

# InterAcademy Partnership Science Education Programme Triennial Conference



**Hosted by the Hassan II Academy of Science and Technology**

**Rabat, Morocco**

**16-17 March 2023**



### **The InterAcademy Partnership (IAP)**

Under the umbrella of the InterAcademy Partnership (IAP), more than 140 national, regional and global member academies work together to support the vital role of science in seeking evidence-based solutions to the world's most challenging problems. In particular, IAP harnesses the expertise of the world's scientific, medical and engineering leaders to advance sound policies, improve public health, promote excellence in science education, and achieve other critical development goals.

IAP's four regional networks – AASSA (for the Asia/Pacific region), EASAC (for Europe), IANAS (for the Americas) and NASAC (for Africa) - are responsible for managing and implementing many IAP-funded projects and help make IAP's work relevant around the world.

More information about IAP can be found at [www.interacademies.org](http://www.interacademies.org), on Twitter at @IAPartnership, on LinkedIn and YouTube.

### **IAP Science Education Programme (SEP)**

Since 2003, IAP has been implementing a global Science Education Programme (SEP) which has the objective of improving science education and science literacy at the pre-university levels in all countries and regions of the world.

The IAP SEP, led by a Global Council of experts, promotes the inquiry-based science education (IBSE) approach.

The IAP SEP Global Council defines and implements the annual activities of the SEP on global and regional scales.

The lead academy of the IAP SEP Global Council 2019-2023 is the Hassan II Academy of Science and Technology (Morocco).

## **Welcome**

Dear colleagues,

In my role as Chair of the IAP Science Education Programme's Global Council, I would like to welcome you to Rabat. I also extend my sincere thanks to the Hassan II Academy of Science and Technology, lead academy of this Global Council, for hosting us here these days.

We have prepared an interesting agenda for our IAP SEP conference - with 15 speakers from 12 countries. We will certainly get a good global overview of progress in inquiry-based science education from around the world. Quality of education for all is a real challenge, and it is known that inquiry-based science education can have a very positive impact, providing its implementation is successful. And I hope our discussions, including the closing round-table session, will bring out some concrete ideas for further progress.

We also have important items to discuss during our Global Council meeting - including the further development of our five pilot Houses of Innovation Science and Technology (ISTEC) in Benin, Ethiopia, Ghana, Morocco and Sudan.

Of course, some of our Global Council members have now served two terms and will be rotating out of the committee. We thank you for your contributions over the past six years and hope that you will stay engaged in our ongoing activities. We will rely on your expertise also to assist us with identifying the best possible future Global Council from among the nominations we have received.

At a time when misinformation and disinformation are able to spread so quickly via social media, with grave consequences for people's understanding of science-based issues, our work to develop science literacy and critical thinking among inquiring young minds is more relevant than ever before. We should use these two days in Morocco wisely and plan for future activities that can really have an impact on the quality of education of thousands of children across the globe. I can think of no other mission that would be more noble - so let us get started!

*Wafa Skalli*

Chair, Global Council, IAP Science Education Programme

Hassan II Academy of Science and Technology, Morocco

## OPENING SESSION

Thursday 16 March – 09:00-10:00

### **Keynote address: Science Education and Literacy for Global Goals (SDGs)**

**Carol O'Donnell\*** - Director, Smithsonian Science Education Center, Washington, DC, USA

#### **Abstract**

In this keynote address, Dr. Carol O'Donnell will discuss how the Smithsonian Institution, through the Smithsonian Science Education Center, in collaboration with the InterAcademy Partnership (IAP), has helped to transform our traditional understanding of inquiry-based science education (IBSE) into the future. Together, the Smithsonian and IAP are helping young people “Discover”, “Understand” and “Act” on the world’s most complex socio-scientific issues of our time (such as climate change, infectious disease, biodiversity loss, the ethics of biotechnology, humans and the atmosphere, clean energy, clean water, the health of our ocean). Dr. O'Donnell will discuss how the [Smithsonian Science for Global Goals](#) project is helping young people engage as partners and action researchers to realize the UN Sustainable Development Goals (SDGs) within their own local communities. She will discuss how students discover the connections between themselves, their communities and global issues; investigate issues using their communities as their laboratories; gather data relevant to them and their communities using science and social science approaches; and act on what they have learned, applying their new knowledge for social good. This innovative approach centres young people in leading their science learning and casts science educators as facilitators of that process. Upending traditional approaches to IBSE, the project centres student voices, diverse perspectives, representational role models, an emphasis on inclusion, and multiple ways of knowing. Filtered through the lenses of systems and futures thinking, this approach transforms education into an experience relevant to the complexities of the 21<sup>st</sup> Century and integral to the accomplishment of the SDGs. The Discover, Understand, Act framework builds student sustainability mindsets (agency and action-taking; open-mindedness and reflection; relationships and interconnection; and equity and justice) while developing their scientific literacy, enabling them to take a role as active contributors to a sustainable future.

#### **Biosketch**

Carol O'Donnell is the Director of the Smithsonian Science Education Center (SSEC), a unit of the Smithsonian Institution that is dedicated to transforming the learning and teaching of science throughout the nation and world. In this role, O'Donnell is responsible for all operational activities and planning for the unit, including building awareness for K-12 science education reform among State and district leaders; conducting programmes that support the professional growth of K-12 science teachers and school leaders; and overseeing all research and curricular resource development, philanthropic development and administration. In this capacity, since 2015, she also serves as the US representative on the Global Council of the IAP Science Education Programme (SEP).

Carol earned her BSc in Education from the University of Pittsburgh, her MSc in Geosciences from Mississippi State University, and her doctorate in Curriculum and Instruction with a focus on science education from George Washington University (GWU).

Prior to joining the Smithsonian, O'Donnell was a leader at the US Department of Education for nearly a decade, supporting States and districts as they built their capacity to implement and sustain education reforms and achieve continued improvement in student outcomes. A former K-12 teacher and curriculum developer, she is still in the classroom today, serving on the part-time faculty of the Physics Department at GWU.

**Keynote address: IBSE Development in Multi-facet Global Initiative**

**R. Indarjani\*** - Dean, Faculty of Sciences and Technology, As-syafiiyah Islamic University, Jakarta, Indonesia

**Abstract**

The rapid of technology information development has changed students' learning style significantly, requiring innovation of learning methods whilst preparing them for lifelong learning. Inquiry Based Science Education (IBSE) has succeeded as a suitable educational method that greatly motivates students to move forward. The pedagogy of "learning by doing" will give opportunity to students to master science concepts by conducting experiments followed by group discussions where respect, leadership and decision-making skills are trained. At that stage, IBSE becomes a learning process for students that expands the limits of classroom instruction, moves beyond facts and figures, and builds transferable life skills and characters. Application of IBSE requires direct observation and investigations, which can nurture the inborn curiosity and creativity of children, making IBSE ideal to introduce to even the youngest schoolchildren.

