared by experts in the field who nurture a research culture. An anomaly results to a crisis and the latter ends up in a paradigm change. This study investigates how indigenous wisdom has developed through time. Local knowledge puts forward a profound alternative in a manner that is integrative in contrast to the detached relationship between the scientist and the object of his investigation.

Safa Baris

Convergent and divergent finding of monogenic Tregopathies and restoring by targeted therapies

Marmara University Hospital Pediatric Allergy and Immunology, Istanbul, Turkey

Lipopolysaccharide-responsive beige-like anchor protein (LRBA) deficiency and cytotoxic T-lymphocyte protein-4 (CTLA-4) insufficiency are recently described disorders that present with susceptibility to infections, autoimmunity, and lymphoproliferation. Clinical and immunological comparisons of the diseases with long-term follow-up have not been previously reported. We sought to compare the clinical and laboratory manifestations of both diseases and investigate the role of flow cytometry in predicting the genetic defect in patients with LRBA deficiency and CTLA-4 insufficiency.
Patients were evaluated clinically with laboratory assessments for lymphocyte subsets, T follicular helper cells (TFH), LRBA expression and expression of CD25, FOXP3, and CTLA4 in regulatory T cells (Tregs) at baseline and 16 hours post-stimulation.
LRBA-deficient patients (n=29) showed significantly early age of symptom onset, higher rates of pneumonia, autoimmunity, chronic diarrhea, and failure to thrive compared to CTLA-4 insufficiency (n=12). In total, 29 patients received abatacept with favorable responses and the overall survival probability was not different between transplanted versus non-transplanted patients in LRBA deficiency. Meanwhile, higher probability of survival was observed in CTLA-4-insufficient patients (P=0.04). The T-cell subsets showed more deviation to memory cells in CTLA-4-insufficiency, accompanied by low percentages of Treg and dysregulated cTFH cells response in both diseases, and the numbers of autoimmunities positively correlated with cTFH frequencies. Baseline CTLA-4 expression was significantly diminished in LRBA deficiency and CTLA-4 insufficiency, but significant induction in CTLA-4 was observed after short-term T-cell stimulation in LRBA deficiency and controls, while this elevation was less in CTLA-4 insufficiency, allowing to differentiate this disease from LRBA deficiency with high sensitivity (87.5%) and specificity (90%).
This cohort provided detailed clinical and laboratory comparisons for LRBA deficiency and CTLA-4 insufficiency. The flow cytometric approach is useful in predicting the defective gene, thus targeted sequencing can be conducted to provide rapid diagnosis and treatment for these diseases impacting the CTLA-4 pathway.

Salvatore Lorusso

My Story and The History of The Case Study Mona Lisa: The Book - Is the Louvre Mona Lisa Leonardo's Second Version?

University of Bologna Alma Mater Studiorum, Department of Cultural Heritage, Italy

The research carried out over the years on the theme of the attribution and authentication of artworks and, subsequently, on the case-study of the "Mona Lisa", a theme which is as topical as it is strongly debated, has continued with the publication of a first volume, followed by a second volume entitled: "Is the Louvre Mona Lisa Leonardo's second version?"
500 years of historical-bibliographic references were examined from publications by scholars of the humanistic and experimental sciences relating to the question posed in the title of the volume. The results show with reasonable certainty that Leonardo executed two distinct and successive paintings of the Mona Lisa with different aesthetic-visual and structural characteristics, elements which have been confirmed by means of analytical investigations as well as historical-bibliographic studies. More specifically, they relate to a first unfinished portrait of a young Lisa del Giocondo referable to a painting known as the Isleworth Mona Lisa, or Earlier Mona Lisa, and to a successive painting, the Louvre Mona Lisa, a finished portrait, in which a more advanced pictorial technique was used.

Umberto Crisanti

What Causes Mental Illness? Exploring Bronfenbrenner's Ecological Systems and The Origins of Mental Disorders

Psychotherapist and CBT Supervisor, Canterbury, UK

Translational research is the application of basic science to promote real-world awareness to improve wellbeing and mental health. Despite a high volume of research globally, the consistent rise in mental health problems is not straightforward to explain, prevent and solve. In the UK, for example, recent data from the Department of Health epidemiological surveys for England (NHS Digital, 2018), show a steady and relentless increase in mental disorders from 1999 to 2017. Epidemiological data are only descriptive of the phenomenon, and understanding the rise of mental health problems 'would require a broad [and more complex] biopsychosocial approach' (Bolton & Gillett, 2019; Engel, 1977). I therefore propose to return and review Bronfenbrenner's ecological systems as a way to track the origins of mental disorders, such as traumatic experiences, and promote functional awareness to reduce the gap between scientific research, interventions and policies.

The primary epidemiological data are mostly confined to descriptive epidemiology, focussing on the What, Who, Where and When, and are limited to speculation when it comes to the fifth W, the Why question in analytic or causal epidemiology.

will help further functional knowledge and identify barriers between theory, practice and policy, besides bridging those barriers

Translational research (TR) is the means by which the knowledge gained through basic scientific research can be implemented specifically for achieving a better quality of life. It seeks to provide a pathway for ideas to quickly reach the implementation stage. TR has now been extended to social sciences, such as applied psychology, where focused TR is underway in several areas, such as happiness, mental health and well-being, promoting positive cultural practices and intervention programmes. Translational Research and Applied Psychology in India focuses on research translated into real-world awareness programmes in various settings—corporate workplaces, educational, religious and social institutions, and rural areas—and even web-based interventions that are facilitating improvement in people's daily lives. This comprehensive overview of theoretical frameworks and programmes will help further functional knowledge and identify barriers between theory, practice and policy, besides bridging those barriers. The book is of critical importance due to the ever-increasing socio-economic differences and other related disparities that lead to ever-widening gaps in healthcare access and other such public concerns.

Ute Römling

Does looking back help us to tackle the future?

Department of Microbiology, Tumor and Cell Biology, Karolinska Institutet, Stockholm, Sweden

Biofilms are multicellular, often surface-associated, communities of autonomous cells. Their formation is the natural mode of growth of up to 80% of microorganisms living on this planet. Their tolerance against multiple environmental stresses makes biofilms refractory towards antimicrobial agents and the actions of the immune system. How did biofilm formation arise? As a hypothesis, the biofilm lifestyle has its foundation in fundamental, surface-triggered chemical reactions and energy preserving mechanisms that enabled the development of life on earth. Subsequently, prototypical biofilm formation has evolved and diversified concomitantly in composition and regulation with the expansion of prokaryotic organisms and their radiation by occupation of diverse ecological niches. This ancient origin of biofilm formation thus indicates that harnessing environmental conditions has been the rule rather than the exception in microbial life. Thus, the emergence of the association of microbes, including recent human pathogens, with higher organisms can be considered as the entry into a nutritional and stress-protecting heaven. Nevertheless, some of these basic mechanisms of biofilm formation have been surprisingly conserved to promote sustained survival in new environments. Thus, to understand the fundamentals of ancient metabolisms which are preserved until today even in evolved organisms might aid in the tackling of chronic infections.

Valentina Cauda

From Chemistry and Physics to Biology and Medicine: How Hard Sciences Can Contribute to Shape the Nanomedicine Approach Against Cancer

Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy

Nanomedicine has received tremendous attention in the last decades due to the incredible promise that it holds in treating diseases which are failed to be diagnosed or cured by conventional approaches. From a strict definition, nanomedicine is the application of nanotechnology, and in particular of nanoparticles with size range between 1 and 100 nm, to the field of medicine.
Indeed, nanomaterials possess several interesting physico-chemical features and their dimension guarantees very close interactions with biological components. In this context, nanoparticles with various compositions and morphologies have been studied so far for their application in cancer treatment, exploiting either the intrinsic cytotoxic properties of the nanomaterial or their ability to act as a carrier for traditional chemotherapeutic agents, or even for their ability to work as a reporter, leading to bioimaging of the diseased site.
It is thus clear how important is a profound knowledge of chemistry, physics and material sciences when designing a nanoparticle for efficient diagnosis and cancer treatment. On the other side, these hard sciences have to be combined with the medical needs and solid considerations of molecular and cancer biology.
Therefore, to successfully design and translate to the clinics a nanomedicine approach, a strong multidisciplinary attitude has to be implemented and many challenges to be faced, such as the biological identity of nanoparticles, their in-vivo biodistribution, biocompatibility and potential degradability, interaction with blood components or healthy tissues and possible toxicity issues, as well as the primary function of being diagnostically and therapeutically active in in-vivo and clinical setting.
All these considerations well underline the complexity of the interactions between nanoparticles and biological systems and clearly entangle the process of design, optimization and translation of innovative nanoparticles to nanomedicine.

Wojciech Krysztofiak

Set Theory, Arithmetic and Their Ontological Foundations: A New Program of Generalization of Arithmetic

University of Szczecin, Szczecin, Poland

From the time of Frege and Russell, we can view natural numbers as properties of sets. The customary view tells us that each natural number is the cardinality of certain finite sets. Zero is the cardinality of the empty set, one - the cardinality of one-element sets, two - two-element sets, etc. In this perspective, natural numbers are classes of abstraction of the relation of equinumerosity of sets. This view is based, however, on an idealized interpretation of sets and their elements, which is expressed in the standard notation of set theory, namely in the grammatical shape of elementary propositions referring towards basic set-theoretic states of affairs consisting in that some element belongs to a given set.

In Lotfi Zadeh's fuzzy set theory, membership of an element in a set is described by a characteristic function that takes values from the range of real numbers (0, 1). In this way, belonging of an element to any set is always realized to some degree.

The second direction of generalizing the standard version of set theory is that the same element may belong to a given set many times, not just once. In this way, it is possible to talk about the number of times the element belongs to a given set.

The third direction of generalization of set theory is simple in its technical dimension. It is enough to reject the foundation axiom of set theory. In this way, we obtain a description of the domain of hyper-sets for which the belonging relation is tangled. For well-founded sets, the degree of entanglement is zero. In the case of non-well-founded founded sets, the degree of entanglement can be even infinite.

Thus, we have three parameters of the relation of belonging to a set: the degree of belonging, the number of times the element belongs to the set, and the degree of entanglement of the set. The relation has three indices. Each element belongs to some degree and n times to a given set with a certain degree of entanglement. How to understand the cardinality of the sets in such a situation? If such a cardinality can be constructed, then it will have a non-diophantine character.

Brian Cantor

Multicomponent High-Entropy Cantor alloys

Department of Materials, University of Oxford; and Research Professor at Brunel Centre for Advanced Solidification Technology (BCAST), Brunel University, United Kingdom

All human advances have depended on making new materials, and all materials are alloys, i.e. mixtures of several different starting materials or components. So, the history of the human race has been the continued invention of new materials by discovering new alloys. Recently a new way of doing this, by manufacturing multicomponent high-entropy alloys, has shown that the total number of possible materials is enormous, even more than the number of atoms in the galaxy, so we have lots of wonderful new materials yet to find. And multicomponent phase space contains a surprisingly large number of extended solid solutions. The first group of these that was discovered are called Cantor alloys, an enormous composition range with a single-phase fcc structure, based loosely on the original equiatomic five-component Cantor alloy CrMnFeCoNi. This talk will discuss the previous history of alloying, the discovery of multicomponent alloys, the structure of multicomponent phase space, the fundamental thermodynamics of multicomponent solid solutions such as the Cantor alloys, the complexity of local atomic and nanoscale configurations in such materials, the effect of this on properties such as atomic diffusion, dislocation slip, and the resulting outstanding mechanical properties and potential applications, including at low and high temperatures, for corrosion and radiation resistance, and to enhance recycling and re-use.

Delfín Ortega-Sánchez

Temporal conceptions of the social and personal future in Spanish high school students

Department of Specific Didactics, Faculty of Education, University of Burgos, Burgos, Spain

The imagination of more democratic and sustainable futures represents one of the bases for activating the acquisition of competencies in democratic culture. However, the inclusion of the imaginative dimension, linked to the imagination of desirable democratic futures, in the documents generated by public and curricular policies is secondary. The educational approach of this time variable leads to the assumption of greater levels of responsibility and social connection in students and, consequently, to the increase of a more solid belief in their leading role in the generation of the future. In the absence of empirical precedents on the existence of a possible relationship between temporal conceptions of the social future and representations of the personal future in the field of social studies education, this study analyzes the relationship between both dimensions in students in the fourth year of secondary education (n = 252), from three schools in northern and southern Spain. From a descriptive, predictive-correlational and relational design, based on the comparison of groups, the results obtained report the existence of significant positive correlations, high effect sizes and optimal statistical power between the ways in which students conceive the social future (evaluation of the history of humanity) and their own personal future (experiences and experiences). They also show the existence of statistically differential proportions between both conceptions, less optimistic and progressive when thinking about the future of society. These results show the need to rethink the temporal concept of social future, in close connection with the development and acquisition of historical-temporal awareness skills and with the construction of personal futures (past-future relationships), as the core of the purposes of social science teaching.

Hadi Shafiee

AI-Engineered smartphone-enabled diagnostics and frameworks with applications in infectious diseases and infertility

Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

The advancements in nanotechnologies, computer programming particularly machine learning, and consumer electronics such as smartphones have allowed the development of accurate, affordable mobile health diagnostics for disease detection, treatment monitoring, or treatment planning at the point-of-care. In this talk, Dr. Shafiee will showcase some of the work done by his team on the development of AI-engineered smartphone-enabled devices and software to address unmet clinical needs particularly in infectious diseases and infertility management including: (i) AI-enabled, smartphone-based nanoparticle optical systems for point-of-care viral diagnostics; (ii) smartphone-enabled bioassays for male infertility screening through deep learning-based sperm image analysis; (iii) smartphone-enabled salivary bioassay for ovulation prediction through deep learning-based saliva ferning image processing; (iv) embryo assessment and selection using deep learning; and (v) adaptive adversarial neural networks for the analysis of lossy and domain-shifted medical image datasets.

Hans Ochs

How a clinical observation made by an astute Pediatrician 85 years ago started the journey of the Wiskott-Aldrich syndrome (WAS) and fascinated generations of physician-scientists

Department of Pediatrics, University of Washington School of Medicine, and Seattle Children's Research Institute, Seattle, USA

In 1937, Alfred Wiskott, a pediatrician with interest in pulmonary diseases, observed 3 brothers, but not their sisters, who presented shortly after birth with micro-thrombocytopenia, bloody diarrhea, eczema, and recurrent ear infections. Based on these findings, he clearly differentiated this syndrome from "Morbus Werlhofii", the German synonym for ITP, by emphasizing that the new entity is familial and congenital. Wiskott published his observation as sole author in a 4-page article in a German Pediatric Journal – and then forgot about it, as everybody else did. It took 17 years for another pediatrician, Bob Aldrich, to rediscover the syndrome when he came upon a family with 6 generations of affected males who all had died in infancy with similar symptoms, demonstrating X-linked inheritance. Although both, Wiskott and Aldrich, noticed increased incidence of infections, it took 14 more years, until, in 1968, Max Cooper classified WAS as an "immunologic deficiency disease". The availability of effective antimicrobials increased life expectancy of these patients into teenage years, revealing additional comorbidities, malignancies and autoimmune disorders. To correct the micro-thrombocytopenia, splenectomy was explored in the 1980ies, demonstrating marked increase in platelet counts and size, but a high mortality rate due to sepsis if not kept on continuous antibiotic prophylaxis. The discovery of immune deficiency as part of the syndrome paved the way to attempt a permanent cure for WAS, using allogeneic hematopoietic stem cell transplantation as early as 1968. Over the years, the procedure has become successful with survival rates of >90%. The discovery, in 1994, of the gene responsible for WAS facilitated the diagnosis of WAS, allowed genotype-phenotype correlation, led to the identification of WAS-like syndromes, such as WIP deficiency, and paved the way for gene therapy, using lentiviral vectors, and may well demonstrate the safety and efficacy of gene correction with CRISPR-Cas9. The man who recognized WAS with the trained eyes of a clinician made these remarks during a hematology meeting in 1964: "I agreed to the invitation by the chairman to talk about WAS with some hesitation. For once, I do not want to cause the impression that I put myself into the limelight as the discoverer of the disease…" Little did Wiskott know at the time what a fascinating scientific adventure he started and that the disease, lethal when he discovered it, is now curable, and continues to fascinate clinicians and biomedical researchers.

Matthias Georg Von Herrath

The winner's curse - or how positivity bias undermines the scientific method

Diabetes Center at La Jolla Institute for Allergy and Immunology, San Diego, USA

Positivity bias prevalent in scientific publications, combined with often small, underpowered studies can lead to significant confirmation bias, reminiscent of the economic term the 'winner's curse'. The consequence is that we, as a community, convince ourselves of a putative scientific truth that deviates from the actual scientific truth. Following the scientific method should be free of such bias, but requires adequate resources and must be free of political interference, so that all people can profit from the gifts that new scientific insights can offer us. We will discuss the prevalent problem and offer thoughts around potential solutions, to improve the existing scientific enterprise.

Seyed Moein Moghimi

Intravenously Injected NanoLigand Carriers Efficiently and Safely Deliver Nucleic Acis Medicines to Brain Parenchymal Cells

Newcastle University, Newcastle upon Tyne NE1 7RU, UK; Translational and Clinical Research Institute

The brain microvasculature is a complex diffusion barrier formed of tightly bound endothelial cells in contact with pericytes, microglial cells, and astrocytic end-feet. This barrier, commonly known as the blood-brain barrier (BBB), selectively excludes most blood-borne substances from entering the brain and accounts for failure of a large number of promising neurotherapeutics to manage and treat central nervous system (CNS) diseases and disorders. Numerous approaches for active targeting of the BBB with nanoparticulate drug carriers have been reported, but the biological performance of these systems has been below par to justify pharmaceutical developments. Complex design (with poor pharmaceutical attributes), late and poor target recognition, low frequency of crossing BBB and poor ability to subsequently target parenchymal cells (e.g., neurons and microglia cells) are among key challenges repeatedly facing such initiatives. In contrast to intravenous administration, the intrathecal route of delivery has become an alternative option, at least, for delivery of nucleic acid medicines to the CNS, exemplified by recent approval of Spinraza™ for treatment of spinal muscular atrophy. However, direct administration into the cerebrospinal fluid is not without risks and may not necessarily amenable to broader therapeutics and patient demographic. Considering these challenges, we are in need of simple, viable and better initiatives for global drug delivery to the brain through minimally invasive routes of administration, and without compromising the integrity of the BBB. To address this, recent work from my laboratory has introduced a versatile multifunctional platform for active targeting of the BBB and beyond.

The phage display technology is widely used for identification and isolation of peptides that bind to a particular target with high affinity and specificity. From a brain-specific phage-derived peptide we designed a phage mimetic that rapidly targets the BBB and brain parenchymal cells on intravenous injection. Phage mimetic (also termed NanoLigand Carriers, NLCs) is selfassemblies of phage display peptides that engage their targets through a hierarchical presentation of display peptides (e.g., as in protofilaments). On intravenous injection, NLCs reach the brain in substantial quantities without disrupting the integrity and functionality of the BBB. NLCs accommodate a wide range of guest molecules and targets two cellular receptors. On reaching the brain-parenchyma, NLCs carrying therapeutic nucleic acids engage with microglial cells and neurons, exerting unprecedented pharmacological effects without inducing inflammation and metabolic perturbations. NLCs therefore overcome previous limitations in active targeting with nanoparticulate drug carriers, including those decorated with phage display peptides.

Pablo Artal

Adaptive optics for vision

Laboratorio de Óptica, Universidad de Murcia, Campus de Espinardo, Murcia, Spain

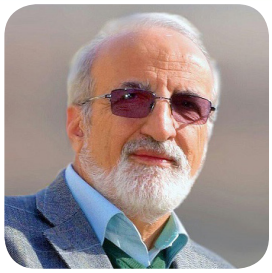
The human eye is a simple optical system but well adapted to the requirements of our visual system. A better optical knowledge has allowed to develop new technological solutions to improve vision. In this lecture, I will review the use of adaptive optics (AO) technologies that permitted to see the retina with high resolution and also to develop new instruments for visual testing and simulations. I will also present several recent results obtained in my laboratory, including the optimization of presbyopic corrections by using AO.

Paulo Roberto Bueno

From Quantum to Biology: Can Quantum Mechanics Explain Respiration?

Institute of Chemistry, coordinator of the Nanobionics Research Group, São Paulo State University, UNESP, São Paulo, Brazil

The understanding of electron transfer and transport is related to a vast array of energy capture, sensor, data storage and electronic technologies. For instance, examinations of energy storage and charge transfer at the molecular scale underpin fundamental developments in electronics and energy conversion (solar cells) and storage (batteries and supercapacitors) devices. In this seminar it is presented a quantum mechanical viewpoint of the electron transfer and transport at the atomic and molecular scale and it is discussed how this quantum mechanical knowledge can underpin our understanding of the long-range transport path of electrons in biology, which constitutes a critical mechanism for understanding respiration processes. The seminar considers how the fundamental quantum mechanics associated with charge transport and storage, exemplified from molecular films to biological cells, are fundamentally able of not explaining nanoscale electronics and redox switches sensing interfaces but also comprises phenomena involving the respiration of biological films over man-made electrodes.



Reza Malekzadeh

Healthy Longevity: Preventing Premature Death in low and Middle Income Countries

Digestive Disease Research Institute, Tehran University of Medical Sciences, Tehran, Iran

Prevention of Premature deaths (death before 70 years of age) is one of the United Nation's sustainable development goals (U.N SDG) for 2030. The burden of premature mortality is particularly high in the low/middle-income countries (LMICs); over 80% of these premature deaths occur in the LMICs. Economic losses associated with premature deaths in LMICs is expected to increase to about US$7trillion by 2030.The Aim of this presentation is to discuss a feasible and cost effective strategy for healthy longevity by extend life expectancy and avoiding disability and premature death.

