



# FIP Forum on International Physics

The American Physical Society

website: <http://www.aps.org/units/fip>

## Fall 2015 Newsletter

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March 2 – 6, 2015, San Antonio	
April 11 – 14, 2015, Baltimore	
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### SAVE THE DATES !

**March 14 – 18, 2016**  
**Baltimore**

**April 16 - 19, 2016**  
**Salt Lake City**

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**Disclaimer—The articles and opinion pieces found in this issue of the APS Forum on International Physics Newsletter are not peer refereed and represent solely the views of the authors and not necessarily the views of the APS.**

## Message from the Chair

*Edmond L Berger*



Dear Colleagues,

This is my second report to you as Chair of the Forum on International Physics (FIP) of the American Physical Society (APS). In 2016, Maria Spiropulu advances to Chair, and I graduate to Past-Chair.

The organization of invited paper sessions at APS General Meetings is one of our principal activities. At the 2015 March Meeting in San Antonio, March 2 - 6, the theme of the FIP sessions was “Condensed Matter Physics in Latin America,” with invited speakers from Argentina, Brazil, Colombia, and Mexico. Executive Committee member Alejandro De Lozanne played a key role in the organization of these March sessions. The speakers did an outstanding job of communicating, and audience participation was lively. However, I must confess to being disappointed by the turnout of FIP members. Let’s do better in future years. We also hosted a very well attended and spirited FIP reception on March 3. Photos taken at the reception appear elsewhere in this Newsletter.

For the 2015 April Meeting in Baltimore, April 11 – 14, Maria Spiropulu and I organized two sessions on “Models of International Partnership,” with invited speakers reporting on the organization and management of international collaborative efforts in astrophysics, particle physics, nuclear physics, fusion, and gravity research. The speakers were David Gross (Santa

Barbara), Sergio Bertolucci (CERN), Joseph Lykken (Fermilab), Thomas Glasmacher (FRIB, Michigan State), Roger Blandford (Stanford), Robert Iotti (Chair, ITER Council), and Gabriela Gonzalez (LIGO Spokesperson). A panel discussion followed these presentations. The Panel included all the speakers plus William Colglazier (recently the Science and Technology Adviser to the US Secretary of State), Saul Gonzalez of the White House Office of Science and Technology Policy, and James Siegrist of the DOE Office of High Energy Physics. In addition, at the April meeting FIP co-sponsored an invited paper session with the Division of Physics of Beams (DPB) on the topic “International Photon Science Facilities,” organized principally by Stuart Henderson (Argonne), as well as a joint session organized by FIP Vice-Chair Cherrill Spencer with the Committee on the Status of Women in Physics (CSWP).

Our FIP colleague Per Nordblad, Professor in Solid State Physics, Uppsala University, was the 2015 recipient of the John Wheatley Award of the American Physical Society, for his sustained efforts of nearly three decades in nurturing physics research and education in Bangladesh, Vietnam, Thailand, and Eritrea. The award was presented at the April meeting. Please consider making nominations of appropriate individuals for the 2017 Wheatley award.

It may be worthwhile to write a few words about APS Fellowships. Any active APS member is eligible for nomination and election to Fellowship. The criterion for election is “exceptional contributions to the physics enterprise”. The procedure for nominations is spelled out at <http://www.aps.org/programs/honors/fellowships/nomination-requirements.cfm>. Nominators are asked to indicate which APS unit (division, topical group, or forum) is best qualified to assess the nomination. In 2015, 15 nominations were sent to FIP for examination, and we were limited to recommending at most 8. In addition to the exceptional contribution criterion, those advanced by FIP should have identifiable contributions to the development of programs and collaborations between physicists and their communities from diverse cultural backgrounds. FIP’s evaluation committee is made up of the 6 members-at-large of the Executive Committee, with the FIP Chair serving as

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Chair of the evaluation committee. Nominations were due by May 15. The FIP Fellowship evaluation committee concluded its conscientious examination in mid-July of the 15 files assigned to us for review. Our recommendations were forwarded at that time to the full APS Fellowship Committee. If there are no concerns regarding the selected nominees, this APS committee will forward the names to the APS Council of Representatives for a vote to elect to Fellowship during their November meeting. All approved recommendations, sponsors, and units will be notified of the results fairly soon afterwards. Until then, our recommendations must remain confidential.

I want to call your attention to the APS International Research Travel Award Program, IRTAP (formerly ITGAP). This program was a FIP initiative that has since drawn sponsors from many APS units. Its purpose is to promote international scientific collaborations between APS members and physicists in developing countries. Up to \$2,000 (US) per recipient is awarded for travel and lodging expenses for international travel while visiting a collaborator. In her capacity as Vice-Chair of the Executive Committee in 2015, Cherrill Spencer is now responsible for the review process, with expert assistance from other sponsoring APS units. For more information and application guidelines, please see <http://www.aps.org/programs/international/programs/travel-grants.cfm>.

FIP's Executive Committee met on Saturday, April 11 in Baltimore during the APS General Meeting. Among the agenda items, special attention was devoted to the planning for the March and April 2016 APS invited session programs, APS Fellowships, and the FIP Newsletter. Ernie Malamud, our dedicated Newsletter Editor, has produced 10 FIP newsletters, each requiring

a substantial commitment of time and concentration. Ernie suggested that FIP should be thinking ahead to appointing a new Editor. There is wide consensus that Ernie has done a superb job as Editor. He will be hard to replace. The importance of the Newsletter for communicating FIP's activities to the FIP membership, and more broadly, means we cannot leave the job to the Editor alone. Members of the Chair line have begun speaking with Ernie about the kinds of added support the Editor needs.

Our Secretary/Treasurer Noemi Mirkin deserves special and well-earned accolades from all of us. Noemi is now in the 3rd year of her second term as Secretary-Treasurer. FIP would not function, and the Chair and the Executive Committee could not do their work, without the benefit of her corporate knowledge, wisdom, dedication, and gentle reminders.

The nomination process is underway for new members of the Chair line and members-at-large of the Executive Committee. Past-Chair Ercan Alp heads up the nomination committee. VOTE when you receive the ballot, and please consider becoming a candidate in the future. Encourage more of your friends to join the Forum and to participate actively!

*Ed Berger is a high energy elementary particle theorist and Distinguished Fellow at Argonne National Laboratory. He is a Fellow of the APS and served previously as Chair of the Division of Particles and Fields (1990); Chair of APS Committee on Constitution and Bylaws (2011); and Chair of the APS Committee on Meetings (1995).*

## Report from the APS International Affairs Office (INTAF)

*Amy Flatten*



The APS Office of International Affairs (INTAF) enjoys a strong partnership with the Forum on International Physics (FIP), with several members of the FIP Executive Committee serving on a key advisory body to INTAF – the Committee on International Scientific Affairs (CISA). Together, INTAF, FIP & CISA have built programs to offer travel grants to graduate students, postdocs and professors, to enhance collaborations among young physicists, to help build new networks and partnerships, and to bring speakers for units' sessions at APS annual meetings.

As deadlines for these opportunities will be fast approaching this fall, I want to use my remarks in the FIP newsletter to highlight these opportunities, and encourage you to apply. For those professors who may be reading this, we ask you to encourage your graduate students and postdocs to avail themselves of these programs. If you are planning to apply yourself, consider asking your student or postdoc to apply as well, so that they may accompany you on your travels.

### U.S.—Brazil Young Physicists Forum March 12-13, 2016; Baltimore MD (*The weekend before the 2016 APS March Meeting*)

The U.S.-Brazil Young Physicists Forum (YPF) is cosponsored by APS, the Brazilian Physical Society (SBF), and the São Paulo Research Foundation (FAPESP). The YPF will combine scientific sessions with career development and networking opportunities for the early-career physicists who are less than 10 years after completing their Ph.D. and are employed in a permanent professional position. Each country will send ~20 representatives (~40 total for this meeting). We especially wish to encourage U.S. early-career physicists without much prior experience in Brazil to join the meeting.



The Forum will span a day and a half, and focus **upon Condensed Matter Physics and Materials Physics**, along with *all related scientific fields* of the APS March Meeting. Through special topical and technical sessions, it will provide early-career physicists from the United States and Brazil with opportunities for:

- Building international & interdisciplinary networks
- Career development discussions on publishing in peer reviewed journals
- Panel sessions on university-industry cooperation
- Plenary sessions and networking opportunities with leaders in condensed matter and materials physics, and VIPs from APS, SBF and FAPESP

**Travel Assistance:** For those attending the 2016 APS March meeting, there should be no additional travel expenses beyond two extra nights in a hotel. Some financial assistance should be available for hotel costs.

**Additional Information:** More details on registration, etc. will be sent to directly FIP members in the near future from the APS Communications Dept., and additional information will soon be available on the APS March Meeting and International Affairs web pages.