IBSE can be understood as generic model to develop scientific thinking of the learner, making IBSE become a key concept in the multifaceted initiatives taken by international education agencies, such as IAP SEP, which has the mission to prepare students to thrive in globalized worlds. IBSE re-emerges as STEM education, which focuses on hands-on learning with real-world applications through a design engineering process that helps students to develop a variety of skills, and cultivate a sense of creativity and innovation to face the challenges.

Referring to global phenomena such as climate change, IT expansions, radicalism, mosquito-borne diseases and the Covid-19 pandemic, IBSE principles are able to explain the processes, causes and effects while students become familiar with the facts. It is expected that students will act wisely addressing the issues, able to produce innovative solutions that contribute to global peace and living in harmony.

To enable IBSE to be effectively and productively implemented, it needs a well develop curriculum, qualified teachers, commitment of education authorities, and support from local and national education boards to assure that IBSE is properly applied in school learning processes.

**Biosketch**

R. Indarjani (PhD, Marine Biology, Adelaide University, Australia) was Deputy Director of the Programme of South East Asia Ministers of Education Organisation (SEAMEO) Regional Centre for "Quality Improvement of Teacher and Education Personnel in Science" (QITEP), Bandung, Indonesia (2012-2019). This institution is committed to promoting Inquiry-based Science Education (IBSE) through various and innovative trainings and workshops, producing learning resources, conducting education seminars and

conferences, and the establishment of a professional community of learning in the Southeast Asia region through cooperation with the UNESCO International Science Technology and Innovation Centre for South-South Cooperation (ISTIC), Malaysia; La Main a la Pate (LAMAP) Foundation, France; Primary Connections of the Australian Academy of Science; and STEL'R of the Australian Academy of Technology and Engineering. She worked with Professor Bruce Alberts, US President Obama's Science Envoy to Indonesia in getting the Indonesian Academy of Science (AIPI) engaged in IBSE and STEM activities.

Her effort to promote IBSE also touched the policy level in SEAMEO and Indonesia by defining IBSE as the niche area of QITEP and also by conducting a High Level Policy Forum on IBSE in 2015 that was officially opened by the Minister of Education and Culture of Republic of Indonesia (Anies Baswedan, MPP, PhD, currently Jakarta's Governor), who started the commitment to implement proper IBSE in science teaching and learning at national and regional levels.

In 2015-2017, she conducted a multi-year project on ICT-Based programme on Adopting 21st Century Curriculum through Science and Mathematics as mandated by the SEAMEO Secretariat, Bangkok.

At the national level, she was successful in bringing STEM education to be adopted in the National Curriculum as an alternate approach in delivering effective science teaching and learning.

Indarjani was a member of the curriculum team of the IAP "Fusion of Belt and Road Civilizations Education Curriculum" that resulted in the publication of the book that showed how IBSE and STEM were applied in a cultural integration context to promote peace and harmony among the youth. The book was published by the Belt and Road International Science Education Coordination Committee (BRISECC), Beijing, China. In addition, she also wrote the book "Introduction to Environmental Science" to inculcate environmental awareness in the light of climate change impacts.

She is a member of Global Council of IAP's Science Education Program since 2015, a founding Fellow of the Academy of Engineering and Technology for Developing World (AETDEW), and has lifetime membership of the International Society of Mangrove Ecosystem (ISME). She was a BRISECC Council member 2017-2019, during which time she vigorously promoted the participation of Indonesian science students in the annual Belt and Road Teenager Maker Camp and Teacher Forum program of the Chinese Association of Science and Technology (CAST).

After 7 years working in QITEP, she has now been appointed as the Dean of Faculty of Sciences and Technology, As-syafiiyah Islamic University, Jakarta, Indonesia, thus making her involvement and experiences in various organizations more meaningful to enhance the quality of higher education in national level toward a University Education 4.0 Framework and is facing the challenges of Society 5.0.

## SESSION 1: Science education, Science Literacy, Science Centres and Science Fairs

Thursday 16 March, 10:40-12:15

### STEM at Primary School: Why, how?

**Daniel Rouan\*** - Past president, *La Main à la Pâte* (LAMAP) Foundation, France

#### Abstract

Children are naturally curious and there is an extraordinary learning potential for STEM in young children. STEM at primary school nurtures this curiosity and allows them to acquire the mindset they need to answer their questions.

With science at primary school, pupils develop skills to: investigate problems, learn how science works, and discover why science matters in the world. Pluridisciplinarity is a key ingredient because it allows cross-enrichment.

With STEM education, pupils acquire as well a citizen training: this is essential for them to master a more and more technological world. They also become aware of the ecological issues they will face. Finally, they develop a critical mind – essential in the epoch where fake news is so widespread.

To reach all those goals, training teachers is key!

STEM education will be efficient only if teachers are themselves well educated in STEM, but often they have studied humanities at university and they fear to teach STEM.

They need basic but solid knowledge, as well as methods, such as IBSE, to capture interest of children.

All studies show that there are some inescapable ingredients to be successful:

- Teachers' pre-service training in STEM must be strengthened in most countries;
- Continuous Professional Development (CDP) must be effective, especially during the first years of a teaching career, noting that self professional development is becoming more and more accessible in the Digital Age;
- Creation of communities is key for exchanging experiences and peer support;
- Transformation requires a long time – not less than 8 years is often advocated;
- In a changing world, CDP must be never-ending;
- Enrolling scientists brings a lot: the direct contact with on-going science is especially motivating.

#### Biosketch

Born in 1950, Daniel Rouan is an astrophysicist, Director of Research, Emeritus at the *Observatoire de Paris (Laboratoire d'Etudes Spatiales et d'Instrumentation en Astrophysique - LESIA)*. Former student from the *Ecole Normale Supérieure (Paris)*, he defended his PhD thesis in 1981, then joined the CNRS in 1982 where he specialized in infrared astronomy. His recent scientific experience was enhanced with discoveries of three dozen extrasolar planets, such as the first earth-sized exoplanet shown to be a rocky one, or the direct detection of a Saturn-like exoplanet.

He has published more than 600 articles and books and supervised 23 PhD students. He has also undertaken important duties in the management of staff and scientific projects, in his laboratory as well as at national and international levels.

During his career, he was very much involved in tertiary education. After many years teaching astrophysics, and observation methods, he took the lead of the Master in Astrophysics, then of the doctoral school of Astrophysics in Ile-de-France that gathers all regional scientific universities in Paris area.