Golestan Cohort Study (GCS) data with 50,000 participants and more than 10 years' prospective follow up in northeastern Iran were used to find the main causes of premature mortality and its associated risk factors. We also used the result of PolyIran trial a cluster randomized pragmatic trial nested in GCS to estimate the efficacy of fixed Dose Combination Therapies with aspirin (Polypill) in Primary cardiovascular (CVD) Prevention which was the most common etiology for premature death in GCS.

The mean age (SD) of participants at baseline was 52 years. Fifty-eight per cent were women, 74.4% were Turkmen, 79.9% lived in rural areas, 87.8% were married and 70.2% had no formal education. Of the 50045 cohort participants, 47547 (95.0%) were younger than 70 years old, potentially at risk of premature death. The follow-up duration up to age 70 years was 444168 person-years (median 10, and maximum 14.2 years). During the follow-up, 6347 of the cohort
participants died and 439 were lost to follow-up. Ischemic heart disease was the leading cause of death in all age categories. Stroke was the second cause
of death except for deaths that occurred younger than 50, for which road injury was the second cause of death. During the 60 months follow up, in PolyIran trial the number of CVD events was 301 in control group and 202 in polypill group. The result suggested a 57% and 34% decrease in the risk of CVD events in polypill group with high adherence (taking more than 70% of tablets during 60 months follow up) and average adherence respectively. In Addition to adherence the effects of Polypill was related the duration of polypill use 34% during 24-39 months and 53% after 40-60 of follow up. The frequencies of adverse events (peptic ulcer, GI bleeding hemorrhagic stroke) were comparable and there was no significant difference between the Polypill and control group.

Polypill with aspirin are a widely applicable low cost approach that will substantially reduce premature death from CVD and avoid between 5 to 10 million premature deaths from CVD events each year. It can also assist in reaching U.N. SDG goal to reduce premature deaths from NCDs by 1/3 by 2030.

Ricardo Vinuesa

Modeling and controlling turbulent flows through deep learning

KTH Engineering Mechanics, Stockholm, Sweden

The advent of new powerful deep neural networks (DNNs) has fostered their application in a wide range of research areas, including more recently in fluid mechanics. In this presentation, we will cover some of the fundamentals of deep learning applied to computational fluid dynamics (CFD). Furthermore, we explore the capabilities of DNNs to perform various predictions in turbulent flows: we will use convolutional neural networks (CNNs) for non-intrusive sensing, i.e. to predict the flow in a turbulent open channel based on quantities measured at the wall. We show that it is possible to obtain very good flow predictions, outperforming traditional linear models, and we showcase the potential of transfer learning between friction Reynolds numbers of 180 and 550. We also discuss other modelling methods based on autoencoders (AEs) and generative adversarial networks (GANs), and we present results of deep-reinforcement-learning-based flow control.

Surapati Pramanik

Multi-Attribute Group Decision Making based on CRITIC-EDAS Strategy using Geometric Aggregation Operator in Pentapartitioned Neutrosophic Set Environment

Nandalal Ghosh B.T. College, West Bengal, India

In this paper, Multi-Attribute Group Decision-Making (MAGDM) methodology is developed based on Criteria Importance Through Inter Criteria Correlation (CRITIC) and EDAS strategy under the Pentapartitioned Neutrosophic Set (PNS) environment. This paper is unique in the literature because it is the first attempt to combine CRITIC and EDAS strategies in the PNS environment. The present work consists of three parts. In the first part, CRITIC strategy is used to calculate attribute weights. The second part uses these attribute weights and EDAS strategy is developed in the PNS environment. In the third part, an illustrative example of a commerce student career selection problem is solved using the developed strategy.

Rossella Castagna

Design of photo switchable ligands to allow the optical control of biological activity

Latvian Institute of Organic Synthesis (LIOS), Aizkraukles 21, Riga 1006, Latvia
Institute for Bioengineering of Catalonia (IBEC), Barcelona Institute for Science and Technology (BIST), Carrer de Baldiri Reixac 15-21, 08028 Barcelona, Spain

In contrast to other tools for the control biological processes, light does not cause contamination of the studied object, has low or negligible toxicity at long wavelengths and can be delivered with very high spatial and temporal precision The possibility to spatiotemporally control biological activity with light-regulated drugs is a powerful capacity of photopharmacology. This emerging field of pharmacology allows mimicking the complex activity patterns of cell-to-cell communication thanks to the use of photoswitchable drugs and controlled light stimulation. To date, photopharmacology has been extensively used to manipulate biological activity at the cellular level by targeting ion channels, G protein-coupled receptors, enzymes and protein-protein interactions. One of the major advancements in photopharmacology would be to develop drugs that can be photoswitched using low energy light, which is less scattered in tissue and can penetrate deeper in the body. To this end, a molecular structure should be designed to ensure photoconversion by red or infrared light. Here, we discuss the rational design of photoswitchable drugs and we present the molecular design of a novel γ-aminobutyric acid type A receptors (GABAARs) ligand derivative. DASA-barbital displays photochromic properties with red light and we discuss its chemical as well as its photoisomerization and photopharmacological properties.

Sudhir Gupta

Members of Immunoregulatory Lymphocyte Club-Old and New

University of California, Irvine, California, USA

In 1982, Damle and Gupta reported immune suppressor activity in both CD4+ and CD8+ T cells. Thirteen years later in 1995, Sakaguchi and colleagues further defined a CD25+ subsets of CD4 T cells with regulatory activity and coined the term Treg cells. In 2003, Tregs were further defined by the presence of transcription factor FoxP3. Since then, a role of CD4 T regulatory cells in peripheral tolerance and in the pathogenesis of murine model and human autoimmune diseases has been well established. Recently, a number of additional regulatory lymphocytes have been added to the club. They include CD8 T regulatory (CD8 Tregs), B regulatory (Bregs), T follicular helper regulatory (TFR) cells, and plasma cells with regulatory activity. There are accumulating data to suggest their roles in both human and experimental models of autoimmune diseases. We have performed extensive studies of CD8 Tregs in health and diseases. The phenotypic characterization and mechanisms of immunoregulation of newly discovered or re-discovered (in case of CD8 Treg) regulatory lymphocyte are evolving, which will be covered in this presentation.

Manoj Gupta

The Urgent Need to Use Magnesium Based Materials for Enhancing Health of Planet Earth and its Inhabitants

Department and Director designate of Materials Science and Engineering Initiative at NUS, Singapore

The current threat to planet earth and its inhabitants is the global warming and increasing levels of pollutions (land, water, air, noise and electromagnetic). Further, there is a pursuit to use sustainable and green materials and technologies to minimize eco-anxiety. From this context, magnesium fits the bill as it is one of the most commonly available non-toxic metallic material in earth crust, sea water and human body (fourth most abundant cation). Added advantages of magnesium include its low density (~33% lighter than aluminum, ~50% lighter than titanium and ~75% lighter than steels), low melting point, easy fabricability, good machinability, good specific modulus and strength (comparable to aluminum, steels and titanium), good damping capability and good electromagnetic shielding capability. These attributes make magnesium based materials extremely suitable for weight critical applications in a wide span of industries particularly for reducing fossil fuel consumption that contribute to global warming. The density, elastic modulus, strength and biocompatibility makes magnesium and its alloys an ideal choice to serve as temporary implants particularly in orthopedic fixation without the need for revision surgery thus avoiding patient's trauma and reducing healing time, medical cost and doctor's time. To note that magnesium is commonly used as supplement for many physiological functions and has medicinal value such as for tinnitus. Accordingly, the present paper/presentation will aim to highlight the multiple capabilities of magnesium, an element which can be regarded as 'God's Own Favorite Metallic Element' and has a wide scope in both engineering and biomedical sectors.

Mohammad Mahdi Hasani-Sadrabadi

Immunomodulatory Biomaterials for Treatment and Regeneration

Department of Bioengineering, Henry Samueli School of Engineering, University of California, Los Angeles, USA

T-cell immunotherapy is a promising approach for cancer, infection, and autoimmune diseases. Deaths from solid tumors outnumber deaths from hematopoietic cancers. Yet progress in immunotherapies for solid tumors is well behind those for hematopoietic cancers. I will discuss various bioengineering strategies to improve ex vivo and in vivo immunotherapies for solid tumors by utilizing next generation biomaterials and drug delivery systems. In this talk, I will discuss our approaches on how to design biomaterials with various form factors from nano and microparticles to hydrogels and scaffolds in order to augment T-cell response to improve cancer immunotherapies. I am going to discuss antitumor response in several tumor models in mice and describe the path toward human clinical trials.

Andrea Cossarizza

Immune Control of Spillover and Zoonosis: The Lesson of COVID-19

University of Modena and Reggio Emilia, Modena, Italy

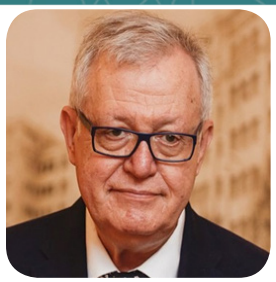
In the last two and a half years we have witnessed a phenomenon that was unthinkable until a few years ago, namely the spread of zoonosis caused by a virus such as SARS-CoV-2 that is normally hosted by bats, and that have been transmitted to humans by a second host, most likely the pangolin. Starting from Wuhan, China, this virus has rapidly invaded our planet, caused millions of deaths and has changed our behavior in radical ways. A question that many have asked ourselves, however, concerned not so much why this zoonosis occurred, but why it happened so late. Deforestation, climate change and the dramatic use of non-renewable fuels have in fact brought too close many animal species residing in well-separated environments. As a result, the passage of microorganisms from one species to another is an inevitable phenomenon, that in this case had caused dramatic consequences. We have learned very soon that the disease can have a number of different manifestations, from the complete lack of symptoms to death, and that the immune response can cause a hyperinflammation that can be fatal to the host. The disease named COVID-19 involves first of all respiratory manifestations, but also other systems can be affected, and acute disease is often followed by protracted complications, defined long COVID – or post-acute COVID syndrome. However, our scientific knowledge has allowed us to develop extremely quickly a series of effective vaccines which are capable, if not of preventing infection, of blocking the onset of severe disease. Starting from zoonosis that occurred in the past and that are still affecting our species (for example, HIV/AIDS), I will discuss different mechanisms that underpin the manifestations of COVID-19, with a consideration of the similarities and differences between the immune response against COVID-19 and that related to other infections, paying a particular attention to the host response to SARS-CoV-2 at the humoral and cellular levels.

Amirhossein Takian

2022: The International Year of Basic Sciences and its role for Sustainable Development

Global Health and Public Policy, Tehran University of Medical Sciences, Tehran, Iran

The 76th session of the United Nations General Assembly proclaimed 2022 the International Year of Basic Sciences for Sustainable Development. This is to emphasize the applications of basic sciences as vital for advances in medicine, industry, agriculture, water resources, energy planning, environment, communications and culture. Basic sciences are the backbone to bridge the gap between technologies and proper response to human needs. In this regard, health literacy is a crucial requirement for a healthy population. This talk will elaborate the status of health literacy and the overarching mechanisms to enhance utilization of basic science for improving access to information, increasing societal well-being, and promoting peace through improved partnership toward sustainable health development.



Massimo Capaccioli

What is Next in Astrophysics and Cosmology?

Faculty of Sciences of the University of Naples Federico II, Naples, Italy

Shuji Ogino

Interdisciplinary Science is Needed to Solve Complex Problems of Human Beings

Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, USA

Ashkan Mowla

Artificial Intelligence in the Management of Cerebrovascular Diseases

Department of Neurological Surgery, Keck School of Medicine, University of Southern California (USC), Los Angeles, USA

Jan Nouwen

Planetary Health: a MUST in Medical Education

Erasmus MC, Rotterdam (Erasmus MC), The Netherlands

Genxing Pan

Shifting from pedology to soil system science

Department of Soil Science, Nanjing Agricultural University, Weigang, Nanjing, Jiangsu, China

Derya Yilmaz

Last Call for Archaeology: Integrated Science for Humanity

Ankara University, Department of Archaeology, Ankara, Turkey

Ajeet Kaushik

Manipulative Nano-Biotechnology for Personalized Health Wellness

Department of Environmental Engineering, Florida Polytechnic University, Lakeland, USA

Jiu-Yao Wang

The Role of Multi-omics Study in the Prevention and Treatment of Allergic Disorder in Children

China Medical University Children's Hospital (CMUCH), Center of Allergy, Immunology and Microbiome (AIM Center), Taichung City, Taiwan

Gary Darmstadt

Importance of Understanding Mindsets and Local Context when Introducing New Health Interventions

Department of Pediatrics, Stanford University School of Medicine, Stanford, California, USA

Constantinos Vayenas

Light, Matter and Neutrinos

Department of Chemical Engineering, University of Patras, Patras, Greece

Stavros Baloyannis

Anaxagoras on Mind

Professor Emeritus at Aristotelian University, Thessaloniki, Greece

Kenneth Kosik

The Use of Brain Organoids for Understanding Alzheimer Pathogenesis

Neuroscience Research Institute and Department of Molecular Cellular and Developmental Biology, University of California, Santa Barbara, CA, USA

Laureates Talk

Fabien Lotte

BrainConquest: Boosting Brain-Computer Communication with high Quality User Training, for Healthy and Motor-Impaired Users alike

Research Director, National Institute for Research in Computer Science and Control (INRIA) Bordeaux Sud-Ouest, Bordeaux, France

Brain-Computer Interfaces (BCIs) are communication systems that enable users to send commands to computers through brain signals (typically measured by ElectroEncephaloGraphy or EEG) only, by measuring and processing these signals. Making computer control possible without any physical activity, BCIs have promised to revolutionize many application areas, notably assistive technologies, e.g., for wheelchair control, and man-machine interaction. Despite this promising potential, BCIs are still barely used outside laboratories, due to their current poor reliability. For instance, BCIs only using two imagined hand movements as mental commands decode, on average, less than 80% of these commands correctly, while 10 to 30% of users cannot control a BCI at all.

A BCI should be considered a co-adaptive communication system: its users learn to encode commands in their brain signals (with mental imagery) that the machine learns to decode using signal processing. Most research efforts so far have been dedicated to decoding the commands. However, BCI control is a skill that users have to learn too. Unfortunately, how BCI users learn to encode the commands is essential but is barely studied, i.e., fundamental knowledge about how users learn BCI control is lacking. Moreover, standard training approaches are only based on heuristics, without satisfying human learning principles. Thus, poor BCI reliability is probably largely due to highly suboptimal user training. In order to obtain a truly reliable BCI we need to completely redefine user training approaches. To do so, my project proposes to study, understand and model how users learn to encode BCI commands, and which factors do influence this learning. We are doing so in a multidisciplinary approach, combining computer science (machine learning, signal processing, computational modeling, human-computer interaction), with cognitive science (health, human factors and user training). Then, based on human learning principles and our models, my project proposes to create a new generation of BCIs, based on optimal user-adapted BCI design and training, which ensures that users learn how to successfully encode commands with high signal-to-noise ratio in their brain signals, hence making BCIs dramatically more reliable. Such a reliable BCI could positively change man-machine interaction as BCIs have promised but failed to do so far.

Mirjana Dimitrievska

SMARTCELL - Sustainable Materials for development of Advanced Renewable Technologies for the next generation solar CELLs

Group Leader at EMPA (Swiss Federal Laboratories for Materials Science and Technology), Dubendorf, Switzerland

Solar photovoltaics (PV) is a leading candidate for the renewable, carbon-free electricity generation with both the scalability and technological maturity to meet the ever-growing global demand for clean energy. While silicon currently dominates the market, it cannot keep pace with our ever more creative and ambitious imagined future of thin, flexible, invisible solar technologies for everything from zero-energy buildings to smart sensors for the Internet of Things to e-textiles for device charging on-the-go. The market needs an innovative alternative, one that is not only commercially competitive, but also in line with social values of sustainability, circularity and responsibility.
SMARTCELL aims at developing sustainable and renewable materials for ultrathin, flexible, and transparent solar cells, which can be used for everything from zero-energy buildings to smart sensors for the Internet-of-Things. SMARTCELL proposes an innovative PV technology based on zinc phosphide (Zn3P2), an earth-abundant, low-cost, direct bandgap semiconductor for development of novel ultra-thin solar cells. SMARTCELL will implement novel technological solutions based on advanced nanofabrication methods for synthesis of high crystal quality zinc phosphide, which together with design and optimization of the device interfaces and the cell architecture will lead to achievement of a challenging increase in the device efficiency of up to 15 % at the cell level. These efficiencies will allow initiating the transfer of zinc phosphide based solar cells to pre-industrial stages and give SMARTCELL the opportunity to demonstrate scalable, cost-effective, and environmentally-friendly ultrathin-film PV technology. The working principle of SMARTCELL is based on a holistic interplay between first-principle calculations, synthesis conditions, and atomic-resolution structural and electronic characterization techniques, which will allow cutting-edge engineering of absorber properties, as well as the design of the solar cell architectures. Moreover, an integrated, flexible methodology will keep this target breakthrough in sight. Finally, SMARTCELL has the potential to make a key science-based contribution to energy security, as well as improved societal perception of green energy production.

Sara De Biasi

Unravelling the role of MHC class I–related molecule–restricted T cells in solid tumor

Department of Medical and Surgical Sciences for Children and Adults, University of Modena and Reggio Emilia, Modena, Italy

The possibility of re-directing the host immune system against tumor cells is the rationale behind immunotherapy which has largely focused on the local T cell activation by checkpoint blockade inhibitors. Circulating mucosal associate invariant T (MAIT) cells are a pro-inflammatory and cytotoxic population within effector memory T cells and can represent up to 10% of peripheral CD8+ T cells. They recognize microbial proteins presented by non-polymorphic MHC class I relatedmolecule (MR1) and display homing properties, as they express different homing and cytokine receptors. Furthermore, MAIT cells are deeply involved in patrolling mucosae and orchestrating the immune response in this environment. Recently, a rare population of MR1-restricted T cells belonging to the family of MAIT cells (defined "MR1" T cells) has been described as a rare population capable to respond, beside microbial antigens, to a variety of tumor cells of different tissue origin (1, 2). Controversial data exist regarding the role of MAIT cells in cancer (3). Recently, we showed that circulating MAIT cells identify metastatic melanoma patients responding to anti-PD1 therapy (4).
Based on our recently published data (4), the hypothesis is that the percentage of MAIT/MR1 T cells is a prognostic marker for successful of anti-PD1 therapy in metastatic melanoma patients and that the therapy can induce a migration of these cells into the tumor lesions and tumor lesions. Given this hypothesis is correct MAIT cells could be targeted in vivo to selectively activate or inhibit their functions within the tumor microenvironment. This strategy of treatment could provide a means to increase MAIT cell numbers or be used to modulate the function of activated MAIT cells in the vicinity of the tumor microenvironment.
The main aim of the study is to decipher MAIT/MR1 T cell identity, function and role in solid cancer, such non-small cell lung cancer (NSCLC) and dissect how to make patients more sensitive to immunotherapy by increasing the proportion of this cell population.
We will expect to: i) In-depth characterize the MAIT/MR1 T cell population in solid tumors; ii) determine the role of MAIT/MR1 T cells solid tumors; iii) identify new MAIT/MR1 T cells-related parameters associated with the clinical outcome of patients; iv) propose a personalized therapeutic strategy for patients.
If MAIT/MR1 T cell would display the ability to control cancer, the in vitro expansion of this population represents a promising potential for cell therapy approaches in several malignancies.
Last but not least, the screening for MAIT/MR1 T cell frequency will be a useful biomarker for response to therapy which will facilitate patient selection for treatment thereby limiting unnecessary treatment related toxicities.

Joseph Firth

Using Lifestyle Medicine in Youth Mental Healthcare: Protecting physical and mental health in young people

Greater Manchester Mental Health NHS Foundation Trust, Manchester Health Science Center, Manchester, UK

Across the entire field of medicine, it has long been accepted that various "lifestyle factors" (such as physical activity, nutrition, sleep and smoking) have a substantial impact upon our physical health. Now, as growing rates of mental illness are quickly becoming a global health priority, there is a renewed interest among researchers, clinicians and the general public alike into how these same "lifestyle factors" may also be beneficial for mental health. In particular, there is an increasingly large scientific and clinical interest into how exercise, diet and may be used to (i) reduce the risk of developing mental illness, and (ii) improve recovery and outcomes in those with diagnosed conditions. However, the actual evidence for using these lifestyle factors in the prevention and treatment of mental illness is unclear, but quickly evolving. Therefore, this presentation will provide an overview of work I have been conducting over the last 5 years to advance understanding of "lifestyle psychiatry". Within this, the presentation will summarise the top-tier evidence for the role of physical activity, diet, smoking and sleep interventions, in the prevention and treatment of a broad spectrum of mental health conditions, including depression, anxiety, bipolar and psychotic disorders, and ADHD. Following this, our latest discoveries and international guidelines around how "lifestyle psychiatry" can be implemented in the real world, in order to improve physical and mental health outcomes in people affected by mental illness, will be presented. Finally, the presentation will conclude with a summary of my ongoing research in this field, describing how we are now using smartphones, wearables, and digital technologies to developed new methods for delivering lifestyle intervention, at scale, to improve mental healthcare for young people in future.

Jianing Fu

Functional profile, migration pattern and microenvironment of human hematopoietic stem and progenitor cells in ectopic organs in physiological and inflammatory conditions

Columbia Center for Translational Immunology, Department of Medicine, Columbia University, New York, USA

It is generally believed that bone marrow (BM) is the primary site of hematopoiesis and hematopoietic stem cell (HSC) maintenance postnatally, and this niche can shift to extramedullary sites in response to hematopoietic stress, usually in association with pathologic processes, such as myelofibrosis, inflammation, and infection. However, little is known about the hematopoietic niche in human ectopic organ sites, such as the gut and lung, both of which are complex organs comprised of multiple different cell types and enriched for lymphoid mass. Previous studies identified the murine lungs as a primary site of terminal platelet production and an organ with considerable hematopoietic potential. Our recent publication demonstrated that human intestine contains HSPCs with multilineage potentiality, similar to BM HSPCs. Our data suggest they actively contribute to hematopoiesis after transplant and migrate to the recipient BM. Preliminary multiplex IHC data suggest that intestinal HSPCs may reside in the lamina propria layer of the gut mucosa around the crypts or at the villous tips close to the epithelium. Our proposed study will provide the opportunity to extend these findings to human lungs as we have demonstrated the presence of HSPCs in human lungs in our preliminary work. Defining the microenvironment and functional profile of human HSPCs in both hematopoietic system (BM) and ectopic organ sites (gut and lung) under physiological conditions provides the opportunity to answer whether human gut and lung HSCs are quiescent or contribute to hematopoiesis under homeostatic conditions, and further understand how they regulate hematopoiesis. Our proposed study is likely to make significant contributions to the stem cell field by providing insights into the functioning HSPCs at human ectopic organ sites under physiological and inflammatory (after organ transplantation) conditions.