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### **Brazil-U.S. Exchange Program**

**Application Deadline for U.S. Applicants: October 26, 2015**

The [Sociedade Brasileira de Física \(SBF\)](#) and the American Physical Society (APS) are pleased to sponsor an exchange program for physics Ph.D. students and professors in the U.S. and Brazil. Postdocs in the U.S. can also apply for support to undertake opportunities in Brazil. The **Brazil-U.S. Professorship/Lectureship Program** funds physicists in Brazil and the United States wishing to visit overseas to teach a short course or deliver a lecture series in the other country. The professorship grants are up to USD \$4,000. Through the **Brazil-U.S. Physics Ph.D. Student & Postdoc Visitation Program**, graduate students and postdocs in the U.S. and Brazil can apply for funds to travel to the other country to pursue a breadth of opportunities in physics. Such opportunities might include:

- Attending a short-course or summer institute;
- Visiting with a professor in his/her field of study;
- Working temporarily in a laboratory; or,
- Undertaking another opportunity that the applicant and host believe is worthy of travel support.

Grants for students and postdocs are up to USD \$3,000. The APS funds 10 Ph.D. students or pos-docs each year, along with 5 professors traveling from the United States. (The SBF funds a similar number of awards for applicants traveling from Brazil.) Calls for proposals are issued each fall and spring and **the next deadline for proposals from U.S. applicants is October 26, 2015**. See program application guidelines at:

<http://www.aps.org/programs/international/programs/brazil.cfm>



### **U.S. - India Travel Grant Program**

**Proposal Deadline for all Applicants: 26 October 2015**

The Indo-U.S. Science and Technology Forum (IUSSTF) sponsors and APS administers the exchange of physicists, physics Ph.D. students, and postdocs between India and the United States. Similar to the Brazil program mentioned above, the **APS-IUSSTF Professorship Awards** permit physics professors from India and the U.S. to deliver short courses or a lecture series in the other country. The **APS-IUSSTF Physics Ph.D. Student & Postdoc Visitation Program** is intended for physics *Ph.D.* students and postdocs who wish to pursue opportunities in physics such as to attend a summer institute or work temporarily in a laboratory. The IUSSTF provides funds that enable 4 students and postdocs and 4 professors (total from U.S. and India) each year. Calls for proposals are issued each fall and the next application deadline is 26 October 2015. More information is available at: <http://www.aps.org/programs/international/honors/us-india-travel.cfm>

### **International Research Travel Award Program (IRTAP)**

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**Application Deadline soon to be announced by FIP (look for more info this fall)**

Also see the article on page “APS International Research Travel Award Program: Providing Support to International Collaborators,” by Michele Irwin

The APS **International Research Travel Award Program (IRTAP)**, formerly known as the International Travel Grant Award Program (ITGAP), was established in 2004 by the Forum on International Physics to promote international scientific collaborations between developed and developing country scientists. The IRTAP continues to grow and flourish and now enjoys financial support from all APS Divisions, several Topical Groups, as well as the Forum on International Physics. Grantees are awarded up to \$2,000 for travel and lodging expenses for international travel while visiting a collaborator. More information on the IRTAP is available at: <http://www.aps.org/programs/international/programs/travel-grants.cfm>



**Marshak & Beller Lectureships - Call for Nominations from Unit Chairs coming this fall 2015**

The Society continues to bring international physicists to speak at APS meetings through both the Marshak and Beller Lectureship Awards, which support distinguished physicists from the developed and developing countries respectively. The Beller Lectureship was endowed by Esther Hoffman Beller for the purpose of bringing distinguished physicists from outside the United States as invited speakers at APS annual meetings. The Marshak Lectureship, endowed by Ruth Marshak in honor of her late husband and former APS president, Robert Marshak, provides travel support for physicists from "developing nations or the Eastern Bloc" invited to speak at APS annual meetings.

Each fall, the Chair of CISA and the Director of International Affairs solicits APS unit Chairs for nominations of outstanding speakers from outside of the United States, whom they have invited to speak during their sessions at the March and April meetings. Along with the travel funds of \$2000, the international speakers will be honored in the meeting program and/or other printed materials as Beller or Marshak Lectureship recipients.

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The opportunities above are just a few of the programs developed by the APS International Office, in partnership with FIP and CISA. We hope that you will apply and we also ask you to encourage your graduate students and postdocs to participate in these programs. Please visit our website for more information on our joint meetings with other national physical societies, advice on visa issues, APS human rights activities and our other expanding efforts across the globe. Most importantly, please don't hesitate to contact me directly—I'd welcome the chance to hear from my colleagues in the Forum on International Physics.

[Flatten@aps.org](mailto:Flatten@aps.org), [www.aps.org/programs/international](http://www.aps.org/programs/international).

*Dr. Amy Flatten is Director of International Affairs at the American Physical Society*

## From the Editor

*Ernie Malamud*

I thank the authors for the many excellent articles in this issue. They cover a wide range of international physics activities and events in different countries. There are many opportunities for you to participate in international physics described in the articles by Ed Berger, Amy Flatten and Michele Irwin.

Accelerators and their applications, from those using light sources to the big machines probing the most fundamental unanswered questions are among the most successful examples of international cooperation in science.

In this issue there are 4 articles about light sources: the current status of SESAME, the light source under construction in Jordan, and articles on the Brazilian synchrotron light source, industrial use of light sources in Japan, and a light source being planned for Mexico.

There are many existing light sources and many new ones under construction. (see <http://lightsources.org>). The one large region on our planet without such a facility is Africa and there is increasing momentum to build one there. A conference in November will discuss progress and I plan to have an article on a light source for Africa in our spring 2016 newsletter.

*(...) “Accelerator laboratories link diverse societies and contribute to a culture of peace.”*

I pulled this phrase from page 23 of the brochure “Accelerators and Beams, Tools of Discovery and Innovation.” This brochure, now in its 4<sup>th</sup> edition, is published and distributed by the APS Division of Physics of Beams. Approximately 28,000 copies have been distributed worldwide. High school physics teachers in particular appreciate this brochure, either as a short, easy to read refresher on accelerators or to distribute in their classes or physics clubs. It is on the DPB website. If you’d like a copy (or a bunch) mailed to you let me know. There is no charge.

I jump a few orders of magnitude from the GeV scale synchrotron light sources to the big TeV scale machines. Both the existing facilities (LHC) and studies

of possible future machines (FCC and CEPC-SPPC described in our last issue) are all international collaborative efforts. In this issue Maria Spiropulu gives us an update on the International Linear Collider.

Featured in this issue are two articles on important US cooperative programs in the Muslim world contributed by Amir Mohagheghi at Sandia National Laboratories.

Sultana Nahar has contributed a trip report on her recent visit to Bangladesh. I learn a great deal from her articles about physics research and teaching in parts of the world quite unknown to me.

## The spring 2016 newsletter deadline is February 1, 2016.

I try to get the spring issue done in time for distribution before the APS Spring meetings so this is a “hard” deadline.

Think about writing a short article and/or sending a couple of pictures with long caption. Or suggest possible topics and/or authors. Please send text in MSword format and graphical material as JPGs.

*Ernie Malamud spent three decades at Fermilab participating in high energy physics experiments and accelerator design and construction. He is a Fermilab Scientist Emeritus and is on the adjunct faculty at the University of Nevada.*

## FIP sponsored or co-sponsored sessions at the APS 2015 Spring Meetings

The APS web pages have links to the abstracts and in many cases the presentations themselves. The links are from the meeting "Epitome". It is easy to find the presentation using the session number and then the specific talk. Finding the "Epitome" takes a few clicks starting from the APS home page:

- (1) Meetings & Events
- (2) Archives of the Bulletin of the American Physical Society
- (3) 2015
- (4) APS March (April) Meeting 2015
- (5) Scientific Program
- (6) Epitome

### ***March Meeting March 2 – 6, 2015, San Antonio, Texas***

#### **Session B3 [Condensed Matter Physics in Latin America I](#)**

**Chair:** Alex de Lozanne, University of Texas at Austin

**Invited Speakers:** Pablo Levy, Adalberto Fazzio, Marcelino Barboza-Flores, Arturo Ayon

#### **Session Q3 [Condensed Matter Physics in Latin America II](#)**

**Chair:** Edmond L Berger, Argonne National Laboratory

**Invited Speakers:** Horacio M. Pastawski, Antonio Jose Roque da Silva, Manuel Quevedo-Lopez, Angela Camacho

### ***April Meeting April 11 – 14, 2015, Baltimore, Maryland***

#### **Session J8 [International Photon Science Facilities](#)**

**Co-sponsors:** DPB FIP **Chair:** Stuart Henderson, Argonne National Laboratory

**Invited Speakers:** Harald Sinn, David Schultz, Harald Reichert

#### **Session J12 [Prize Session: Joseph A. Burton, Leo Szilard and John Wheatley Awards](#)**

**Co-sponsors:** FPS FIP **Chair:** Micah Lowenthal, National Academy of Science

**Invited Speakers:** E. William Colglazier, Ashok Gadgil, Per Nordblad

#### **Session S12 [Models of International Partnership I](#)**

**Chair:** Edmond Berger, Argonne National Laboratory

**Invited Speakers:** David Gross, Joseph Lykken, Thomas Glasmacher, Sergio Bertolucci

#### **Session U12 [Models of International Partnership II](#)**

**Chair:** Maria Spiropulu, California Institute of Technology

**Invited Speakers:** Robert Iotti, Roger Blandford, Gabriela Gonzalez, Round Table

#### **Session Y8 [The 5th Inter. Conf/ on Women in Physics, Reflections and Going Forward](#)**

**Co-sponsors:** CSWP, FIP **Chair:** Susan Blessing, Florida State University

**Invited Speakers:** Beth Cunningham, Prajval Shastri, Kathyne Sparks Woodle, Herman White



## Photos at the FIP Reception during the 2015 March Meeting in San Antonio

*Photos by Esen Ercan Alp*

Amy Flatten, APS International Affairs Director, mingling with the participants at the FIP reception



Ed Berger, FIP Chair and Kate Kirby, APS Chief Executive Officer chatting at the reception.

