



Fall 2013 Newsletter

Ernie Malamud, Editor

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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.

View from the Chair

Sergio E. Ulloa

Welcome to the Fall 2013 Newsletter!!

Let me start by thanking our Editor, Ernie Malamud, who once again has prepared a great issue with articles from many contributors on many interesting topics. The level of effort and great quality of the Newsletter he edits is self evident and has impressed us all at FIP. The Newsletter serves the important role of communicating activities to the FIP membership, of initiating discussions on topics of interest, and providing a medium to hear from the members. We thank Ernie for doing a great job!

Participate!!

Over the last few months as FIP Chair, I have witnessed first hand a few of the many great programs that APS has developed to assist the membership in a variety of ways, and to recognize and honor those who have made important contributions. Of particular interest to the members of FIP, and as you would read in this issue of the Newsletter, APS offers (through the Office of International Affairs) two region-specific programs: the **India-US Travel Grants**, and the **Brazil-US Exchange** programs. They facilitate interactions of US scientists with those regions of the world, and have upcoming deadlines in November 2013.

I am particularly fond of the **ITGAP (International Travel Grant Award Program)**. This program, which FIP was instrumental in establishing and helps administering, has typically two competitions per year, and has assisted colleagues all over the world. ITGAP was established to foster physics collaborations among APS members *wherever their home institutions are*, with emphasis in supporting science in developing countries. Although the funds available are modest, the program has been very successful in furthering research exchanges of APS members. I invite you to go to the program website for more information, and especially to read about past awards. Every competition has identified highly meritorious proposals.



Fellowships and Prizes

Another important opportunity for us to participate is in helping recognize important achievements among our colleagues. I consider it is our duty as APS members to actively participate in nominating our fellow colleagues to one of the APS Prizes and/or for APS Fellowship through one of the units of the society, and most certainly through FIP. I believe this is a wonderful recognition for those you consider exceptional, and may include your former advisors, colleagues around you, and even those far away that you consider meritorious.

APS Fellowship. As you may know, each division, topical group and forum in APS is eligible to nominate APS members in the US *and elsewhere* for this recognition by the society. The units have a Fellowship selection committee that inspects in detail the nomination packages submitted by the membership and then selects a slate of nominees to forward to the central APS Fellowship Committee. The nomination process is relatively simple, with *different* deadlines for the different units, but the consequences are most important. To quote from the APS site, "*Fellowship is a distinct honor signifying recognition by one's professional peers.*" I encourage you to participate and nominate the individual you believe deserves this recognition.

Prizes. APS also awards a variety of prizes for outstanding achievements in different aspects of the physics profession, on research, education and public service. FIP in particular is closely involved in the John Wheatley Award, given biennially (in odd-numbered years), to recognize an individual who "...*working in a*

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developing country has made an outstanding contribution to the development of physics in that region by working with local physicists in physics research or teaching." Although the next Wheatley Award nomination cycle will not be here for little more than a year, I invite you to participate and consider nominating fellow members that would fit the criteria of the prize.

There are many more programs under APS that require the participation from us all. It is not only our right but also our duty. Do contact me (ullosa@ohio.edu) if you have any questions about these or any other topics. Have a great Fall/Winter, and see you in one of the APS meetings in 2014!

Sergio Ulloa is Professor in condensed matter theory at Ohio University. His interests, apart from international affairs, include electronic transport and spintronics in nanometer scale structures. He has just returned from a sabbatical leave at the Dahlem Center for Complex Quantum Systems at the Freie Universität in Berlin, where he had a wonderful time.



Physicists, physics graduate students, and postdocs in India and the United States can apply for travel grants to pursue opportunities in the other country.

The **APS-IUSSTF Professorship Awards in Physics** funds physicists in India or the United States wishing to visit overseas to teach short courses or provide a physics lecture series delivered at a U.S. or Indian university. Awards are up to U.S. \$4,000.

Through the **APS-IUSSTF Physics Graduate Student and Postdoc Visitation Program**, U.S. and Indian graduate students and postdocs may apply for travel funds to pursue a breadth of opportunities in physics, such as: 1) attend a short-course or summer institute; 2) visit with a professor in his/her field of study; 3) work temporarily in a lab; or 4) any other opportunity that the applicant and host deem worthy of travel support. Grants are for up to USD \$3,000. This program aims to support travel to India by U.S. graduate students and postdocs, and enable graduate students and postdocs from India to travel to the United States.

This program is sponsored by the Indo-U.S. Science and Technology Forum (IUSSTF) and administered by the American Physical Society (APS).

Application Deadline: Friday, 1 November 2013



Indo-US Science and Technology Forum

Application information: www.aps.org/programs/international/us-india-travel.cfm



BRAZIL-U.S. Exchange Program 2014

The American Physical Society is now accepting applications from U.S. applicants for the Brazil-U.S. Exchange Program.

Through the **Brazil-U.S. Physics Graduate Student and Postdoc Visitation Program**, graduate students and postdocs can apply for travel funds to pursue a breadth of opportunities in physics, such as: 1) attend a short-course or summer institute; 2) visit with a professor in his/her field of study; 3) work temporarily in a lab; or 4) any other opportunity that the applicant and host deem worthy of travel support. Grants are for up to USD \$3,000.

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. Grants are for up to USD \$4,000. Professors from the United States who will travel to Brazil are invited to include an option to bring a U.S. graduate student from their department on the trip.

The deadline for U.S. applicants traveling to Brazil is Friday, 1 November 2013. More application information: <http://www.aps.org/international/programs/brazil.cfm>



Information for Brazilian applicants: www.sbfisica.org.br/v1/

This program is sponsored by the Sociedade Brasileira de Física (SBF) and APS.

Remarks by the APS Director of International Affairs

Amy Flatten



The APS Office of International Affairs (INTAF) has enjoyed 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 a portfolio of ongoing, sustainable programs that serve APS members and physicists worldwide. Some of these programs offer travel grants to graduate students, postdocs and professors. These programs can enhance their ongoing collaborations, help build new networks and partnerships, or 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 post-docs 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.

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 post-docs 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.

Brazil-U.S. Exchange Program

Application Deadline for



U.S. Applicants: 1 November 2013

The Sociedade Brasileira de Física (SBF) and the American Physical Society (APS) are pleased to sponsor an exchange program for physics graduate students and professors in the U.S. and Brazil. Post-docs 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 Graduate Student & Post-**

doc Visitation Program, graduate students and post-docs 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:

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

Grants for students and post-docs are up to USD \$3,000. The APS funds 10 graduate students or post-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 1 November 2013**. See program application guidelines at: <http://www.aps.org/international/programs/brazil.cfm>

U.S. - India Travel Grant Program



Now Accepting Proposals: Deadline is 1 November 2013

The Indo-U.S. Science and Technology Forum (IUSSTF) sponsors and APS administers the exchange of physicists, physics graduate students, and post-docs 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 Student & Post-doc Visitation Program** is intended for physics *graduate* students and post-docs 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 10 students and 6 professors (total from U.S. and India) each year.

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Calls for proposals are issued each fall and spring and the next application deadline is 1 November 2013.



APS International Travel Grant Award Program (ITGAP)

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

The APS **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 ITGAP continues to grow and flourish and now enjoys financial support from 14 APS units, as well as the U.S. Liaison Committee to the International Union of Pure and Applied Physics (IUPAP). Grantees are awarded up to \$2,000 for travel and lodging expenses for international travel while visiting a collaborator.