Congress Special Panels

Jan Treur

Modelling Synchrony and Behavioral Adaptively in Brain, Body and Social World: An Integrative AI Approach

Artificial Intelligence, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Jan Treur has been a full professor of AI since 1990 and is a well-recognized expert on the area of multidisciplinary human-like AI-modeling. He has published over 700 well-cited papers about cognitive, affective, and social modeling and AI systems making use of such models. He has also supervised more than 40 Ph.D. students in these areas and from 2016 on written and edited three books on (adaptive) network-oriented AI-modeling and its application in various other disciplines. Current research addresses modeling of higher-order adaptive processes by self-modeling network models with a specific focus on mental processes based on internal mental models and their use by internal simulation, their learning or formation (including organizational learning), and the control over them. The application focus is on the development and use of shared mental models supporting the road toward a just safety culture in organizations such as hospitals.

Sophie Hendrikse

Modelling Synchrony and Behavioral Adaptively in Brain, Body and Social World: An Integrative AI Approach

Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam: Amsterdam, Netherlands

Tommaso Dorigo

Opportunities and Challenges for Society from Artificial Intelligence

First Researcher of Experimental Particle Physics, Italian Institute for Nuclear Physics (INFN), Padua, Italy

Tommaso Dorigo is an experimental particle physicist collaborating with the CMS experiment at the CERN Large Hadron Collider; he has authored over 1500 scientific publications in peer-reviewed journals (H-index over 170). Dorigo works as a First Researcher for the Italian Institute of Nuclear Physics (INFN) in Padova; he got his Ph.D. in 1999 with research on data from the CDF experiment at the Tevatron collider. He has been the Sci¬entific Coordinator (2014-2019) of AMVA4NewPhysics, a training network funded by the Horizon2020 program of the EC, as well as Scientific Coordinator (2016-2020) for accelerator-based physics in Padova. Dorigo is the Editor of two Elsevier journals (Reviews in Physics, Physics Open), and is very active in research at the crossroads of particle physics, statistics, and machine learning; in CMS he belongs to the Statistics Committee, which he chaired in 2012-2015.

Pietro Vischia

Artificial Intelligence for Fundamental Physics Research

Particle physicist (CMS at LHC) and FNRS fellow, Institut de recherche en mathématique et physique, Université catholique de Louvain, Belgium

Alice Plebe

The Promise and the Reality of Autonomous Vehicles

Department of Industrial Engineering, University of Trento, Trento, Italy

Edouard Oyallon

Interpretability of Artificial Intelligence Methods

Sorbonne University, Paris, France

USERN Junior Talks (UJTs) and Poster Presentations

Alkhatib Al Saadi

Explore the Demographic and Clinical Profile of Patients Receiving Electroconvulsive Therapy at Tertiary Care Hospital in Oman: A Cluster Analysis

Alkhatib Al Saadi
Psychiatry Residency Program, Oman Medical Speciality Board, Muscat, Sultanate of Oman

The study aimed to identify subgroups of psychiatric patients in a sample of patients admitted at a tertiary care hospital in Oman who received ECT based on their demographic and clinical outcomes.
Data from patients who received ECT at Al-Massarh hospital, Muscat, Oman, were retrospectively collected from medical records from January 2015 to December 2019. Socio-demographic characteristics, clinical profiles, and psychiatric comorbidities were examined.
A summary of 179 psychiatric patients who received ECT, 96 (53.6%) were females, and the average age at diagnosis was 42.5 years. The 2-step cluster analysis showed 70 patients in Cluster 1 (39.1%) and 109 patients in Cluster 2 (60.9%). Patients in cluster 1 are more females (61.4%), older (Mean=55.2 years), the majority were married (95.7%), and unemployed (88.6%). They reported they had comorbidities medical conditions (55.7%) and less frequent ECT use (Mean=8.7) than patients in Cluster 2. Clusters differences were found on gender (p=0.001), age (<.001), marital status (p<.001), and occupation (p=0.001). In clinical outcomes, significant differences were found in diagnosis (p<.001), had comorbidity medical conditions (p<.001), and use of ECT sessions (p=0.006).
This study showed that psychiatric patients receiving ECT are heterogeneous, with different demographic and clinical outcomes. Our study has shown that patients in Cluster 1 are older females, unemployed, with more comorbidities in medical conditions and depressive disorders but received fewer ECT sessions. This study provides important information for clinicians to identify strategies to promote the use of ECT on its effectiveness and safety issues for each group.

Keywords:
Electroconvulsive therapy; Schizophrenia; Cluster analysis; Oman

Amir Reza Mazandarani

A Journey through Time, Between the Peloponnesian War and the Ukraine War, a Historical Review of Game-Changer Events in World History Induced by Epidemics

Amir Reza Mazandarani, Leyli Shadman
Department of Pharmacoeconomics and Pharma Management, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran

We are living in a time of transition from a pandemic. Clearly, we are not the first humans to face this situation. Throughout history, epidemics have emerged and left, as well as world-changing relics being left from them occasionally. This study aims to investigate the most significant moments of epidemics that changed our world with a survey in history.
By conducting a bibliographic search, the most important historical events were collected. The period of this study begins with the first historical evidence of epidemics in 430 BC (Athens, typhoid fever)
Among various events, 9 moments were chosen as the most influential moments:
Typhoid epidemic and the Peloponnesian war, Justinian's plague and the weakening of the Byzantine Empire, the Black Death and the Renaissance, the Black Death and the decline of Islamic civilization, the American plague and the defeat of the Aztecs, the cholera pandemic and the beginning of urban sanitation, the cholera epidemic and the constitutional revolution of Iran. Polio epidemic and crossing the iron curtain, COVID-19, and the Ukraine war
These events show how epidemics can have lasting effects on the future of different societies. Assessment of these events showed that after the industrial revolution, human companionship and unity were able to help them against the spread of epidemics. But unlike victorious examples such as the conduction of the polio vaccine after the scientific competition in the cold war, COVID-19 vaccines were not such a case! However, there is still no information on how much COVID-19 will last and what the legacy of this pandemic will be for human beings; we will definitely play an important role in the impact of this pandemic on our future generations.

Keywords:
Pandemic; Epidemic; COVID-19; History

Amirhassan Dehghan Nayeri

Investigating the Causes of Infertility and New Methods in Its Diagnosis and Treatment; A Systematic Review Study

Amirhassan Dehghan Nayeri, Zeynab Zahedi, Beheshteh Shirali
1 Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran
2 USERN SEMUMS Office, Semnan University of Medical Sciences, Semnan, Iran

Infertility means the inability to conceive after one year of regular sexual intercourse without the use of contraceptives.
Assisted Reproductive Technology (ART) in all treatment methods that lead to artificial insemination with human intervention. This set includes methods of intrauterine sperm insemination, in vitro fertilization, transfer of eggs and sperm into the fallopian tubes, transfer of egg cells into the fallopian tubes, and injection of sperm into the egg. The aim of this study was to evaluate new methods in diagnosis and infertility treatment.
We systematically searched the five scientific databases, including PubMed, Cochrane, Web Of Science, Embase, and Google scholar inception until September 2022 with 4-related keywords: infertility, diagnosis, treatment, and assisted reproduction. To ensure the completeness of the search results, the sources of the articles were checked. STROBE checklist was used to check the quality of the articles.
54 articles were reviewed, and finally, 18 articles were selected that were related to the purpose of the study. According to studies the results of some studies have shown that a woman's lack of ovulation can cause infertility. Diseases such as polycystic ovary syndrome (PCOS), thyroid disease, and other hormonal disorders can affect ovulation. Reproductive technology (ART) helps to treat infertility. This includes fertility treatments that include both a female egg and a male sperm. This is done by removing the egg from a woman's body. The eggs are then mixed with sperm to produce the embryo. In vitro fertilization (IVF) is the most common and effective type of ART.
The results show that assisted reproductive therapy (ART) is a treatment for infertility, and today, by applying new techniques in infertility treatment, we can contribute to reducing infertility and thus improving family health.

Keywords:
Infertility; Diagnosis; Treatment; Assisted reproduction

Amirhossein Vakili Razlighi

Comparison Between Two Kinds of Online Educational Interventions on Knowledge-Attitude and Practice of Prosthodontists about the Role of Intra-Oral Appliances in the Management of Obstructive Sleep Apnea

Amirhossein Vakili Razlighi
School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

Obstructive sleep apnea (OSA) needs early detection and effective treatments to reduce the risk of its harmful consequences. The aim of this study was to assess the knowledge and practice of prosthodontists about OSA and oral appliances (OAs) after a period of training and comparative evaluation between two types of virtual education.

This study was a randomized clinical trial with two types of educational interventions (PowerPoint and podcast) performed among the members of the Association of Prosthodontists (dentists who are specialists in prosthodontics) in 2020. The participants answered a questionnaire that assessed their knowledge and practical actions about OSA. Data were analyzed using SPSS software and independent-sample t-test.

Group A (PowerPoint) obtained higher scores in all knowledge sections compared to group B (podcast). Totally, the mean scores of group A in the knowledge and practical sections were 77.56 ± 9.09 and 81.75 ± 12.39, respectively. In addition, the mean scores of group B in knowledge and practical sections were 74.72 ± 10.79 and 80.69 ± 14.05, respectively. The difference between the mean scores of the two groups in the knowledge and practical sections was not significant.

The virtual educational intervention had positive effects on the knowledge and practice of prosthodontists about OSA and OAs. Although the power Point was more effective than podcasts, there was not a significant difference between them.

Keywords:
Obstructive sleep apnea; Mandibular advancement; Knowledge; Distance learning; Online education

Atousa Moghadam Fard

Evaluation of Renal Complications in Hospitalized Patients with COVID-19

Atousa Moghadam Fard[1], Zeynab Yassin[2], Mahshid Talebi-Taher[2]
1 Student Research Committee, School of Medicine, Iran University of Medical Sciences, Tehran, Iran
2 Antimicrobial Resistance Research Center, Institute of Immunology and Infectious Diseases, Iran University of Medical Sciences, Tehran, Iran

Although the respiratory system is the principal target of coronavirus disease 2019, evidence has shown that COVID-19 is a multi-organ disease and can also involve the kidney. SARS-CoV-2 enters human host cells via the cellular ACE2 receptor, which is expressed in the brush border of proximal tubular cells and podocytes in the kidney. This study is performed to evaluate renal complications in patients with COVID-19.
In this observational and comparative study, the laboratory and clinical data of 584 hospitalized participants with a mean age of 64 ± 16 (39.6 % female) were collected and analyzed. None of the included participants had a history of any kind of kidney complications. We determined the severity of the disease by the stage of lung involvement.
Proteinuria, hematuria, and pyuria were found in 43.8%, 30.6%, and 15.8% of participants, which was notable. We found that the evidence of hematuria was related to the severity of the disease (P-value=0.028). Elevated creatinine serum levels and raised baseline blood urea nitrogen (BUN) were found in 41.8% and 55.9% of participants. In 16.4%, 8.9%, 5.6%, and 43.6% of participants, hyponatremia, hypokalemia, hyperkalemia, and hypermagnesemia were found. Evidence of hyperkalemia (P-value=0.001), hyponatremia (P-value=0.005), and hypermagnesemia (P-value=0.044) were associated with the severe disease. We found aging as an unfavorable prognostic factor (P-value=0.02), especially in participants more than 50 years of age (P-value=0.000). We did not find a significant association between sex and the severity of the disease.
Our findings showed that COVID-19 could involve kidneys, and kidney injury is more common and severe in critically ill patients.

Keywords:
Renal complications; COVID-19; Acute kidney injury; SARS-CoV-2

Azar Ghasemi

The Wounded Caregiver: Surgeons' Self-Compassion Fatigue

Azar Ghasemi, Masoud Sadeghi
USERN KUMS office, Kermanshah University of Medical Sciences, Kermanshah, Iran

Recently concepts like empathy and compassion have gained increasing attention in healthcare literature. There are lots of studies investigating the impact of physicians' empathy and compassion in clinical practice. These studies are mostly based on a patient-centered philosophy. But let's turn the camera this time and take a look at healthcare professionals themselves.

Resiliency at medical workplaces is not a piece of cake. You get to face permanent scientific issues, multiple ethical challenges and witness humans suffer in their utmost pain. Among doctors, Surgeons have long been described as severe, impatient, impersonal, and "mechanics" of the human body rather than "healers".

But we are here to contemplate and look carefully at all phenomena around us. Surgeons need to conduct a conversation about complicated medical issues, treatment choices, and complexities of surgical procedures, and they should allay patients' fears and build trust during short visits. On the other hand, the current technocratic and biomedical paradigm of medicine denies imperfection, privileges control, and punishes vulnerability. Mistreatment, lack of social support, poor work-life balance, and inadequate role models cause distress and, eventually, loss of self-compassion.

There are studies showing that empathy increases patient outcomes. Here we want to talk about the relationship between empathy and self-compassion. We assume that surgeons are more prone to self-compassion fatigue and that eventually leads to losing empathy. When the surgeon loses compassion for herself, she objectifies even her own self; and that is so much more likely that she objectifies her patients too. The sense of freedom of will and personal agency is often diminished or lost, and she becomes alienated from the existential-humanistic worldview.

This assumption can be investigated. We can use Kristin Neff's self-compassion scale in a sample population of surgeons and use the Jefferson scale of physician empathy to measure empathy in the same group.

Keywords:
Self-compassion; Empathy; Surgeons; Fatigue

Bushra Alkhalili

The Wounded Caregiver: Surgeons' Self-Compassion Fatigue

Bushra Alkhalili, Lamya Alkharusi, Eenas Abusin
Sultan Qaboos University Hospital, Muscat, Oman

The misoprostol medical management of missed and incomplete miscarriages emerged as a non-invasive alternative to the surgical option of Dilatation and Curettage (D&C). This study aimed to review the outcomes of misoprostol use in managing first and early second-trimester miscarriages (incomplete and missed types).
A retrospective study was conducted among admitted patients for the management of miscarriage during the period from 2016 to 2020 at Sultan Qaboos University Hospital, Muscat, Oman. The association of type of miscarriage, maternal demographics, and gestational age on the success of misoprostol was determined using the Chi-square test. Time from the last dose of misoprostol till the evacuation was studied. For some cases that required additional surgical management after misoprostol, the indication of the crossover was assessed. Data were analyzed using Statistical Package for the Social Science (SPSS) version 27.0.
Of a total of 448 included women, misoprostol was successful in the complete termination of 50.2% (225/448) of the subject. A higher misoprostol success rate was significantly associated with the followings (%; success rate): incomplete type of miscarriage (57.4%), younger women (<25 years; 58.5%), nulliparous women (59.8%), women with no previous miscarriages (61.5%), women with no previous cesarean sections: (53.5%), earlier gestational ages (5-9 weeks; 60.8%). Of the remaining patients who required additional surgical intervention, the majority were referred due to failed termination with misoprostol, followed by excessive bleeding. There was a sharp decrease in the misoprostol success rate after 24 hours from the last dose of the regimen, and the lowest success rate seen was after 72 hours from the last dose (9.1%).
Misoprostol was highly effective in reducing the need for surgical evacuation in select patients according to their demographics. Patients and Physicians should be aware of those differences when considering misoprostol as a treatment, thus, avoiding double treatment (medical then surgical). Other studies are needed to elucidate the optimal time to await full response after the last dose of misoprostol prior to offering surgical management.

Keywords:
Incomplete Miscarriage; Miscarriage; Misoprostol; Gynaecology

Fatemeh Sodeifian

Insulin Improves Reproductive Ability in Mouse Model of Aging by Restoring Ovarian Follicular Reservation

Fatemeh Sodeifian, Mohammad Amin Abdollahifar
School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Ovarian function decreases during aging due to a disorder of gonadotropin-releasing hormone (GnRH) in the hypothalamus, leading to high levels of FSH, which accelerates the aging process in the ovaries. Insulin is an anabolic hormone that has metabolic and non-metabolic effects. It also regulates energy intake, as well as lipid and glucose. Besides, it has been shown that insulin and insulin-like growth factor-1 (IGF-1) have a vital role in longevity. In this regard, we investigate the effects of insulin in the ovaries of aged mice. For this purpose, we used 36 adult female NMRI mice and kept them under standard conditions (22±2°C and 12-hour light/dark). The mice were divided into two groups of control and insulin. The insulin group was treated with insulin (dose) by oral gavage for 33 weeks, and the control group received water. At the 8, 12, and 33 weeks of treatment, six mice were selected randomly, and their ovaries were extracted for histological analysis. For the purpose of analyzing the level of gonadal hormones (progesterone, estradiol, LH, and FSH) and gene expression, the blood samples were collected from the heart of anesthetized mice. DCF absorption and GPX activity were also analyzed. According to our data, insulin could notably increase the volume of the ovary and the total number of primordial, primary, secondary, antral, and Graafian follicles. In addition, the level of progesterone, estradiol, LH, and FSH was higher compared to the control group. Furthermore, the activity of GPx and the level of Bcl2 was high in the insulin group, while the level of caspase3 and Bax were low. In conclusion, insulin may be effective in enhancing the function of ovaries in aged mice.

Keywords:
Insulin; Reproductive ability; Mouse model of aging; Ovarian follicular reservation

Fatma Al Yaqoubi

Use of Simulation in Interprofessional Team-Based Learning to Develop Teamwork Skills in Acute Emergencies for Undergraduate Medical and Nursing Students at Sultan Qaboos University

Fatma Al Yaqoubi, Aisha Al Khamisi, Koukab Al Kharibi, Amal Al Mandhari, Iman Al Hashmi
Sultan Qaboos University, Muscat, Oman

This study aimed to assess the improvement of crisis resource management (CRM) skills of the interprofessional students' team over time using simulation of medical emergencies at Sultan Qaboos University (SQU). Interprofessional education (IPE) has never been performed among students of the health profession at SQU. This study aims to be a motivation for the application of IPE for undergraduate medical and nursing students at SQU.

This was a longitudinal study evaluating the performance of interprofessional undergraduate senior medical and nursing students' teams over time and assessing the improvement in their CRM skills. There were 3 interprofessional student teams; each consisted of 5 students, 2 medical and 3 nursing students. Each team participated in 3 interprofessional high-fidelity simulation-based sessions. The performance of interprofessional student teams was assessed using Team Emergency Assessment Measure (TEAM).

The study's results showed that there was a continuous improvement in the overall teamwork skills and CRM skills over time for all teams. This improvement was statistically significant for team A and team B, with a P-value of 0.009 and 0.038, respectively. The results showed gradual improvement in the teams' communication skills; however, this improvement was not statistically significant for all teams.

This study shows that interprofessional team training using simulation is effective in improving undergraduate CRM skills and their ability to manage medical emergencies. The non-technical skills of CRM, such as communication and leadership skills, improved over time.

Keywords:
Crisis Resource Management (CRM); High fidelity simulation; Interprofessional Education (IPE); Medical students; Nursing students; Sultan Qaboos University (SQU)

Fiona Morrison

Climate Protection and the Humanitarian Sector: How Should the Reduction of Their Carbon Footprint be Prioritized by Organisations?

Fiona Morrison
Akkon University of Human Sciences, Berlin Germany

Climate change is considered one of the largest challenges mankind faces during the 21st century. The effects of climate change are already making themselves known around the globe, and attempts to adhere to the 1.5°C goal are paired with efforts to adapt to adverse climate effects already taking place. Those most severely impacted by climate change are usually those in developing countries, mounting in humanitarian crises caused by extreme weather events and other long-term effects. The adverse effects of climate change 'multiply' vulnerability and fragility in regions already afflicted, often requiring humanitarian intervention.

Humanitarian organizations and responses are tasked with providing life-saving support 'quickly and efficiently' during crises while following the humanitarian principles of humanity, neutrality, independence, and impartiality. The methods used to provide this support must, above all, be efficient and reliable. However, it has been shown that certain methods used during humanitarian responses and within organizations have a damaging climate impact. Examples of such methods are water trucking (the process of transporting large amounts of water; organizational flights; the use of generators; and the use of certain materials which contribute to deforestation when building shelters.

Humanitarian actors are bound by the principle of 'Do No Harm' – their interventions should not have a direct negative impact on the people they are helping, nor indirectly increase their vulnerability. Would climate-harmful interventions fall under the scope of 'doing harm'? Or is this long-term effect outweighed by the priority of providing immediate aid? Should humanitarian actors be removed from the responsibility of 'greening' their practices, allowing them to continue providing quick and efficient interventions? Different perspectives are held by various humanitarian organizations and actors, both large and small. This paper looks to answer these questions, examining whether climate-friendly methods should be prioritized within the humanitarian sector and, if so, to what degree.

Keywords:
Climate change; Humanitarian action; Greenwashing; Environmental risks

Firas Al Majrafi

The Effect of COVID-19 Infection on Drug Abusers Presented to Sultan Qaboos University Hospital Emergency Department, Oman

Firas Al Majrafi, Saud Al Abri
Sultan Qaboos University Hospital, Muscat, Oman

Substance use disorder (SUD) is defined as the damaging usage of psychoactive substances, including alcohol and drugs. SUDs can results in pulmonary damage, hypertension, cardiomyopathy, and other complications. This combination, COVID-19 infection with SUD considering that COVID-19 affects respiratory function, could worsen the outcome or, in some cases, cause death.