The Overseas Chinese Physical Association awards were given at the FIP reception.



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Turkish physicists attending the APS meeting were addressed by Dr. Amy Flatten, the director of APS International Affairs.



**The FIP Executive Committee met during the April 2015 APS Meeting in Baltimore.**



From left to right: Ercan Alp, Aldo Romero, Susan Seestrom, Annick Suzor-Weiner, Noemi Mirkin, Christine Darve, Ed Berger, Alex de Lozanne, Cherrill Spencer, Maria Spiropulu, Amy Flatten, and Young-Kee Kim.

*Photo by Esen Ercan Alp*

## SESAME Moves towards Commissioning

*Chris Llewellyn Smith*

As many readers will know, SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) is a 2.5 GeV third generation light source under construction in Jordan. It will foster scientific and technological capacities in the Middle East and the neighbouring countries, and better understanding through collaboration between peoples with very different creeds and political systems. The members of SESAME are currently Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey (others are being sought). Brazil, China, the European Union, France, Germany, Greece, Italy, Japan, Kuwait, Portugal, the Russian Federation, Spain, Sweden, Switzerland, the UK, and the USA are Observers.

If all goes well, commissioning will begin in the second half of next year. What barriers have been surmounted in reaching this stage, and what are the remaining challenges?

### Progress in construction

It was originally proposed that SESAME would be a 1 GeV light-source based on components of the BESSY I facility in Berlin (for a history of SESAME see [www.sesame.org.jo](http://www.sesame.org.jo)). In 2002, however, it was decided to build a completely new 2.5 GeV main storage ring, with straight sections that can accommodate insertion devices, while retaining the main elements of the BESSY 1 microtron, which provides the first stage of acceleration, and the booster synchrotron.

The building, which was provided by the Jordanian government, was formally opened in November 2008. Other progress has not been as rapid as had been hoped, due mainly to lack of funding. The collapse of the roof under unprecedented snowfall in December 2013 (when it even snowed in Cairo) has not helped, although – despite working under the open sky throughout the year – the SESAME team successfully commissioned the 800 MeV booster in September 2014.

The final design of the magnets for the main ring and the powering scheme was carried out by CERN in collaboration with SESAME. Construction of the magnets is being managed by CERN using funds provided by

the European Commission. The first of 16 cells was assembled and successfully tested at CERN at the end of March: installation will begin later this year. If all goes well, commissioning of the whole facility – initially with two beamlines and two of the four accelerating cavities – should begin in June next year.

### Training

From the start SESAME has organised a vigorous training programme, with generous support from Agencies and laboratories around the world. Initially the emphasis was on training accelerator experts, but it has now shifted to training beamline scientists and potential scientific users of SESAME. The potential user community already numbers some 300 and is expected eventually to grow to 1,000 to 1,500.

### The scientific programme

SESAME will nominally have four ‘day-one’ beamlines in Phase 1a, although – to speed things up and to save money – it will actually start with just two (Infrared - a thermal source Fourier Transform Infrared microscope, that will be used with this beamline, has been in use in experiments since last year; and X-ray Absorption Fine Structure and X-ray Fluorescence). Two more (Macro-molecular Crystallography; and Materials Science) will be added in the next two years, once the necessary funding is available. Three others will be added in Phase 1b (Soft X-ray; Small and Wide Angle X-ray Scattering; and Extreme Ultraviolet). This suite of beamlines will enable research in subjects ranging from biology and medical sciences through materials science, physics and chemistry to archaeology.

### Challenges

The main challenge has been, and is, obtaining funding. Most of the SESAME Members have tiny science budgets and face financial difficulties, and they do not find it easy to pay their contributions to the operational costs, which are rising rapidly as more staff are recruited, and will increase even faster when SESAME comes into operation and is faced with paying large electricity

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bills, at \$0.36/kWh and rising (a solar power plant that will cover part of the need will be constructed once the funding can be found). Increasing budgets have been approved by the SESAME Council, but more Members, which SESAME has always sought, primarily to share the benefits, would provide some relief.

So far \$65 M has been invested, including the value to SESAME of in-kind contributions of equipment (from Jordan, Germany, UK, France, Italy, USA, and Switzerland), cash contributions to the capital budget (from the EC, Jordan, Israel, Turkey, and Italy), and manpower and other operational costs that are paid by the Members (but not including important in-kind contributions of manpower from CERN and the French light-source SOLEIL).

Thanks to major contributions from the EU and Italy, and pledges to voluntarily provide \$5 million each (much now paid) by Iran, Israel, Jordan and Turkey, most of the funds that are required simply to bring SESAME into operation next year are now available. At the SESAME Council meeting in May, Egypt announced that it will also make a voluntary contribution, which will narrow the immediate funding gap. More will, however, be needed to provide additional beamlines and a properly equipped laboratory, and additional funds are being sought from a variety of governments and philanthropic organisations.

It would be wonderful if the USA could match, or exceed, the \$11 million so far contributed by the European Union. Over many years various Departments of the US Government have expressed support for SESAME, and in 2010 the US National Commission for UNESCO endorsed SESAME as ‘an initiative that supports the diplomatic interests of the United States’. So far, however, this has not resulted in support (apart from some training opportunities and donations of surplus equipment). We hope that recent letters urging US support, to the President from Representative Bill Foster and four colleagues, and from Rush Holt CEO of the AAAS (who, with Foster and others, wrote to

Hilary Clinton about SESAME in 2009) to Secretary of State John Kerry, will produce results. Any pressure that APS members can exert, directly or through members of the Congress, could help.

The on-going turbulence in the Middle East has only had two direct effects on SESAME. First, sanctions have up to now made it impossible for Iran to pay its capital and operational contributions, which are very much needed. Second, discussions of Egypt joining other Members in making voluntary contributions were interrupted several times by changes in the government.

### **Conclusions**

Senior scientists and administrators from the SESAME region are working together to govern SESAME through the Council, with input from scientists from around the world through its Advisory Committees. Young and senior scientists from the region are collaborating in preparing the scientific programme (at Users’ Meetings and Workshops). And the extensive training programme (Fellowships, Visits to operating light-sources, Schools) is already building scientific and technical capacity in the region.

There are still huge challenges, but I am confident that thanks to the enthusiasm of all those involved they will be met. There are light-sources with higher energy and greater brightness, but SESAME’s performance should be good enough to attract leading scientists from across the region. The scientists who work together at SESAME will quickly develop professional respect, which in turn will lead to greater mutual tolerance and understanding for their diverse views on non-technical issues. In the words of an endorsement of SESAME issued by 45 Nobel laureates, SESAME is expected to become “a beacon, demonstrating how shared scientific initiatives can help light the way towards peace”.

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The SESAME building, 35-km north-west of Amman, seen with its new roof in May 2015 (Image credit: SESAME)



The first of 16 cells of the SESAME storage ring, assembled for testing at CERN in late March, with components constructed in SESAME members and observers: quadrupoles (green) - Spain and Turkey; dipoles (red) - UK; sextupoles (yellow) - Cyprus and Pakistan; sextupole coils - France; vacuum chambers - Germany; girders - Spain. In addition, there are: dipole power supply - Italy; controllers and corrector power supplies - Switzerland; quadrupole and sextupole power supplies - Israel (Image credit: CERN-PHOTO-201503-059-57)

*Professor Chris Llewellyn Smith is President of the SESAME Council and Director of Energy Research, Oxford University and formerly Director General of CERN.*

## The São Paulo School of Advanced Sciences (ESPCA) on Recent Developments in Synchrotron Radiation

*Harry Westfahl, Helio Tolentino and Esen Ercan Alp*

The São Paulo School of Advanced Sciences (ESPCA) on Recent Developments in Synchrotron Radiation was held between July 13-24, 2015 at LNLS in Campinas, Brazil. LNLS is the Laboratório Nacional de Luz Síncrotron, The Brazilian Synchrotron Light Source. 96 students, 48 of them from abroad spread over 17 different countries attended the school. A total of 27 different nationalities were represented in this 12 days school, in which 22 lecturers presented 34 lectures.