He was elected a member of the *Académie des sciences* in 2005 and became the President of the *Fondation La main à la pâte* in April 2014 for a mandate of 8 years. He is currently Vice-President of the *Société Française de Physique* of which he will soon become the President.

## **Presenting 'Big Ideas in Science Education' in Central Asia**

**Lazzat Kussainova\*** - President, International Centre for Scientific Collaborations, Kazakhstan

### **Abstract**

In Kazakhstan, since February 2022, the training of school teachers, teachers of colleges and universities in the practical application of the book "Working with Big Ideas of Scientific Education" has been started. This book, published by IAP in 2015, is available in Chinese, English, Farsi, French, Italian, Russian, Serbian and Spanish.

In order to popularize scientific education and apply the principles of "Big Ideas" in schools in Kazakhstan, with the support of the UNESCO Cluster Office in Almaty (Kazakhstan), the Global Council for Scientific Education of the Interacademic Partnership (IAP-SEP), a member of the IAP Global Council, President of the private institution "International Centre of Scientific Collaborations" (ICSC) - Dr. Lazzat Kusainova developed "Methodological recommendations for the practical application of the book "Working with Big Ideas of Scientific Education" (2021). Based on the Methodological Recommendations, the programme of the "Scientific Literacy: Working with Big Ideas of Scientific Education" training seminar was also developed.

The developed programmes and materials of the course were examined by Kazakhstani specialists in the field of education, and in February 2022, they were recommended for use by the Coordinating Council "Development of Scientific and Technical Creativity of Children and Youth" of the Republican Scientific and Methodological Centre for Additional Education of the Ministry of Education and Science of the Republic of Kazakhstan.

The author's course "Scientific literacy: Working with big ideas of scientific education" contains information about international organizations such as IAP, WOSL, TWAS, UNESCO and ECOSF, whose activities are aimed at popularizing science, encouraging scientific creativity of children and the development of scientific education.

To attract schoolchildren and teachers to international scientific cooperation, students are provided with information about the work of the Camp for Teenagers, about international scientific competitions that take place in China, Indonesia, Mexico, Tunisia, Turkey and other countries. Special attention is paid to the topic of protection of intellectual property rights of minors.

The purpose of the course "Scientific Literacy" is to teach teachers the practical application of the methodology and principles of scientific literacy proposed by the authors of the book "Big Ideas", as well as the skills of developing curricula based on research, taking into account the age characteristics of children from 5 to 17 years.



From 7 February to 23 April 2022, 183 people were trained in scientific literacy courses, including 32 schoolchildren and 151 school teachers, teachers of colleges and universities of Kazakhstan.

The conducted survey of the participants of the training seminar showed a high interest among Kazakhstani teachers in studying the principles of scientific literacy and, in general, the methods of scientific education set out in the book "Big Ideas". For example, the satisfaction with the course in all groups is 100%; the answer to the question "Will you use the book of "Big Ideas" in your practice?" was – 100%; to the question "Would you like to study the course "scientific literacy" at teacher training courses?" the positive answer was - 100%.

Work on the organization of training seminars on scientific education in Kazakhstan is carried out by ICSC in partnership with the Educational and Methodological Centre for Additional Education, as well as with the scientific and practical centre "Daryn" of the Ministry of Education and Science of the Republic of Kazakhstan.

In November 2022, together with the UNESCO Office in Almaty, seminars were organized in Bishkek, in which 55 Kyrgyz teachers participated. It is planned to continue this work in the republics of Uzbekistan and Tajikistan. On 2-3 March 2023, Dr. Lazzat Kusainova took part in the international conference "National Dialogue on Women in Science", which was held in Tashkent, Uzbekistan, where she presented the results of teaching Kazakh and Kyrgyz teachers the basics of scientific education of "Big Ideas". Further training of teachers in Central Asia is necessary, as more active work is needed to disseminate the principles of scientific literacy for teachers, on whom the ability to have a great influence on the scientific education of the younger generation depends. Such measures are necessary in the interests of future science not only in Kazakhstan, but also in other Central Asian republics, to achieve the goals of sustainable development in the field of education and science.

### **Biosketch**

Founder of a non-profit organization and President of the International Centre for Scientific Collaborations, which carries out extensive cooperation with the country's scientific communities, foreign embassies and international scientific organizations such as ECOSF, IAP, CAST, INSTP, INIC and others. In July 2019, Kussainova was elected a member of the International Scientific Council of ECOSF.

Kussainova worked for 20 years in the civil service, of which, from 2010 to 2017, she was deputy chair of the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan. In this regard, he has a lot of experience in the field of legal regulation of scientific activity and organization of scientific work.

She holds a PhD in Law and a Master's in Public Policy (Duke University, USA). Since 2010, she has been a patent attorney of the Republic of Kazakhstan, and since 2019 a member of the National Chamber of Legal Advisers. Her professional scientific interests are environmental, agricultural and land law, as well as intellectual property and human rights. She is also the author of several monographs, tutorials and scientific publications in the field of various fields of law. She has extensive legislative drafting skills. In particular, she was the developer of such laws as the Law on Public Service of the Republic of Kazakhstan, the Law on Peasants (Farms), the Law on Science, and has an author's certificate for the draft Concept of the Law on Commercialization of the Results of Scientific and (or) Scientific and Technical Activities. At present, they are all valid laws in the Republic of Kazakhstan.

Kussainova is actively engaged in the popularization of science of Kazakhstan, and consistently advocates the dissemination of scientific education and scientific knowledge in the pedagogical, academic and scientific environment, as well as promoting the principles of zero tolerance to manifestations of corruption in science (scientific fraud).

She instills a culture of scientific knowledge to children, and pays great attention to promoting children's scientific projects for international scientific competitions. Scientific projects of Kazakh children supported by ICSC took the first (2018) and second places (2019) at the international scientific competition CASTIC in China. With the legal and consulting assistance of Kussainova, these children received patents for their own scientific developments.

### **Early Education: Why and how?**

**Joan Lombardi** - Visiting Scholar, Stanford Center on Early Childhood, USA

#### **Abstract**

This minute presentation will cover three topics:

- (1) an overview of early education (what we mean by early education (prenatal-8) and what this period means for health, learning and behaviour, importance of nurturing care);
- (2) what we know about effective pre-school (teacher child interaction, active learning, promotion of curiosity and social emotional skill, etc.);
- (3) and the role of early childhood in environmental education (the vulnerability of young children to environmental risk and the role of early childhood in mitigation and resiliency).