Of the many teams that have reported results after the completion of the ITGAP award, all continue to collaborate and many have had additional face-to-face meetings. The collaborations have resulted in publications, conference papers and presentations, as well as book chapters, with some planning to publish additional articles together in the near future. Some awardees also initiated new research projects (including other new collaborations) and developed new connections between students and colleagues at their collaborators' institutions. Others have reported that the grant was crucial for the developing country collaborator to publish their first article in a "Western" journal and to bring a colleague into the mainstream international physics community. More information on the ITGAP 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 2013



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.

The opportunities above are just a few of the programs developed by the APS International Office, in partnership with FIP and CISA. 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, www.aps.org/programs/international.

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

From the Editor

Ernie Malamud

In this issue are contributions from many different parts of the planet. I thank all of the authors for their contributions as well as our Newsletter Committee and members of our Executive Committee for their excellent suggestions.

In our last issue we had articles describing organizations of expatriate physicists working in the US: China, Ethiopia, Japan and Korea. In this issue Vladimir Shiltsev has contributed an article on the Russian American Scientists Association.

Despite political turmoil and uncertainty in Africa, there is continued major progress in science research and education. Two members of the FIP Executive Committee, Christine Darve and Sultana Nahar, have written informative articles about physics Africa.

I encourage FIP members to suggest topics and authors for future issues. The **deadline for receipt of materials for the spring 2014 issue is February 1, 2014**. If you can, please send text in MSword format and graphical material as JPGs. It also helps if you are covering more than one topic in an article to divide the material into several shorter articles.

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, Reno. He is the Editor of the DPB brochure "Accelerators and Beams, Tools of Discovery and Innovation." Copies of the recently completed 4th edition are available by writing to malamud@foothill.net.

Participate and vote!!

ELECTION

From Noemi Mirkin, FIP Secretary-Treasurer

The Executive Committee of the Forum on International Physics consists of 13 voting members. The following positions become vacant beginning January 2014: Vice-Chair, (4-year term in the Forum's chair line), APS Councilor (4-year term), and two Members-at-Large (3-year terms). The Nominating Committee, chaired by Bill Barletta, did an excellent job selecting the candidates for this election,

The election begins October 1 and ends November 30. All members of FIP will receive official ballot information by email. The notification will include links to brief bios and statements of the candidates and the ballot itself.

The newly elected members will start their terms January 1st, 2014. They will replace the four outgoing members of the FIP Executive Committee whose terms end December 31, 2013: Bill Barletta, Herman Winick, Carl Akerlof and Eugene Chudnovsky.

FIP Sessions at the APS Spring Meetings

The APS web pages have links to the abstracts and in many cases the presentations themselves. The links are from the “Epitome” of each meeting, and from there it is easy to find the presentation using the session number and then the specific talk.

Finding the “Epitome” takes a few steps: (1) APS Meetings & Events (2) Archives of the Bulletin of the APS (3) 2013 (4) March or April Meeting 2013 (5) Meeting abstracts (or program) (6) Epitome

March Meeting 2013

March 18 - 22 • Baltimore Convention Center,

Baltimore, Maryland

FIP sponsored and co-sponsored three great symposia.

Session B9 – FIP Symposium on the Science of Climate.

Chaired by Eugene Chudnovsky.

Richard Lindzen, “Climate Concerns: Asking the Right Questions”

Joanna Haigh, “Solar Variability and Climate Change”

Bhupendra Nath Goswami, “On Winning the Race for Predicting the Indian Summer Monsoon Rainfall”

Darryn W. Waugh, “Stratospheric ozone: a major (long neglected) anthropogenic forcing of the climate system”

Francois Forget, “Climate of Mars and Other Planets”



Session N32 – International Physics Programs and History of Physics. Jointly sponsored by FIP and the Forum on the History of Physics (FHP). Chaired by Gloria Lubkin, Physics Today Editor.

Katrin DeWindt, “Fulbright Opportunities in the Physical Sciences”

Ernst Wall, “Revisiting the Bohr Atom 100 Years Later”

Charles W. Clark, Joseph Reader, “A transformational year in physics: 1932”

Yeuncheol Jeong, Ming Yin, Timir Datta, “Discovery and development of x-ray diffraction”

Amy Young, “Latest developments on documentary film - The State of the Unit: The Kilogram”

Session R9 - Advances in Condensed Matter Physics in Latin America.

Chaired by Eugenio Vogel, Universidad de La Frontera, Chile.

Elisa Maria Baggio Saitovitch, “CLAF: 50 Years of Promotion and Coordination of Physics in Latin America”

Lilia Meza-Montes, “Marshak Lectureship: Women in Physics: Increasing in Number, and What Else?”

Antonio Jose Roque da Silva, “Brazilian Synchrotron Light Source: current results and future perspectives”

Carlos A. Balseiro, “Physics in Argentina: The Case of Nanoscience and Nanotechnology”

Romeo de Coss, “Condensed Matter Physics in Mexico”

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April Meeting 2013

April 13 - 16 • Sheraton Denver Downtown Hotel, Denver, CO

FIP co-organized two symposia on different aspects of Science Diplomacy.

Session H7 – FIP/FGSA Session on Science Diplomacy

Chaired by FIP Past Chair Harvey Newman, Caltech.

Marco A. Raupp, “Science in Brazil”

Nicholas Suntzeff, “Science Foreign Policy at the State Department: Why Would They Need a Cosmologist?”

E. William Colglazier, “Science and Diplomacy”

Session R6 – Grassroots Science. Chaired by William Barletta, Massachusetts Institute of Technology.

Sultana Nahar, “John Wheatley Award Talk: Promoting Under-Represented Physicists in Asian and Arab Countries and Muslim Women in Science”

Andrew Sessler, “International Aspects of Particle Accelerators”

Hamed Tarawneh, “Status of SESAME Synchrotron Light Source”

Mark your calendars for the Spring 2014 APS Meetings!

Your Program and Executive Committees are hard at work lining up great invited sessions.

March Meeting 2014 • March 3 - 7 • Denver, Colorado

The largest physics meeting in the world, focusing on research from industry, universities, and major labs. **Venue:** Denver Convention Center **HQ Hotel:** Sheraton Downtown

Expected Sessions: >100 Invited **Expected Attendees:** >9000



April Meeting 2014 • April 5 - April 8 • Savannah, Georgia

Highlights include the latest research from participating APS Units. The April Meeting gathers particle physicists, nuclear physicists, and astrophysicists to share new results and insights.



Obama-Singh 21st Century Knowledge Award for the Ohio State University - Aligarh Muslim University Partnership

Sultana Nahar



L-R: Anil Pradhan, AMU Alumni Association (AAA) Vice President, OSU Vice Provost of Office of International Affairs, Sultana Nahar, AMU Vice-Chancellor Zameer Uddin Shah, AAA ex-president, AAA current president

On June 25th, Secretary of State John Kerry announced in Delhi the Obama-Singh 21st Century Knowledge Awards under the US-India Education Foundation (USIEF) for eight bilateral partnerships, four US-led and four India-led partnerships. The Ohio State University (OSU) and Aligarh Muslim University (AMU)

partnership for **"THE STEM-FACULTY PROJECT: Training the Next Generation of STEM Faculty at Higher Education Institutions in India"** was one of the four recipients of US university-led partnerships.