Welcoming talks by A. José Roque da Silva, Director of LNLS, and C. Henrique de Brito Cruz, Scientific Director of FAPESP (São Paulo funding agency), gave the participants a chance to learn first hand the future plans for LNLS and Science in São Paulo. In particular, the ongoing construction of one of the brightest synchrotron X-ray sources in the world, SIRIUS, provided a perfect setting for this summer (winter) school.

The topics discussed at the school were synchrotron radiation source characteristics, including coherence and polarization, new X-ray optics components for focusing, and high-resolution monochromatization, as well as crystal analyzers. Among the scientific topics discussed were applications of various X-ray spectros-

copy, scattering and imaging techniques to problems in materials science, geology, structural biology, condensed matter physics, soil science, and environmental science.

The school was accompanied by hands-on experiments and tutorials at 17 different beamlines of the LNLS, complemented with tutorials on the accelerator itself, X-ray detectors and X-ray optics. Each student had a chance to participate in 5 experiments plus an experiment of their choice. LNLS staff had prepared a detailed introduction to each beamline covering spectroscopy, diffraction and imaging, and students were then allowed to take data under the beamline personnel's supervision.

The Sao Paulo School on Recent Developments in Synchrotron Radiation was able to attract some of the best young researchers in the world, as well as leading scientists to present lectures. Complemented with superb hands-on experiments in the afternoon, the school provided an unprecedented opportunity for students and postdoctoral researchers. The fact that Brazil is building the brightest X-ray source in the World

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(SIRIUS) was the perfect back drop for the summer (winter) school. The vision of the funding agency, FAPESP, in terms of making Brazil a destination country for young talent to come and work can only be realized by showing the opportunities it has in research laboratories and in its Universities. Thus, one of the important aspects of the school in terms of explaining and showing the real opportunities available in Brazil was accomplished, with students sharing 13 days in Brazil with their peers.

The friendly atmosphere, and the excellent hospitality offered to the visitors, students and teachers alike, complemented this positive picture. The school may boost the current user capacity of the existing synchrotron,

LNLS, and increase the scientific interest in the dozen or so new beamlines which are being designed for SIRIUS.

The generous support from FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo), the Sao Paulo Research Foundation to fund the school, strong promotion by American Physical Society, and genuine embrace of the LNLS and CNPEM management and staff were the key to the success of this school.

*Harry Westfahl is the Scientific Director of LNLS, Helio Tolentino is a Researcher, LNLS, and Esen Ercan Alp is a Senior Scientist at the Advanced Photon Source at Argonne National Laboratory and Past-Chair of the FIP.*

## **Industrial Use of the Japanese Synchrotron Radiation (SR) and the X-ray Free Electron Laser (XFEL) Facilities**

*Tetsuya Ishikawa*

The Japanese government, like many other governments, wants to see higher participation rates for industry in research facilities like SPring-8 (synchrotron radiation, SR), SACLA (X-ray free electron laser, XFEL), J-PARC (spallation neutron), and the K-computer. Since its inauguration in 1997, SPring-8 has encouraged participation from industry by establishing an equal-access policy for users from both academic and industrial circles. As a result of several strategic initiatives, approximately 20% of accepted proposals currently come from industry. Many companies have found solutions to their specific problems by using SPring-8, often leading to the introduction of new products in the marketplace. SPring-8, originally named for “Super Photon ring 8 GeV”, now refers to “Solution Providing ring 8 GeV” or “Solving Problem ring 8 GeV”.

Initially, the SPring-8 beamlines were used by individual companies, mostly by users from their analysis departments. Soon after SPring-8’s launch, thirteen companies from heavy industry, electronics, electric companies, automotive companies, and chemical industries collaborated to construct two beamlines as proprietary assets, one using a bending magnet and the other using an undulator. A consortium of pharmaceutical companies soon followed, constructing a bending magnet beamline for protein crystallography as its proprietary

asset. Next, the local government, Hyogo Prefecture, constructed two beamlines, which opened partially for industrial use by local companies. SPring-8 then constructed two public beamlines for proposal-based industrial use, and converted one beamline for undulator R&D for proposal-based industrial applications as well. Finally, Toyota Central R&D Laboratories, Inc., a unit of Toyota Motor Corporation, constructed a beamline for research supporting the Toyota Group.

The second phase of SPring-8 opened with the construction of the Frontier Soft matter Beamline by a consortium comprising nineteen leading polymer companies in Japan. One of the consortium’s initial trials was to set up a strategic academic-industrial alliance, which resulted in the development of energy-saving automotive tires by a collaboration between Sumitomo Rubber Industries, Ltd. and the University of Tokyo. Construction of two similar beamlines followed with investment from the New Energy and Industrial Technology Development Organization (NEDO). One targets development of new battery technology with collaboration between Kyoto University and related companies, and the other targets development of catalysts for Fuel Cells with collaboration between the University of Electro-Communications and related companies.

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The considerable success with industrial applications at SPring-8 has encouraged both the facility and representatives from industry to seek additional opportunities for collaboration. There has been strong demand in industrial circles to address common, significant problems facing their industrial segments by using SPring-8 facilities for research. In addition, there has been momentum both in the facility and within industrial circles to use SPring-8 not only as an analytical tool but also as a tool for advancing business strategy.

Innovations in science and technology are indispensable for addressing many challenges facing the world today, such as a steadily growing world population, limited and/or costly energy sources, global warming, and rapidly evolving infectious diseases. Leading-edge photon science will undoubtedly play a prominent role in the technology required to analyze the properties of materials that can help to address these problems. Synchrotron radiation (SR) and X-ray free electron laser (XFEL) technologies are expected to provide insights as observation and analysis tools. A serious examination of the roles that scientific and technological innovation plays in resolving the problems facing humankind, and the roles for SR/XFEL facilities, requires active participation from the industrial arena.

In order to facilitate further collaboration between academia and industry, a two-day workshop titled "Workshop toward Innovation and Photon Science" was convened in November 2014 to hold a series of roundtable discussions among Japanese industrial leaders and leaders of SR facilities around the world. The workshop represented a first attempt for this type of discussion. Japanese industrial companies have earned a reputation for excellence in analyzing the unique structures of various materials to develop technologies for everyday use. The workshop aimed to inspire discussion about cutting-edge science and technology among representatives of several international SR/XFEL facilities and Japanese industrial leaders. Roundtable sessions were conducted to discuss methods for solving various challenging problems facing mankind, roles for photon science in addressing these problems, and technological innovations required in SR/XFEL facilities.

The workshop was held at the foot of Mt. Fuji. Attendees included leaders from fourteen SR/XFEL facilities (Advanced Light Source, USA; Advanced Photon Source, USA; Australian Synchrotron, Australia; CHESS, USA; Diamond, UK; ESRF, EU; Euro XFEL, EU; NSLS and NSLSII, USA; NSRRC, Taiwan; PLS-II and PAL XFEL, Korea; PSI, Switzerland; Shanghai

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**Workshop group photograph with Mt. Fuji in the background**



*(Continued from page 16)*

Light Source, China; SLAC National Accelerator Laboratory, USA; and SPring-8/SACLA, Japan), and the CTOs or CEOs from eleven Japanese companies (Asahi Kasei Corp.; Hitachi Metal Ltd.; Hitachi Zosen Corporation; Honda R&D Co. Ltd.; KYOCERA Corporation; Mitsubishi Electric TOKKI Systems Corporation; Mitsubishi Heavy Industries, Ltd.; NICHICON Corporation; Sumitomo Rubber Industries, LTD.; TOSHIBA Corporation; and TOYOTA MOTOR Corporation). In addition, the workshop included professors and researchers from the University of Tokyo, Hokkaido University, Osaka University, UCLA, MEXT, JST, GIST, JASRI and RIKEN.

On the first day, the present author gave a keynote lecture titled “*Can photon science contribute to making a more sustainable world?*” The second day started with the first roundtable discussion on “the Energy Problem”, moderated by Prof. Gerhard Materlik. Problems in energy production, transfer, storage and conservation were discussed. The second roundtable session addressed “the Environmental Problem”, moderated by

Dr. Dennis Mills. Challenges with carbon dioxide, auto exhaust, biodegradable materials, saline water conversion, and nuclear decontamination were discussed. The final roundtable discussion on “Atomic Level Understanding of Destruction” was moderated by the present author. Topics for this session included making products more indestructible, deterring destruction, and investigating the possibility of programmed destruction.