#### **Biosketch**

Joan Lombardi, PhD, is a Visiting Scholar and Chair of the Leadership Council, Graduate School of Education, Stanford Center on Early Childhood, Stanford University, USA. She is also Senior Fellow at the Collaborative on Global Children's Issues, Georgetown University.

Joan Lombardi, PhD, is a Visiting Scholar at the Stanford Center on Early Childhood, Stanford University, USA, and Director of Early Opportunities LLC. Over the past 50 years, she has made significant contributions in the areas of child and family policy as an innovative leader and policy advisor to national and international organizations and foundations and as a public servant. Her work focuses on young children, families and communities, and the intersection of health, education and family support. Lombardi served as the first Deputy Assistant Secretary for Early Childhood during the Obama Administration and the first Director of the Child Care Bureau during the Clinton Administration.

### **The Value of Science Centres: Especially in low- and middle-income countries**

**Guadalupe Díaz Costanzo** - Director of Museums, Exhibitions and Fairs of the Ministry of Science, Technology and Innovation of Argentina; Executive Director, Cultural Centre of Science (C3), Argentina

In recent years, the relevance of scientific and technological culture has become clear: as a society we face many everyday decisions that affect our own health or even broader public issues such as climate change, information technologies or vaccination, just to mention some examples. At the same time,

growing evidence supports the critical role of science centres and museums as strategic organizations that can tackle inequalities in people's participation in the cultural field of science and technology, especially in low- and middle income countries.

Such centres and museums can impact people and communities in several ways: by stimulating science and technology learning, awareness and interest; by actively involving communities in addressing the Sustainable Development Goals (SDGs); by facilitating local and urban development; and by promoting social inclusion. Ultimately, science centres and museums become relevant in developing more democratic access to science and technology literacy and culture, thus enhancing opportunities of participating in the public debates of our time. Strong and creative efforts should be made to support and develop new science centres and museums and to enhance access opportunities.

This presentation is intended to provide introductory insight and examples to policy- and decision-makers, enabling them to review the multiple dimensions on which science centres and museums can have an impact, and why there is an urgent need for science centres and museums within a community, department or city, especially in low- and middle-income countries.

### **Biosketch**

Guadalupe Díaz Costanzo is the Director of Museums, Exhibitions and Fairs of the Ministry of Science, Technology and Innovation of Argentina and executive director of the Cultural Centre of Science (C3) since 2017. She has been working since 2014 in science outreach and museum exhibits. The exhibition 'Ocean', which was first released in October 2021 and was entirely developed under her coordination, received the international award from ICOM (International Council of Museums) for "setting an inspirational standard for science museums on how they ought to develop exhibitions and programmes in the future".

She is also in charge of developing and implementing national public policies on science education and outreach. Among other initiatives, she was in charge of developing the first national award for women scientists in science communication in collaboration with the French Embassy in Argentina; the Blue School National Programme to encourage schools to work on ocean and environmental topics in their communities and the National Science Reading Programme.

She holds a PhD in physics from the University of Buenos Aires, which included an Erasmus scholarship at the University of Groningen, the Netherlands. In addition, she completed a postgraduate degree in education and new technologies at the Latin American School for Social Sciences (FLACSO). Díaz Costanzo frequently participates in national and international conferences and meetings on science outreach, science centres and public policies. She has been a consultant for international organizations such as the Inter-American Development Bank and the InterAcademy Partnership. She is the Argentinean expert representative on Ocean Literacy in the European AANCHOR project. She was recently invited by the Department of State of the United States to participate from their International Visitor Leadership Program.

## **Lessons Learnt from Belt and Road Teenager Maker Camps & Teacher Workshops**

**Yang Feng** - Deputy Director General, China Children and Youth Science Centre, Chinese Association of Science and Technology (CAST)

### **Abstract**

From 117 teachers and students covering 16 countries to more than 7,000 teachers and students from 74 countries and regions, from offline activity to online and offline combinations, in the past six years, the "Belt and Road" Teenager Maker Camp and Teacher Workshop has become an internationally influential brand of science and education activity for teenagers, encouraging thousands of young people to pursue their dreams of science and promoting the exchange and development of science and education in the region. The past six years have witnessed our effort in creating an organic ecology of science education for young people, which is based on Maker Camp activities, taking the Belt and Road International Science and Education Consortium (BRISEC) as the working mechanism, and the Belt and Road Virtual Science Centre as the resource platform.

To meet the needs of international science and education development, based on the Maker Camp, in 2018 we created BRISEC, a long-term multilateral cooperation mechanism with other international partners who are committed to science and education, with the aim of continuously promoting the coordinated development and common prosperity of international science education. As of now, BRISEC has 27 member organizations from 21 countries and international organizations.

Under the joint initiative of the members of the Consortium, we have established the Belt and Road Virtual Science Centre to explore a cooperation model of resource sharing, information exchange and joint construction of activities. In face of Covid-19, we jointly explored the new model of a "Cloud Maker Camp". In the past year, under the framework of BRISEC, we have promoted bilateral cooperation such as the joint development of China-Thailand water resources protection project-based learning courses, the development of China-Pakistan STEM teaching courses, and the Tunisia Space Maker Camp.

### **Biosketch**

Yang Feng, serves as Deputy Director of Division of Communication and Cooperation, Children and Youth Science Center of CAST (CYSCC). She holds a Master's Degree in Public Administration from Renmin University, China, and began to work in 2013. She previously worked in Division of Science Popularization of CYSCC and the Department of International Affairs, China Association for Science and Technology (CAST).

She is mainly responsible for promoting international youth S&T and cultural exchanges through organizing various scientific contests and communication programmes for teenagers, science education forums and teacher training workshops. She facilitated the establishment of the Belt and Road International Science Education Consortium (BRISEC) in 2018 and now is the Deputy Secretary General. She also contributed to the construction of the Belt and Road Virtual Science Centre, an international online platform for science education resources, which has gathered hundreds of science teaching modules, science reports and virtual resources from various countries.

## SESSION 2: Science Education, Science Literacy and Science Centres: Focus on Africa

Thursday 16 March, 13:30-15:05

### Implementation of IBSE in Africa: Report of a NASAC survey

*Jackie Kado* - Executive Director, Network of African Science Academies (NASAC), Nairobi, Kenya

#### Abstract

In 2020, the NASAC Science Education Programme Working Group undertook a baseline survey on the State of Science Education in Africa. The survey enabled NASAC to review science education in the broad context of its availability as STEM (Science, Technology, Engineering and Mathematics) in the curricula of different national education systems in Africa. The assumption was that science education is taught in the pedagogical context of Inquiry-based Science Education (IBSE). The report provided an analysis and summary of the findings of the survey entitled: 'The State of Science Education in Africa'.