This was a retrospective study in which drug abusers admitted to the Emergency Department (ED) at Sultan Qaboos University Hospital (SQUH) were studied. Demographic characteristics, clinical presentations, and outcomes of drug abusers with COVID-19 infection were collected between 1st March 2020 to 1st March 2021. Data were analyzed using SPSS software.

Over one year, 150 drug abusers were admitted to the ED. 104 (69.3%) drug abusers had a COVID-19 PCR test. A total of 9 cases (8.65%) were identified with COVID-19 infection, and most of them were males (88.9%). At the time of presentation, 22.2% of drug abusers with COVID-19 infection showed hepatic complications with hepatitis B or E, leading to a 5.5 and 26.9 increased risk of getting infected with COVID-19, respectively. Drug abuser patients with COVID-19 infection have an 11.4 increased risk of death along with worse outcomes as 88.9% were admitted and with a mortality rate of 33.33%.

The prevalence of COVID-19 infection among the drug abusers population was relatively high, as well as the mortality rate. Hepatic complications were the most associated with COVID-19 positive drug abusers. Patients with hepatitis B or hepatitis E virus are more prone to COVID-19 infection. Further studies are required to extend these findings along with the predictive factors associated with COVID-19 infection in drug abusers.

Keywords:
Drug abusers; COVID-19; Substances Use Disorder (SUD); Emergency department

Ghazal Mohammadbeigi

Herbal Cure for SARS-CoV-2

Ghazal Mohammadbeigi
Tehran University of Medical Sciences, Tehran, Iran

The first known case of coronavirus disease 2019 (COVID-19) was detected in Wuhan, China, in December 2019. The virus is caused by the novel severe acute respiratory syndrome coronavirus2 (SARS-CoV-2). Coronavirus is a positive sense single-stranded RNA virus (ss RNA (+)). The viral 3-chymotrypsin-like cysteine protease (3CLpro) is responsible for the assembly of replication-transcription machinery in the virus. This protease could be a crucial target for drug discovery. A structure of 3CLpro named 5R8T was chosen as our target in this research due to its high resolution in PDB and the large size of the main protein. Also, the collected ligands have been chosen according to a review about "plant products as inhibitors of coronavirus 3CL protease" and finding similar structures to them in PubChem. The aim of this research is to find a phytochemical to inhibit 3CLpro and stop the replication of the virus ultimately.

Different search engines such as PubMed and Google Scholar and different databases like ViralZone, PubChem, PDB, and Way2Drug are being used to collect literature and data based on the keywords below.

According to protein-ligand docking using AutoDock Vina, phytochemicals exhibiting anti-3CLpro activity are Myricetin, Rhamnetin, Morin, Sakuranetin, and Triacetin. These compounds exist in some plants, such as Myricaceae, cloves, Chlorophora tinctoria (figs), rice, and papaya, respectively.

Currently, a plant-derived drug is highly desirable due to the lack of specific treatments for SARS-CoV-2 and also fewer side effects due to being natural. The named ligands could be potent targets for further studies and formulating of new drugs to treat COVID-19.

Keywords:
SARS-CoVs-3CL protease; Antiviral herbs; 3CL protease plant inhibitor

Golnaz Ghazizadeh Esslami

Follow-Up of Children Referred to Developmental Disorders Center of Ziaian Hospital, Tehran, Iran, from March 2018 till May 2021

Golnaz Ghazizadeh Esslami, Gilda Rajabi, Suhail Ahamd Mir, Mehrnaz Olfat
Pediatrics Department, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

Children who lack the developmental features and abilities appropriate to their age in comparison with healthy children are considered to be developmentally delayed (DD) children. The main cause of developmental delay remains unknown, but possible factors include biological, pregnancy, and environmental factors. Approximately 15-18% of children in different communities suffer from disabilities in speech and learning.

The present retrospective cohort survey evaluated the data of 44 patients with DD referred to the center of developmental disorders in Ziaian hospital, Tehran, Iran, from March 2018 till May 2021. The data collection instruments included the Age and Stage questionnaire (ASQ) at the time of referral and the time of follow-up for the developmental staging of children under 5 years old. Moreover, demographic data, interventions, treatments, and the reason for not accomplishing the follow-up by parents were assessed. The data was analyzed using SPSS version 22, and a P-value <0.05 was considered statistically significant.

We followed up 44 children with developmental delay, of which 15 children had a speech delay, 3 children had a locomotor delay, 1 child had both speech and locomotor delay, and 21 children had other complaints of developmental delay. Furthermore, 4 children were referred by physicians based on suspicious findings of developmental delay. 31 children (70.5%) were boys, and 13 (29.5%) were girls. 11 Children underwent speech therapy of which only 3 continued and 8 discontinued. 6 children underwent occupational therapy, of which 4 continued the therapy and showed improvement but 2 discontinued due to no effect of the therapy. Pharmacological treatment was administered to 11 children.

In this study, we conclude that developmental delay in children could be influenced by maternal age, delivery type, and history of psychiatric illness. It is recommended to educate parents regarding the impact of these factors on their children.

Keywords:
Follow-up; Children; Developmental disorders

Hana Tahmouresi

The Link between Hypoxia-Induced Metabolic Alterations and Chemoresistance in Breast Cancer

Hana Tahmouresi, Farzaneh Darbeheshti, Nima Rezaei
Universal Scientific Education and Research Network (USERN), Tehran, Iran

Breast cancer is the most common cancer in females worldwide, with about 2.26 million new cases and 684,996 deaths among women in 2020. Though there are several therapies for breast cancer, some of the most used types of therapies are surgery and chemotherapy. Chemotherapy is not always giving the best results for cancer patients. The reason for that is resistance to chemotherapy, known as chemoresistance, which will decrease the effectiveness of drugs due to the phenomenon called multi-drug resistance and the presence of some types of ABC-Transporters on the cell membrane of the cancer cells. Hypoxia is a condition seen in most tumors due to the high rate of cell division and tumor mass increase, and it's a state of low concentration of oxygen in tissue. Hypoxia is one of the reasons for the increase of metastasis in tumors as a consequence of affecting the extracellular matrix components. The need for O2 in hypoxic tissues will lead to some changes in metabolic pathways and also vascularization of the tissue by a transcription factor named hypoxia-inducible factor (HIF), which will cause the overexpression of GLUT-1 and increase the inflow of glucose in turmeric cells. This matter will change the tumor microenvironment, which is a key factor in tumors' proliferation and response to chemotherapy. This research aims to study the hypoxic microenvironment and the effect of hypoxia on chemoresistance in breast cancer.

Keywords:
Chemoresistance; Hypoxia; Breast cancer

Jamila Abdullah Al-Zadjali

Semi-Quantification of Serum SARS-CoV-2 Igg in COVID-19 Patients Recovered from Mild and Severe Infection

Jamila Abdullah Al-Zadjali, Khalfan AL-Jabri, Amani Al-Khaifi, Amal Al-Lawati, Najwa Al-Jarradi, Ali Al-Barhoumi, Kowkab Al-Farsi, Jumana Saleh
Biochemistry Department, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman

The continued spread of Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has prompted widespread interest around the world. SARS-CoV-2-specific IgG antibodies are the major subject to be studied to facilitate vaccine development and virus control. Quantification of IgG antibodies against SARS-CoV-2 is required to investigate the relation between the levels of IgG antibodies and clinical characteristics of COVID-19 patients. In this study, IgG antibodies against SARS-CoV-2 are semi-quantified in serum samples of patients recovered from COVID-19 infection.

To determine the association between the levels of SARS-CoV-2 IgG antibodies and the clinical characteristics of patients admitted to the Sultan Qaboos University Hospital (SQUH). Most previous studies showed an association between the level of the antibodies and the severity of the disease. This study is necessary to understand these relationships as no similar previous study has been conducted in Oman. Furthermore, whether there are differences in the levels of SARS-CoV-2 IgG antibodies among males and females and among different age groups were also investigated

A total of 125 blood samples were collected from 96 Post-COVID-19 patients recruited to (SQUH) from October 2020 to August 2021 and from 29 healthy volunteers. Serum SARS-CoV-2-specific IgG antibody levels were semi-quantifies using an ELISA test.

The data obtained in this study showed that post-COVID-19 patients have significantly increased SARS-CoV-2-specific IgG antibody levels compared to healthy volunteers ($p = 0.05$). Out of a total of ninety-six patients, thirty-six patients (37.5%) with severe clinical symptoms had significantly higher SARS-CoV-2 IgG levels compared to thirty-eight patients (39.5%) with mild symptoms (P value < 0.05). Additionally, older age patients were characterized by higher levels of SARS-CoV-2 IgG compared to younger patients (P value < 0.05). Also, males have greater levels of SARS-CoV-2 IgG compared to females (P value $= 0.035$).

Severe COVID-19 patients produce higher concentrations of SARS-CoV-2-specific IgG antibodies than patients with mild symptoms. Moreover, the immunologic response differs among patients based on age as well as gender.

Keywords:
Post-COVID-19; IgG; Corona Virus-2

Joana Kochendörfer

Biodegradable Packaging

Joana Kochendörfer
Akkon University of Human Sciences, Berlin Germany

Every Person uses more than 220 kg of packing materials yearly. So the production of wast because of packing material in Germany amounts to 18,16 million Tonnes per year. Most of these packing materials can't be reused and end up in incinerators or, in the worst case, in the environment. This is increasingly leading to ecological damage because, for example, toxic fumes during the burning of plastic packaging or micro plastic particles are ingested by living beings, which leads to damage to health. However, how these materials are handled differs from country to country. So often, economic interests are put above the well-being of living beings and the environment. With this background, the relevance of degradable packing materials is increasing and also on the basis of climate change. Because of that reason, this paper looks to answer the questions: Which biodegradable packaging materials are there at all? How are they manufactured? And what do you need to consider?

Judith Nora Fischer

The Privatization of Resources/Raw Materials

Judith Nora Fischer
Akkon University of Human Sciences, Berlin Germany

Raw materials are naturally occurring materials that can be used for the production of consumer products. Raw materials such as water and air are the basis of our everyday life. There are raw materials that are still relatively abundant, while the occurrence of some other raw materials continues to decrease. For example, in recent years, the availability of fresh water and unpolluted air has become scarce due to pollution and overexploitation. Because of the unchanged human lifestyle and production mechanisms, this trend (of decreasing resources) is likely to continue. In order to avoid this, there are various strategies for protecting resources that could be implemented. One such strategy is resource privatization. Privatization of raw materials is discussed controversially in politics and society. Possible matters of the controversial debate are the questions now being addressed: What does privatization of raw materials mean exactly? What are the advantages and disadvantages of possible privatization? And what are the risks of privatizing raw materials? The focus of this poster will be on the resource of fresh water and its privatization.

Kiarash Saleki

Neuropsychiatric Implications of Toll-Like Receptors; Beyond Expectations

Kiarash Saleki[1,2], Parsa Alijanizadeh[1,2], Nima Javanmehr[1,2], and Nima Rezaei[3,4,5]
1 Student Research Committee, Babol University of Medical Sciences, Babol, Iran
2 USERN Office, Babol University of Medical Sciences, Babol, Iran
3 Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran
4 Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
5 Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran

TLRs are innate immune receptors implicated in various phases of most neuropsychiatric illnesses through the mediation of the downstream inflammatory factors. These receptors and their downstream elements can be influenced both via standard pharmacotherapeutic and specific TLR inducer/suppressor therapies. The TLRs are a historical category of pattern recognition receptor (PRR) proteins that have been conserved during evolution. TLRs are generated in different species, including insects (Drosophila) and more advanced animals (humans). In order to quickly recognize pathogenic agents, these receptors activate the innate immune feedbacks by sensing conserved molecular patterns. Neuropsychiatric disorders denote a broad range of diseases utilizing neurology along with psychiatry. These disorders include depressive disorders, anxiety, schizophrenia, bipolar disorder, attention deficit-hyperactivity disorder (ADHD), autism spectrum disorders (ASDs), headaches, seizures, and neurodegeneration. In addition to their core neuropathology which lies in the central nervous system (CNS), new research has emphasized the role of immunity and neuroinflammation in neuropsychiatric conditions. TLRs exert a key role in the course of neuropsychiatric disorders and are influenced during their pharmacotherapy; For example, the synthesis of different TLRs is normalized during the treatment of MDD. TLRs are also influenced by microRNAs. A work on epilepsy found that TLR7 induction through microRNAs could lead to neuroinflammation. In this review, the role of TLRs in neuroimmunology, therapy, and management of neuropsychiatric disorders is discussed. We advise further research to comparatively evaluate the cell-type specific expression of TLRs during treatment, disease advancement, and recovery. As well further research should explore molecular insights into TLRs regulation and related pathways. Future research should discover the underpinnings of immune intelligence enabling TLRs response in different stimulant contexts and identify the link between CNS cell-type-exclusive TLRs signaling and various stages in the clinical course of neuropsychiatric disorders.

Keywords:
Toll-like receptors; Innate immunity; Neuropsychiatry; Neuroimmunology

Kosar Zolfaghari

Smart Photodynamic Therapy for Cancer: with Focus on Novel Photo Sensitizers and Nanotechnology-Based Strategies

Kosar Zolfaghari, Banafshe Abadi
Universal Scientific Education and Research Network (USERN), Tehran, Iran

Cancer is one of the most significant leading causes of death. Treatment methods such as chemotherapy and radiotherapy have been used to treat cancer, but those with fewer side effects are always considered. One such method is photodynamic therapy, a non-invasive photo-based approach that describes the use of light in treatment and diagnosis. This method reduces damage to healthy cells as photosensitizers (PS) accumulate in abnormal cells. With the help of PSs, the marker cells are targeted very precisely, and the cancer cells are destroyed. The success of PDT depends on the correct selection of PSs. Types of PS have been investigated and used until now. Each has advantages and disadvantages, or they differ from each other in terms of stability or other factors, but they give good results in clinical use. We are looking to find novel and smart PS methods with a better ability to target the desired tissue in a specific light wavelength to achieve the best results with minor damage. In this study, an attempt has been made to investigate the effect of nanotechnology in improving PDT. New PSs and nanotechnology-based PSs that help us better target tissues are reviewed. These can be nanomaterials or molecules mounted on nanomaterials. They help make PDT more effective and less risky in treating and preventing the progression of cancers. Challenges, concerns, and hopes are also discussed.

Keywords:
Photodynamic therapy; Cancer; Sensitizers; Nanotechnology

Mahshad Naserpour

The Impact of Animal-Assisted Therapy (AAT) on Children's Fear and Anxiety in the Healthcare System

Mahshad Naserpour, Amir Hossein Loghman
Universal Scientific Education and Research Network (USERN), Tehran, Iran

Hospitalizations and medical procedures are often very stressful experiences for children. Hospital-related stress may lead to physiological and psychological consequences. This study aims to review the current literature about the effects of companion pets on children's fear and anxiety in the healthcare system.
Searching literature was performed using PubMed, Google Scholar, and Scopus, with terms related to pets, children, fear, and anxiety. Analyzing included studies revealed positive effects of AAT in different healthcare system settings. In dentistry, researchers found that 15 minutes of dog presence results in lower blood pressure, pulse rate, fear, and pain in children during dental procedures. While taking MRI scans of children, technicians face different challenges, from child's fear of keeping them in the scanner. Studies showed that the presence of pets could decrease children's anxiety during and before MRI scans and even lead to scanning without anesthesia in some cases. The postoperative benefits of AAT are the rapid recovery of vigilance and activity after anesthesia, reduced anxiety and stress levels, and the perception of pain. In cardiac transplantation, this companionship helped to normalize the hospital environment and diminish fear and anxiety. Studies regarding the presence of an animal in the oncology ward stated that it reduces fear and discomfort felt during cancer therapeutic procedures. According to the mentioned evidence, it seems that pets can have a positive effect on the anxiety and fear of hospitalized children. Despite AAT's benefits, some researchers mentioned its disadvantages, including animal bites, zoonoses, the transmission of infection, etc., thus recommending evaluating its pros and cons for children before running it.
Animals have always existed around us, but it is necessary to take a closer look at them to discover their potential benefits to the healthcare system.

Keywords:
Pets; Children; Fear; Anxiety; Animal-assisted therapy

Mahshid Babamohammadi

The Role of Hormone Therapy on Immune Response Mechanisms in Treating SARS-CoV-2 Infection

Mahshid Babamohammadi, Mehregan Babamohammadi
Student's Research Committee, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran

The COVID-19 disease has affected different parts of the lives of billions of people worldwide, and the consequences of this pandemic have been burdensome. Based on clinical evidence, the severity of the disease is reported to be higher in men than in women. Also, according to epidemiological data, the complications of SARS-CoV-2 infection are higher in older men compared to younger men and postmenopausal women compared to young women. These findings encouraged researchers to research the role of sex hormones in the rate of disease incidence and treatments based on hormone therapy. Therefore, the level of estrogen and progesterone may have a good effect on the body's immunity against COVID-19. Considering that the SARS-CoV-2 virus has had many mutations and variants, This review tries to analyze the mechanisms of hormone-dependent immunity and the results of studies in this field and investigate whether we can count on hormone therapy to treat COVID-19 or not.

Keywords:
SARS-CoV-2 infection; Estrogen; Progesterone; Hormone therapy; Immune response mechanisms

Maryam Sadeghi

Improvement of Immunotherapy in Pediatric Leukemia

Maryam Sadeghi
Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Leukemia remains the most common malignancy in children, with the main subtype named acute lymphoblastic leukemia (ALL). Despite immense efforts to improve outcomes over the last decades, conventional therapy fails in 10-20% of diagnosed cases. Survival in children with relapsed ALL is poor. Thus, the development and recruitment of novel therapeutic approaches, such as immunotherapy, in pediatric leukemia is necessary. Here, new achievements in immunotherapy of pediatric leukemia are discussed, focusing on natural killer (NK) cell and chimeric antigen receptor (CAR) T-cell therapies. NK cells' anticancer role improves through different factors. Alloreactive ex vivo generated blood dendritic cells (DCs) are able to boost anti-tumor T cells and also improve NK cell activation in hematopoietic stem cell transplanted patients. The allogenic cytokine-induced memory-like NK cells can highly act against ALL blasts. Investigation of killer-cell immunoglobulin-like receptors (KIR) genes as the main determinant of NK cells' anti-cancer activity shows that donor KIR genotype and KIR alloreactivity do not significantly affect the pathogenesis of leukemia. Despite substantial responses upon CAR T cell therapy in patients with ALL, the risk of relapse remains 40-60% in the course of the disease because malignant cells can escape the immune system attack by redirecting immune checkpoints on T cells. TIM-3 (T-cell immunoglobulin and mucin domain-containing protein 3), a type I transmembrane protein, as a checkpoint, is expressed on T cells. Following the binding of TIM-3 to its ligand, T-cell activation is inhibited. One of the TIM-3 ligands is on the tumor cells too. Therefor TIM-3-CD28, a checkpoint fusion protein, was developed to transform tumor cells' inhibitory signals to stimulatory ones to improve CAR T cell therapy.
Implementation of immunotherapy in patients with leukemia has demonstrated durable remission in relapsed and refractory patients. These studies continue and promote treatment approaches in patients with leukemia.

Keywords:
Immunotherapy; CAR T cell therapy; NK cell; Pediatric leukemia

Maryam Sadat Tonekaboni

A Base-Mediated Intramolecular Hydroalkoxylation for Synthesis of [1,4]Oxathiepino[5,6-b] quinolines

Maryam Sadat Tonekaboni[1], Zahra Tanbakouchian[1], Soma Majedi[2], Morteza Shiri[1]
1 Department of Chemistry, Faculty of Physics and Chemistry, Alzahra University, Tehran, Iran
2 Medical Analysis Department, Faculty of Science, Tishk International University, Erbil, Kurdistan Region, Iraq

The preparation of a series of seven-membered S,O-heterocycles by using a base-mediated intramolecular hydroalkoxylation is described. 2-Thiopropargyl-3-hydroxymethyl quinolines were prepared to start from 2-mercaptoquinoline-3-carbaldehydes, via S-propargylation and reduction of a formyl group. In the last part, the conversion of 2-mercaptopropargyl-3-hydroxymethyl quinolines into the corresponding oxathiepinoquinolines in the presence of t-BuOK was done successfully. It is proposed that the S-propargyl moiety, in the presence of a base, is converted into its allenyl isomer; the subsequent addition of a hydroxyl group to the terminal double bond yields the 3-methyl-5H-[1,4]oxathiepino[5,6-b]quinoline in good to high yield. Notably, the conversion of N-propargyl indole-2-methanol into the corresponding intramolecular hydroalkoxylation product was obtained by this procedure.

Keywords:
Quinoline; Intramolecular reactions; 2-chloroquinoline-3-carbaldehyde; Base-mediated cyclization; Hydroalkoxylation

Marzieh Pirzadeh

Immunotherapy for Ocular Tumors

Marzieh Pirzadeh, Nima Rezaei
Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Primary ocular cancers are not frequent. These include uveal melanoma, a rare subtype of melanoma, which is the most frequent intraocular tumor in adults with a poor prognosis upon metastasis, and retinoblastoma, a pediatric cancer of the retina. Furthermore, Conjunctival melanoma, a pigmented lesion of the ocular surface, which is rare but potentially deadly, and ocular adnexal lymphoma are among the other ocular malignancies. Early diagnosis and effective management of ocular malignancies are of great importance as these tumors pose a threat to patients' life and vison. The application of conventional therapies such as surgery, radiotherapy, and chemotherapy, although effective as the first-line treatment, has been reported to be correlated with poor metastasis control, especially in the case of uveal melanoma. These strategies could even be associated with mortality in some cases if used alone in these malignancies. Immunotherapy, however, compared to conventional therapies, has been reported to enhance patients' survival and quality of life and is potentially effective in ocular malignancies. The commonest immunotherapeutic approaches in ocular tumors include immune checkpoint inhibitors, adoptive T cell therapy, anti-CD20 antibody, and vaccinations.

In the current chapter, we aimed to summarize the immunotherapeutic approaches in the treatment of ocular malignancies, including retinoblastoma, uveal and conjunctival melanoma, and ocular adnexal lymphoma.