Throughout the course of the workshop, participants discovered new possibilities for photon science using SR/XFEL to contribute to developing solutions to great challenges with clean energy sources, environmental degradation, and other issues that impede sustainable development. These discussions also spurred new academic-industrial alliances to develop novel applications at SR/XFEL facilities.

*Tetsuya Ishikawa is the Director of the RIKEN SPring-8 Center, a branch of RIKEN responsible for developing and operating Spring-8, a third generation hard X-ray SR facility, and SACLA, a hard X-ray free-electron laser facility.*

## Momentum gathers towards a Mexican Light Source

*Armando Antillón, José Jiménez and Matías Moreno*

Mexico is the only large economy in the world that lacks a Synchrotron Light Source. This, however, might change soon. Indeed, ever since the government of Morelos — a tiny and beautiful state south of Mexico City — committed itself to support such a facility by funding a Strategic Plan to Build and Operate a Synchrotron in Morelos, favorable winds have been blowing for the supporters of this idea. Funding is actually a joint one; half comes from Conacyt (Consejo Nacional de Ciencia y Tecnología) Mexico’s science and technology federal funding agency. The grant was awarded to the Physics Institute at UNAM (National Autonomous University of Mexico). But other institutions also play an important role: Cinvestav, the UAM (Autonomous Metropolitan University), the University of Guanajuato and the Instituto for Physical Sciences at Morelos.

El Colegio Nacional is an emblematic national institu-

tion created by a presidential decree in 1943 and its members are the country’s foremost artists and scientists. The main objective of El Colegio Nacional is the diffusion of high level culture in the country.—The promoters of the Mexican synchrotron choose this institution to inform the nation of the advances made in this Project. With the help of a member of El Colegio Nacional, Dr. Octavio Novaro, a conference took place on June 23<sup>rd</sup> and 24<sup>th</sup> of this year with the objective of giving an opportunity to the academic and political sectors to exchange ideas on the feasibility of creating a facility of such magnitude, knowing that it would be the largest scientific and technological center for innovation science and technology in Mexico. Attendees from the political side included, among others, Dr. Enrique Cabrero Director of Conacyt, Dr. Jorge Flores, Coordinator of the Science Advisory Council of the Presidency of the Republic, a co-organizer of the meeting. Senator Luz María Beristain, an enthusiastic poli-

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tician, also attended.

The international participants were exceptionally receptive and skillfully addressed the objectives of the meeting. The attendees were Professors Brian Kobilka and Herman Winick from Stanford, Roger Falcone from Berkeley, José Roque from LNLS, Caterina Biscari and Miguel Angel García from ALBA and Edward Mitchell from ESRF.

The sessions were broadcast live by El Colegio Nacional and the national press was also present at the event.

This event had the major success of convincing a large sector of the academic world. After the meeting, many who had previously been skeptics became supporters of the Project. The conference also opened the doors of the Federal Congress.

More recently, the 5<sup>th</sup> Mexican Synchrotron Radiation Users Meeting took pace in Morelos' State capital,

Cuernavaca, on August 12<sup>th</sup> to 14<sup>th</sup>. The number of participants has increased since the first meeting. This time there were 60 contributions from 104 participants who came from half of the Mexican States. Plenary talks from distinguished scientists were given: Harald Reichert, ESRF, Mingh Shi and Thorsten Schmitt, PSI in Switzerland, Vivian Stojanoff, Brookhaven National Laboratory, and John Rehr, Washington University.

The governor of Morelos State, Graco Ramírez renewed his support for the MLS at the opening ceremony and spent time with students and researchers.

One relevant outcome of El Colegio Nacional synchrotron meeting was the awareness it created among a small, but influential, members of Congress and other politicians. In particular, in the Senate of the Mexican Republic, momentum is gathering to promote funding and to organize an official Senate Forum on the subject of a Mexican Synchrotron Light Source. The latter could take place as soon as this September.

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**Octavio Novaro Peñalosa**  
miembro de El Colegio Nacional

**GRANDES PROYECTOS CIENTÍFICOS**

**SINCROTRÓN**

23 de junio de 2015, 8-14 horas • 24 de junio de 2015, 9-10 horas  
Donceles 104, Centro Histórico, ciudad de México

**PARTICIPANTES INTERNACIONALES**

<b>Brian Kobilka</b> Premio Nobel de Química 2012 Universidad de Stanford, EUA	<b>Caterina Biscari</b> Directora General de ALBA, España	<b>Roger Falcone</b> Laboratorio Nacional Lawrence Berkeley, EUA
<b>Edward Mitchell</b> European Synchrotron Radiation Facility, Francia	<b>Miguel Ángel García</b> Director Científico de ALBA, España	<b>Herman Winick</b> Emérito de SLAC y de la Universidad de Stanford, EUA

**COMITÉ ORGANIZADOR**

Jorge Flores CIC	Matías Moreno IFMAB	Armando Antillón IC-UNAM	Tomás Viveros UNAM
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2015

**EL COLEGIO NACIONAL**  
LIBERTAD POR EL SABER  
ENTRADA LIBRE Y GRATUITA

(Continued from page 18)



**Prof. Brian Kobilka at El Colegio Nacional Meeting, June 23-24<sup>th</sup>, 2015.**



**Prof. Herman Winick with Dr. Armando Antillón, a meeting co-organizer from Universidad Nacional Autónoma de México, at El Colegio Nacional. June 23-24<sup>th</sup>, 2015.**



**5<sup>th</sup> Mexican Radiation Users Meeting. Cuernavaca, August 12-14<sup>th</sup>, 2015.**

*Armando Antillón, José Jiménez and Matías Moreno are members of the group working in the Conacyt-Morelos State project, Strategic Plan for the construction and operation of a synchrotron in Morelos. A. Antillón is in the Institute of Physical Sciences at UNAM-Morelos and is coordinating the conceptual design of the light source; J. Jiménez is in the Institute of Nuclear Sciences at UNAM-Mexico City and has a great experience working on synchrotron light sources in other countries, and M. Moreno, a high energy physicist, is in the Institute of Physics at UNAM-Mexico City and is the leader of the project.*

## The Gulf Nuclear Energy Infrastructure Institute, GNEII

*Amir Mohagheghi, Adam Williams, Phil Beeley and Alex Solodov*

The Gulf Nuclear Energy Infrastructure Institute (GNEII) was established collaboratively by Sandia National Laboratories, Texas A&M University, and the United Arab Emirates' (UAE's) Khalifa University of Science, Technology and Research in 2011 to provide a regional mechanism for developing responsible nuclear energy infrastructure. By combining education and research, GNEII helps increase knowledge and expertise about nuclear energy infrastructure—including safety, safeguards, and security—among Gulf and Middle East professionals working in regional nuclear-power programs. GNEII has been recognized by the White House as a major achievement in enhanced science and technology partnerships with the developing world.

### Background

GNEII's mission is to engender a responsible nuclear-energy culture through professional development and education of decision-makers from Gulf-region nuclear-energy programs. GNEII constitutes a strategic partnership among several entities in the UAE and the United States. In the UAE, these are the Federal Authority for Nuclear Regulation (FANR), the Emirates Nuclear Energy Corporation (ENEC), the Critical Infrastructure and Coastal Protection Authority (CICPA), and the Khalifa University. In the US, the partnership includes support from the Department of Energy's National Nuclear Security Administration Office of Nonproliferation and International Security and the Department of State's Partnership for Nuclear Security. Sandia National Laboratories and Texas A&M University's Nuclear Security Science and Policy Institute (NSSPI) are the US implementers working with Khalifa University. By 2017, GNEII's UAE partners will assume responsibility for GNEII operations, making it a fully indigenous regional institute.

As implementing partners, Khalifa University, Sandia, and NSSPI—with support from key UAE stakeholders and US government sponsors—have developed the curriculum, established the facilities, provided the instructors, and are preparing Khalifa University staff and GNEII program alumni to become permanent GNEII faculty. The strategic partnership of the primary

implementers—Khalifa University, Sandia, and NSSPI—has successfully leveraged diverse technical expertise to produce a well-respected and successful regional institute helping to develop a strong culture of integrated safety, safeguards, and security while promoting international norms and standards in nuclear energy infrastructure.

### Foundational pillars

GNEII was founded on the three strategic pillars of proficiency in education, research, and technical capability.

#### *Education — GNEII Fundamentals Course*

The GNEII Fundamentals Course introduces participants (known as Fellows) to critical thinking, systems thinking, and the scientific method, providing a framework in which they can learn about interrelated elements of a responsible nuclear-energy program. The Fundamentals Course begins with a survey of the technical and operational aspects of nuclear energy, including nuclear and radiological sciences, power-plant operations, nuclear-material controls, and the international nonproliferation regime. The survey is followed by focused instruction on nuclear **safety, security, and safeguards**, emphasizing the way these three components interrelate and interact as a system. This integrated “**3S**” approach is a fundamental framework for implementing a responsible national nuclear-energy program.