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This is a pilot project to lay the groundwork for capacity building in STEM Education and Research (ER) programs at Indian universities in collaboration with US universities. The objective is to meet the urgent and growing need for world-class STEM faculty at higher education institutions in India. India needs to train about 300,000 faculty members for existing and upcoming institutions. The project will establish a Center of Excellence in STEM ER to train in teaching STEM subjects to undergraduate students as well as to conduct state-of-the-art research. The first joint OSU-AMU meeting with the AMU Vice-Chancellor and the AMU Alumni Association (AAA) was held in June in Atlanta where a plan of action was agreed upon.

Aligarh Muslim University is in the northern Indian state of Uttar Pradesh and located about 90 miles southeast of New Delhi. It was founded by Sir Syed Ahmed Khan during British rule in 1875 in India to encourage Muslims to pursue higher education and traditionally is a leader in science, particularly in spectroscopy, biochemistry, and medicine.

I initiated a STEM program for education and research in physics at AMU in 2011. The program encourages teachers to achieve excellence in classroom teaching, to provide research guidance to students, to encourage students in their academic performance and to support their research publications. The connection established

by the program led to the proposal with Principal Investigator Anil Pradhan. Under the USIEF Obama-Singh Knowledge Initiative award my role is to be the Chief liaison officer from OSU, to consult in the organization of the Advisory and Steering committees for the STEM Center, and to establish connections with other central universities including the University of Delhi, and participate guidance in teaching and research. The aim of the project includes implementation of digital e-learning technologies to reach large numbers of students mediated by current and newly trained STEM faculty at the Center and expand the project by forming an Indo-US consortium of universities.

Dr. Sultana N. Nahar, a Bangladeshi American physicist, is a research scientist in the Department of Astronomy at Ohio State University and an elected member of the FIP Executive Committee. She has published extensively on radiative and collisional atomic processes in astrophysical and laboratory plasmas, and also worked on dielectric satellite lines, theoretical spectroscopy, and computational nanospectroscopy for biomedical applications. Sultana Nahar is the winner of the APS 2013 John Wheatley Award. Email: nahar@astronomy.ohio-state.edu

3rd European Energy Conference

From Luisa Cifarelli, Past President of the European Physical Society, and Annick Suzor-Weiner, APS International Councilor



The conference will be held from 27-30 October 2013 in Budapest, Hungary. This conference is one of the key contributions to European Physical Society (EPS) initiatives in energy. It is jointly organized with the European Materials Research Society (E-MRS), and the European Association of Chemical and Molecular Sciences (EuCheMS).

An exciting plenary program has been put together by the chairmen, L. Sarkadi, President of the Hungarian Chemical Society, and N. Kroó, President of the Hungarian Physical Society.

Speakers include:

- Pál Kovacs - Hungarian State Secretary
- Robert-Jan Smits - DG Research representative
- Romana Jordan - European Parliament, ITRE
- Stefan Weitemeyer, NEXT ENERGY - EWE Research Center for Energy Technology, Germany
- Alberto Loarte, ITER Organization, France
- Harald Bolt, Forschungszentrum Juelich GmbH, Germany

The full plenary and invited speaker program is available at:

<http://www.e2c2013.mke.org.hu/invited-speakers.html>

We urge scientists and students in energy research to consider attending this conference. The European Energy Conference and the Joint EPS-SIF International School on Energy alternate in odd and even years. Both of these high level scientific events are important for the visibility and impact of the EPS in the rapidly expanding field of energy.

Empowering the African Scientific Community

Christine Darve

More than 50 years after the independence of a large number of African countries, and the first election in Ghana (of Kwame Nkrumah), Africa aspires to achieve scientific progress and shows signs of a promising future evolution.

With more than one billion inhabitants living in the 53 African countries, and with enormous and rich natural resources, Africa is a major economic asset for the future of the planet. The diversity of Africa is spanned across its cultures, its climates, its histories and its political and economic systems. The integration of Africa into the international economic system still remains tentative and many challenges remain.

On the one hand, due to the large public debt, and uncontrolled diseases and malnutrition, a large number of people are moving into the cities, or emigrating to richer countries. On the other hand, a few key countries are building outstanding scientific capacities within Africa to support its autonomy and its integrity.

Education and industrialization are essential to promote positive developments. Scientific research in Africa is becoming more vibrant, although the initial gap between the African universities and those in the developed countries in scientific and technical investment is huge. Half of 1% of the Gross Domestic Product (GDP) is spent in Africa on R&D compared to 2% in Europe and the USA. The figure shows the distribution of university education in Africa and the tables show the number of researchers and R&D expenditures in many African countries.

Although today, very few patents and publications originate from Africa, the situation is evolving thanks to partnerships between individual African countries, and between the African continent and other continents as well as to efforts from the international scientific community. Below we illustrate a few initiatives, which contribute to creating a path to knowledge in Africa and

address some of the major challenges.

The new generation of policy-makers in Africa are more assertive and endorse science and technology. This aspiration increases productivity and helps cope with current issues which paralyze Africa's development in the sciences and its applications. Local centers for medical applications, pandemics treatments, life sciences, materials, energy, environmental sciences, earth sciences and engineering studies are growing across the continent. The goal of those initiatives is to catalyze the development of world-class institutions through the production of high-quality scientists and engineers to stimulate economic growth and employment creation. Pursuant to this goal, the objective is to produce the next generation of African scientists and engineers by training them in the necessary technical, entrepreneurial and leadership capacities to solve African problems thus contributing to economic and social transformation.

One of the most dynamic institutions supporting these objectives is the International Center for Theoretical Physics (ICTP) in Trieste. Founded in 1964 by the late Nobel Laureate Abdus Salam, ICTP's mission is to provide scientists from developing countries with continuing education and skills in the sciences, hence counteracting the scientific brain drain from the developing world.

In addition, local African initiatives are progressing. The Nelson Mandela African Institute of Science and Technology (NM-AIST) in Arusha (Tanzania) has been established as one in a network of African Institutions of Science and Technology (AISTs) in Sub-Saharan Africa (SSA). The AISTs develop the next generation of African scientists, engineers and technologists, who will impact on the continent's development through the application of science, engineering and technology.

Another example of excellence is the establishment of the African Institute for Mathematical Sciences (AIMS) in 2003 in Cape Town. The success of AIMS has encouraged the opening of new centers in Senegal, Ethiopia and extending to more countries in the future. Each

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center welcomes 50 African students in a self-contained residential center with excellent computer, library and lecture facilities.

The African School of Fundamental Physics and its Applications (ASP) represents an itinerant initiative, providing a 3-week program given by renowned professors to more than 70 selected African students. The school is being organized in a Sub-Saharan African country every second year and it is based on a close interplay between theoretical, experimental, and applied physics.

University partnerships are more frequently created in partnership with European and North American institutions. Lund University has trained African students using on-line classes on environment topics. The Dunlap Institute and Canadian Institute for Theoretical Astrophysics (CITA) at the University of Toronto in Canada, are partnering with the National Space Research and Development Agency (NASRDA) and Center for Basic Space Sciences (CBSS) of Nigeria to hold a week long school for West African undergraduate science majors in Abuja, Nigeria in October 2013.

Beyond education, large-scale science facilities will play a central role in the rising visibility of the African continent. “New synergies between the European Union and the African Union are underway, and new large-scale facilities which will embrace initiatives for African student training are being proposed”, said Colin Carlile, lately the Director General of the European Spallation Source in Sweden and before that of the Institute Laue-Langevin.