Keywords:
Conjunctival melanoma; Immunotherapy; Ocular adnexal lymphoma; Retinoblastoma; Uveal melanoma

Mehdi Azhdari

The Fragrant Mind

Mehdi Azhdari
University of Tehran Kish International Campus, Kish, Iran

Like Freud's theory that every person has personality levels, the world of perfumes is also divided into three categories. Although each of these personality units has its own characteristics, performance states, dynamics, and mechanisms, they are inseparable and interdependent; measuring their effects on all human behaviors is not impossible, but it is a very difficult task. The same is true for perfume.
Each smell and fragrance awakens different emotions in us. These feelings are different depending on the culture and where each person lives. In general, these feelings can be divided into several categories.
In this presentation, we discuss that the sense of smell is related to memory. The smell you smell is recorded in the memory. By smelling the same smell again, all the memories come alive. The foods we ate, the places we traveled, and the people we loved but missed. In a moment, memories appear before the eyes like vivid images, and emotions erupt. Scent can defy logic and evoke feelings of power, love, or sadness

Keywords:
Perfume; Scent; Psychology; Character

Mehregan Babamohamadi

Mesenchymal Stem Cell-Derived Exosomes: A Potential Therapeutic Candidate for Regenerative Medicine-Based Treatments for COVID-19

Mehregan Babamohamadi[1,2], Zhila Izadi[2,3]
1 Department of Biology, School of Natural Sciences, University of Tabriz, Tabriz, Iran
2 USERN KUMS Office, Kermanshah University of Medical Sciences, Kermanshah, Iran
3 Pharmaceutical Sciences Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

The COVID-19 pandemic significantly impacted the health of the global community. The lack of medicine and the lack of definitive treatment have prompted many researchers and pharmaceutical companies to conduct extensive research on various treatment strategies to reduce the symptoms and complications of this disease. Much research has focused on conventional therapies, including antiviral drugs, vaccine design and development, and monoclonal antibodies. Meanwhile, more advanced therapeutic approaches and regenerative medicine-based therapies are being investigated, and initial results in in vitro and phase I studies have been promising. Exosomes are extracellular nanovesicles that have been considered a tool for targeted therapies and drug delivery due to their small size, ubiquitous presence in body fluids, strength and stability, ability to cross biological barriers, and engineering ability. Therefore, research has been conducted using exosomes derived from mesenchymal stem cells (MSCs) to treat COVID-19. MSCs are non-hematopoietic multipotent cells that have self-renewal potential and differentiation ability. The selection of MSC-derived exosomes is due to the anti-inflammatory and immunomodulatory properties of MSCs, exerted mainly through exosome-mediated paracrine effects. Also, unlike most cells in the body, the ACE2 receptor is not expressed on MSCs and can be valuable as a new target for exosome-based therapies and nanomedicines. This article aims to investigate the role of mesenchymal stem cells and exosomes derived from them as a potential therapeutic candidate for treating severe disease complications in patients with COVID-19.

Keywords:
COVID-19; Exosome; Mesenchymal stem cells; Targeted therapies; Regenerative medicine

Mehrnaz Olfat

Health Care Associated Infections in Children: The Importance of Infection Prevention and Control in a Health Care Setting

Mehrnaz Olfat, Golnaz Ghazizadeh Esslami, Masoud Mohammadpour
Pediatrics Department, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

Health care associated infections (HAIs) are infections that are transmitted to patients due to admission in a hospital or a health care setting. Patients acquire HAIs due to several factors, including disturbed skin barrier, the severity of underlying disease which resulted in hospitalization, poor nutritional status, presence of resistant organisms in a health care setting, and inserted medical devices, i.e., peripheral and central intravenous lines, foley catheter, and chest tube. Infants and young children are more vulnerable to HAIs compared to adults due to their young age. There are several types of HAIs; the most common ones are catheter line associated blood stream infection (CLABSI), catheter-associated urinary tract infection, bloodstream infection, and ventilator-associated pneumonia (VAP). Common organisms are mostly ominous and multi-drug resistance pathogens. HAIs result in increased morbidity and mortality, overuse of antibiotics with consequence antibiotic resistance organisms, and significant financial burden to families, hospitals, and the government. So, all hospitals, including pediatric hospitals, should have a written protocol for infection prevention and control and an efficient surveillance system to guarantee the implementation of the practices. It is worth noting that hand hygiene is of particular importance in this regard. Although significant progress is evident in this area, challenges remain that can be subjects of future research.

Keywords:
Hospital-associated infection; Children; Prevention; Hand hygiene

Mohaddese Pourashoury

Cancer Vaccines; Promising Tools to Fight Cancer

Mohaddese Pourashoury
Islamic Azad University of Garmsar, Garmsar, Iran

In the past decades, rapid advancements in medicine have contributed considerably to overcoming pandemics and diseases that were once serious health issues in human societies. But new diseases emerge at an uncontrolled pace that demand new medical techniques. Cancer has been a severe health issue in the past few years, claiming nearly 10 million lives in 2020. So many areas of this malignant disease are yet unknown to us. Scientists and researchers from multidisciplinary fields are working together to fill in the gaps for a better understanding of cancer mechanisms and find new ways to overcome the difficulties of this disease. Cancer vaccines are new immunotherapy tools designed explicitly for this purpose. Conventional vaccines enhance your body's natural defenses against harmful invaders like viruses and bacteria. Therapeutic cancer vaccines prepare your body to protect itself against its own compromised or abnormal cells, including cancer cells. These vaccines expose your immune system to cancer-related molecules, allowing the immune system to detect and eliminate cancer cells. The concept of a therapeutic cancer vaccine is simple: Give the immune system a whiff of cancer's scent and then unleash the hounds. In this example, the smell is a distinct molecular marker known as an antigen, which an immune cell may detect as harmful, mixed with a general inducer of immunological activity known as an adjuvant. The goal is that the vaccine would teach immune cells to detect and fight cancer in the body. Cancer cells develop DNA mutations rapidly because they are prone to genetic errors. Some of these mutations result in distinct protein versions that vary from the typical ones. These unique products are referred to as neo-antigens by scientists. Neo-antigens are an appealing target for vaccines since they are irregular to cancer cells and absent from normal ones. In 1980, the first cancer vaccine based on tumor cells and lysates was created. To treat colorectal cancer, researchers employed autologous tumor cells. The discovery of the first human tumor antigen, melanoma-associated antigen 1, in the early 1990s opened a new chapter in the use of tumor antigens in cancer vaccines. In 2010, a dendritic cell-based vaccine (Sipuleucel-T) was effectively utilized to treat prostate cancer, demonstrating the feasibility of cancer vaccines and igniting interest in the topic. The COVID-19 epidemic has accelerated the progress of vaccine technologies and pushed cancer vaccines back into the public eye. Cancer vaccines primarily employ tumor-associated antigens (TAAs) and tumor-specific antigens (TSAs) to stimulate the patient's immune system. In theory, the vaccine might induce specific cellular immunity and humoral immune response, preventing tumor development and eradicating tumor cells. Cancer vaccines vary from regular vaccines in that they attempt to destroy tumor cells through tumor antigen-specific cellular immune responses. Cell-based cancer vaccines are those that utilize entire cells as antigen carriers. Cell-based vaccinations are the most common pre-clinical cancer vaccine, with the dendritic cells (DCs) vaccine showing promising outcomes in clinical studies. Virus-based cancer vaccines cure and prevent cancers by using viruses as vectors. Peptide-based vaccinations are made up of tumor antigen epitopes that are known or anticipated. Peptide-based vaccines are often less immunogenic, necessitating the use of adjuvants to improve immunogenicity. DNA and RNA vaccines comprise the encoding gene and a carrier group of pathogen antigens. DNA cancer vaccines are closed circular DNA plasmids that encode tumor-specific TAAs or immunomodulatory compounds. Cancer vaccines have been thoroughly researched throughout the last decade. The in-depth study of immunological mechanisms and various new vaccine platforms have extensively promoted cancer vaccine research, so there seems to be new hope on the horizon for the treatment of cancer.

Keywords:
Cancer; Cancer therapeutic vaccines; Vaccines; Cancer vaccines

Mohammed Al-Harrasi

Perception and Attitudes of Undergraduate Medical and Nursing Students Towards Simulation-Based Interprofessional Education

Mohammed Al-Harrasi, Aisha Al Khamisi, Koukab Al Kharibi, Amal Al Mandhari, Iman Al Hashmi
Emergency Medicine, College of Medicine and Health Science, Sultan Qaboos University, Muscat, Oman

Developing clinical, teamwork, and communication skills of healthcare professionals have been shown to influence patient safety, and simulation-based team-interprofessional education (IPE) is an effective means to develop these skills. This study aimed to assess the perception, satisfaction, and attitude of undergraduate senior medical and nursing students of Sultan Qaboos University (SQU) towards IPE using simulation over time.
A cohort study was conducted by recruiting 15 undergraduate senior medical and nursing students at SQU. The participants were divided into 3 groups: A, B, and C. Each group consists of 5 students, 2 medical and 3 nursing. Three simulation-based team-IPE sessions were conducted using high-fidelity scenarios. The validated Readiness for Interprofessional Learning Scale (RIPLS) and Interdisciplinary Education Perception Scale (IEPS) was used to assess perception, satisfaction, and attitude over time.
Out of 15 distributed questionnaires, 15 (100%) were completed and returned. Data analysis of these questionnaires showed that all of the participants confirmed an improvement in their perception, satisfaction, and attitudes toward simulation-based team-IPE overtime. Most of the participants strongly agreed that learning with other healthcare students will make them a more effective members of a healthcare team which ultimately has a positive effect on the patients' outcomes (>90%). The importance of cooperation in learning with other healthcare professionals to develop clinical skills was significantly high among the participants (>93%). 80% of the participants stated that having clear goals and objectives while working with individuals of other professions is important, so each member can understand his/her role while taking care of patients.
The results of the present study revealed that the perception, satisfaction, and attitudes of undergraduate medical and nursing students toward simulation-based team IPE are high. These findings can be helpful in applying IPE in the clinical skills approach as a part of undergraduate students' curriculum while keeping patients risk-free.

Keywords:
Simulation; Interprofessional education; Perception; Attitude; Satisfaction

Mohammad Sedaghati Jahromi

A Study of Relation Between Perception and Design

Mohammad Sedaghati Jahromi
University of Tehran, Tehran, Iran

Creativity is a process, and great ideas do not fall from the sky. They develop over time. Learn to fail fast and discover what is possible once you get past your comfort zone. The cerebral Cortex is the largest part of our brain where our complex thinking takes place. This is where designing and creativity happen. Designing starts in our brains, where creativity happens. All the designers use this part of their brains more effectively and productively. Designing is a Journey from our brain to create a product or a service. Product designers work to optimize the user experience in the solutions they make for their users. In a productive view, designers conceptualize and evaluate ideas, turning them into tangible inventions and products. Design must be attractive to customers. To build a unique product design, using creativity must be considered. Using some principles helps us to create unique ones. In this article, I want to describe new aspects of creativity to create a wonderful product design.

Keywords:
Perception; Creativity; Design

Mohammad Ali Tahmasbi Nejad

Artificial Intelligence-Assisted Diagnosis of Metastatic Oral Cancers based on Imaging Examinations

Mohammad Ali Tahmasbi Nejad
School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

Oral squamous cell carcinoma is among the most prevalent cancers worldwide, with 40% of cases being locoregionally metastatic to cervical lymph nodes. While the information provided by medical history and physical examination is not of sufficient sensitivity to diagnose such neoplasms, accurate approaches like fine-needle aspiration are more invasive, painful, and with such complications as swelling, hemorrhage, and nerve injury at the puncture site in some cases. As a recently introduced and widely used utility, artificial intelligence can bring forward novel diagnostic tools to pave the way for the detection of head and neck tumors spreading to cervical lymph nodes. Data elicited from diagnostic imaging technologies, such as ultrasound, MRI, and CT scan, can be considered as appropriate input to algorithms developed via artificial intelligence returning the cancer metastatic status as the output. Therefore, as a noteworthy and promising research area, we survey the studies which have investigated the application of artificial intelligence-assisted methods in diagnosing metastatic cancers in the head and neck region.

Keywords: Artificial intelligence; Squamous cell carcinoma; Medical imaging

Mohammd Hossein Khosravi

Prevalence and Characteristics of Sleep Disorders Following a Cerebral Concussion: A Survey of Belgian, French and Swiss Patients

Mohammad Hossein Khosravi, Géraldine Martens, Jean-François Kaux, Nicolas Lejeune, Aurore Thibaut
Coma Science Group, GIGA-Consciousness, University Hospital of Liège, Liège, Belgium

Post-concussion sleep disorders are a result of sleep-wake dysfunction. Having unclear pathogenesis, this alteration varies among patients. Evaluation of sleep disorders after a concussion may improve diagnostic and therapeutic efficacy.

This cross-sectional study was conducted on Belgian, French, and Swiss patients with 18 to 55 years of age and confirmed diagnosis of concussion no more than 5 years prior to the study. Our survey had 86 questions, including demographic information, Epworth Sleepiness Scale (ESS), Rivermead and Pittsburgh Sleep Quality Index (PSQI). The link to the survey was disseminated by publication on many social networks (physiotherapists, physicians, student groups and etc.) via sending emails to Belgian, French, and Swiss sports associations (e.g., football, rugby, and cycling), coma science group and Department of Physical Medicine - Neuropsychology - Functional revalidation of the University Hospital of Liège.

Finally, 91 (30 males and 61 females) patients completely answered the survey. Mean ESS, PSQI, and Rivermead scores were 7.68±4.84, 7.47±3.90, and 16.98±15.28, respectively. More than half (58.2%) of the patients had one, and 38(41.8%) patients had experienced more than one concussion. Sleep disorders occurred in 20(22%) patients and worsened in 31(34.1%) out of 39(42.9%) patients with prior problems. PSQI score was significantly higher in patients with more than one concussion (8.57±4.10 vs. 6.67±3.58, $p=0.019$). Females are susceptible to higher Rivermead scores ($p<0.001$) but not PSQI ($p=0.153$) or ESS ($p=0.063$). We realized that PSQI score is significantly correlated with ESS ($r=0.371$, $p<0.001$) and Rivermead ($r=0.541$, $p<0.001$) scores.

We found that concussion imposes sleep disorders and exacerbates the existing problem. A higher number of concussions affects the PSQI score but not ESS or Rivermead. Also, Female patients are susceptible to higher Rivermead scores but not PSQI or ESS.

Keywords:
Concussion; Sleep disorders; PSQI; Rivermead questionnaire; Epworth sleepiness scale

Mohammad Mehdi Gravandi

Targeting Ras/Raf/MAPK Pathway in Neurodegeneration: Phytochemical Approaches

Mohammad Mehdi Gravandi
Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran

In recent decades, several neuroprotective agents have been provided in combating neuronal dysfunctions. Several dysregulated pathways are behind the pathogenesis of neurodegenerative diseases; However, the crucial targets are still unknown. Oxidative stress, apoptosis, autophagy, and inflammation are the most dominant pathways that strongly influence neurodegeneration. In this way, targeting Ras/Raf/Mapk pathways appears to be a developing strategy for combating neurodegenerative disorders like Alzheimer's disease, Parkinson's disease, ischemic stroke, aging, and miscellaneous neurodegeneration disease. In this line, plant secondary metabolites (e.g., flavonoids/phenolic compounds, alkaloids, and terpenoids) have shown promising potential for the simultaneous modulation of Ras/Raf/Mapk. cRaf-1 kinase is one participant of a three membered kinase family, and it plays an essential role in NDDs by involving in the process of neuroinflammation. Mitogen-activated protein kinases (MAPKs), including extracellular signal-regulated kinase 1/2 (ERK 1/2), p38 MAPK, and c-Jun N-terminal kinase (JNK), are important molecular players in the brain injury pathway and Ras, which is located at the upstream of the MAPK pathway and influences NDDs. This review aimed to address Ras/Raf/Mapk pathways in several NDDs by plant-derived secondary metabolites.

Mohammad Reza Fattahi

COVID-19 and Pulmonary Bullae: A Multicenter Prospective Study

Shahab Rafieian, Reza Ershadi, Mohammad Reza Fattahi, Fereshteh Ghiasvand, Samira Mirzaei, Sara Ghaderkhani, Matin Vahedi

Student Research Committee, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

This is the first large-scale case series reporting the coexistence of COVID-19 and pulmonary bullous disease. This is a prospective clinical study conducted on patients with confirmed COVID-19 that had been hospitalized at Imam Khomeini complex hospital and Sina hospital from July 2021 to February 2022. An experienced radiologist reviewed the chest computed tomography (CT) scan of all patients for pulmonary bullae or cysts.
A total of 34 patients with COVID-19 and lung bullae were identified. Of these, 41.2% were located in the left lung, 38.2% were in the right lung, and 20.6% were found bilaterally. Most bullae were small (50%) and medium (29.4%). Finally, the majority of patients had single bullae (58.8%). The mortality rate was 29.4% (10 patients) in this period. The average survival time for deceased patients was 13 (8.17) days. Our results demonstrated that increased age (p=0.001), smoking (p=0.001), respiratory comorbidities (p=0.013), intubation (p=0.008), and bilateral bullae (p=0.005) are associated with lower survival time in patients with COVID-19 and bullae. However, there was no significant association between survival time and sex and size, and the number of bullae. Although our results do not provide a causality relation between COVID-19 and pulmonary bullous disease, clinicians should be aware of this complication in patients with COVID-19. Our results demonstrated that those with bilateral bullae have a lower survival time. Further studies are required to investigate the incidence and causality relation between COVID-19 and lung bullae.

Keywords:
COVID-19; Lung bullae; Pulmonary cystic disease; CT scan

Mohammadreza Mirzaee Goodarzi

Strategies for Reinforcing Communicable Diseases Surveillance System in Iran

Mohammadreza Mirzaee Goodarzi, Alireza Jafari Azad, Mehdi Abbasi, Amir Rezaei
Tehran University of Medical Sciences, Tehran, Iran

Since the early beginning of the COVID-19 pandemic, health systems in both developed and developing countries have encountered serious challenges in terms of providing efficient health infrastructures in order to fight the COVID-19 pandemic. These challenges in different functions of health systems cause the health governors to consider reinforcing communicable diseases surveillance systems. Communicable diseases surveillance system, according to the learned experiences from previous epidemics, is the most effective way in order to strengthen resilience, decrease vulnerabilities and provide an efficient response to a crisis like the COVID-19 pandemic. This system, established based on primary health care (PHC) purposes, provides comprehensive, accessible, and affordable services for the entire community with special attention to the most vulnerable groups during a crisis. This study has the intention to review the most successful responses from various societies against previous crises caused by communicable diseases and finally tries to recommend the most suitable strategies with the purpose of reinforcing the communicable diseases surveillance system in Iran.

Keywords:
COVID-19; PHC; Communicable diseases surveillance system; Pandemic

Natalie Samhan

Reified Networks Simulating the Effect of Different Culture Types on Mistake Handling and Organizational Learning

Natalie Samhan
Department of Artificial Intelligence, Vrije Universiteit Amsterdam, Amsterdam, the Netherlands

This paper utilizes in-silico explorations to investigate the following research hypotheses: (1) Higher flexibility and discretion in organizational culture results in better mistake management and thus better organizational learning, (2) Effective organizational learning requires a transformational leader to have both high social and formal status and consistency, and (3) Company culture and leader's behavior must align for the best learning effects. Computational simulations of the introduced adaptive network were analyzed in different contexts varying in organization culture and leader characteristics. Statistical analysis results proved to be significant and supported the research hypotheses. The paper ultimately simulates how mistake-tolerant organizational cultures, aligning with the leader, expedite significantly better individual and team learning in an organization.

Nasser Al-khamisi

Respiratory Symptoms in Adult Patients who Have Recovered from COVID-19 at Sultan Qaboos University Hospital

Nasser Al-khamisi, Saif Al Mubhaisi, Sanjay Jaju, Deepali Jaju
Sultan Qaboos University, Muscat, Oman

To determine the proportion of respiratory symptoms in COVID-19 patients during disease; at 3 months and 1 year post-recovery and to study the association between different respiratory symptoms with gender and severity of the disease.

This cross-sectional study used close-ended telephone interviews to document the respiratory symptoms at the above phases. All patients with confirmed laboratory diagnosis of COVID-19 in SQUH from January 2020 to October 2020 were included. The severity of COVID-19 was grouped based on admission to ICU.

In this cohort (n=200; males 56%), the respiratory symptoms during disease phase were cough (50.5%), sore throat (43.0%), anosmia (41.9%), rhinitis (28.6%), SOB (24.0%), chest pain (22.0%) and sputum production (14.0%). After 3 months the frequencies were anosmia (30.2%), cough (26.0%), SOB (23.5%), chest pain (17.0%), sore throat (14.5%), rhinitis (10.5%), sputum production (8.5%) and wheezing (6.5%). At one year of recovery SOB (7.0%), sore throat (2.5%), anosmia (2.0%), chest pain (1.5%), cough (1.5%), sputum production (1.0%) and wheezing (1.0%) were documented. The respiratory symptoms during, at 3 months and 1 year post recovery were not associated with gender ($p>0.05$). SOB, cough, chest pain, and wheezing at 3 months and SOB at 1 year were associated with increasing disease severity ($p<0.05$). At 1 year, at least one respiratory symptom was noted in 65% of patients. Some patients developed wheezing post-COVID-19 recovery.

Almost 65% of patients had at least one respiratory symptom at 1-year of recovery. The increasing severity of the disease is associated with late respiratory symptoms.

Keywords:
Late respiratory symptoms

Navid Ravan

Medicalization; A Comparison Between Different Perspectives

Navid Ravan[1], Mohammadhossein B. Jahromi[2]
1 Faculty of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran
2 Center for Multidisciplinary Studies and Health Humanities, University of London, London, UK

Medicalization is a process by which non-medical aspects of everyday human life are defined as medical problems which are essential to treat and need medical observation and intervention. There are many examples of medicalization in the history of medicine, especially in recent decades. Addiction is no longer a crime, sadness is defined as a depressive disorder, and even beauty is an object of medical intervention through cosmetic surgeries. There are many criticisms from different perspectives, such as the philosophy of medicine, bioethics, sociology, anthropology, and gender studies against medicalization. This study aimed to compare these different perspectives.