From the survey, close to 92% of the schools had science laboratories, but only 82% had equipment, chemicals and other relevant materials for practical science lessons. Equipping and capacitating school laboratories was proposed as a way to promote practical lessons for science education. Most schools further indicated that theoretical and practical methods of teaching science-related subjects were preferred to IBSE. Unfortunately, the SDGs were mainly taught for general awareness in only 62.5% of the schools.

The report concludes that for subsequent research, the survey tool should be more deductive and narrower in scope so as to obtain unique information for science education and not education in general. The role of ICT in science education is highlighted as instrumental in realizing SDG4, which aims 'to ensure inclusive and quality education for all and promote lifelong learning'. SDG4 is a big ask for Africa, because it strives to bridge the technological gap with the rest of the world. ICT can also leverage emerging opportunities for teachers and learners in science education. Lastly, the report challenges science academies to foster interaction among scientists, science teachers and learners. In so doing, a link between education, research and industry is made possible and learners can then be encouraged to take up careers in STEM.

#### Biosketch

Jackie Kado is the Executive Director of the Network of African Science Academies (NASAC) – IAP's regional network for Africa – based in Nairobi, Kenya. NASAC is a consortium of 28 science academies in Africa, whose membership is drawn from all spheres of science. She has served science academies in various capacities since the establishment of NASAC in 2001. Kado holds a Master's Degree in Project Planning and Management and a Bachelor's Degree in Education (Mathematics and Commerce) from the University of Nairobi, Kenya. She is passionate about project management for policy advice in science and an astute believer in using homegrown solutions to overcome societal challenges. She also currently serves on several regional and international committees.

## **Changing the Curriculum to Introduce IBSE: The case of Morocco**

**Fouad Chafiqi** - Inspector General in charge of pedagogical affairs, Ministry of Education, Preschool and Sports, Morocco

### **Abstract**

Not yet available

### **Biosketch:**

Fouad Chafiqi is Professor of higher education in educational sciences, and a specialist in school curriculum and science education at the national training center for pedagogical inspectors. He holds a doctorate in didactics of physical sciences from the *Ecole Normale Supérieure* of Rabat, Morocco, and HDR in Educational Sciences from the Victor Segalen University of Bordeaux 2 in France.

His is also General Inspector of Educational Affairs in the National Education Sector, Morocco, and previously held the position of Curriculum Director from June 2010 to November 2022.

In November 2022, he was appointed by His Majesty as a member of the Supreme Council for Education, Training and Scientific Research, within the Panel of Experts.

He has supervised several doctoral and master's theses in educational sciences. He also participated in the discussion of doctoral theses in Moroccan, Algerian and French universities.

He was National Coordinator of the Arab Reading Challenge and the supervisor of the previous six sessions (2015-2022); is general supervisor of the National Reading Project, launched on 14 November 2022; Member of the Permanent Advisory Committee for Education in the Arab Organization for Education, Culture and Science - ALECSO (2020); Member of the Board of the International Bureau of Education (BIE) of UNESCO in Geneva (2010-2012) representing the countries of the Arab Group; and Served as Secretary-General of the International Association for the Sciences of Education (AMSE-AMCE-WAER), (2008-2012).

He has published more than thirty scientific articles in Moroccan and foreign refereed journals. He has also previously participated in several scientific papers in international conferences in the sciences of education and contributed to the preparation of a collective author on the status of educational sciences in the Arab region under the title 'Science Education in the Arab State' (2008).

## **Houses of 'Innovation, Science and Technology for Education and Culture': The IAP ISTEK project**

**Wafa Skalli** - Chair of the IAP SEP Global Council, representative of Hassan II Academy of Science and Technology, Morocco. Emeritus professor at Arts et Métiers Institute of Technology, France

### **Abstract**

Inquiry-based science education (IBSE) is recognized as increasing people's knowledge while developing essential soft skills such as curiosity, enthusiasm, sense of observation, creativity, self-confidence and also perseverance, a critical mind, the value of error, objectivity and rigour. However, while the impact of IBSE may be high on children's performances at school, its successful implementation raises several challenges:

- Reinforcing teachers' education and motivation: this requires continuous training to explain the role of IBSE and develop specific pedagogical skills for conceptual understanding and practical implementation.
- Promoting science literacy: A clear perception of the value of science and technology in communities has a clear impact both on students and teachers.
- Changing mindset and sharing common vision and goals regarding science; this is perhaps one of the most difficult but also one of the crucial points to increase science literacy and create a dynamic and favourable eco-system.
- Science centres and museums, open to the public and with participation of schools, universities and scientists, help with building such a favourable ecosystem. Around the world, they have proven their relevance. However, in Africa, they are few and far between.

To tackle this need, IAP has proposed a scheme for frugal and efficient centres called 'Houses of Innovation, Science and Technology for Education and Culture' (ISTEC), as areas of convergence between educational structures, the scientific community and the general public. Four components are considered: workshop rooms for teacher training, a mini-fablab, a numerical interactive exhibition space and a pedagogic garden. The concept and the advancement of the project will be presented during the talk.

Taking advantage of new technologies, benefiting from digital resources and integrated into scientific knowledge networks, ISTEC could be efficient and replicable models, promoting the emergence of passionate, creative and enthusiastic teachers and citizens, willing to contribute to shape the future: a great challenge!

### **Biosketch**

Wafa Skalli is a mechanical engineer and holds a PhD in biomechanics. She is focused on translational research in clinical biomechanics, with a strong link between numerical simulation, experimental approach, and quantitative clinical investigation. She is co-inventor of the innovative EOS low dose biplanar x-ray system, developed in multidisciplinary collaboration. Skalli is co-author of 345 scientific publications (H index 49) and 12 patents. She received various awards, and was decorated in 2015 as officer of the national merit by His Majesty the King of Morocco.

In 2014, Skalli has been named as a member of the National Academy of Surgery in France and corresponding member of the Hassan II Academy for Science and Technique in Morocco. Since 2019, she is the chair of the IAP Science Education Programme's Global Council, and committed to promoting the development of science centres, particularly in Africa.

In parallel with her academic activities, Skalli is the founding president of the '*Relais Instruction education Maroc*' (RIM), an organisation that contributes to access to knowledge and education in Morocco in a spirit of openness and tolerance. RIM is involved in pre-school development and also the access of rural girls to secondary school and to high level scientific studies.