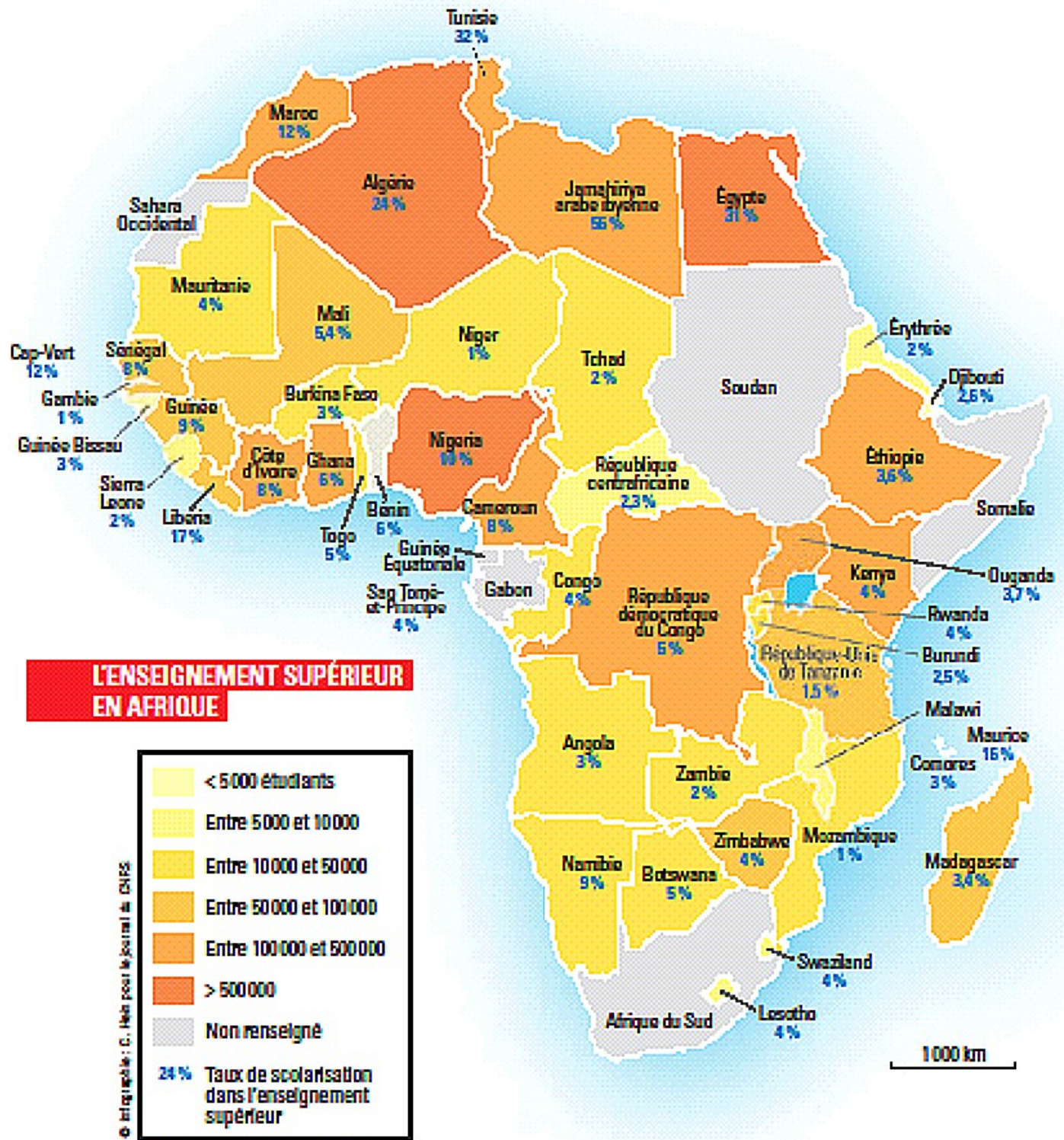
Carlile speaks admiringly of the initiative and energy applied in South Africa to attract the huge Square Kilometer Array Radio Telescope. “This project is proving to be a catalyst in bringing Africa as a whole into international prominence”, he says. “Outreach activities in particular are proving to be very effective, and the con-

version of disused telecommunication dishes in many African countries into effective radio telescope dishes, is providing training in the science as well as opportunities in project management. This creates a sense of ownership, which extends well beyond the site itself in South Africa. Equally well, the provision of a high-speed optic fibre data transmission network along the African coast is bringing experience with high technology and providing employment over wide swathes of the continent.”

The South African Institute of Physics (SAIP) promotes science to support development within the continent. The Square Kilometer Array Project (SKA SA) is an international project supported by the Department of Science and Technology, administered by the National Research Foundation and has several African and European partners as well as a second site in Australia. SKA SA is currently designing and constructing the MeerKAT Radio Telescope in the Karoo Region of Northern Cape Province. MeerKAT is a world-class radio telescope and is designed to do ground-breaking science as well as being a prototype test-bed to iron out potential pitfalls in the building and operation of SKA. Newly-formed collaborations between the European partner countries and the African partner countries have resulted in a high visibility of African activities in Brussels and beyond.

So, despite the constant challenge of political instability in some targeted countries, education and scientific motivation act as remedies against entropy and chaos. African institutes supported by the international scientific community bridge the research and industrial progress gaps by developing local expertise, henceforth supporting democracy. The signs are very positive and upward trends are becoming quite evident and truly welcome.

(Continued on the next two pages)



EFFECTIFS DE CHERCHEURS

Pays	Nombre total	Nombre par million d'habitants
Bénin	1 000	119
Burkina Faso	187	13
Égypte	95 947	1 198
Éthiopie	2 377	30
Madagascar	1 852	100
Ouganda	891	29
République centrafricaine	41	10
Sénégal	8 709	732
Togo	834	132

(Source : Unesco, données 2007)

DÉPENSES EN RECHERCHE ET DÉVELOPPEMENT

Pays	Total (en dollars)	Part du PIB en %
Afrique du Sud	4 120 396	0,95
Burkina Faso	18 391	0,11
Égypte	927 917	0,23
Éthiopie	106 791	0,17
Madagascar	25 862	0,14
Maroc	761 726	0,64
Ouganda	119 654	0,41

(Source : Unesco, données les plus récentes disponibles entre 2000 et 2009)

Christine Darve, a member of the FIP Executive Committee, is an Engineering Scientist in the Accelerator Division of the European Spallation Source (ESS AB P.O. Box 176, SE-221 00 Lund, Sweden). Dr Darve is a member of the International Organization Committee of the biannual African School of Fundamental Physics and its Applications and has been the main organizer of its first edition, ASP2010.

Editor's note: See Darve's article on ASP 2010 in our Spring 2011 issue

<http://www.aps.org/units/fip/newsletters/201103/darve.cfm>

and a short report on ASP 2012 in our Fall 2012 issue.

<http://www.aps.org/units/fip/newsletters/201209/darve.cfm>

Egypt Connection 2

Sultana N. Nahar

Note by the Editor: A previous article by Dr. Nahar on her continuing relationship with universities in Egypt appeared in our Fall 2012 Newsletter.

