IUPAP Centenary Panel on Physics for Development

Photo courtesy of Marielle Agbahoungbata, X-TechLab, Benin)

Photo left-to-right:
Panelists
Professor Michele Zema
   Chair of the LAAAMP Executive Committee
   Executive Outreach Officer of IUCr
   University of Bari (Italy)
Professor Özgül Öztürk
   Chair of the SESAME Users’ Committee
   Member of the LAAAMP Executive Committee
   University of Siegen (Germany)
Professor Sónia Semedo,
   Vice-President of the Union of Physicists from Portuguese-Speaking Countries
   University of Cape Verde

Moderator
Hon. Sekazi K. Mtingwa
   Administrative Judge, U.S. Nuclear Regulatory Commission
   Member of the LAAAMP Executive Committee
   Former Chair of the IUPAP C13 Commission on Physics for Development
   Member of IUPAP Working Group 14 on Accelerator Science
   Principal Partner of TriSEED Consultants, LLC, North Carolina, United States
The Panel on Physics for Development discussed the history, activities and achievements of several recently established organizations that are making tremendous strides in enhancing the development of physics and related disciplines in various developing regions of the world. Highlights are enumerated below.

**LAAAMP (Lightsources for Africa, the Americas, Asia, Middle East and Pacific)**

Michele Zema gave an overview and provided updates on the activities of *LAAAMP* (https://laaamp.iucr.org), which is managed under an MoU signed by IUPAP, International Union of Crystallography (IUCr), and Abdus Salam International Centre for Theoretical Physics (ICTP). Among the achievements he discussed were the following:

**Regional Strategic Plans**

Strategic Plans have been developed for the various regions in which *LAAAMP* is engaged. As an example, the Strategic Plan for Africa was motivated by the Grenoble Resolutions, which were declared in the first African Light Source (AfLS, https://www.africanlightsource.org) Annual Conference that convened at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France during 2015. The Grenoble Resolutions state the following:

1. Advanced light sources are the most transformative scientific instruments similar to the invention of conventional lasers and computers.

2. Advanced light sources are revolutionizing a myriad of fundamental and applied sciences, including agriculture, biology, biomedicine, chemistry, climate and environmental ecosystems science, cultural heritage studies, energy, engineering, geology, materials science, nanotechnology, palaeontology, pharmaceutical discoveries, and physics, with an accompanying impact on sustainable industry.

3. The community of researchers around the world are striving collaboratively to construct ever more intense sources of electromagnetic radiation, specifically derived from synchrotron light sources and X-ray free-electron lasers (XFELs), to address the most challenging questions in living and condensed matter sciences.

4. The AfLS is expected to contribute significantly to the African Science Renaissance, the return of the African Science Diaspora, the enhancement of University Education, the training of a new generation of young researchers, the growth of competitive African industries, and the advancement of research that addresses issues, challenges and concerns relevant to Africa. For African countries to take control of their destinies and become major players in the international community, it is inevitable that a light source must begin construction somewhere on the African continent in the near future, which will promote peace and collaborations among African nations and the wider global community.

**Advanced Light Source Primer**

The Brochure that *LAAAMP* developed (https://laaamp.iucr.org/tasks/brochure) that explains advanced light sources for the layperson has gained tremendous popularity. When hard copies are
presented at conferences, they quickly disappear and many requests are made for them. The Brochure is available on the LAAAMP Website in Arabic, English, French, Portuguese and Spanish.

**LAAAMP brochure**

The LAAAMP brochure “Advanced Light Sources and Crystallography: Tools of Discovery and Innovation” is available in English, Spanish, French, Arabic and Portuguese.

Translations have been made available thanks to a collaboration with the International Atomic Energy Agency (IAEA).

Brochure editor: Ernie Malamud

**DOWNLOAD FOR FREE at**

[https://laaamp.iucr.org/tasks/brochure](https://laaamp.iucr.org/tasks/brochure)

**Colloquium Program**

One of the major successes of the Colloquium Program is the partnership that it created between LAAAMP and the government of Benin. That partnership led to the establishment of X-TechLab ([https://www.xtechlab.co](https://www.xtechlab.co)), which provides 2-week training sessions for students from various African countries in the basics of crystallography and mathematical modeling of crystal structures.