For the investigation and comparison of different definitions and criticisms, first, a comprehensive search strategy was established. By using medicalization and related keywords in various databases such as Pubmed, Scopus, and Jstor, related articles were selected and categorized. Then, with a meta-synthesis method, qualitative studies were compared and interpreted, and their interrelations were found.

This study shows that a new categorization and arrangement of medicalization criticisms are needed to make an effective dialogue between them and to find out their strengths and weaknesses. This study will especially focus on the philosophical point of view and compare it with other points of view to shed light on some unseen aspects of medicalization and to show the importance of the classic discussions on the definition of health and illness and the original aim of medicine as well. A philosophical perspective could complete other perspectives and situate them in the best position. It could deepen our perception of the dangers of medicalization and help us to find a solution for them.

Keywords:
Medicalization; Over-medicalization; Over-diagnosis; Philosophy of medicine

Nazanin Abbasi

Don't Confuse Perimenopausal Symptoms with Long COVID

Nazanin Abbasi
Research Committee, Azad Medical University of Mashhad, Mashhad, Iran

Women, especially women under the age of 50, are more likely to be involved in Long COVID. However, recognized predictors of acute COVID-19 mortality risk (increasing age, chronic comorbidity, male sex) fail to predict poor outcomes in Long COVID. This makes it more difficult to identify women who are at risk.

Transient menstrual abnormalities during acute COVID-19 are due to the expression of ACE2 receptor proteins in the ovaries. In fact, the production of ovarian steroid hormone, which can be exacerbated by COVID-19, is also a sign of perimenopause.

Many symptoms of Long COVID have a significant overlap with perimenopause which can affect women of all ages. Failure to recognize this overlap misses an opportunity to treat many debilitating symptoms affecting both physical and mental health, such as effective hormone replacement therapy (HRT).

Also, early diagnosis and treatment perimenopause reduces the risk of many diseases, such as dementia, obesity, osteoporosis, and cardiovascular disease.

Thousands of women who are diagnosed with Long COVID may not be aware that their hormones could also be responsible for their symptoms. The inability to predict Long COVID is immoral and risky. Informing women and the accuracy of doctors in this regard is very important. The balance menopause support app is being used by some multidisciplinary teams in their Long COVID clinics as part of the treatment pathway to help identify which patients are experiencing other symptoms associated with perimenopause and menopause, as well as their Long COVID symptoms.

I review previous studies on how to differentiate between Long COVID and menopause in middle-aged women and offer an evidence-based review of current practice.

Nazik Ahmed

Prevalence of Dizziness, Tinnitus, and Headache Among COVID-19 Patients at Sultan Qaboos University Hospital

Nazik Ahmed, Rashid Al Abri, Sanjay Jaju, Deepali Jaju
Sultan Qaboos University, College of Medicine And Health Sciences, Muscat, Oman

To determine the prevalence of dizziness, tinnitus, and headache among adult patients pre, during, and post-COVID-19 recovery phases at Sultan Qaboos University Hospital and to study their association with age and gender.

This cross-sectional study was based on telephone interviews to determine the prevalence of dizziness, tinnitus, and headache during the above three phases. Patients (n=280) who had confirmed laboratory diagnosis of COVID-19 in SQUH during the period of January-July 2021 were contacted, but only 36% responded (n=102; Males 50.0%; age range 30-40 years).

The Pre-COVID-19 prevalence of dizziness was 16%, tinnitus 13%, and headache 53%. During COVID, the prevalence of dizziness was 41%, tinnitus 13%, and headache 73%. Post-COVID-19 prevalence of dizziness was 24%, tinnitus 12%, and headache 54%. During the pre-COVID-19 and during-COVID-19 phases, there was a significant association seen in headache (p=0.0001) and tinnitus (p=0.01). During the pre-COVID-19 and post-COVID-19 phases, there was a significant association seen in headache, tinnitus, and dizziness (All p=0.0001). In the pre-COVID-19 phase, a high proportion of those between 33-40years experienced dizziness (49% vs 9.5%; p=0.03) and headache (67% vs 44.4%; p=0.023) as compared to 30-32year group (median 32 years). In the post-COVID-19 phase, a high proportion of those between 33-40years experienced tinnitus (21% vs. 6%; p=0.034) as compared to the 30-32 year group. A high proportion of females (83%) had a headache during COVID-19 compared to males (63%; p=0.027).

Pre-COVID-19 headaches and tinnitus persist during and post-COVID-19. Females and higher age groups are more vulnerable to experiencing these symptoms.

Keywords:
COVID-19; Dizziness; Tinnitus; Headache; Oman

Negin Jarrah

Immunonutrition in Colorectal Cancer Surgery

Negin Jarrah, Sepideh Razi
Universal Scientific Education and Research Network (USERN), Tehran, Iran
School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Among cancers, colorectal cancer is the second leading cause of mortality. Poor nutrition intake, higher demands of nutrition, and digestion issues bring more importance to nutrition care pre and post-operation. Poor nutrition worsens immunosuppression in cancer patients; therefore, the use of immunonutrition has become more recognized. Immunonutritients consist of special nutrients like certain aminoacids, fatty acids, and nucleotides which affect the immune system. The use of immunonutrition preoperative affects inflammation pathways in colorectal cancer through markers like Interleukin 6, Tumor necrosis factor alpha, CD8 positive T cells, interleukin 8 or chemokine (C-X-C motif) ligand (CXCL8), and chemokine (C-X-C motif) ligand 1 (CXCL1) expression. In studies, it is shown that the administration of immunonutrition seven days prior to oncological surgery benefits high-risk patients. Some studies demonstrate that immunonutrition can lower the length of stay in the hospital. In others, it is found that it lowers the risk of infectious complications. Yet there are studies that found no difference and benefits in giving preoperative immunonutrition. In conclusion, there are controversial opinions about immunonutrition effects on morbidity, mortality, and reducing complications. In this narrative review, we aimed to address the effects of using immunonutrition in patients with oncological surgery.

Keywords:
Immunonutrition; Colorectal cancer; Surgery

Niloufar Yazdanpanah

Vaccine Hesitancy in the COVID-19 Pandemic Era: Lessons Learned for Future Preparedness

Mohammad Mahdi Aliasin[1,2,3], Niloufar Yazdanpanah[1,4,3], Nima Rezaei[4,3,5]
1 School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
2 Students' Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran
3 Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran
4 Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran
5 Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Vaccines seem to be the best promising and effective way to combat the COVID-19 pandemic and prevent its devastating outcomes. Due to the rapid development of numerous COVID-19 vaccines and the urgency of mass vaccination to stop the virus spread, some of the candidates have not completed the clinical phase. Besides, various adverse effects of COVID-19 vaccines have affected the public acceptance of vaccines. Vaccine hesitancy has become an alarming issue in the pandemic era, threatening public health. Similar cases of hesitancy in response to major public health measures have occurred throughout history. To dive deep into the roots of COVID-19 vaccine hesitancy, similar historical scenarios are discussed, and some potential solutions are suggested.

Keywords:
Vaccine; Hesitancy; COVID-19; Pandemic; Public health; Future preparedness

Ramyar Rahimi Darehbagh

The Effect of Nanomaterials on Embryonic Stem Cell Neural Differentiation: A Systematic Review

Ramyar Rahimi Darehbagh, Mozaffar Mahmoudi, Nader Amini, Media Babahajiani, Azra Allavaisie, Yousef Moradi
Student Research Committee, Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran
Nanoclub Elites Association, Tehran, Iran
Environmental Health Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran
Social Determinants of Health Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran
Department of Epidemiology and Biostatistics, Faculty of Medicine, Kurdistan University of Medical Sciences, Sanandaj, Iran

Humans' nervous system has a limited ability to repair nerve cells, which poses substantial challenges in the treatment of its injury and disease. Stem cells are characterized by their ability to self-renew as well as develop into several cell types, making them ideal candidates for cell replacement in injured neurons. Nanomaterials have distinct advantages in directing stem cell function and tissue regeneration for the nervous system. Neuronal differentiation of embryonic stem cells in modern medicine is very important, so the introduction of contributing materials for this purpose can help scientists and physicians solve more problems in the future. We attempted in this study to collect and report research on the effect of nanomaterials on neuronal differentiation of embryonic stem cells in the form of a systematic review study to assist researchers and clinicians in their work. PubMed, Scopus, ISI Web of Science, and EMBASE were searched for available articles on the effect of nanomaterials on neuronal differentiation of embryonic stem cells (up to April 2022). In total, 1301 articles were identified and assessed, and then only 27 articles were found eligible and included.
8 studies utilized 0D nanomaterials, 10 studies used 1D nanomaterial, 1 study reported 2D nanomaterials, and 8 studies demonstrated the application of 3D nanomaterials. The main biomaterial in studies was polymer-based composites. Three studies report the negative effect of nanomaterials on neural differentiation.
The subject of neurological regenerative medicine is predicted to benefit greatly from advances in stem cell research. Neural differentiations are very important in neurological regenerative medicine. Nanomaterials with different characteristics, particularly those that regulate cellular activity and stem cell fate, have a lot of potential in neural tissue engineering. These findings indicate a new understanding of the potential applications of physicochemical cues in brain tissue engineering.

Keywords:
Nanomaterials; Embryonic stem cell; Neural differentiation

Reyhaneh Dehdari

Dusty Air Pollution is Associated with an Increased Risk of Allergic Diseases in Southwestern Part of Iran

Mohammad Kazzem Gheybi[1], Ali Movahed[2], Reyhaneh Dehdari[1], Shahram Amiri[3], Hossein Ali Khazaei[4], Mostafa Gooya[3], Fereshteh Dehbashi[1], Atena Fatemi[3], Neda Sovid[1], Gholamreza Hajiani[5], Rahim Tahmasebi[6], Sina Dobaradaran[3], Majid Assadi[1], Shokrollah Farrokhi[1,3]

1 The Persian Gulf Nuclear Medicine Research Centre, Bushehr University of Medical Sciences, Bushehr, Iran
2 Department of Biochemistry, Bushehr University of Medical Sciences, Bushehr, Iran
3 Department of Immunology, Asthma and Allergy, The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, Iran
4 Research Center for Cellular and Molecular, Department of Immunology and Hematology, Zahedan Medical Sciences University, Zahedan, Iran
5 Bushehr Blood Transfusion Organization (BBTO), Bushehr, Iran
6 Department of Biostatistics, School of Public Health, Bushehr University of Medical Sciences, Bushehr, Iran

Asthma and allergic diseases represent a significant health burden. Evidence on the prevalence of these diseases indicates that these diseases are on the rise in various parts of the world. It is hoped that this study will benefit health system decision-makers in the planning of allergy prevention programs in the region.
The prevalence of asthma and allergic diseases and relation between the diverse risk factors involved were assessed among schoolchildren in the city of Bushehr, Iran. The ISAAC Phase I and III questionnaires were completed by parents of 1280 children aged 6-7 years and self-completed by 1115 students aged 13-14 years.
The prevalence of atopic eczema, allergic rhinitis and asthma among 6-7 year-old students were 12.1%, 11.8% and 6.7%, respectively. While, the prevalence of these diseases among 13-14 year-old students were found to be 19%, 30% and 7.6%, respectively. There was an association between asthma and allergic rhinitis as well as eczema ($p<0.05$). Consumption of fast food as a risk factor was significantly associated with asthma ($p=0.03$).
The prevalence of asthma and allergic diseases was high among schoolchildren in the city of Bushehr, Iran. Also an association was observed between the fast food consumption and asthma.

Roshanak Amirian

Targeted Protein Degradation for the Treatment of Parkinson's Disease

Roshanak Amirian, Mehdi Azadi
USERN KUMS Office, Kermanshah University of Medical Sciences, Kermanshah, Iran

PD is the most prevalent neurodegenerative disorder of movement. Over the past two centuries, advances in understanding the pathophysiology of Parkinson's and the molecular, neurophysiological, and behavioral processes that underpin the disorder and its symptoms have improved our knowledge and ability to treat the condition. Although tremor, rigidity, bradykinesia/akinesia, and postural instability are its cardinal motor symptoms, and even include other motor and non-motor symptoms (NMSs) such as cognitive impairment, autonomic dysfunction, sleep disorders, depression, and hyposmia (impaired smell), which are all associated with the disease and contribute significantly to overall burden. TPD is a new modality in drug discovery that harnesses autophagy or UPS to selectively degrade the target of interest (TOI). This mechanism of action makes TPD a suitable strategy for non-enzymatic and structural proteins, which are out of reach of conventional inhibitors proteins involved in neurodegenerative diseases, like tau protein and α-synuclein are among them. PROteolysis-TArgeting-Chimera (PROTAC) is the most known TPD strategy. PROTAC is a heterobifunctional small-molecule or peptide that, from one side, attaches to the E3 ubiquitin ligase and, from the other side, binds to the TOI. The ternary complex (TOI-PROTAC-UPS) forms and TOI undergoes ubiquitination and subsequently will be degraded by the UPS. PROTAC has been shown to be effective in a variety of fields, including the treatment of various cancers, autoimmune diseases, and neurodegenerative disorders. In recent years, several synthesized PROTACs have advanced to the phase of clinical trials. Based on the TPD technology, some PROTACs and AUTOTACs have been developed for the treatment of neurodegenerative diseases such as PD, Huntington's disease, and Alzheimer's disease. In this section, we discuss these small molecules and peptides that may have potential applications in PD. It includes small molecules and peptides that have been developed for α-synuclein, LRRK2, and tau protein based on PROTAC or other TPD technologies.

Keywords:
Parkinson's disease; α-Synuclein; PROTAC

Saba Mirikermanshahi

On Being a Truth-Seeker

Saba Mirikermanshahi
Medical Humanities Association (MHA), Universal Scientific Education and Research Network (USERN), Kermanshah, Iran
Kermanshah University of Medical Sciences, Kermanshah, Iran

Once upon a time, there was an artist who decided to dedicate his life to capturing human suffering by way of photography. He played a vital role in a significant health issue in Japan called Minamata disease. He brought the world's attention to a small village in japan where people were dealing with severe health problems, and the monopoly of money and power created the situation. Although he was not a physician or health practitioner, he greatly impacted the Minamata case and the world's attention to environmental health issues caused by illegal industries. Being One of the most outstanding photojournalists ever known, he used his gift as a photographer to capture the disaster and took action towards it. Although Minamata is the last and most famous of his works, it is only one of his projects. With his focus on humanitarian situations in his professional career, William Eugene smith introduced a concept known as "Humanistic Photography."
However, why is it essential o be mentioned? When it comes to "looking at the universe, thinking in science," we must realize that we humans genuinely tend to be tackled in our vision of things and only see what we want to see. So first and foremost, we must learn to look at the world and make sense of what is happening in it. In doing so, we must learn how to be and remain a truth-seeker, and the story of Willian Eugene smith is an example to think about and perhaps revise our views. It shows the necessity of involving artists and interdisciplinary efforts in all fields of knowledge and teaches us how important it is to realize the right action and how to do it. So it is a real story worth to be told and reflecting on.

Keywords:
Interdisciplinarity; Humanistic photography; Environmental health issues; Minamata disease

Sahel Noorikoloori

Cancer Vive

Sahel Noorikoloori
Amirkabir University of Technology, Tehran, Iran

Woefully, statistics showed a remarkable number for the rate of diagnosis of cancer. This means that many people would be involved in the journey of cancer, so global awareness about the available and future treatments can be very effective in raising the rate of hope in (future) patients. To reach this goal, in this presentation, the history of the first cancer treatment until future treatments in cancer (with the concept of target treatment) will be covered. The main focus of this presentation is the platform for delivering cancer drugs to cancer tumors in order to decrease the side effects of chemotherapy.

Keywords:
Cancer; Drug; Nanoparticle

Sajjad Ghane Ezabadi

Is There a Link Between Multiple Sclerosis and Pregnancy in Terms of Tendency, Reproductive Characteristics, and Disability? A Secondary Data Analysis of Nationwide MS Registry of Iran

Sajjad Ghane Ezabadi[1], Fereshteh Ashtari[2], Seyed Mohammad Baghbanian[3], Nastaran Majdi-Nasab[4], Elham Madreseh[1], Hamidreza Hatamian[5], Fardin Faraji[6], Asghar Bayati[7], Hoda Kamali[8], Ehsan Sharifipour[9], Hossein Mozhdehipanah[10], Mohammad Amin Shahrbaf[11], Saeideh Ayoubi[1], Mohammad Ali Sahraian[1], Sharareh Eskandarieh[1]
1 Multiple Sclerosis Research Center, Neuroscience Institute, Tehran University of Medical Sciences, Tehran, Iran
2 Department of Neurology, Faculty of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran
3 Department of Neurology, Faculty of Medicine, Mazandaran University of Medical Sciences, Mazandaran, Iran
4 Musculoskeletal Rehabilitation Research Center, Jundishapur University of Medical Sciences, Ahvaz, Iran
5 Department of Neurology, Faculty of Medicine, Guilan University of Medical Sciences, Guilan, Iran
6 Department of Neurology, Traditional and Complementary Medicine Research Center, School of Medicine, Arak University of Medical Sciences, Arak, Iran
7 Department of Neurology, Faculty of Medicine, Shahrekord University of Medical Sciences and Health Services, Shahrekord, Iran
8 Neurology Research Center, Kerman University of Medical Sciences, Kerman, Iran
9 Department of Neurology, Faculty of Medicine, Qom University of Medical Sciences, Qom, Iran
10 Department of Neurology, Faculty of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran
11 Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Multiple sclerosis (MS) mainly affects young women, which may be important since having the disease may affect the pregnancy tendency; on the other hand, pregnancy may change the disability status as it changes the hormonal and pharmacological equilibrium.
This study aimed to investigate the impact of pregnancy history and outcomes on the pregnancy tendency and the level of disability caused by MS (through EDSS) in affected Iranian women.
Secondary data analysis was done on the data gathered through the nationwide MS registry of Iran (NMSRI) from 2018 to 2021. NMSRI is the official MS registry of Iran, holding a standardized minimum data set on Iranian patients with MS (PwMS), including demographics, clinical presentations, types of MS, diagnostic and treatments, reproductive and pregnancy history, and EDDS scores. An EDSS cut-off point of 3.5-4 was determined to differentiate mild MS cases from others.
The final analysis was performed on 1120 patients with a mean age (± SD) of 34.2 (± 12.6) and a total disease duration of 6 years. Patients tend to have more pregnancies, parities, and abortions (P <0.001) in the pre-MS period. An abortion history was associated with EDSS score ≥ 4 (OR: 2.05; 95% CI: 1.05-4.00; P = 0.035). Furthermore, EDSS scores were significantly higher in patients with pregnancy or abortion history in the post-MS period (P = 0.02 and 0.04, respectively); however, the EDSS cut-off wiped the association out. There was also a decreasing trend of abortions in PwMS who had an EDSS score ≥ 4 (OR: 2.34; 95% CI: 1.18-4.62; P = 0.015).
Pregnancy, parity, and abortion may affect the disability in PwMS regardless of their current first symptoms or diagnosis age and MS type. Besides, the chance of parity may be affected by a higher disability score, which should be considered in the clinical setting.

Keywords:
Multiple sclerosis; Pregnancy; Parity; Disability

Sepideh Razi

DCLK1, a Promising Colorectal Cancer Stem Cell Marker, Regulates Tumor Progression and Invasion through Mir-137 and Mir-15a Dependent Manner

Sepideh Razi, Asieh Sadeghi, Zeynab Asadi-Lari, Kevin J. Tam, Elham Kalantari, Zahra Madjd
Oncopathology Research Center, Iran University of Medical Sciences, Tehran, Iran

Cancer stem cells (CSCs) are thought to be a major player in tumor initiation, progression, and metastasis. Targeting CSCs for elimination presents a promising therapeutic strategy; however, this approach will require a stronger understanding of CSC biology and the identification of CSC-specific markers. The present study was conducted to examine the correlation between DCLK1 and miR-137 and miR-15a levels in colorectal cancer. A total of 222 samples, including 181 colorectal cancer specimens, 24 adenomatoses, and 17 non-adenomatoses colonic polyps, were stained for DCLK1 expression using immunohistochemistry. Also, the expression of miR-137 and miR-15a was assessed in colorectal cancer with high and low DCLK1 expression levels. Most colorectal cancer specimens (76%) showed strong expression of DCLK1, whereas only 21% of adenomatous and none of non-adenomatous colonic polyps showed strong DCLK1 expression. A significant difference in DCLK1 expression was found between colorectal cancer, adenomatous, and non-adenomatous colonic polyps ($P < 0.001$). Higher expression of DCLK1 was more frequently detected in colorectal cases with larger tumor size ($P = 0.03$), poor differentiation ($P = 0.03$), and lymph node involvement ($P = 0.04$). Comparison of miR-137 and miR-15a in colorectal cancer cases revealed a significant inverse correlation with DCLK1 expression ($P = 0.03$ and $P = 0.04$, respectively). DCLK1 may act as a candidate marker for colorectal cancer stem cells. The critical role of DCLK1 in colorectal cancer suggests that it may represent an early diagnostic marker and therapeutic target; however, further investigation is warranted.

Keywords:
Cancer stem cells; Colorectal cancer; DCLK1; MiR-137; MiR-15a

Seyedeh Saba Sajadi Tabar

Human Creativity, the Only Area Artificial Intelligence Can Not Take Over ... Or Can It?