<http://www.aps.org/units/fip/newsletters/201209/nahar.cfm>

I went to Egypt to teach a condensed course on "Atomic Spectroscopy and Opacity" during February and March of 2013, a period of post-revolution protests. The teaching was arranged under the Memorandum of Agreement (MOA) between Ohio State University and Cairo University. Despite the unrest I did not face any problems while there. There was a considerable reduction in western tourists. I noticed positive changes in education and benefits for the poor that Morsi had brought to Egypt. During the visit, I had contact with a number of universities, each with a great urge for knowledge, research collaboration, and raising educational standards to the levels in US universities. At several institutions I donated books to their library.

A notice of my spectroscopy course was widely circulated in Arabic on campus as well as to a number of universities and institutes. Participants were postgraduate students (masters or Ph.D.), researchers, and faculty members wanting to review the materials and learn of new research advances. In addition to those from Cairo University and the National Institute of Laser Enhanced Sciences (NILES), they came from other institutes: Al Azhar University, the Egyptian Atomic Energy Authority, Menoufiya University, National Research Center, Minya University, and Zewail City of Science and Technology. It was an enjoyable experience for me to see the interest in the participants in the two-hour lectures presented three times a week for three weeks. The course covered material from eight chapters of the textbook "Atomic Astrophysics and Spectroscopy" (Cambridge University press, 2011) that I coauthored. We also had computer labs running an atomic structure program and R-matrix codes to initiate research projects and there was one final exam.

Teaching the course gave me the opportunity to know the participants and their academic and research status. I visited laser labs and nanotechnology labs. Popular research interests are in the study of laser produced

plasmas, solar cells, graphene properties, and magnetic field effects. Posters from regional conferences hang on the lab walls.

One young and very active associate professor at NILES, Dr. Mona Bakry, who graduated from Georgia Tech, is also the head of a private nanotechnology lab where she leads a team of 22 postgraduate students and researchers from NILES as well as from a few other places who work on various topics in nanotechnology. She was very pleased to show me the electron microscope and a high resolution image taken by two students. She also treated Professor El Nadi and myself to dinner at the Mall of Arabia.

There is interest in extending the MOA between OSU and Cairo University to include medical research and training. The director of NILES, who is a physician, spoke about possible research collaboration in laser applications in medicine. I also had meetings at the National Cancer Institute (NCI) hosted by Cairo University, with the Heads of the Virology and Immunity Department, Radiation Oncology, and Department of Surgery of Liver and Digestive systems, as well as with graduate students doing stem cell research.

The most common cancers in Egypt are liver and breast. In Professor Zekri's lab at NCI, Ph.D. student Ola works on stem cells to differentiate them into liver cells which are given directly to patients. They have done extensive research on irradiation on patients, injecting the nanoparticles of radiosensitizing agents, and on the structure and shape of the nanoparticles for dose absorption. Animal rights is still under debate in Egypt. Hence, they could carry out experiments on rats and see the effects rather easily. There are also terminally ill patients who volunteer for the experiments. The resonant physics with low energy X-rays that we proposed was of great interest for NCI research. A draft plan was made to formulate cooperation in cancer research. There is a strong desire and motivation for collaboration in advanced research and training in developed countries. The sophisticated lab equipment they use is from the US or Germany and so they face serious delays when an instrument malfunctions and requires repair or parts.

My course ended in March. Each participant received a

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well-deserved certificate from the Dean of the Faculty of Science in a ceremony held in Cairo University's Ibn Sina Hall (Ibn Sina, 980-1037, a great scholar particularly noted for books on medicine). Many compliments and appreciation about the course were conveyed to the Dean. At the *Festival for Thanks for Loyalty* which recognized faculty achievements and honored retirees, I was given the "*Shield of the Faculty of Science*" award and a certificate for teaching and introducing the STEM program in Cairo University.

I met with faculty members of Beni Suf University, Suez Canal University, and Al Azhar University, largely to discuss future research directions. All these institutions are active in research and are keen on research cooperation with Ohio State University and for guidance to raise education standards. Suez Canal University is building a center for excellence in laser experiments. I also had discussions on research collaboration with Dr. Tamer Elkfrawy of Ain Shams University where I presented a seminar and contributed a number of books. Elkfrawy, a young faculty member who I have known since his graduate studies as a top student at Western Michigan University presented a very good seminar after mine.

With Professor Lotfia El Nadi, I met with the Dean and vice Dean of the Faculty of Science of Alexandria University (next to the Mediterranean). This university is expanding and a few new departments have opened. This is the university where Ahmed Zewail, (known as the "father of femtochemistry, 1999 Nobel Prize in Chemistry), earned his bachelor's degree. We spoke about research collaboration and a joint proposal under the US - Egypt agreement. Alexandria University has a campus next to Bibliotheca Alexandria. The 2300 year-old library founded by Ptolemy during Alexander's ruling of Egypt was destroyed after about 700 years of existence. It has been rebuilt with the help of the United Nations and other contributions. It has a huge circular wall at the front above the entrance floor with scripts from languages from all over the world, and inside a space for 2000 readers in the 5-story slanting structure

with glass roof.

It was impressive to visit the Zewail City of Science and Technology founded by Ahmed Zewail of Caltech. Professor Lotfia El Nadi arranged for me to visit the centers for Nanotechnology and Theoretical Physics, and the provost of the Zewail City. A very high sense of inspiration and dedication exists at Zewail. It may become an innovative brainstorming center for the Arab and African countries. During my visit, I met seven scientists who gave up their jobs in the US, Canada, Germany, and Italy to take positions at Zewail City. The nanotechnology group is doing cutting edge research, has a large research grant and is closely linked to Intel. The physics group participated in the Higgs discovery and several Egyptian physicists participate in experiments at CERN.

The land donated by the Egyptian Government is surrounded by a wall and Zewail City is still under development. Members are working overtime to complete construction. Four out of eight centers are now in operation. The huge sky blue glass administrative building at the front and the building for research and academia behind it have been built with spaces to hold large poster sessions and for events in the open air with a stage. There are open discussion areas and circular skylights along hallways. Rain is rare in Cairo and most of Egypt so a gathering space without a roof should not cause scheduling problems. There will be short and longtime visitor programs for researchers and students from many countries. There will be a Ph.D. program for the most talented students in Egypt and surrounding countries. I was invited to give a seminar at Zewail City.

During my meetings with faculty members of various universities, my guidance for advanced research and new areas of importance was sought. I wondered how to connect the objectives of all these institutions and their desire for knowledge into a fast-track framework for advancing Egyptian research and science education.

During my Egypt visit another task was completed. I

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had been working for a couple of years on initiating a STEM program to enhance in-class teaching in Cairo University. The program recognizes teachers, with input from the students, for their guidance for the students' best learning and research experiences. This STEM program also encourages students to do well in research and recognizes each year the two best Ph.D. graduating students, one male and one female, and the best MSc graduating student. The proposal received final approval from the university on December 26, 2012. The certificate ceremony for my course participants was extended to recognize teachers and students under the STEM program for the first time. Two faculty members, one for best teaching and one for best research guidance, and three students received prizes.

I made progress at Al Azhar University on initiating the STEM program in the Physics Departments (in male and female branches) and in the Astronomy and Meteorology Department. The objective of the program is to enhance excellence in education and research in physics and astronomy. The program includes recognition of four faculty members and three Ph.D. and three Masters students in Physics Departments (male and female campus) and in the Astronomy and Meteorology Department. Student involvement in teacher recognition was an issue. However, with some modifications the program has been approved by the university. I met the faculty members of the three departments, and the Dean of the Faculty of Science. I gave a seminar attended by members in these departments. They appreciated learning of new advances in research. Physics faculty members from the female branch treated us at the restaurant inside the beautiful Al Masa resort. They are also members of the International Society of Muslim Women in Science that I founded.