The Fundamentals Course includes lectures, classroom exercises, and case studies. A crucial component is the Capstone project — independent research analyzing a regionally relevant nuclear-energy issue. The GNEII Fellows present their Capstone projects as written papers and oral presentations to an open audience at the conclusion of the course.

The Fundamentals Course is the first and most developed component of GNEII's education pillar; however,

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effort continues in developing additional course offerings and materials, with an expanded curriculum expected to become available as demand dictates. Initial efforts are focused on integrating GNEII's curriculum with course offerings and expertise at Khalifa University, including the Nuclear Engineering Department and potential involvement of the Institute of International and Civil Security.

GNEII Fellows have come from Gulf Cooperation Council (GCC) countries and other countries in the region. In the coming years, GNEII expects to progressively expand its reach to include all GCC countries and other Arabic-speaking countries in the region.

### **Research**

GNEII aspires to be a regional center for collaborative research in 3S—including integrating 3S into national nuclear programs. GNEII's research component is led by a Senior Research Fellow who examines technical, social, and political aspects of nuclear safety, safeguards, security, and nonproliferation. The Senior Research Fellow also coordinates collaborative research projects among GNEII, Khalifa University's graduate programs, and regional and international institutions. Research-oriented papers by GNEII Fellows and the Senior Research Fellow have been submitted to peer-

reviewed journals and published in conference proceedings.

### **Technical Capability**

Along with academic courses and research, GNEII includes practical exercises and hands-on instruction that provide Fellows with knowledge about instruments, simulators, computer codes, and related technical tools used in the nuclear industry. In addition to access to laboratory facilities in Khalifa University's Nuclear Engineering Department, GNEII is developing a technology-demonstration area where nuclear safety, safeguards, and security equipment will be displayed and available for use.

### **GNEII Operations and Management**

GNEII is a strategic partnership with a long-term vision of developing a responsible nuclear energy safety and security culture in leaders and decision-makers within Middle Eastern nuclear energy programs. GNEII is managed through its affiliation with Khalifa University. GNEII's educational and research strategy, long-term goals, and progress are periodically reviewed during annual meetings of the GNEII Steering Committee, which consists of Khalifa University, FANR, ENEC, CICPA, Sandia, and Texas A&M's NSSPI.

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**GNEII Graduating Class 2014**

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For more information, visit the GNEII website at <http://www.kustar.ac.ae/pages/gnei>.

*Dr. Amir Mohagheghi is a Distinguished Member of the Technical Staff at Sandia National Laboratories<sup>1</sup>. He currently provides strategic guidance for Sandia's regional programs in the Middle East, North Africa, and support for South Asia and East Asia regional programs on Arms Control, Nonproliferation, and Regional Security. Amir serves as the Sandia GNEII Program manager and received his doctorate in experimental high energy atomic physics from the University of New Mexico.*

*Mr. Adam Williams is a senior R&D systems engineer at Sandia National Laboratories. He is currently involved in numerous nuclear security-related projects, including conducting vulnerability assessments, designing physical protection systems and planning other international security engagement projects in support of Department of Energy and State missions. Adam also serves as the Sandia GNEII project manager and is currently a PhD candidate in the engineering systems division at the Massachusetts Institute of Technology.*

*Dr. Philip Beeley is a Professor of Practice and Program Chair for the Department of Nuclear Engineering at Khalifa University of Science, Technology and Research. In addition to managerial duties, he currently teaches courses in reactor physics and radiation metrology as well as oversees research related to reactor design, experimental reactor physics, computational reactor design methods and neutron spectrometry. Philip received his doctorate in nuclear chemistry and nuclear physics from McGill University in Canada.*

*Dr. Alexander Solodov is an assistant professor in the Department of Nuclear Engineering at Khalifa University of Science, Technology and Research. His course teaching responsibilities includes international safeguards and nonproliferation, nondestructive assay (NDA) of nuclear materials and nuclear security and his research covers NDA, radiation detection instrumentation and safeguards systems and implementation. Alexander has also served as both a lecturer and Faculty Coordinator for the GNEII Fundamentals Course and received his doctorate in nuclear engineering from Texas A&M University.*

<sup>1</sup>Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company for the United States Department of Energy under contract DE-AC04-94AL85000. SAND2015-6994J.

## The Radiation Measurements Cross Calibration (RMCC) project

*Amir Mohagheghi, Al Sharif Nasser Bin Nasser, and Matthew Sernat*

Detecting the presence of radioactive sources, preventing the illicit use of radiological materials, supporting arms control treaties, responding to accidental radiation releases, and disposing of radioactive sources safely and securely are common concerns in the Middle East. The Radiation Measurements Cross Calibration (RMCC) project aims to improve radiation measurement capabilities across the region and establish common standards.

The RMCC project has been an ongoing initiative for the last twelve years. Its goal is to build core competencies in radioanalysis in the Middle East by facilitating the exchange of expertise and fostering dialogue to improve methods and strengthen a growing network. This

year the **Middle East Scientific Institute for Security (MESIS)** in Amman, Jordan assumed leadership of the RMCC.

The RMCC project was launched in 2002 by the Cooperative Monitoring Center (CMC) at Sandia National Laboratories. The goal was to develop and share internationally recognized standards for laboratory analytical radiation measurements, including radiochemistry techniques. RMCC is sponsored by the Department of Energy's National Nuclear Security Administration and the Department of State's Cooperative Threat Reduction Office. It is implemented in collaboration with the International Atomic Energy Agency (IAEA) and the

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Comprehensive Test Ban Treaty Organization (CTBTO).

The RMCC project provides a number of benefits to regional laboratories. The project conducts annual workshops that include host country laboratory tours where participants often identify opportunities for increased technical cooperation. The workshops provide training on relevant topics such as laboratory management, quality assurance, radiochemistry, mass spectrometry, and gamma spectroscopy for both destructive and non-destructive assays. They encourage valuable discussion on radiological measurement challenges and on developing internationally recognized laboratory standards for destructive and non-destructive analytical methods. Discussions build confidence among participants by encouraging transparency and improving data sharing and reliability. The workshops increase the indigenous capacity to competently address radioanalysis-related issues in the Middle East.

The first RMCC workshops were conducted in 2004. They were developed in collaboration with the Kuwait Institute for Scientific Research (KISR) and the Qatar Supreme Council for the Environment and Natural Reserves (SCENR). Since then, workshops have been hosted by key organizations and institutes in Qatar, Oman, Bahrain, Jordan, and Morocco. The ninth RMCC Workshop was hosted on 20-22 October 2014 by MESIS on the campus of the Royal Scientific Society in Amman.

Because MESIS hosted the annual RMCC workshops in 2011 and 2013 and has managed the project website since 2005, it has a strong understanding of the project. This may have been the reason why members unanimously endorsed a proposal for MESIS to host and manage the project going forward. MESIS has developed a core competency in sustainable project management and is well suited to take a leading role in transitioning the project to the region, with a plan for full indigenization.

The ninth RMCC Workshop was the first meeting held following this transition of project management. In attendance at the workshop were 26 participants from regional countries and several other international subject matter experts who hailed from the IAEA, the

CTBTO, and US national laboratories. The workshop successfully met its primary goal, which is to set the project on course for further indigenization as a regionally owned initiative.

MESIS took the lead in developing the ninth RMCC workshop agenda and in moderating all sessions. The success of the workshop can be largely attributed to the emphasis on the transition phase of the project, which included revamped branding, workshop language, and new services offered to members. Revamped branding included a new logo and a website in both Arabic and English. The official language of the workshop was Arabic. Sessions were held almost entirely in Arabic, and Arabic was used as the primary language for all communications with members. Several English speaking members voiced praise for their ability to engage experts in both languages through the help of translators who have worked with MESIS for a number of years and were provided at no additional cost by MESIS.

Several additional actions were taken to emphasize the transition of the project to the region and to promote ownership. The workshop included special sessions that focused on country analysis and relevant case studies. Regional speakers were given prominence, many speaking on the first day. Veteran participants were able to participate in the development of the new logo.

One of the primary challenges of the project is to ensure that participants remain actively engaged in RMCC throughout the year and not limit their participation to the annual workshop. Increasing awareness and promoting the benefits of RMCC membership will be key to generating stronger engagement and providing incentive to remain involved. In this regard, MESIS developed several new services to benefit RMCC members. A number of offered services are integrated in the new RMCC website in order to maximize interactivity among participating members. One addition is an "ask an expert" feature, where members can pose radiation related questions. MESIS staff then develop and post an appropriate response. Several experts have volunteered their services to aid in providing scientifically sound answers for members. Another key feature is publication assistance. Members who publish work

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elsewhere may share it with the network on a dedicated page. And members interested in developing their qualitative and quantitative research or hoping to publish work in established journals will be able to receive guidance and expert advice from a Review Committee. Likewise, there is a prize for the “Outstanding Publication of the Year.”