Seyedeh Saba Sajadi Tabar
Mazandaran University of Medical Sciences, Sari, Iran

Today, we are witnessing new artificial intelligence technologies that are moving at the fastest speed toward the specialized fields of humans and what we call the "human domain". Art is one of the fields that are born of human genius, and while it's a mixture of human feelings and social life, it also expresses the amount of human creativity within the process of conveying those feelings to his audience. But can computer science be creative by itself and dominate the infinite realm of human creativity and independently create a piece of art?
In this review, recently published articles that have shown the rapid and high-quality progress of computer science in most fields of art, like painting, music, varieties of architecture, etc., are checked. Also, articles observing how AI has created works through the algorithms provided to it.
One of the common methods of making art by computing is generative adversarial networks or GANs, within which programmers create algorithms employing a data set so that they will recognize different shapes of objects and models, then Create a new image of the identical object. And within the adversarial part, these images are presented to a different algorithm in which the system is trained to differentiate human-created debris from machine-created artifacts. But within the continuation of the research process, the results obtained showed that there's always somebody behind the method of making a piece of art by computing. The created works of art were the results of the efforts of many artists, scientists, and programmers to come up with ideas, write suitable programs and algorithms, guide the method, and control and edit it to do an ideal work.
As a result, the output of this technology can not be attributed solely to the power of the software itself.

Shiva Falahian

Evaluation of Anticancer Effect of Colchicum Autumnale L. Corm on Breast Cancer Cell Model

Shiva Falahian
Department of Pharmacy, Ayatollah Amoli Branch, Islamic Azad University, Amol, Iran

Breast cancer is the most common malignancy in women worldwide and the second most common cause of cancer death. One of the new prevention and treatment factors for cancer is the use of medicinal plants. The aim of this study was to evaluate the effect of the Colchicum autumnale plant on MCF-7 breast cancer cells and compare it with the Doxorubicin drug.
In this study, the alkaloid-rich extract was prepared. Then the cells with concentrations of 62.5 to 200 ng/ml were treated at regular intervals of 48 and 72 hours, and survival percentage and colony-forming ability were evaluated. IC50 values were calculated by Calcusyn software. Excel and SPSS software are used to analyze the data. Also, a P-value of <0.05 was considered significant.
Alkaloid-rich extract of the Colchicum autumnale plant significantly decreased the viability and ability of the cell colony formation. The IC50 parameter showed more cytotoxic effects of Colchicum autumnale plant extract on the MCF-7 cancer cell line than the HFF2 normal cell line for 48 and 72 hours. In addition, with the increasing concentration of the extract, cytotoxicity and growth inhibitory effect increased significantly compared to the doxorubicin drug.
Colchicum autumnale plant extract had a significant cytotoxic effect compared to the Doxorubicin drug on the breast cancer cell line (MCF-7).

Keywords:
Breast cancer; Cytotoxicity; MCF-7; MTT; Colchicum autumnale plant

Zahra Momenzadeh

Reviewing Telemedicine: The Necessity of Launching Televisit Application

Zahra Momenzadeh, Fatemeh Nematollahi, Sirous Momenzadeh, Fatemeh Momenzadeh, Reyhan Dehdari
Iranian Telemedicine Association, School of Medicine, University of Pécs Medical School, Pécs, Hungary

We start this review study by describing TeleVisit with the help of this motto from the Iranian Telemedicine Association (ITA), "use TeleVisiting before going to the doctor". Telemedicine may look a bit like sci-fi movies, but it is real. Telemedicine provides services, including health services and medical care, with the help of virtual technology and instruments. From the advantages of telemedicine, we can point out the easy use of this technology, more efficient use of time and money, and reduction in the number of visits in person.
TeleVisit (visiting patients by doctors from a distance) is the solution by which patients and doctors can get in touch with each other from anywhere on the planet where the internet is found. For using TeleVisit application, any doctor who is graduated and/or has a private clinic can also have their own virtual clinic.
Non-urgent patients upload their medical history and related documents before coming for visit in person; this way doctor can check results and request further investigations or prescribe medications accordingly and share them with the patient. If a new examination is needed, patients will virtually share the results to be checked. However, according to the patient's condition and need, there will be patients that will have to attend the clinic in person eventually.
In this study, we conclude that all of the non-urgent patients can first be visited by their doctors in the related medical filled via the TeleVisit application in whichever city or country they prefer and start their medical check-up as well as treatment. Therefore Iranian Telemedicine Association is planning to write contracts with different countries around the world and share this creativity and opportunity with them and expand this doctor-patient connection net in the scale of the world, without having borders. It seems that launching TeleVisit is a very efficient and useful plan.

Keywords:
Telemedicine; TeleVisit; Health informatics; Virtual net for treatment

Zahra Shahbazi

Panoptic Medical AI

Zahra Shahbazi, Kasra Ekhtiary, Saba Miri Kermanshahi
Medical Humanities Association (MHA), Universal Scientific Education and Research Network (USERN), Kermanshah, Iran

Today, the advancement of technology and scientific knowledge has led to the emergence of artificial intelligence, A phenomenon that seeks to achieve abilities equal to the skills of the human mind or even beyond. Numerous amounts of information are collected from us, stored, and tested by artificial intelligence algorithms. It is not out of mind that such programs, designed for limited duration and purposes, will become permanent monitors of humans to control them. In my opinion, artificial intelligence in medicine, like in all other fields, has provided new levels of control over society, which Foucault explains through Panopticism. As a philosopher of technologies of Power, Foucault fundamentally criticizes technological institutions, including the institution of medicine. In his opinion, technology has brought the subject into submission by exercising power over human subjects by controlling scientific knowledge over bodies and minds. Artificial intelligence, as the ultimate evolution of technology, is playing a progressive role in this field so that every moment of human life and every action is supervised by its object-making gaze. Panoptic artificial intelligence, as the most recent face of technology, reveals all that should be seen and is relevant and all that should be hidden to medical knowledge; The knowledge that instead of liberating the patient from the pain and suffering of the disease as its purpose, is at the service of the phenomenon that is trying to inject power into the veins of human relations and neutralize the flow of freedom in it.

Keywords:
Panopticism; Foucault; Power; Medical AI

Zeynab Zahedi

Investigating Antibiotic Resistance Patterns in Strains Causing Urinary Tract Infections in Semnan, Iran

Zeynab Zahedi, Samare Dash Mohammadi, Bahman Yousefi, Farahnaz Bineshian, Majid Eslami
1 Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran
2 USERN SEMUMS Office, Semnan University of Medical Sciences, Semnan, Iran
3 Universal Scientific Education and Research Network (USERN), Tehran, Iran

Urinary tract infections are among the most common bacterial infections, which are divided into lower UTIs (cystitis) and upper UTIs (pyelonephritis). The purpose of this study is to identify antibiotic resistance isolated from urinary tract infections and the antibiotic resistance pattern of the studied strains.
Urine samples of 60 people referred to the health reference laboratory in Semnan who have urinary tract infections were collected and confirmed using biochemical tests of the samples. Antibiogram (disc diffusion) was performed based on CLSI recommendations.
In the present study, 91.6% were women, and 8.5% were men. The age range of patients was from under 1 year to 87 years. In total, 10 isolates (16.6%) were gram-positive bacteria belonging to the staphylococci and enterococci families, and 50 samples (83.4%) were gram-negative bacteria. The highest frequency percentage is related to Escherichia coli bacteria with 40% and Klebsiella pneumonia with 26.6%, and the lowest frequency percentage is related to Pseudomonas aeruginosa, Staphylococcus aureus and Proteus mirabilis bacteria with only 1.6%. In gram-negative bacteria, the highest resistance to cotrimoxazole was observed with 54% resistance, and the lowest resistance to tobramycin was observed with 6% resistance. In gram-positive bacteria, the highest resistance is related to tetracycline and cotrimoxazole, with a number of 57.1%, and the lowest resistance is related to clindamycin, which was 100% sensitive.
Gram-negative bacteria are the most common bacteria isolated from urinary tract infections in people with urinary tract infections, and among them, Escherichia coli and Klebsiella pneumonia bacteria were highly prevalent. Tobramycin antibiotic for gram-negative bacteria and clindamycin for gram-positive bacteria are the best options for antibiotic treatment.

Keywords:
Urinary tract infection; Antibiotic; Antibiotic resistance; Disc diffusion

Recent Publication about USERN

Universal Accreditation System (UAS): An Innovative Education and Research Credit Appraisal by USERN

Acta Medica Iranica, Vol. 59, No. 1 (2021)

Universal Accreditation System (UAS): An Innovative Education and Research Credit Appraisal by USERN

Niloufar Yazdanpanah, Mahsa Keshavarz-Fathi, Heliya Ziaei, Ali Jaberipour, Mona Mirbeyk, Sara Hanaei, Simin Seyedpour, Negar Azami, Milad Akbarzadehmoallemkolaei, Kawthar Mohamed, Noosha Samieefar, Zahra Kolahchi, Sajad Kolahchi, Zahra Rahimi Pirkoohi, Sara Momtazmanesh, Mojdeh Sarzaeim, Negar Moradian, Alireza Sarkar Lotfabadi, Amir Hossein Loghman, Saboura Ashkevarian, Nima Rezaei

Universal Scientific Education and Research Network (USERN), Tehran, Iran

USERN; a borderless network promoting scientific education and research

The Universal Scientific Education and Research Network (USERN), as its name implies, aims to promote two main foci, education and research (1). As for the research arm, USERN has a great accomplishment of publishing more than 1450 scientific documents, resulting in an H-index of 57 at the end of 2021 (Figure 1). Education, as defined by USERN, is "the process of receiving or giving systematic instructions to prepare individuals to be functional in learning and generating knowledge and spreading wisdom" (2). As one of the central organizations which have been established to promote science without borders, USERN has organized over 800 educational and inspirational scientific events, including different scientific workshops, Focused Group Discussions (FGD), Meet the Expert sessions (USERN Expert Express Event, UEEE), Scientific Debates, USERN Research Week Events, talks, and schools, during the first six years of activity (3,4). At the dawn of the 7th year of activity, USERN is also proud to have its invaluable scientific community including over 18,000 members, more than 600 top 1% scientists, and 19 Nobel/Abel laureates as its Advisory Board members, 63 USERN junior ambassadors (UJAs), 70 USERN Interest Groups (UIGs), 78 Memorandum of Understandings (MoUs), and 46 USERN offices (Figure 2).

Indexing of educational activities

Indexing educational activities is of great importance for the supervisors and employers seeking skilled fellows and employees. Unlike a scholar's research outputs that are readily accessible through online databases, one's extra-curricular educational and executive activities are not usually indexed on online databases with public access. Individuals' attendance in extra-curricular educational programs qualifies them in different fields other than their field of specialty. In addition, experiencing executive roles in different activities improves students' communicating, management, and cooperative skills and prepares them for their future occupations.

There are different scoring systems designed for scoring educational activities. For instance, the Maintenance of Certification (MOC) program aims to create a continuing commitment for lifelong learning to increase the knowledge, skills, and proper performance that is essential for board-certified physicians/surgeons' practice. The MOC's credit system comprises three types of credits; credits based on time, credits based on completing an activity of the program, and partial credits. The new MOC program learning framework categorizes the learning process and, in relative scoring, into three sections: group-learning, self-learning, and assessment (5). The MOC program is limited to scoring activities for fellows and healthcare professionals.

On the other hand, a groups of physicians criticize it for being expensive, burdensome, and not completely in line with their usual practice. Nevertheless, Gray et al., reported that physicians who have completed the MOC program gained better performance scores in their analytical study (6). The importance of continued educational activities and knowledge and skill assessment is not arguable; however, the way the MOC program is implemented has been controversial for years (7,8).

The Accreditation Council for Continuing Medical Education (ACCME) put forward board-specific requirements, which could better fit physicians' daily practice rather than MOC requirements. In addition, many of the accredited Continuing Medical Education (CME) activities could be registered for MOC credits. CME is introduced as a proper alternative for MOC (9).

The European Credit Transfer and Accumulation System (ECTS) aims to create a system for evaluating and representing students' educational activities. It is designed to facilitate the representation and recognition of the

student's academic qualifications and achievements and make possible the application of national higher education degrees in different countries and on international scales. Hence, ECTS helps validate the student mobility between higher education institutions and is adopted by the European Higher Education Area (EHEA) (10).

Universal accreditation system (UAS): an innovation from USERN

Since its establishment in 2016, USERN has applied different accreditation methods to evaluate the educational and research activities of USERN beneficiaries, including UIGs, USERN offices, and UJAs (11). Moreover, many organizing committees of external events have requested to obtain the accreditation of their events by USERN. In the 6th year, after experiencing and examining different accreditation methods, USERN aimed to launch the Universal Accreditation System (UAS) to quantify educational activities and professional development, which have not been indexed on online databases. This system includes accreditation of activities for different categories, including participation in various educational programs and performing executive roles. The importance of educational activities and experiencing different educational courses and their strong association with future employment and career accomplishments is not hidden to anyone. While almost all the reviewed accreditation systems mainly focused on educational activities, the administrative and executive activities could not be neglected. Executive activities and team working improve the soft skills of individuals in different aspects, including communicating skills, time management, language skills, cognitive and emotional empathy, negotiation and conflict resolution, problem-solving, flexibility, decisiveness, and leadership skills. Integrating these skills equips students with necessary features that considerably help them in their future careers (12,13). Therefore, assessing both educational and executive activities is considered to design UAS.

UAS credits appear on the profile of USERN members as online evidence of participation in educational programs and administrative activities (Figure 3).

USERN welcomes event organizers to apply to get UAS credits for their events if the event proposal meets the standard criteria to grant UAS credits for its participants. The amount of UAS credits for each event is calculated based on the approved UAS instructions, based on the event's type, duration, and scale (local, national, international), which is developed by the UAS core committee in USERN.

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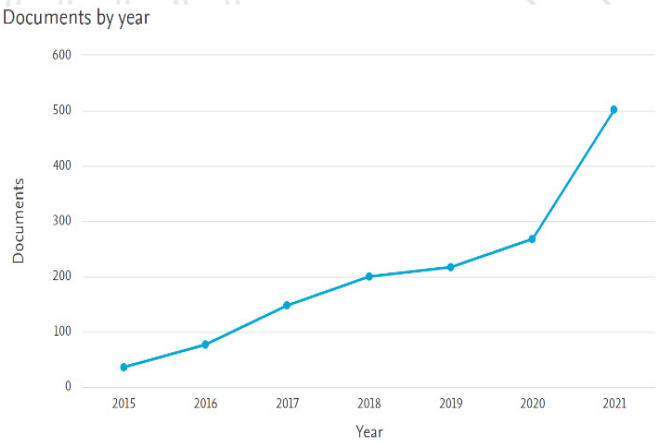

Figure 1. USERN scientific output during 6 years of scientific activities,resulting in an H-index of 57 and more than 1450 scientific documents

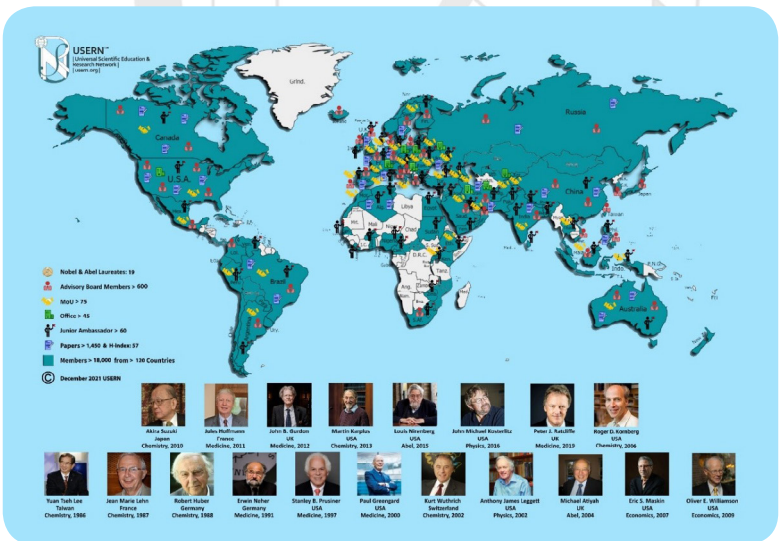

Figure 2. USERN map, December 2021

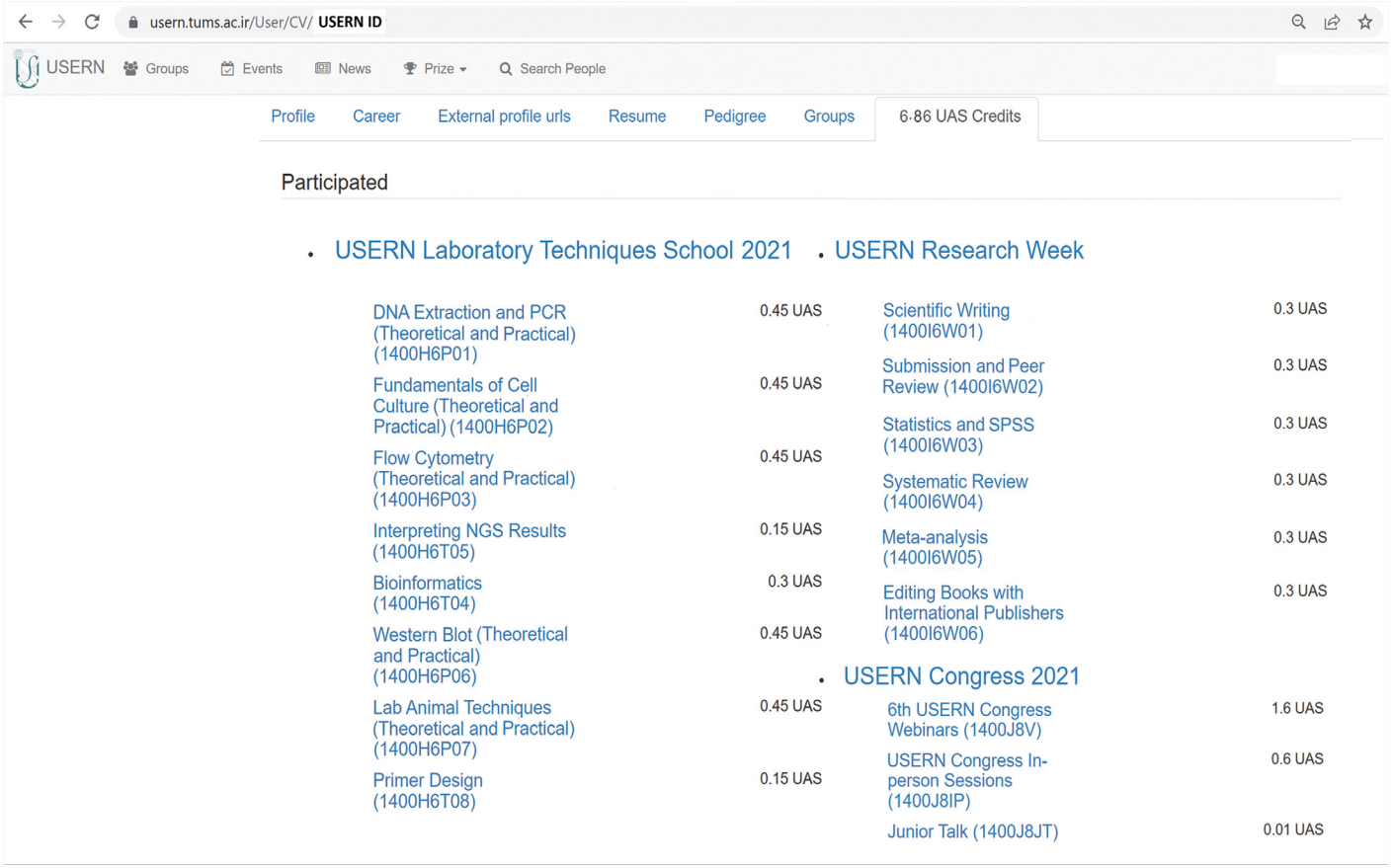

Figure 2. An example of how UAS credits appear on the USERN profile of individuals. The UAS for each event is recorded separately on the profile, while the total UAS credits obtained appears on the top

USERN Map
November 2022

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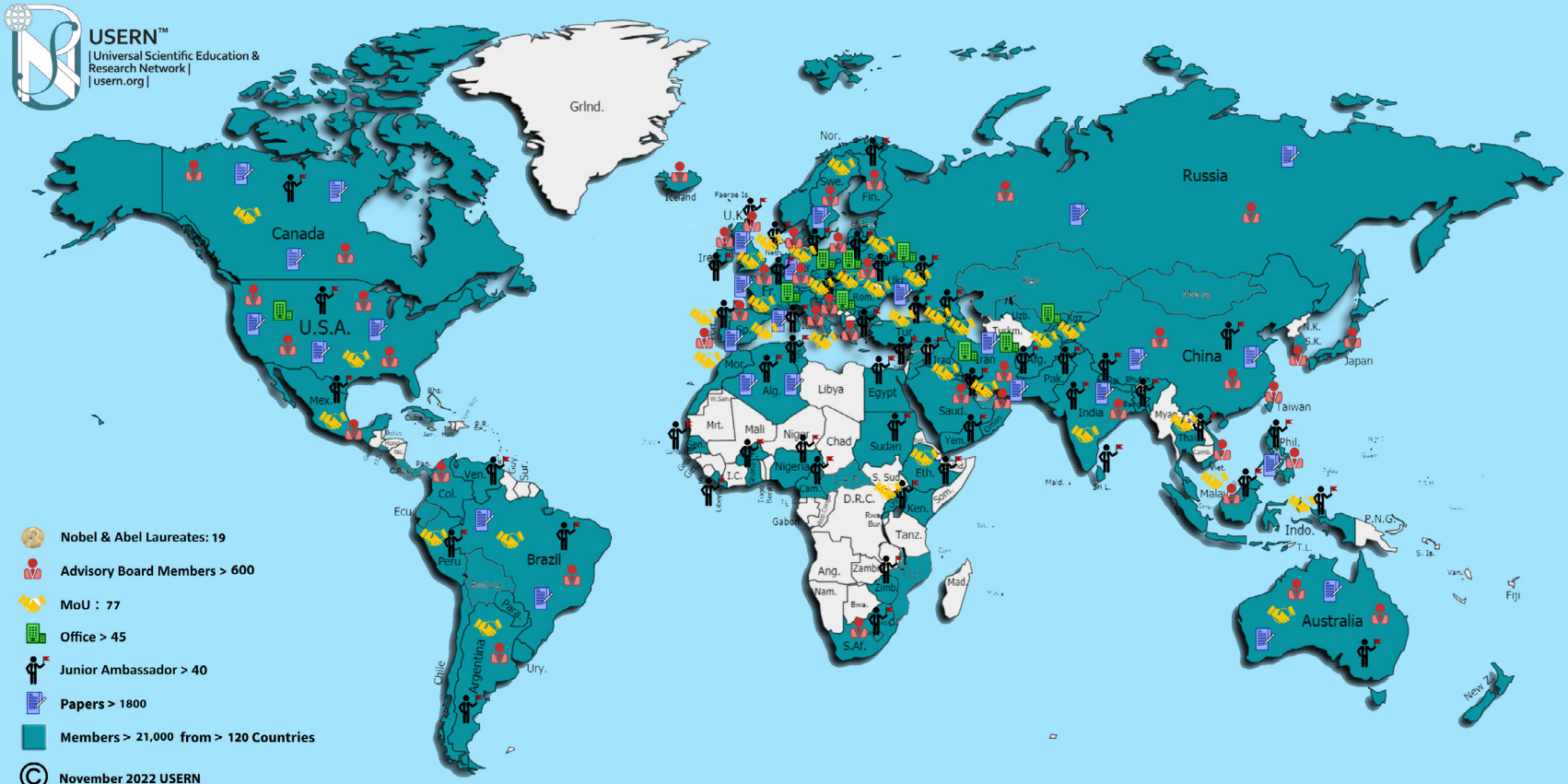

