International Collaborations for Sustained Development

J. Niemela ICTP, Trieste



A little light reading....

Check for updates
Comment

Physics for a better world

The United Nations Sustainable Development Goals outline a roadmap towards a more equitable future for humanity. Along with other scientists, physicists have long made valuable contributions to this endeavour.

Joseph J. Niemela

he COVID-19 pandemic has become a feature of the daily news. Unfortunately, this is taking place against a backdrop of continuing deterioration of the public's trust in the evidence-based scientific process. This is another challenge that we must all face by engaging with the wider community (see trust-science.org) and by highlighting the key role science plays in bettering human welfare. Indeed, physics has long been instrumental in responding to critical societal challenges and improving the quality of life worldwide. As we move towards an international year devoted to basic sciences for sustainable development (see www.iybssd2022.org), we can celebrate by reflecting on some of these achievements.

For the purpose of discussion, it may help to roughly divide the members of our global communities — physicists and non-physicists alike — into those residing in a country characterized by the World Bank as having a high average income and those living in low- and middle-income countries (LMICs), historically referred



Fig. 1 | Undergraduates at Quaid-i-Azam University in Islamabad coming to grips with light. Credit: J. Niemela.

International collaborations come in all sizes....

Large scale international facilities focused on fundamental problems

Individual collaborations that span continents and cultures

- Collaborations between both like and unlike organizations (e.g., professional societies with intergovernmental organizations)
- International scientific facilities with an underlying goal of promoting peace and understanding

➢And international years like IYBSSD of course!

Scientific facilities promoting Understanding (and Peace)

SESAME | Synchrotron-light for Experimental Science and Applications in the Middle East



SESAME, which is located at Amman (Jordan), is a state of the art "third generation" synchrotron light source. It is the Middle East's first major international research center.

SESAME is a cooperative venture by scientists and governments of the region set up on the model of CERN and was developed under the auspices of UNESCO (formal approval by 164th session of Execuive Board, May 2002).

It is an **autonomous intergovernmental organization** at the service of its Members which have full control over its development, exploitation and financial matters.

SESAME began with two main goals:

1) Foster scientific and technological excellence in the Middle East and neighboring countries by enabling world-class research in subjects ranging from biology, archaeology and medical sciences.

2) Build scientific and cultural bridges between diverse societies, and contribute to a culture of peace through international cooperation in science.



Gihan Kamel, IR beamline scientist

Well before SESAME's commissioning, Gihan ran a working Infrared laboratory and was able to support Palestinian Master's students doing thesis work in collaboration with OEA @ ICTP

Who are the Members?

Current **Members:** Cyprus, Egypt, Iran (Islamic Republic of), Israel, Jordan, Pakistan, Palestine, and Turkey.

Current **Observers:** Brazil, Canada, China (People's Republic of), the European Organization for Nuclear Research (CERN), the European Union (EU), France, Germany, Greece, **Italy**, Japan, Kuwait, Portugal, Russian Federation, Spain, Sweden, Switzerland, the United Arab Emirates, the United Kingdom, and the United States of America.

SESAME is a <u>user facility</u> and has joined the European consortium of accelerator-based Photon Sources (LEAPS) in an *associate* status

SESAME is also the world's first large accelerator complex to be **fully powered by renewable (solar) energy**, thus making it the world's first carbon neutral accelerator laboratory

NOTE: 2 out of the last 3 Scientific Directors of SESAME were from Elettra (Trieste)

In the beginning a beautiful building, courtesy of the Jordanian government and situated in Allan, Jordan





The microtron injection device taken from **Bessy 1**, a decommissioned synchrotron gifted by Germany. Photographed together with UNESCO Natural Sciences ADG Gretchen Kalonji.

With all the other challenges, heavy snowfall in Jordan collapses the roof!



SESAME moving back on track after collapse of roof caused by unprecedented snow, with a big boost from additional Italian funding

20 May 2014

The 24th meeting of the SESAME Council was held on the premises of the Laboratori Nazionali di Frascati (LNF) in Frascati (Italy) on 12-13 May 2014. This was the first Council meeting to be held after the collapse, on 14 December 2013, of the roof of SESAME's experimental hall caused by unprecedented heavy snowfalls.



2017-- The inauguration of SESAME: scientists, diplomats, policy makers all under the new roof

"The first priority is good science. The fostering-better-relations bit will look after itself—provided SESAME attracts large numbers of scientists from different members."-- Chris Llewellyn-Smith (*Physics Today,* 2017)



Princess Sumaya bint Hassan Chris Llewellyn-Smith, Carlos Moedas,....



IAEA DG Amano and colleagues



King Abdullah II, CL and Khaled Toukan





Flavia Schlegel (ADG UNESCO) flanked by Fabrizio Nicoletti and Fabiola Gianotti

The Iranian Delegation including **Javad Rahighi**, Iran representative and President, Iranian Light Source Facility (ILSF)

Science under sanctions

January 16, 2016: "Implementation Day" in Tehran: ILSF research laboratories at IPM



All instruments "Made in Iran" by necessity



Signing an agreement on an ILSF *travel program* with the Director of IPM, Javad Larijani



2017--Iranian delegation in Trieste to promote an Iranian beam line at Elettra following example of the **Indian government** to train beam line scientists and provide additional research opportunities.