Several participants at the ninth RMCC Workshop voiced their support for increased engagement with relevant institutions in the field, reaching beyond individual experts involved in the project. Further institutional engagement and support across the region will in turn help expand the project. It will also be key in securing active participation from members and ensuring their continued interest in the project.

An all-Arab Advisory Committee was formed to offer strategic guidance on the project. Twelve senior officials from the region were identified, and six of them met the day before the workshop to discuss the future structure and role of the project.

Financial sustainability will be key to the future success of the RMCC project. Funding from the region is expected to increase at a gradual rate, but only in parallel with the growing interest generated by the project. The largest expense is the cost of hosting the annual workshop. To meet this challenge, several options were considered. Among them were an annual institutional membership fee, a workshop participation fee, and corporate sponsorship.

The transition of the RMCC project to MESIS will aid its ownership and acceptance. This will allow for more

direct engagement by regional governments, universities, and agencies involved in nuclear energy.

For more information, visit the RMCC website at <http://rmccnetwork.net/en>.

*Dr. Amir Mohagheghi is a Distinguished Member of the Technical Staff at Sandia National Laboratories<sup>1</sup>. He currently provides strategic guidance for Sandia's regional programs in the Middle East, North Africa, and support for South Asia and East Asia regional programs on Arms Control, Nonproliferation, and Regional Security. Amir received his Ph.D in experimental high energy atomic physics from the Univ of New Mexico.*

*Al-Sharif Nasser bin Nasser is the managing director of the Middle East Scientific Institute for Security based in Amman, Jordan. He focuses on addressing chemical, biological, radiological, and nuclear (CBRN) risks across the region. Mr. Nasser is also the head of the Middle East Regional Secretariat, the first of eight secretariats to be established globally under the European Union's Centers of Excellence initiative on CBRN issues. Nasser received his master's degree in Near Eastern studies from Princeton University.*

*Dr. Matt Sternat is a Senior Member of the Technical Staff at Sandia National Laboratories<sup>1</sup>. His primary areas of expertise are nuclear forensics, safeguards, nonproliferation, nuclear reactor physics, and nuclear engineering. Matt received his doctorate from Texas A&M University in College Station, Texas working with the Nuclear Security Science and Policy Institute within the Nuclear Engineering Department.*

<sup>1</sup>Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under contract DE-AC04-94AL85000. SAND2015-6908J.





## Improvement in Education and Research through Recognition, a report from Bangladesh

*Sultana N. Nahar*

This report is on a visit to Bangladesh during November-December 2014 in which positive progress in education and physics research was observed since the last visit in 2011 [1].

### Razzaq-Shamsun Physics Prizes

These are of two kinds, an annual physics research prize I initiated in 1995 with awards beginning in 2000, and a lifetime achievement award initiated in 2008. Competition for these are global throughout Bangladesh and are administered through the University of Dhaka. The objectives of these prizes are to encourage physics research and publication, and especially to encourage people to continue to contribute in research, teaching, and physics related work. It was very satisfying to observe the significant increases compared to past years in the number of publications, and the number of applicants for the prizes. The standards by which excellence is measured have also significantly improved.

Applications came from Dhaka, Chittagong, Jagannath, Jahangirnagar, and Rajshahi universities where most physics research in Bangladesh is carried out. Applications were for the annual Razzaq-Shamsun physics research prizes from 2008 to 2013 and Razzaq-Shamsun lifetime achievement prizes for two years.

The annual prize winners were:

2008. Prof Md. A.R. Patoary, Rajshahi University, "For study of electron impact ionization using models."  
 2009. Dr. A.F.M. Yusuf Haider, Dhaka University, "For study of semiconductor using laser

Raman spectroscopy."

2010. Dr. Kamrul Khan, Jagannath University, "For creating sustainable electricity using patharkuchi leaves."

2011. Dr. Mohammad Idrish Mia, Chittagong University, "For study of spin effects in semiconductors."

2012 Dr. Rezaul Azim, Chittagong University, "For study of ultra wide band antenna with multiple notches."

2013 Dr. Muhammad M. Rahman, Dhaka University, "For study of nanohole surface plasmon resonance."

The lifetime achievement prizes went to:

Professor K. Siddique-e-Rabbani of Dhaka University, founder of the Biomedical Physics and Biotechnology Department of Dhaka University. "*For outstanding contributions in physics applications to affordable health care technology and training of many students in Bangladesh*"

Professor Ajoy Roy of Dhaka University, "*For electron-spin resonance work*"...

The prize event was an occasion to commemorate some inspiring figures and their contributions. Physics Chair Prof. Azizur Rahman discussed the contributions by Satyen Bose for Bose-Einstein statistics and Professor K.S. Krishnan for his extensive experiments on the Raman Effect under C.V. Raman. Krishnan became widely known and recognized for the study of magnetic properties of crystals with Professors S. Banerjee, B.C. Guha, and A. Mookherjee while he was at Dhaka University. He continued to collaborate with Banerjee

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**Prize winners and University officials**

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and developed the Krishnan Banerjee method for measuring magnetic susceptibility of small crystals.



**Prize winning invention by Professor K. Siddique-e-Rabbani. A doctor in a remote village uses a system of a simple computer and to take an ECG and transmit it through the internet to an expert in a hospital**

Vice Chancellor of Dhaka University, Professor A.A.M.S. Arfen Siddique helped to complete the award process which had been delayed for a number of years. He gave me a certificate of recognition: "*For her continuing inspirational and sincere work for promotion of physics research and education in whole Bangladesh*" and trophy of Dhaka University.

#### **Physics Teaching, Research and Academic prizes in individual universities**

These prizes are instituted in the main research universities. Selection of the best students is not a problem since they are already qualified through their academic achievement in their examinations. The objective of these prizes is to encourage students to make their best effort and compete positively with fellow students. At the end of the prize ceremony at Chittagong University, a student asked permission to speak and expressed his gratitude for the recognition and how inspired he felt to continue his hard work with the prospect of getting attention and joy of receiving recognition.

Faculty members can improve the weak education and research in Bangladesh. The purpose of these prizes is encouragement through recognition of accomplishments. The physics research prize is based on research

publications and involvement of graduate students. The teaching prize is based on students learning in-class. In-class learning is very important for a student to avoid the additional expense of a tutor. Only the best students from high schools are able to enter the university after tough admission tests. They have a passion to learn and use the savings of their parents for their education. Very few scholarship are available. The winning teachers are nominated by student votes. These ideas are new in Bangladesh and it is taking time to appreciate, adopt and implement by the institutions.

Rajshahi University in Rajshahi was the most successful in adapting the policies of the prize program. This university went through many troubled times for a long time in the past, but has found the way to concentrate on education and carrying out research more than others. In an enlightened ceremony, three well deserved faculty members received the prizes: Professor Aminul Islam for excellence in teaching, Professor Saleh Naqib for excellence in research, and Professor Alfaz Uddin for lifetime contributions in research. The student scholarship went to a female undergraduate student: Mahmuda Akter.

Jahangirnagar University in Savar has agreed to accept students' evaluation of teachers conditionally for 5 years and winners for 2013 were selected. Approval of this new concept (to Bangladesh) of student evaluations of teachers also came from various faculty members in Dhaka University and nominations were made by students. However, a few physics faculty members and the administration in Dhaka University strongly opposed this system and stopped those prizes. Similarly, there was opposition in Chittagong and Jagannath universities and award of the prizes was stalled. At the student ceremony in Chittagong University both Pro-Vice Chancellor and Dean of Faculty of Science appealed in their speeches to Physics Department to accept the faculty prizes

#### **STEM Education in Primary, Secondary and Higher Secondary Schools**

This is a success story. Maniza Rahman Girls High School adopted students' evaluation for the best teachers in 2003. This school has seen a reverse in its achievements. Students are performing better. The

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number getting an A grade in board exams in increasing each year. The school has grown, not only in numbers, from about 500 to 2000 students, it has also expanded to college (higher secondary) programs in several arts subjects.



**A supportive audience where students cheered when their voted teachers' names were announced.**

The two primary schools, one in the city and one in a village, a madrasa all with poor students are making amazing progress. Teachers have become dedicated and are very pleased to hear when their names are announced in the ceremony. More students are getting high grades and government scholarships. Each winning teacher and student receives a certificate and an honorarium. The headmasters tell about the beaming students reporting how their parents appreciated the honored cash prizes and how other parents are encouraging their children to be so honored. In my address to students, I explained how good and helpful knowledge is and how far they can go with discoveries and inventions. When asked of students at each institution who wanted to be a scientist or a great scholar, the students responded with enthusiastic "I want to be" with hands raised.



**Students at Gandaria Mahila Samitee Primary School respond with hands raised to the question: "who wants to be a scientist in the future?"**

Reference.

S. N. Nahar, "Recent Visit to Bangladesh Universities and Physics Prizes," APS Forum on International Physics newsletter spring 2013.