- Nobel & Abel Laureates: 19
- Advisory Board Members > 600
- MoU : 77
- Office > 45
- Junior Ambassador > 40
- Papers > 1800
- Members > 21,000 from > 120 Countries

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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

Roger D. Kornberg
USA
CHemistry, 2006

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

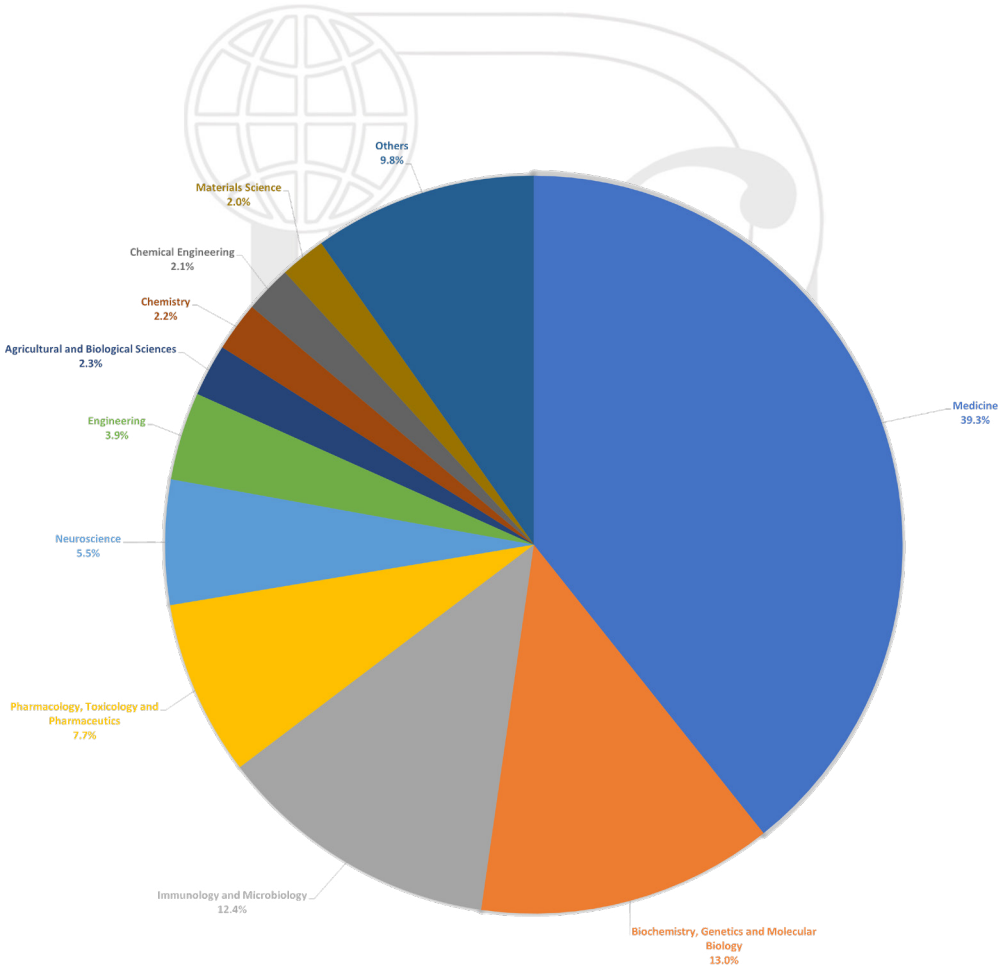
Oliver E. Williamson
USA
Economics, 2009

USERN Scientometrics 2022

USERN Scientometrics 2022

USERN has tried diligently to promote its scientific activities in 2022. The following charts represent the output of USERN scientific activities in these year:

	H-index	Documents
Scientometrics	70	1886

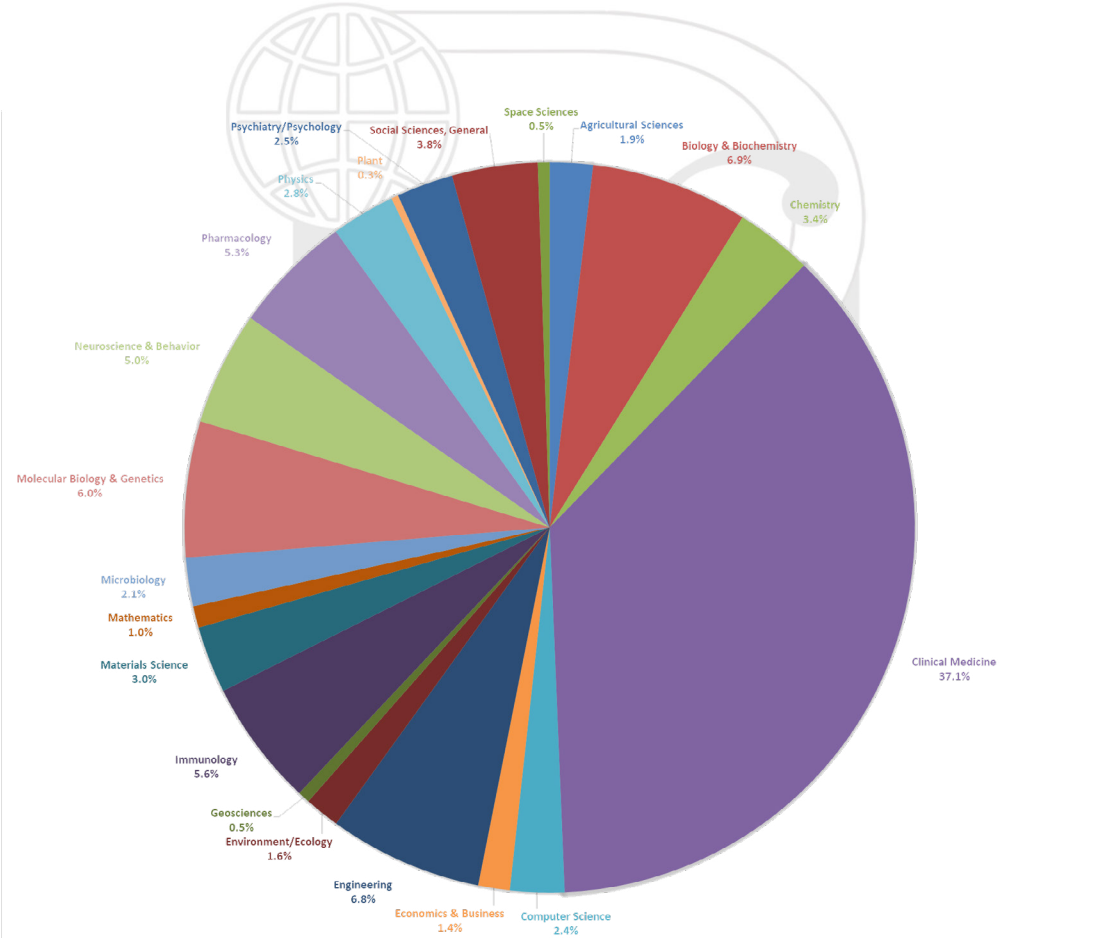


USERN Members 2022

USERN Members 2022

Members are importance to USERN; as they are the representative of USERN popularity among academic people.

Proudly, USERN has more than 21000 members from all 5 continents and over 120 countries, 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 Molecular Biology & Genetics are the next most popular majors among USERN members:



USERN Memorandum of Understanding (MoUs) and Offices Worldwide

USERN's Memorandums of Understanding (MoUs) Worldwide

To date, USERN has developed a borderless trans-disciplinary network by signing 78 MoUs with international academic institutes with the aim of promoting universal scientific education and research.

Akkon University for Human Sciences, Institute for Research in International Assistance (IRIA), Berlin, GERMANY
Alma Mater Europaea (ECM), Ljubljana, SLOVENIA
Al-Sabah Hospital, Department of Pediatrics, Kuwait, KUWAIT
Arabkir Medical Center, Yerevan, ARMENIA
Association of Medical Schools in Europe (AMSE), Berlin, GERMANY
Astana Medical University, Nur-Sultan, KAZAKHSTAN
Azerbaijan Medical University, Baku, AZERBAIJAN
Baltic International Academy, Riga, LATVIA
Bangladesh University of Health Sciences, Dhaka, BANGLADESH
Belarusian National Research Center for Pediatric Oncology, Hematology and Immunology, Minsk, BELARUS
Belarusian State Medical University, Minsk, BELARUS
Brain Connectivity and Cognition Lab, University of Miami, Miami, USA
Brazilian Group for Immunodeficiency (BRAGID), Sao Paulo, BRAZIL
Brigham and Women's Hospital, Laboratory of Nanomedicine and Biomaterials, Boston, USA
Care-for-Rare Foundation, Munich, GERMANY
Center for Biomedical Law, University of Coimbra, Coimbra, PORTUGAL
Children's Hospital Philadelphia, Philadelphia, USA
Doctoral School of the University of Szczecin, Szczecin, POLAND
Erasmus University Medical Center Rotterdam, Rotterdam, THE NETHERLANDS
European School of Genetics in Medicine, Bertinoro, ITALY
Faculty of Dentistry, Thammasat University, Bangkok, THAILAND
Faculty of Medicine, University of Coimbra, Coimbra, PORTUGAL
Great Ormond Street Institute of Child Health, University College London, London, UK
Hannover Medical School, Department of Immunology and Rheumatology, Hannover, GERMANY
Hospital Nacional Edgardo Rebagliati Martins, Lima, PERU
Institute of Biomedicine and Pharmacy Russian-Armenian University, Yerevan, ARMENIA Armenian Association of Molecular Immunology and Allergology, Yerevan, ARMENIA
Institute of Genetic and Biomedical Research (IRGB), Institute of Neurogenetics and Neuropharmacology, Sardinia, ITALY
Instituto de Pesquisa Pele Pequeno Principle, Curitiba, BRAZIL
International Patient Organization for Primary Immunodeficiencies, Oxford, UK
Jimma University, Jimma, ETHIOPIA
Karolinska Institutet, Department of Laboratory Medicine, Lennart Hammarstrom Research Group, Stockholm, SWEDEN
Kharkiv National Medical University, Kharkiv, UKRAINE
Kharkiv Polytechnic Institute (KhPI), Kharkiv, UKRAINE
Latin America Society for Immunodeficiencies (LASID), Sao Paulo, BRAZIL
Ljubljana University Medical Center, Ljubljana, SLOVENIA
Ludwig Boltzmann Institute for Rare and Undiagnosed Diseases & Vienna Center for Rare and Undiagnosed Diseases (CeRUD), Vienna, AUSTRIA
Ludwig Maximilian University of Munich, University Children's Hospital Munich, Munich, GERMANY
Makerere University, College of Health Sciences (MAKCHS), Kampala, UGANDA
Malaysian Society of Allergy and Immunology (MSAI), Kuala Lumpur, MALAYSIA
ManRos Therapeutics, Roscoff, FRANCE
Maribor University, Faculty of Medicine, Maribor, SLOVENIA
Maribor University, Faculty of Natural Sciences and Mathematics, Maribor, SLOVENIA
Maribor University, Maribor, SLOVENIA
Marmara University, Marmara University Hospital, Division of Pediatric Allergy/Immunology, Istanbul, TURKEY

MCM-DAV-College for Women, Chandigarh, INDIA
Medical College of Wisconsin, Wisconsin, USA
Medical University of Graz, Institute of Health Technology and Prevention Research, Weiz, AUSTRIA
Medical University of Vienna, Center for Pathophysiology, Infectiology and Immunology, Vienna, AUSTRIA
Mexican Foundation for Girls and Boys with Primary Immunodeficiencies, Huixquilucan, MEXICO
Monash University, Monash Clinical and Imaging Neuroscience, Melbourne, AUSTRALIA
Moroccan Association Hassanian for Health and Environment (AMHES), Rabat, MOROCCO
Nab'a-Al Hayat Foundation for Medical Sciences and Healthcare, Najaf, IRAQ
Necker Medical School, Laboratory of Human Genetics of Infectious Diseases, Paris, FRANCE
Panjab University (PU), Chandigarh, INDIA
Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, INDIA
Rare Immune Disease, Kiev, UKRAINE
Rhode Island Hospital, Rhode Island, USA
Rocket Pharmaceuticals, The Alexandria Center for Life Sciences, New York, USA
Scenarium Group GmBH, Berlin, GERMANY
Seattle Children's Research Institute, Seattle, USA
Semmelweis University, International Nephrology Research & Training Center, Institute of Pathophysiology, Budapest, HUNGARY
Shupyk National Medical Academy of Postgraduate Education, Kiev, UKRAINE
Sister María Ludovica Children's Hospital, La Plata, ARGENTINA
STEM Fellowship, Vancouver, CANADA
Sultan Idris Education University (UPSI), Vilnius, LITHUANIA
Sultan Qaboos University, Muscat, OMAN
Tajikistan National Medical Center, Dushanbe, TAJIKISTAN
Ukrainian Association of Pediatric Immunology, Kiev, UKRAINE
Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, BRAZIL
Universitas Brawijaya, Malang, INDONESIA
University of Gothenburg, The Queen Silvia Children's Hospital, Gothenburg, SWEDEN
University of Pavia, Pavia, ITALY
University of Santiago de Compostela (USC), Santiago de Compostela, SPAIN
University of São Paulo, Institute of Biomedical Sciences, Sao Paulo, BRAZIL
University of South Florida, South Florida, USA
University of Strasbourg, Strasbourg School of Medicine, Strasburg, FRANCE
V. N. Karazin Kharkiv National University, Kharkiv, UKRAINE

USERN Offices

Office is the symbol of identification for a persistent and mutually beneficial collaboration. USERN offices grow, as USERN grows. We continue to establish new offices world-wide, to dialogue, and commit to operate on science, and on every scientific motion that brings us courage to move further and move forwards. Thanks to the brilliant office directors worldwide and to the supporting hosting academia and institutions USERN is now home to #44 offices:

Active USERN Offices list:

USERN Headquarter Office, Children's Medical Center, Tehran University of Medical Sciences, Tehran, IRAN; December 25th 2016
USERN Dushanbe Office, Tajikistan National Medical Center, Dushanbe, TAJIKISTAN; January 25th 2016
USERN SSRC Office, Students' Scientific Research Center, Tehran University of Medical Sciences, Tehran, IRAN; January 30th 2016
USERN PPNCD Office, Research Institute for Primordial Prevention of Non-Communicable Disease, Isfahan University of Medical Sciences, Isfahan, IRAN; February 17th 2016
USERN Roscoff Office, ManRos Therapeutitics, Roscoff, FRANCE; March 25th 2016
USERN Munich Office, Care-for-Rare Institute, Munich, GERMANY; April 8th 2016
USERN Boston Office, Harvard Medical School, Children's Hospital-Boston, Boston, USA; August 16th 2016
USERN Khrakov Office, Kharkiv National Medical University, Kharkiv, UKRAINE; December 16th 2016
USERN Tabriz Office, FAKT group, Medical Research and Development Complex, Tabriz, IRAN; January 1st 2017
USERN AJUMS Office, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, IRAN; January 1st 2017
USERN SSU Office, Shahid Sadoughi University of Medical Sciences, Yazd, IRAN; January 1st 2017
USERN KMU Office, Kerman University of Medical Sciences, Kerman, IRAN; January 1st 2017
USERN AUSMT Office, Amol University of Special Modern Technologies, Amol, IRAN; January 1st 2017
USERN BUMS Office, Birjand University of Medical Sciences, Birjand, IRAN; January 1st 2017
USERN SUMS Office, Shiraz University of Medical Sciences, Shiraz, IRAN; January 1st 2017
USERN GUMS Office, Guilan University of Medical Sciences, Rasht, IRAN; January 1st 2017
USERN Bonn Office, Wachsbleiche, Bonn, GERMANY; February 1st 2017
USERN Maribor Office, Faculty of Natural Sciences and Mathematics, University of Maribor, Maribor, SLOVENIA; February 28th 2017
USERN AIC Office, Avicenna International College, Budapest, HUNGARY; February 30th 2017
USERN IAUM office, Islamic Azad University of Mashhad, Faculty of Medicine, Mashhad, IRAN; March 13th 2017
USERN MUI Office, Isfahan University of Medical Sciences, Isfahan, IRAN; July 23rd 2017
USERN ZAUMS Office, Zahedan University of Medical Sciences, Sistan va Balouchestan, IRAN; October 21st 2017
USERN ZUMS Office, Zanjan University of Medical Sciences, Zanjan, IRAN; March 18th 2018
USERN MazUMS Office, Mazandaran University of Medical Sciences, Mazandaran, IRAN; April 23rd 2018
USERN ArakU Office, Arak University, Arak, IRAN; May 20th 2018
USERN UMSHA Office, Hamadan University of Medical Sciences and Health Services, Hamadan, IRAN; May 21st 2018
USERN AUMS Office, Abadan University of Medical Sciences, Abadan, IRAN; November 14th 2018
USERN CARE (TUMS) Office, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, IRAN; November 21st 2018
USERN Dentistry School (TUMS) Office, Tehran University of Medical Sciences, Tehran, IRAN; December 30th 2018
USERN Amirkabir Office, Amirkabir University of Technology, Tehran, IRAN; June 12th 2019
USERN HUMS Office, Hormozgan University of Medical Sciences, Bandarabbas, IRAN; June 20th 2019
USERN ABZUMS Office, Alborz University of Medical Sciences, Karaj, IRAN; July 20th 2019
USERN ArUMS Office, Ardabil University of Medical Sciences, Ardabil, IRAN; August 20th 2019
USERN SBMU Office, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, IRAN; October 2nd 2019
USERN SKUMS Office, Shahrekord University of Medical Sciences, Shahrekord, IRAN; December 1st 2019
USERN FUMS Office, Fasa University of Medical Sciences, Fasa, IRAN; September 2nd 2020
USERN JUMS Office, Jahrom University of Medical Sciences, Jahrom, IRAN; September 21st 2020

USERN MUBabol Office, Babol University of Medical Sciences, Babol, IRAN; December 16th 2020
USERN FNRC Office, Functional Neurosurgery Research Center, Shahid Beheshti University of Medical Sciences, Tehran, IRAN; March 13th 2021
USERN LUMS Office, Lorestan University of Medical Sciences, Lorestan, IRAN; March 17th 2021
USERN KUMS Office, Kermanshah University of Medical Sciences, Kermanshah, IRAN; May 11th 2021
USERN GoUMS Office, Golestan University of Medical Sciences, Golestan, IRAN; August 21st 2021
USERN SavehUMS Office, Saveh University of Medical Sciences, Saveh, IRAN; June 21st 2022
USERN SemUMS Office, Semnan University of Medical Sciences, Semnan, IRAN; July 16st 2022

USERN Prize

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

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

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

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

USERN 2020 Laureate in Formal Sciences

Dongrui Wu | **China**

Signal Processing and Machine Learning for Calibration-free and Secure Brain-Computer Interfaces (BCIs)

USERN 2020 Laureate in Physical and Chemical Sciences

Gregory Mark Allen Ashton | **Australia**

Black holes and neutron stars: enabling astrophysics with Bilb y

USERN 2020 Laureate in Biological Sciences

Daniel Sauter | **Germany**

Deciphering molecular determinants of coronavirus spread in the human population

USERN 2020 in Medical Sciences

Mohammad Ali Shahbazi | **Finland**

A Thermo-responsive Biopolymeric Microimplant for the Treatment of Autoimmune Disorders

USERN 2020 Laureate in Social Sciences

Lianne Schamaal | **Australia**

A Global Alliance to Elucidate Neurobiological Signatures of Depression and Suicide

USERN 2021 Laureate in Formal Sciences

Xudong Zhao | **China**

Control Synthesis of Switched Systems

USERN 2021 Laureate in Physical and Chemical Sciences

Minghao Yu | **Germany**

Developing Sustainable Energy Storage Devices with Resource-aboundant Raw Materials

USERN 2021 Laureate in Biological Sciences

Federico Bella | **Italy**

From Air to Fertilizers: Zero-impact Agriculture of the Future

USERN 2021 in Medical Sciences

Hassan Abolhassani | **Sweden**

Integrative Multi-Omics Analysis of Unsolved Comman Variable Immunodeficiency

USERN 2021 Laureate in Social Sciences

Daniel King | **Australia**

Empowering Vulnerable Population to Overcome Unhealthy Gaming Habits and Gaming Disorders

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 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 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 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 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.