I am indebted to Professor Lotfia El Nadi of Cairo University and founder of NILES for helping make my ef-

forts in Egypt possible. Both of us founded the International Society of Arab Women in Science (ISAWS) in 2010 which has now 240 members from seven Arab and Middle Eastern countries. Several women scientists signed up for ISAWS during two conferences, one on nanotechnology organized by Beni Suef and Cairo University and one on biomedicine organized by Ain Shams University. Quite a number of people also signed up for the International Society of Muslim Women in Science (ISMWS).

Giving the course at Cairo University I came to learn of more issues on women in science. Compared to other Arab counties, Egypt has more professional female scientists. The reason behind this is more support from the parents and relatively more acceptance by society. However, I was also told of the issue of conservative husbands restricting their wives with degrees in science and engineering from having professional lives, and also from attending conferences. Professor Yosr of Cairo University who spent eleven years in King Aziz University in Saudi Arabia became very supportive of ISMWS. She connected me to two professors in Saudi Arabia regarding registration of ISMWS.

Overall I had a wonderful experience in Egypt.



Figure 1: Course lecture in Cairo University. Participants are postgraduate students, researchers and faculty members.



Figure 2. Running programs on atomic calculations was part of the course



Figure 3: Dr. Mona Bakry with students in front of the electron microscope.



Figure 4: Female researchers with certificates after the course



Figure 5: Bibliotheca Alexandria next to the University



Figure 6. Standing in front of Zewail City of Science and Technology.



Figure 7. Professor Ali of Cairo University receives the award for best research guidance. Ali has a large group of motivated students. This is the first award of its kind in Cairo University.



Figure 8. At Al Azhar University the Dean of the Faculty of Science and Nahar together hold the STEM proposal for physics and astronomy. It took a significant effort to convince people of the importance of faculty recognition by students.



Figure 9. Lunch hosted by Al Azhar faculty members of the female campus at the Al Masah restaurant with Ali Pasha portrait at the center.



Figure 10. ISMWS members at the palace of Sultan Qalauun who had school, mosque and the hospital attached to the palace. Each member has a vision of professional research life.

Dr. Sultana N. Nahar, a Bangladeshi American physicist, is a research scientist in the Department of Astronomy at Ohio State University and an elected member of the FIP Executive Committee. 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@astronomy.ohio-state.edu

Bilim Akademisi – the new Science Academy in Turkey

M. Ali Alpar

In August 2011 the Turkish Government issued a decree to bring in government appointments to the Turkish Academy of Sciences (TÜBA). This resulted in an appointed majority of members in TÜBA, many with mediocre academic records. 52 of the 82 formerly elected regular members of TÜBA resigned. A new academy, Bilim Akademisi – the Science Academy (www.bilimakademisi.org) was founded on Nov. 25, 2011. These developments took place in a background of increasing political interference in publicly funded institutions as well as professional associations, non-governmental organizations and the media. Many academies throughout the world receive support from public funds. They are accountable financially but are independent in their academic and scientific activities, including, fundamentally, the election of their members. Academies and scientific societies can function as sources of reference and advice to the public and to governments on the basis of this independence.

The universities system in Turkey is centralized, rigid and hierarchical. There are constraints on academic freedom which have led to an increasing number of investigations and court cases in recent years. Science policy is shaped by the misconception of developing or adopting technology while downplaying basic scientific research. This goes hand in hand with an ideological distrust of science by the present government.

The Science Academy was set up as a Society under Turkish Law, financed by members' dues and donations so as to be independent of any state support. It now has 121 members, of which 29 are physicists. Ordinary members are Turkish citizens elected on the basis of academic excellence who sign a Declaration of Academic Merit, Freedom and Integrity on joining the Science Academy. The first elected (2012) foreign honorary members are the physicists Edouard Brezin, Joel Lebowitz and David Pines, the astrophysicist Lord Martin Rees, the chemist Atta-ur Rahman, the philosopher Dagfinn Follesdal, and political scientists Dame

Helen Wallace and Sir Adam Roberts.

To attract young talent to careers in science and scholarship is a fundamental priority. The Science Academy has started a research award program for young scientists and scholars, and in its first year has already made 20 awards for two-year research support based on donations from business and individuals. The support we received at the launch of this program was very encouraging. In the US tax deductible donations to the Science Academy can be made through the Turkish Philanthropy Funds, www.tpfund.org

The Science Academy has started studies and made declarations on science and education policy, in particular on recent official statements that the theory of evolution is "controversial" vis-a-vis creationism. Our members in social and political sciences and economics have made an analysis of the current political developments in Turkey in the summer of 2013.

The Science Academy is already a member of the International Human Rights Network of Academies and Scholarly Societies, IHRNASS, an international network of academies hosted by the US National Academy of Sciences. We have applied for membership in other international leagues of academies like the European ALLEA, the Inter Academy Panel and the Academy of Sciences of the Developing World (Trieste).

Professor M. Ali Alpar, astrophysicist, is on the faculty of Sabanci University in Istanbul and Chairman, of the Science Academy.

The AAAS Science and Human Rights Coalition Meeting: - a brief report

Juan C. Gallardo and Michele Irwin

This biannual AAAS Science and Human Rights Coalition meeting was held at the headquarters of AAAS, Washington DC on July 11-12, 2013. A news release and the meeting agenda (with links to some of the presentations) are available on the Coalition website: www.aaas.org/news/releases/2013/0730_article-15.shtml and <http://srhrl.aaas.org/coalition/Meetings/2013/July/index.shtml#Agenda>

The theme of the Coalition meeting was Article 15 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) (<https://www.un.org/millennium/law/iv-3.htm>), which states, in part, that everyone has the right “to enjoy the benefits of scientific progress and its applications.” The ICESCR was adopted by the General Assembly of the United Nations in December 1966, but until recently, this right has received little attention. As a result, there has been no clear definition of this right. Thus, in 2007, the United Nations undertook a process to elucidate it. In order to bring attention to this undertaking and ensure that the views of scientists are included in the process, the Coalition has focused much of its work around Article 15. This meeting highlighted the many diverse facets of the right. We summarize here one of the four panels in the agenda.

The panel “International Scientific Cooperation and Article 15” explored the relationship among human rights, national security and scientific freedom. Speakers focused on access to the right to science though the lens of international scientific cooperation. One of the panelists, Frank William La Rue, UN Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression, stressed the need of unencumbered scientific freedom of expression and reminded us that, nowadays, free exchange of information depends increasingly on the Internet, both from the standpoint of access to connectivity as well as content. This point was highlighted in an example he provided: While India has essentially unrestricted Internet content, in 2011, only 7% of its citizens had Internet connectivity. This impedes the majority of people in the country from accessing information. China had the

opposite problem, i.e., a high level of connectivity among its citizens, but restricted access to content and by extension, information generally. These scenarios are especially serious when one considers the possible implications on the ability to access scientific knowledge and information.

Throughout his presentation, La Rue stressed that there is a link among all human rights; they are a network and cannot be separated from each other. The ability to access the Internet facilitates one’s capability of accessing information and knowledge, which then influences how people can express themselves, enabling freedom of expression, for example.