### **Projekt Inspire: Establishing a science centre in Dar es Salaam, Tanzania**

**Lwidiko Mhamilawa** - Co-founder, Projektinspire, Tanzania. An IAP Young Physician Leader (YPL)

### **Abstract**

Projekt Inspire is a social impact initiative aimed at improving STEM education for young learners in developing countries. With a focus on providing hands-on and engaging learning experiences, the organization's flagship project is the establishment of a science centre in Dar es Salaam, Tanzania. This science centre aims to offer students the opportunity to engage with and experience the principles of science, technology, engineering, and mathematics (STEM) through interactive exhibitions and educational programmes. The centre provides a space where students can explore and experiment, fostering critical thinking and problem-solving skills, and ultimately inspiring them to pursue careers in STEM. The establishment of the science centre in Dar es Salaam represents a major step towards achieving Projekt Inspire's mission of transforming STEM education in developing countries and empowering the next generation of scientists, engineers and innovators.

### **Biosketch**

Dr. Lwidiko Mhamilawa (MD, PhD-Uppsala University) is a lecturer at the department of parasitology and medical entomology at Muhimbili University of Health and Allied Sciences (MUHAS), Tanzania. As a malaria researcher, he has 6 years of experience in malaria drug efficacy clinical trials, molecular analysis of malaria drug resistance markers, malaria diagnostic tools and malaria epidemiology.

Mhamilawa has experience in being both frontline worker and consulting in epidemiology during outbreaks of epidemics such as cholera. Currently he is leading an implementation research consultancy with UNICEF in exploring factors that affect access to immunization for children in Tanzania and is part of researcher group that works to explore acceptability of COVID-19 vaccination in Tanzania among healthcare workers. Further, he is planning a study that will explore further the clinical and seroprevalence of COVID-19 infection in the context of malaria endemic rural Bagamoyo District, Tanzania.

He is also co-founder of Projektinspire that has established a science centre in Dar es Salaam.



## SESSION 3: Science Literacy and Climate Change Education

Thursday 16 March, 15:10-16:10

### The Swedish IBSE-school Project NTA

**Lena Kjellén\*** - University of Uppsala, Sweden. IAP SEP Global Council member. Member, ALLEA science education group

#### Abstract

NTA ("science and technology for all") was founded in 2004 by the Royal Swedish Academy of Sciences and the Royal Swedish Academy of Engineering Sciences. It is a non-profit organization which supports IBSE in science, technology and mathematics linked to the curricula of primary schools and preschools. Nearly half of the municipalities in Sweden in addition to some independent schools are members of the organization. Each member creates a long-term organization where the NTA-coordinator has an important role.

NTA was originally based on STC (Science and Technology for Children), which was translated to Swedish and adapted to Swedish curricula. New themes and programmes have since then been developed, some of which are digitalized. All themes have been reviewed by a scientific advisory board consisting of teachers and members of the two founding Academies. Plans are ongoing to translate some of the digitalized themes to English and Arabic.

An NTA-theme contains a number of different tasks for the children, material for practicals, teacher instructions, books on the theme and other supporting material. NTA also helps teachers and children to evaluate the learning outcomes. Research studies clearly show that children who have worked with NTA-themes perform better in school.

#### Biosketch

Lena Kjellén has a PhD in medical chemistry from Uppsala University, Sweden. Her area of research is biosynthesis of glycosaminoglycans including physiological as well as pathological aspects. From 2001 she is professor in medical glycobiology at the University of Uppsala where she moved from the Swedish University of Agricultural Sciences. She previously had an appointment as Professor II at Bergen University, Norway, and has also spent one and a half years as a student in Birmingham, Alabama, USA,. She is a teacher of biochemistry for medical and biomedical students at Uppsala University.

Since 2007 she is a member of the Royal Swedish Academy of Sciences. She is also a member of the scientific committee of NTA ("science and technology for all"), a programme for school development in science, engineering and mathematics, and represents the Royal Swedish Academy of Sciences in the ALLEA working group on Science Education.

## **Developing and Strengthening Climate Change Education in Pakistan**

**Khalil Raza and Manzoor Soomro\*** - Outgoing President, ECOSF, Pakistan

### **Abstract**

Science education plays a vital role to prepare societies for the future global challenges, including climate change. Climate science education can be one of the essential components and a catalyst in de-escalating the rate of climate change by raising awareness, and by promoting evidence-based research and knowledge. Climate change issues can also be effectively dealt with in a policy framework and with political determination only if the decisions are based on scientific data and rational judgement. Hence, integrating climate change education into the science curriculum and capacity development of science teachers are important steps for strengthening climate change adaptation and mitigation.

In this context, the Economic Cooperation Organization Science Foundation (ECOSF), with the cooperation and support of the InterAcademy Partnership (IAP), developed a Teacher Training Module on Climate Change Education for science teachers. The presentation will highlight the unique aspects of this module and the applicable use of Inquiry-based Science Education (IBSE) pedagogy.

It may be noted that ECOSF is an intergovernmental organization of 10 countries (<http://www.ecosf.org>) and has been promoting IBSE as one of its flagship programmes in cooperation with IAP, LAMAP Foundation, France, and ISTIC, Malaysia, ever since its establishment.

### **Biosketch**

Manzoor Hussain Soomro is an eminent scientist and academician of Pakistan with more than 30 years experience as a researcher, educator and science manager.

He is the immediate past President of the ECO Science Foundation (ECOSF), an intergovernmental organization of 10 countries: Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan, that promotes science & technology and STEM education. He has previously served as Chair of the Pakistan Science Foundation, Director General of the Pakistan Scientific and Technological Information Centre, and Director General of the Pakistan Museum of Natural History. He has also served as Senior Researcher at the Pakistan Agricultural Research Council, Professor at Sindh Agriculture University Tandojam, Pakistan, and as an integrated pest management expert at the UN Food and Agriculture Organization (FAO) where he implemented a non-formal education programme through an innovative 'Farmer Field School' (FFS) approach in South East Asia. Since 2010, Soomro is promoting Inquiry-based Science Education (IBSE)/*La main a la pate* in Pakistan in collaboration with the French Academy of Sciences. Lately, he has led the roll-out of IBSE/*La main a la pate* in the ECO region.

Soomro is member of numerous scientific societies, bodies and forums including the Global Council of IAP SEP, the Governing Board of the International Science, Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC), Malaysia, the Asian STI Think Tanks Network (ASTN) and the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES).

## **Inquiry-based Science Education: A case study to address the energy challenge**

**Edgar E González\*** - *Pontificia Universidad Javeriana, Colombia*

### **Abstract**

The results of the research project “Inquiry-based Science Education: A case study to address the energy challenge” are presented. This project was funded by the InterAcademy Partnership (IAP) and co-financed by the Colombian Academy of Exact Physical and Natural Sciences and the Nanoscale Science and Technology Centre, Colombia. The contextualized learning model was adopted as a strategic contribution to improving science teaching processes, in addition to promoting in students a commitment and responsibility to the reality and challenges that are part of their local and global environment. This contextualization, integrated into an inquiry-based science education, was delimited in a specific case study related to the energy problem.