**FAculty-STudent (FAST) Teams**

The biggest program of LAAAMP is the FAST Team program that sends faculty and their graduate students to any one of approximately 16 advanced light sources around the globe for 2-month training visits. Many participants return the following year for two more months of training. There have been approximately 100 FAST Award grantees who have been participated in the program.

The COVID-19 pandemic caused a disruption in the program; however, it is close to being back to normal. Thus, Michele painted an optimistic future for LAAAMP and its Leadership Team.
EXECUTIVE COMMITTEE

Michele Zema (Chair)
University of Pavia, Italy
IUCR Executive Outreach Officer

Marie-Jean Agbahioungbata
Coordinator, X-NichLab, Cottonou, Benin

Sekazi Mingwa
THESBEX Consultants, LLC, Hillsborough, NC, USA
Chair of the JUFFAP C11 Commission for Development

Özgül Öztürk
University of Siegen, Germany
Chair of SESAME Users’ Committee

Sandro Scandolo
Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy
Özgül Öztürk discussed the activities of the SESAME Users’ Committee (https://www.sesame.org.jo/for-users/sesame-users-committee-suc), of which she is Chair. The focus of those activities is on increasing and assisting the facility’s user base. Thus, the role of the Users’ Committee primarily consists of the following:

1. Represent the interests of all students, postdocs and scientists who perform research at SESAME.

2. Provide a platform for communication between the SESAME user community and the management of SESAME. This provides a means to convey the concerns and needs of the user community to the management, and the management may transmit to the users information on current and future plans for the facility.

3. Facilitate communication between the SESAME users and users of other synchrotron radiation laboratories around the world.

4. Assist SESAME with organizing its Annual Users’ Meetings.

The following are some of the highlights in the History of SESAME:

1. May 16th, 2017 - The SESAME light source was officially commissioned.
2. April 2018 - Scientists at SESAME commissioned the Infrared spectromicroscopy beamline.

3. July 2018 - The first users arrived to perform experiments using the XAFS/XRF (X-ray absorption fine structure/X-ray fluorescence) spectroscopy beamline.


5. June 2019 - The first scientific paper was published based upon research at SESAME.

6. December 2019 - SESAME’s MS (Materials Science) beamline was commissioned.

7. December 2020 - MS was the third beamline of SESAME to start full user operation.

8. December 2021 - SESAME served as the host facility of the virtual School on Synchrotron Light Sources and their Applications (https://laaamp.iucr.org/news/ictp-school-on-synchrotron-light-sources-and-their-applications) hosted by the Abdus Salam International Centre for Theoretical Physics (ICTP), IAEA, African Light Source, LAAAMP, ESRF University of Johannesburg, Cyprus Institute, and TriSEED, LLC.


For the High School Teachers’ Workshop, there were 115 participants, and they came from Turkey, Mexico, United States, El Salvador, Jordan, Iran, Pakistan, Israel and India. The goals of the Workshop were the following:

1. Build awareness of regional science research facilities like SESAME for science teachers to support science education efforts.

2. Create a network of science teachers who are interested in contributing to accessible teaching resources that feature science research facilities.

3. Develop the capacity for student-led research projects at advanced light source facilities.

Öztürk described the opportunities provided by OPEN SESAME (http://www.opensesame-h2020.eu/en), which is a training program that includes storage ring operation, safety, assistance with user access to SESAME, machine commissioning, instrumentation, beamline techniques, stakeholder engagement, and public outreach. These are accomplished through schools and workshops, 1-3 month fellowships for selected Masters and Doctoral students to visit a European advanced light source facility to conduct research, staff exchanges, and an online warehouse of training materials. The effectiveness of the training programs can be seen in the following numbers:
The number of proposals increases at each call

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<th>Country</th>
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<td>Italy</td>
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<td>1</td>
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<td>Jordan</td>
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<td>Malta</td>
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<td>United Kingdom</td>
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<td><strong>Total</strong></td>
<td>64</td>
<td>63</td>
<td>34</td>
<td>151</td>
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</tbody>
</table>

167 Proposals in January 2020
103 Proposals in the 2nd call
55 Proposals in the 1st call

Öztürk concluded with a word of thanks to the entire SESAME Team.