La Rue’s remarks echoed comments by Michael Posner, US Assistant Secretary of State during an event at AAAS on October 2012 (<http://srhrl.aaas.org/coalition/Meetings/2012/Posner/index.shtml>). Posner said “... academic freedom.... depends on an Internet that is maintained as an open platform for the free exchange of information and ideas—or Internet Freedom”; “...and this must be across campuses and borders.” He added “the freedom to debate and participate in scientific research is essential to scientists.” Scientific freedom will not exist without Internet freedom. This is further emphasized by the UN Human Rights Council resolution on Internet Freedom (<http://geneva.usmission.gov/2012/07/05/internet-resolution/>) that asserts that freedom of expression online is a basic human right.

The next speaker was E. William Colglazier, the Science and Technology Adviser to the US Secretary of State, as well as a physicist and past chair of the APS Forum on Physics and Society. He enunciated the important role that science and scientific research can play in advancing diplomacy and economic progress. In 1966, the ICESCR that includes Article 15 was ratified by 160 governments. The US has signed the Covenant but has not ratified it. Colglazier said that the US, “as a policy matter” does uphold the “values and principles of Article 15 – envisioning a world that promotes the

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ability of everyone to share in scientific advancement and its benefits.” He noted that his office is working to ease regulatory barriers, such as cumbersome visa application procedures for foreign scientists and students, which inhibit international research collaborations.

He also expressed the active involvement of his office in a number of US—sponsored programs to promote international scientific and economic cooperation. A couple of examples of those efforts are in (<http://www.state.gov/e/stas/c51577.htm>): The NeXXt Scholars Program offers women students from Muslim-majority countries and the US who are interested in studying STEM disciplines the opportunity to pursue undergraduate programs at US women's colleges. LAUNCH identifies innovations that have the potential to have significant impact on vital sustainability issues. The program then connects the innovators with investors, mentors and other stakeholders to provide leverage to implement their projects into the global market.

Colglazier also described a program to support scientific libraries on the continent of Africa and in Iraq and spoke of his office's efforts to keep open scientific communication channels with countries the US does not have either diplomatic or economic relations. These programs demonstrate how science can be used as a tool to overcome diplomatic obstacles and improve communications and access to information.

Colglazier spoke of how scientific expertise and cooperation can positively influence problems that nations face every day, whether it be dealing with natural disasters, health issues or ensuring national security. Countries that stay at the forefront of science will be those that are increasing their investments in education, scientific research and research and development. These investments lead to improved economic development.

The third panelist was Herman Winick, a member of the FIP Executive Committee (Councilor) and retired physicist from the Department of Applied Physics, Stanford University. (Winick is also a former Chair of the APS Committee on International Freedom of Scientists.) During the session, he talked passionately about the benefits of international collaborations in science, economics and cultural areas. He eloquently affirmed the statement by the APS Council in November 1989,

“Science belongs to all humanity and transcends national boundaries...science can serve as a bridge for mutual understanding across political and ideological divisions and as a vehicle for the enhancement of peace.”

Winick gave details of his involvement with the Synchrotron-Light for Experimental Science and Applications in the Middle East (SESAME). SESAME (<http://www.sesame.org.jo/sesame/>) is a major intergovernmental scientific facility under construction near Amman, Jordan whose members are Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey. The commissioning of the machine is expected in late 2015. This facility follows the model of CERN (<http://home.web.cern.ch/>), the European Organization for Nuclear Research, with different scientific aims but with the same cultural and economic vision to establish scientific links to foster better understanding and a culture of peace, trust and cooperation. In the way that CERN played a role in bringing together scientists from the East and the West during the Cold War, so does SESAME in bringing together scientists from countries in the Middle East, some of which do not have diplomatic relations. Again, we see how science can serve as a vehicle for dialogue and the sharing of knowledge.

In addition to the meeting sessions, the Coalition welcomed several graduate student representatives. These students will officially represent their organizations in the Coalition. APS is pleased to have Vikram Singh Prasher represent the Society. Vikram is a graduate student at the University of Massachusetts – Lowell. He will serve as a liaison between the Coalition and the graduate student members of APS. He will work to bring the voices of physics graduate students to the Coalition and ensure that the physics graduate student community is better aware of the connection between science and human rights as well as the efforts of the Coalition.

Information about previous Coalition meetings can be found in our previous report in the May 2013 issue of the APS Forum on International Physics newsletter as well as in the “CIFS Briefs” of the June 2013 issue of *APS News* (vol. 22, No. 6, pp 4).

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We encourage APS members to attend the next AAAS Science and Human Rights Coalition meeting to be held in Washington, D.C., January 27-28, 2014.

Juan Gallardo, gallardo@bnl.gov, is retired from the Advanced Accelerator Group, Brookhaven National Laboratory. He has served on the APS Committee on International Freedom of Scientists (CIFS), including as Chair in 2007. In addition,

he has been a member of the APS Andrei Sakharov Prize Selection Committee.

Michele Irwin, irwin@aps.org, is the International Programs Administrator at APS where she works closely with CIFS. Both represent APS at the AAAS Science and Human Rights Coalition and serve on the Coalition's Council.

The Russian-American Scientists Association (RASA)

Vladimir Shiltsev

The Russian American Scientists Association (RASA) is a US-based organization representing the Russian science community. RASA's website (in Russian) is <http://rasa-usa.org/>. RASA is a nonprofit organization working to consolidate the Russian scientific diaspora, to advance the career development and qualifications of its members, and to provide opportunities for social and cultural exchanges. RASA represents over 200 members, including scientists, engineers and hi-tech entrepreneurs in academia, national laboratories and industry in the United States. Together with a European branch, RASA is an integral part of the international Russian-speaking Academic Scientists Association. The objectives of RASA include exchange of knowledge and experience, initiation of joint projects and coordination of research programs, organization of conferences, seminars, research schools, sharing knowledge of teaching programs and lecture materials (more on RASA and its goals can be found in the December 2012 issue of "APS News").

RASA is governed by a Coordinating Committee comprised of leading US scientists representing a wide spectrum of research areas—physics, biology, mathematics, biomedicine, chemistry, etc., as well as those working in many high-tech and IT areas. We hold annual conferences; the next conference will take place in Clearwater, FL on November 8-10, 2013. In addition, RASA actively interacts with Russian scientific-educational and governmental organizations. At the request of the Russian Corporation of Nanotechnolo-

gies (RUSNANO) and the Ministry of Education and Science (RMES), many members of RASA provided scientific expertise on applications for various supporting grant programs. Some dozen members of RASA actively collaborate with individual Russian institutions and lead research groups in Russia. In 2010 RASA along with RMES started the program of the International Center of Advanced Science. Under this program, undergraduate and postgraduate students from Russian universities compete for scholarships from the President of the Russian Federation for training in research centers abroad in fields such as biotechnology, energy, nuclear technology and software, medical equipment and pharmaceuticals, aerospace and telecommunications, nanotechnology, etc. At present, there are four ICAS centers in the US: at Argonne National Laboratory and Fermi National Accelerator Laboratory (both in IL), Boston's Children Hospital (MA) and at Stony Brook University (NY).

Since 2011 RASA has actively participated in and coordinated activities aimed at cooperation with the Skolkovo Institute of Science and Technology (SkTech), which is formed as part of a cooperative agreement between the Russian Foundation of the Center of Research and Commercializing of New Technologies "Skolkovo" and the Massachusetts Institute of Technology—see <http://sktech.mit.edu/>. RASA members take an active part in reviews of the proposals for the organization of the SkTech / MIT research centers.