*Dr. Sultana N. Nahar is a research professor in the Department of Astronomy at [Ohio State University](http://ohio-state.edu). She has published extensively on radiative and collisional atomic processes in astrophysical and laboratory plasmas, and also worked on dielectronic satellite lines, theoretical spectroscopy, and computational nanospectroscopy for biomedical applications. Sultana Nahar is the winner of the APS 2013 John Wheatley Award. Email: [nahar.1@osu.edu](mailto:nahar.1@osu.edu)*

## APS International Research Travel Award Program, IRTAP: Providing Support to International Collaborators

*Michele Irwin*

The APS International Research Travel Award Program (IRTAP) — formerly the International Travel Grant Award Program (ITGAP) — was established by the Forum on International Physics (FIP) in 2004. The program was created to support scientific collaborations between developing and developed country scientists. FIP believed that one way to help sustain international collaborations was by providing modest funds to support travel, which could often be difficult to obtain. Through this program, grantees are awarded up to \$2,000 that can be used towards travel to visit and conduct research with a collaborator abroad for a minimum of one month. Grants are awarded twice a year for a total of ten (10) grants per year. The program has been made possible — and has grown significantly — thanks to generous support from APS units including all of the APS divisions, FIP, the Topical Group in Gravitation (GGR), and the Topical Group on Magnetism and its Applications (GMAG). IRTAP has also received support from the APS Presidential Line, the APS Office of International Affairs, and the U.S. Liaison Committee for the International Union of Pure and Applied Physics. As a result, APS has been able to award fifty-nine (59) grants to two-person collaboration teams since the program's inception. The grants have benefited scientists from thirty-six (36) countries, in addition to the United States.

### Successes

Grant recipients regularly report that the travel grants from APS have been invaluable to their collaborations. The grants can be the key to maintaining a long-distance collaboration or demonstrating to other potential funders that a research project has the support of the scientific community. One grantee from Venezuela, for example, recently reported that the “APS travel grant has allowed us to plan our short-term and long-term projects more consistently” and has also resulted in matching funds from other organizations. Further, the grant from APS “resulted in funding support...to participate to topical meetings...we would not have been able to accomplish what we did without the APS travel grant.” One of the key aspects of the program is

the expectation that applicants will seek out funding from other sources to support their projects. Securing and/or applying for matching funds is viewed as a positive factor in the IRTAP application process. In addition, it is hoped once a collaborative team receives APS support that this will lead to support from other sources, creating a snowball effect. Happily, there is evidence that this has been the case for many projects supported by IRTAP grants.

Other grantees have reported that important advances were achieved in their research collaborations that were supported by the IRTAP grants. Many grantees have indicated that they continue to collaborate and have had additional face-to-face meetings. In some cases, the grant was vital to bringing a colleague into the mainstream international physics community or to publishing their first article in a high-impact journal. The collaborations supported by IRTAP have resulted in publications, book chapters, conference papers and presentations. Reports from grantees note that the APS support has helped advance the collaborators' research and led to further collaborations.

### Applying for a Grant

Members of APS units that sponsor IRTAP are eligible to apply. Specifically, one of the two co-applicants must be a member of one of the sponsoring units, i.e., the APS Divisions as well as FIP, GGR, and GMAG. In addition, one of the co-applicants must be from a developing country and the other co-applicant must be from a developed country. While APS does not maintain a list of developing countries — in order to keep the program inclusive and flexible — the IRTAP review committee often references the World Bank's "[List of Economies](#)" for guidance. APS also recognizes that there are pockets of underdevelopment in some regions or countries that could be considered ‘developed’ or ‘emerging.’

When applying for a grant, strong consideration is given to proposals that demonstrate three important char-

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acteristics: merit, need and evidence of other support. In particular, strong proposals 1) demonstrate a past record of research accomplishments and the promise of future accomplishments, 2) include invited talks to be delivered during the trip, especially talks at APS-sponsored meetings, 3) benefit under-represented countries and ethnic groups, and 4) demonstrate financial support (i.e., leverage) from other sources. Proposals that can demonstrate a benefit to graduate students and early career scientists are also viewed positively.

APS issues a call for proposals twice a year. The next deadline will be announced in the fall. For anyone interested in applying, keep in mind that IRTAP applications are submitted online and should include the following information:

- Narrative proposal that includes:
  - Explanation of the role of the principals in the collaboration
  - Explanation of the expertise or facilities that each co-applicant brings to the proposal
  - Description of how the collaboration became established
- Lists of the most relevant publications of each of the co-applicants, including papers co-authored by the co-applicants, if relevant
- Statement of financial support from other sources, i.e., demonstrating leverage
- Indication of which co-applicant is a member of one of the APS units that sponsors IRTAP
- Outline of benefits to junior scientists, students, or post-docs from a developing country
- Description of the travel plan and budget

Visit the IRTAP website at [www.aps.org/programs/international/programs/travel-grants.cfm](http://www.aps.org/programs/international/programs/travel-grants.cfm) for additional information about the program. Also, FIP members

should feel free to contact me at [irwin@aps.org](mailto:irwin@aps.org) or (301) 209-3237 with any questions they have about IRTAP.



**APS travel award recipients Douglas Singleton and Sujoy Modak on the "Sun Pyramid" of Teotihuacan**

*[Michele Irwin](mailto:irwin@aps.org) is the International Programs Administrator at APS.*

## Large International Linear Collider Collaboration Status

*Maria Spiropulu*

The International Linear Collider (ILC) project has been promoted by the international community of elementary particle physicists as a global project. Its scientific value is concentrated on the detailed exploration of the H (125) boson as well as any other new physics particle at the TeV scale that the machine can access.

The technical design of the facility was presented in the Technical Design Report (TDR) in June 2013. The 2015 summer conferences of both the European Physical Society, HEP 2015, Vienna, <http://indico.cern.ch/event/356420/contributions>

and the Division of Particles and Fields of the American Physical Society

<https://indico.cern.ch/event/361123/>

offered reports on the post-TDR work towards the ILC. The focus has been on the site-specific design of an up to 500 GeV machine while the physics studies have been performed for up to 1 TeV center of mass. Advancement in superconducting radio frequency technology was presented. A notable example was the December 2014 ILC-type cryomodule test at Fermilab after initial testing at Jefferson Lab. A gradient of  $< 31.5 >$  MV/m was achieved exceeding ILC specifications.

The international community of the ILC project proposes to construct the machine in Japan with an ambitious

goal of building an “international science city” associated with the ILC. The ILC advisory panel published its findings and recommendations on the ILC path forward on Aug 6 2015

(<http://newslines.linearcollider.org/2015/08/06/>).

The recommendations of the panel include careful exploration of i) the cost sharing model among the international partners (the price tag for the machine is estimated at about 10B USD) ii) the maximization of the accelerator performance especially in view of the 13 TeV LHC results and iii) the understanding of the project by the public and science communities. A follow-up working group is being formed to review the necessary human resources during the construction and operation phases. This group will also review world trends in technology issues related to accelerator construction and cost reduction. In the meantime, the Advanced Accelerator Association Promoting Science & Technology (AAA) in Japan and the Hudson Institute in the US are working closely on embedding the ILC into a Japan-US technology co-operation framework.

*Professor Maria Spiropulu is an experimental physicist at the California Institute of Technology. She is a member of the CMS collaboration and is Chair-Elect of the FIP.*

## Distinguished Student Seminar Program DS3

The first round of applications for the Forum on International Physics 2015 Travel Award for the Distinguished Student Seminar Program (DS3) opened on September 1, 2015.

The award information is summarized below.

### Maximum Award Allocation:

- US \$ 500 to assist with travel within North America and lodging, for students working in research groups in the US or Canada.
  - Up to \$ 1000 to assist with international travel and lodging for students working overseas with research groups in developed countries.
- Up to \$ 2500 for international travel and lodging for students working overseas with research groups in developing countries.

### Qualifications:

The applicant must be a graduate or undergraduate student from a developing country who is enrolled in a degree program at a recognized university.

APS members of FIP, FGSA, or other units sponsoring the DS3 program are eligible to apply for the travel grants.

### Application Materials:

A CV (of appropriate length) and a Narrative proposal of 5,000 characters (maximum), including:

- Explanation in detail of the student's research program, including past accomplishments and current work, and its physics impact
- A summary of education and outreach activities.
- Other work on behalf of the physics community
- Give examples of innovation or leadership where applicable, in any of the above items
- List of up to five of the most relevant publications, where the applicant had the primary role or an important role (as explained in the proposal)
- Statement of financial support from an appropriate representative of other sources of funds complementing the award, where applicable

Description of the travel plan and budget (2,000 characters maximum).

**Deadline:** October 15, 2015 (11:59 p.m. EDT). Decisions will be made shortly after the deadline.

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**Send to [malamud@foothill.net](mailto:malamud@foothill.net) or [ernie.malamud@gmail.com](mailto:ernie.malamud@gmail.com)**

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