As the object of study, a natural system for energy production by anaerobic digestion of biogas was selected. This type of system has positioned itself as one of the most environmentally friendly and sustainable generators of renewable energy and organic waste management currently available. These converters are strategically integrated into the social, environmental and economic components of sustainable development:

- (1) energy production to supply the demand of communities lacking electricity service;
- (2) control and management of organic waste pollutants that cause bad odours, greenhouse gas emissions, propagation of insects and microorganisms capable of producing diseases; and
- (3) production of ecological biofertilizers of high quality, nutritional value and low cost.

The development of the research proposal, elaborated by the students with the participation of teachers and advisors, traced a important roadmap that offered conclusive results to make contextualized inquiry-based science education a strategy of great value to improve science teaching processes.

*Reference:* Gonzalez, E., Rios, A., Monsalve, A (Eds). (2023). Inquiry-Based Science Education: A Case Study to Address the Energy Challenge. ACCEFYN, Nanocitec.

### **Biosketch**

Edgar E. González is a full Professor of physics, nanoscience and nanotechnology at the *Pontificia Universidad Javeriana*, Colombia, where he leads the Group of Nanoscience and Nanotechnology. He is director of the Nanoscale Science and Technology Centre, member of the Colombian Academy of Exact Physical and Natural Sciences, General Coordinator of the Colombian Network of Nanoscience & Nanotechnology, and Convergence Bio-Nano Network.

He completed his undergraduate studies in physics at the National University of Colombia, and his doctoral studies at the Autonomous University of Barcelona. He is a researcher in the area of quantum physics and science and technology of nanomaterials, specifically in the production of nanostructures, modelling, characterization, study of physicochemical properties and their implementation in systems and processes for production of clean energy, environmental remediation, and diagnosis and treatment in the area of health.

He has actively worked with high school students and teachers to promote the building and development of comprehensive thinking spaces as a base to encourage creativity and the strengthening of logic-formal thinking in the formative process. He has worked in the creation of spaces aimed at cultivating creativity and stimulate curiosity, amazement, sensitivity and interest in science. Activities such as the museum: Journey Inside the Matter, the Nano in School programme and Save Water Save Life Initiative, are some of the activities carried out in recent years.

\* Denotes IAP SEP Global Council member

## Other Invited Guests

***Teketel Yohannes Anshebo*** - Professor of Physical Chemistry; Executive Director, Ethiopian Academy of Sciences

### **Biosketch**

Prof. Teketel obtained his BSc in 1984, MSc in 1989 and PhD in 1997 from Addis Ababa University, Ethiopia. Since 1984, he has been serving at higher education institutes. His academic career started as a graduate assistant in the Department of Chemistry of the then Bahir Dar Teachers College; which was the satellite College of Addis Ababa University. He also served as a Committee Member for the preparation of a strategic plan for the AAU using Balanced Scorecard for GTP I and GTP II periods.

Over the years, Teketel had the opportunity of advising 10 PhD students, 25 MSc students and presenting numerous undergraduate and postgraduate chemistry courses. With his research group and collaborators, he extensively studied electrochemistry, spectroelectrochemistry, photovoltaic and photoelectrochemistry of organic conducting polymer materials. He has published and co-authored more than 60 scientific articles in highly reputable local and international journals. He has also organized major international conferences in Ethiopia such as the African School on Nanoscience for Solar Energy (2010), Joint US-Africa Institute's First Materials Research School (2012), the 7th Biannual Conference of African Materials Research Society (2013), Organic Photovoltaics and Biopolymer-Based Batteries and Supercapacitors for Solar Electricity Storage (2014), and the 5th African School on Electronic Structure Methods and Applications (ASESMA) (2018).

His leadership quality shone through his service at Bahirdar Teachers College, Ethiopia, as the Chairman of the Department of Chemistry over seven years; Director, Chair and Coordinator of the Materials Science Programme at College of Natural Sciences (Addis Ababa University) for over five years; Associate Dean for Graduate Programmes (central University position) for the College of Natural Sciences (AAU) for two and half years; Director for Research (central University position) at Addis Ababa University for over three years, and currently as Executive Director, Ethiopian Academy of Sciences (EAS).

He represents EAS in the IAP ISTECE project.

***Beatriz Caputto*** - President, National Academy of Sciences of Argentina, Academic of the Academy of Sciences of Latin America; Executive Director of the Inter-American Network of Academies of Sciences (IANAS)

### **Biosketch**

Beatriz Caputto has a degree in pharmaceutical chemistry from the School of Chemical Sciences (1972) and a PhD (1978) from the National University of Córdoba (UNC). She was a Full Professor and is currently Professor Emeritus and Senior Researcher of the Argentine Research Council (CONICET). She has been the advisor of 14 doctoral theses and has published numerous scientific papers on lipid metabolism and its regulation by proteins of the c-Fos family. She was Argentina's representative in the South American Brain Research Organization (1994-1999), member of the EC of the International Conference for the Bioscience of Lipids (2014-2018), President of the Biology Society of Córdoba (1989-1991), the Argentine Society of Neurosciences (1997-1999) and the Argentine Society for Research in

Biochemistry and Molecular Biology (2007-2009). She was Research Scholar of the James S. McDonnell Foundation, USA (1997-2007) and Member of the Editorial Board of the Journal of Neuroscience Research (Elsevier) (1994-2018) and of Metabolic Brain Research (Springer) (2013-present). Currently, Beatriz Caputto is President of the National Academy of Sciences of Argentina, academician of the Academy of Sciences of Latin America and Executive Director of the Inter-American Network of Academies of Sciences (IANAS), IAP's regional network for the Americas.

***Tengku Sharizad Binti Tengku Chik*** - Director, International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC), Malaysia

#### **Biosketch**

Tengku Sharizad Binti Tengku Chik assumed the position of the Director of the International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC) under the auspices of UNESCO in June 2020. She has 20 years of experience in international relations, R&D and technology management and institutional governance, with a primary focus on science and technology industry. She holds a BSc in microbiology from the Flinders University of South Australia.

Before joining ISTIC she was attached to the Academy of Sciences Malaysia where she headed the STI Strategic Initiatives and Partnership Division before assuming the position of the Chief of International Affairs and Communication (CIAC). Prior to this, she served the International Science Council Regional Office for Asia and the Pacific (ISC ROAP) where she was responsible for developing and implementing its regional strategy and programmes, with a special focus on areas like Urban Health and Wellbeing, Disaster Risk Reduction, science policy and inter-regional collaborations.