Many thanks to

Giorgio Paolucci

Andrea Lausi

Gihan Kamel
Messaoud Harfouche
Mahmoud Abdellatif
Sónia Semedo described the recent founding of the Union of Physicists from Portuguese-Speaking Countries (UFPLP) and the upcoming 4a Conferência de Física de Países de Língua Portuguesa – 4aCFPLP (4th Conference of Physicists from Portuguese-speaking Countries, https://4cfplp.sci-meet.net/en) conference that she organized and subsequently convened at the University of Cape Verde during 12-16 September 2022. The Conference Group Photo is below. The goal of the conference was to establish synergies and networking among the Portuguese-speaking countries, providing a framework for cooperation in physics teaching and innovation, as well as fostering valuable exchange of knowledge.

4aCFPLP was highly successful and allowed the participants to both share their research activities and provide various workshops for student participants and regional primary and high school teachers. The program included a technical-pedagogical fair opened to the local community over the whole week, a 2-day course for teachers of primary and secondary schools, and a 3-day scientific conference in physics teaching, environment and climate, sustainable energy sources, complex systems, artificial intelligence, space technology, and nanotechnology.

The pre-planning for the establishment of the UFPLP occurred in São Tomé e Príncipe in 2019 at the conclusion of the 3aCFPLP. For the future, the goal is to include all the Portuguese-speaking countries shown on the map below.
Below is a photo of those who attended in person the establishment of UFPLP. On 15 November 2019, in the beautiful Penafiel Palace in Lisbon, headquarters of the Comunidade de Países de Língua Portuguesa, physicists from Angola, Brazil, Cape Verde, Mozambique, Portugal and São Tomé e Príncipe formally launched the União de Físicos de Países de Língua Portuguesa. Thus, the UFPLP was born!

The mission of UFPLP is to promote the development of opportunities and conditions for collaborations between physicists and contribute to the professional affirmation, cultural,
scientific, technological and economic development of the different countries and territories, particularly the least developed in terms of education and research infrastructures.

There are two membership categories: **Individuals** and **Societies**. As of the IUPAP Centenary, as shown below, there were Individual members from seven (7) countries, and there were three (3) Society members. The latter are the Brazilian Physical Society, Portuguese Physical Society, and Angolan Physical Association. The Brazilian Physical Society is the oldest at 50 years-old.

The UFPLP is administered by an Executive Committee as shown below.
Since its founding in 2019, UFPLP initiated a number of social media accounts, including Facebook, Twitter, YouTube channel, and a Webpage. Despite the COVID-19 pandemic, it managed to execute a number of online meetings and activities, including the following:

1. Conversations with other similar societies, such as the European Physical Society, to explore various means of collaborations
2. Celebration of the International Day of Women and Girls in Science
3. Launching on Camões Day a series of Monthly Physics Webinars
4. Submission of two grant applications: Pilot of Physics Olympiad of Portuguese-Speaking Countries and Youth Physics.

For the near future, UFPLP is planning to accomplish the following:

1. Workshops for high school teachers
2. Physicists survey/mapping in Portuguese-Speaking Countries
3. Conferences of Physicists from Portuguese-Speaking Countries
4. Encouraging the creation of National Physical Societies
5. Promotion of collaboration networks of researchers in projects and grant applications.

To conclude, Semedo thanked IUPAP for its tremendous in assisting UFPLP and stated the following:

1. UFPLP is building bridges between physicists from various Portuguese-speaking countries to foster collaborations and the dissemination of opportunities.

2. UFPLP has some challenges, such as physics dissemination, physics education and applications, lack of infrastructures, lack of funding.

3. UFPLP believes that working together is the way to success and all are invited to be part of the journey.

Conclusion of Panel

Sekazi K. Mtingwa concluded the panel discussion with a brief overview of the progress to date for the African Light Source (https://www.africanlightsource.org). He described the establishment of the AfLS Foundation in November 2015 during the 1st Annual AfLS Conference. Since that momentous occasion, the AfLS efforts have grown tremendously, culminating in the Conceptual Design Report, which is being written by a team of approximately 100 researchers, mostly from Africa, and for which he has been named Editor-in-Chief. It is expected to be issued later in the Year 2022, around the time of the next Annual AfLS Conference, which will convene virtually during 14-18 November 2022. It will meet jointly with the Annual Conference of the African Physical Society. Finally, Mtingwa acknowledged the tremendous support provided to the AfLS Foundation by IUPAP C13 Commission and thanked the AfLS Leadership Team led by Simon Connell, Chair of the AfLS Executive Committee from the University of Johannesburg in South Africa, and Deputy Chair Prosper Ngabonziza from Louisiana State University in the United States and originally from Rwanda.