2022: 3D View of storage ring building (ILSF)



Courtesy: J. Rahighi

Individual International Collaborations in Light Sciences

The extraordinary Humberto Cabrera: Cuba to Venezuela to ICTP, Italy



<u>Top right:</u> Jehan Akbar, Hazara University, Khyber Pakhtunkhwa Region, Pakistan, <u>Bottom right:</u> Komlan Gadedjisso-Tossou, University of Lome, Togo----Two success stories for sustainable actions

In research, Humberto has extraordinarily propelled the **careers** of many young scientists from the developed world with incredible energy and time commitment, and mentorship echoing words from UNESCO's first DG Julian Huxley on science in diplomacy:

"Practical demonstration is the best form of education"

IceCube Neutrino Observatory, South Pole: collaboration between 56 institutions in North America, Europe and Asia. Photo entered in **IUPAP100** Photo Contest



Creating an enduring legacy to the International Year of Light and Light-based Technologies 2015

International Day of Light



International Steering Committee Chairs John Dudley and JN

The International Day of Light is a global observance

The key objective of The International Day of Light is to raise awareness of the importance of light-based technology for society.

Events since 2018 have reached millions of people in more than 80 countries and even on the International Space Station!



Real impact during five International Days ... 2018-2022

2250 Events in 103 countries & worldwide



Also a message from the International Space Station

Breakdown by event type

68% Science-themed conferences & online webinars etc

- 12% Art-themed events, exhibitions & festivals
- 9% Events specifically targeted to schools
- 7% Competitions
- 5% Open Days & Citizen Science

Also 2 global campaigns #SeetheLight & #TrustScience

Breakdown by UN regional groups

- 10% Events held worldwide
- 3% Africa
- 22% Asia-Pacific
- 8% Eastern Europe
- 18% Latin America & Caribbean
- 39% Western Europe, North America & Others



Highlights

Political visibility

Regular high-level messages e.g. Audrey Azouley (UNESCO), Rolf Heuer (SESAME)

Global Audience

2022 numbers: 200,000 direct participants, 1,000,000 via festivals, social media etc.

Social Media

International Day of Light hashtags stimulate engagement on Twitter, Instagram, Facebook, Linke



UNESCO, UNESCO National Commissions, the United Nations New York, the United Nations Development Programme, UN Office for Sustainable Development, UN Women, UNESCO Courier; ICTP; All IDL Steering Committee members (thank you!) The International Astronomical Union; the European Space Agency ESA; the ESA Hubble Telescope account; synchrotron sources and research infrastructures from around the world; the PowerforAll coalition; laser and photonics companies (Coherent, Nokia Bell Labs, Menlo Systems, NKT Photonics to name just a few); Export Development Canada; the US Department of Energy; the US National Photonics Initiative; the World Bank (Climate); the European Commission CORDIS (EU-funded projects); the Nobel Prize; the European Commission DG Environment (Science for Environment Policy); the European Research Council ERC; the Gujarat Council on Science & Technology; HM Coastguard UK; Liter of Light Philippines, NRC Canada; Max Planck School of Photonics; Audi, Maserati, FC Bayern Munich!

Highlights - Trust Science campaign against misinformation





TRUST SCIENCE

5000 international science leaders including Nobel, UNESCO L'Oréal, Breakthrough prize winners, and supporters from 95 countries

Highlights – Activities around the world in 2022



The International Day of Light encourages activities that would not take place otherwise, helping to promote science education for all

Light-based technology and the UN sustainable development goals



Remote sensing & imaging Spectroscopy for monitoring

Diagnostics for imaging Sterilization and water purification

Affordable lights in remote communities Communications infrastructure

Solar power Energy efficient and smart lighting







Sharing our experience – making it easier for others



Executive Summary	×
PART 1	
Origins	+
UNESCO	
Visions, Goals, and Objectives	-
Light-based Technologies and the UN Sustainable Development Goals 7	-
Anniversaries during 2015	1
Organizational Structure 14-	4

CONTENTS

PART 2

Communications	22-24
Overview of IYL 2015 Activities	25-45
UNESCO Activities and Actions	46-47

PART 3

Founding Partner Activities	54-74
Patron Sponsor Activities	75-80
Other Node Activities	81-82
National Node Activities	3-186
Activities in Countries without IYL 2015 National Nodes	8-195

ANNEXES

JN Resolutions and Statements	198-216
YL 2015 Sponsors and Media Partners	.217-219
Contributors.	220-221





United Nations Educational, Scientific and Cultural Organization . of Chemical Elements

International Year

· of the Periodic Table





lightday.org/reports

Without light, our planet would be but a cold and barren place. Indeed, where there is light, there is often an abundance of life. Yet light represents even more for humanity. Light goes hand in hand with knowledge; It is a lens through which to see and understand the world.

Ms Audrey Azoulay | Director-General of UNESCO On the occasion of the International Day of Light 16 May 2022



United Nations • Educational, Scientific and • Cultural Organization •

A proposal in the pipeline:

An International Year of Quantum Science and Technology 2025

The initiative is being led by the American Physical Society, together with the German Physical Society and a broad and growing consortium of dozens of national, regional and international academies, societies, and organizations from Africa, Asia, Europe, the Middle East, North and South America, and Oceania.

It has received the endorsement of the International Union of Pure and Applied Physics (IUPAP) at its 30th General Assembly and will amplify the message of IYBSSD and other international scientific years, specifically on the role of quantum science and technology in addressing society's most critical challenges in all parts of the globe and help meet the UN SDGs

THANKS!