***Thierry d'Almeida*** - Agence de Développement de Sèmè City (ADSC), Cotonou, Bénin

#### **Biosketch**

Thierry d'Almeida is a director of research at the French Atomic Energy and Alternative Energies Commission (CEA), currently in secondment as director of the Education and Research Programmes at Sèmè City, the International Knowledge and Innovation City, a flagship programme of the Government of the Republic of Benin.

A material scientist and nuclear physicist by training, he has held several high-level international positions in the field of research and education, including a position as beamline scientist at the European Synchrotron in Grenoble, Senior Research Fellow at the Cavendish Lab in Cambridge, UK, and at the Institute for Shock Physics in Washington State University, USA.

He carries out numerous expert missions with various bodies at the regional level such as the African Centre of Excellence and at the international level such as the International Atomic Energy Agency. He is strongly involved in various training and educational engineering programmes in Africa. His areas of interest include energy sustainability, ecological materials, environmental transition, food security and sustainable urban planning.

He represents the Benin Academy of Sciences and Technology in the IAP ISTEAC project.

**Elhag Abugabr Elhag** - Associate Professor in University of Khartoum, Sudan

### **Biosketch**

A professional ecologist with international experience in the marine and coastal environmental sciences, supported by a good knowledge of ecosystem identification and functioning and university teaching. He is Associate Professor in University of Khartoum and five other Sudanese universities. Seconded to Sabha University and Omar Mokhtar University (Libya, 1988-1994), Asmara University (Eritrea, 1994-1996) and Qatar University (1997-2002).

Prof. Elhag was holder of the UNESCO Chair on Marine Biology and Oceanography, Sudan (2006-2018) and is currently: UNESCO expert and consultant in marine biology and biodiversity, member of UNESCO/IOC list of experts, member of Scientific Committee/National Commission, Sudan (1975-present), state member representative in IOC/Sub-commission Africa and state member for IOC General Assembly.

He established, built and equipped the Suakin Marine Laboratory, Sudan, and rehabilitated Massawa Marine Station, University of Asmara, Eritrea. Team leader to many projects in the field of marine biology, in Sudan, Libya, Eritrea and Yemen. Team leader of preparers of the scientific file for the inscription of a serial site as natural heritage site for UNESCO/Sudan.

He represents the Sudanese Academy of Sciences in the IAP ISTEK project.

**James Hawkins Ephraim** – President, Ilma Institute of Science and Technology, a new tertiary institution in Accra, Ghana.

### **Biosketch**

James Ephraim is a Professor of Chemistry with rich experience in teaching, research and administration. A physical-inorganic chemist who obtained his PhD in 1985 from SUNY, Buffalo, USA, his research interests include distribution, speciation and mobility of trace metal ions and low-molecular organic acids in aquatic and terrestrial environments. For 10 years, Ephraim was a member of the Chemistry Group of the Swedish Nuclear Fuel and Waste Management Company, SKB. As well as Sweden and the USA, he has worked in Botswana, Ghana, Kenya and Zimbabwe. His administrative experience ranges from membership of the Ghana Atomic Energy Commission (GAEC); Head of Chemistry Department, GAEC; Acting Director of National Nuclear Research Institute; Chair of the School Management Committee of GAEC schools; Head of Chemistry Department, Kwame Nkrumah University of Science and Technology, KNUST; Vice-Dean, Faculty of Physical Sciences, KNUST; Dean of the School of Graduate Studies, KNUST; and member of the Executive Committee, KNUST.

Ephraim was the Occupant of the Unilever/David Andoh Chair of Chemistry at KNUST, 2002-2004; the first Vice Chancellor of the Catholic University College of Ghana, Fiapre, 2007-2015; and the founding Rector of the Nduom School of Business and Technology, Aboabo-Elmina, 2015-2018.

Prof. Ephraim was admitted as a Fellow of the Ghana Academy of Arts and Sciences in 1991 and served as a member of the Expert Committee on National Vision and Plan for Tertiary Education constituted by the National Council for Tertiary Education in 2016. As a Project Evaluation Expert, he has performed Independent Terminal Evaluations projects for UNIDO and UNEP.

He is currently the President of Ilma Institute of Science and Technology, a new tertiary institution in Accra, Ghana, represents the Ghana Academy of Arts and Sciences in the IAP ISTEC project.

**Priscilla Kolibea Mante** - Senior Lecturer, Kwame Nkrumah University of Science and Technology, Ghana; Co-chair, Global Young Academy

#### **Biosketch**

Priscilla Kolibea Mante is a neuropharmacologist and senior lecturer at the Kwame Nkrumah University of Science and Technology (KNUST), Ghana. She has a PhD from KNUST and postdoctoral training from the University of Michigan with expertise in drug discovery and neurogenetics. Her research focuses on developing better therapeutic options for resistant epilepsy by reducing diagnosing costs and improving therapy based on patients' genetics.

She received the International Rising Talent Award in 2019 for her research. She is a 2019 OWSD Early Career Fellowship awardee; a Fellow of the African Science Leadership Programme; an Affiliate of the African Academy of Sciences and The World Academy of Sciences (TWAS); and currently co-chair of the Global Young Academy.

**A. Nuri Yurdusev** - Professor of International Relations at the Middle East Technical University, Ankara, Turkey; President, AASSA

#### **Biosketch**

Prof. Yurdusev, educated in Turkey and England, is presently Professor of International Relations at the Middle East Technical University, Ankara, Turkey. He has been a Visiting Fellow at University of Oxford, UK, and University of Kansai, Japan. His research interests include theory and history of international relations, and the making of European identity and Ottoman diplomacy. He is the author of 'International Relations and the Philosophy of History: A Civilizational Approach' (Palgrave Macmillan, 2003) and the editor of 'Ottoman Diplomacy: Conventional or Unconventional?' (Palgrave Macmillan, 2004).

He has many conference presentations and publications as book contributions and journal articles. His articles have been published in international journals such as Millennium: Journal of International Studies, Critical Middle Eastern Studies, Australian Journal of International Affairs, Korean Journal of Defense Analysis, *Economia Exterior*, *Nomos* (Japan), *Journal of South Asian and Middle Eastern Studies*.

Elected as a full member to the Turkish Academy of Sciences (TÜBA) in June 2012, Yurdusev was a member of the TÜBA Academy Council from December 2012 to December 2018 and Vice-President of the Academy from January 2015 to January 2019. Professor Yurdusev is a Fellow of the World Academy of Art and Science and currently president of the Association of Academies and Societies of Science in Asia (AASSA), IAP's regional network for the Asia/Pacific region.