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Together with the Russian Center of Science and Culture in Washington, DC, RASA organized a tercentennial celebration of the great Russian polymath Mikhail Lomonosov in November 2011 and 150th anniversary of physicist/geochemist Vladimir Vernadsky in March 2013 (see <http://usa.rs.gov.ru/en/node/1230>.) Highlights of the latter include presentations of Prof. Roald Sagdeev (University of Maryland) on development of the Russian Academy of Sciences and Prof. Edwin Squires (George Washington University) "The concept of the biosphere: the life and legacy of Vernadsky". Dan Davidson, President of the American Councils for International Education, gave a presentation on current issues of university research in the US and his vision for cooperation between Russian and American scientists.

Among other notable activities of RASA members was the organization of and participation in an international team of scientists to replicate an experiment by 18th-century Russian scientific and literary luminary Mikhail Lomonosov in a quest to demolish skeptics' doubts that he discovered Venus' atmosphere. Using an early achromatic telescope from his St. Petersburg observatory in 1761, Lomonosov had witnessed evidence of Venus' atmosphere in the form of a "luminous arc" jutting out from the planet as it made its rare transit between Earth and the Sun. The 2012 transit of Venus gave us a chance to reproduce Lomonosov's 1761 observation with antique 18th-century telescopes simultaneously in the US, Russia and Canada and demonstrate

the instruments' excellent quality. Results of the successful replication are reported in the February 2013 issue of *Physics Today*.

Recent turmoil over proposed reforms of the Russian Academy of Sciences (RAS) – see, e.g., "New Law Would Dilute and Diminish Science Academy" in *Science* (5 July, 2013) – raised serious concerns in the broad international scientific community, including in the US National Academy and in the National Academies of many other countries, as well as in the Russian-speaking scientific diaspora in the US. Many prominent members expressed their fears that proposed reforms will be carried out without taking into the account the opinion of the scholarly community, will weaken RAS as a center of basic research and likely diminish the high position of Russian science and scholarship, will transfer the administrative responsibility of scientific research from scholars to state officials, and will remove protection of freedom from outside pressure.

RASA is seeking new members – so, if you want to join, please, email us at mod.rasa.usa@gmail.com.

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Participants of "Day of Russian Science" meeting at the Russian Center for Science and Culture in Washington, DC (<http://rccusa.org/>) on February 11, 2013



Scientific outreach event in Batavia, IL on the day of the observation of the transit of Venus with modern and antique telescopes (June 5, 2012).

Vladimir Shiltsev is President of the Russian-American Scientists Association (RASA) and Director of the Accelerator Physics Center, Fermilab, Batavia, Illinois.

International collaborations in large-scale scientific projects

Christine Darve and Colin Carlile

What will the world of tomorrow be like with respect to science? As we face growing challenges in our society, science is evolving. A century ago science was pursued in small university laboratories and was seen as an esoteric pursuit with limited relevance to real life. Today it has become a global endeavour and governments are acknowledging that it is a potent economic driver. Science has redefined our place in the universe, moving from the earth as the center of the universe to the knowledge today concerning the Big Bang and the expanding universe and, with that, the realization that we live on a rather ordinary planet around an ordinary star in an ordinary galaxy. And yet we are special. The large international scientific facilities of today have become global and provide the foundations for the solution to some of the pressing problems facing humanity and our planet. They are fertile sources of innovation.

Collaborative projects and international cooperation are the keys to successful large-scale scientific facilities. Many examples of such “Big Science” projects can be detailed: LHC, ITER, XFEL, ESA, IFMIF, ESO, FAIR, ILC. These international ambassadors of science support knowledge transfer and transmit our human heritage to the younger generations empowered to lead in the coming decades.

Applying science to society leads to new products relevant to society’s needs, and leads to new business, new organizations and new jobs. Our everyday lives depend heavily upon the fruits of scientific discovery. Let us take the smart phone that has truly transformed our lives in less than one decade. Without satellite technology, without development of new materials – nano-material lithium ion batteries for example – without perfect silicon crystals, such a device would not be possible. Do we as a society recognise the debt that we owe to scientific research and the engineering and manufacturing capabilities that follow for this life-changing piece of technology? We suspect not.

Hence, a forum of international physics such as our APS FIP can promote active dialogue and exchange of ideas and opinions aimed at addressing and responding

to key challenges. In this article we give examples of large-scale international projects that promote societal improvement.

Nowadays, large-scale scientific projects can generally be successful by organizing and distributing the creation and operation of the large and unique enterprise among partners, utilizing their individual capacities. Such synergies foster not only the common project but also advance local development of the partner institutions. Cutting edge facilities have grown beyond what it possible for one country to build, for more that one continent to build in some case, if we take ITER and the International Space Station as examples.

Major events of history have paved the way to new scientific discoveries and have led to the innovative technologies referred to above. There are many examples that illustrate how this happened following the Second World War (SWW).

First, the shining example of international collaboration is embodied by the European Organisation for Nuclear Research (CERN), as one of Europe’s first joint ventures. CERN was created in 1956 following the need to unify countries and coordinate scientific breakthroughs after the Second World War. It emerged from the Peaceful Uses of Atomic Energy initiative.

CERN represents a collective effort of European countries to build the world’s leading particle physics research center to address fundamental scientific questions. Following the SWW, ideas for international laboratories were put forward as early as 1946 within the United Nations Organisation. Officially, the Convention establishing CERN was approved by 12 Member States on July 1st, 1953. Today, CERN has 20 Member States and countries with observer status are India, Israel, Japan, the Russian Federation, Turkey, the United States, the European Community (EC) and UNESCO. Some 8,000 scientists, over half the world’s active particle physicists, use CERN facilities. They represent 580 universities and over 85 nationalities. The con-

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struction and operation budget contributions are proportional to the GDP of each of the member states.

The second example is the Institute Laue-Langevin (ILL) and the use of neutrons for science. “We are celebrating this year the 50th anniversary of the Franco-German alliance, for which the first milestone has been the creation of the ILL, in 1967”, says Andrew Harrison, ILL’s Director General.

The use of neutrons mirrors history. The understanding of matter reflects the quest of humanity, allowing us to better understand nature and to improve the world in which we live. Modern societies are technology driven. Progress in many scientific areas depends on understanding materials at their atomic and molecular level, whether we are interested in components of an electronic circuit, the membranes and contacts of a fuel cell or battery, or proteins in a biological cell. Neutrons were discovered in 1932 by Chadwick, and harnessed during the SWW to create the first nuclear reactors and separate the fissile material used to devastating effect at the end of the war. Neutron sources today have a unique potential for the most advanced sciences. From nanotechnology to biological discoveries, neutrons provide answers to many important questions related to the fundamental laws governing our universe. Neutrons often provide decisive information for developing applications. Neutrons are also themselves objects of great scientific interest since their properties have consequences for the understanding of the origin and evolution of our universe. Europe today has more than 5,000 researchers using neutrons.

The ILL is a successful example that embodies the success of scientific cooperation to build large-scale tools thanks to the vision of successive directors and the excellence of the international staff that were attracted to work on the facility. Sciences in the hand of proactive leaders, skilled and committed scientists and engineers, and policy makers result in building the most accomplished and balanced society. As the world’s flagship center for neutron science, the ILL provides scientists from the member states and beyond with a very high flux of neutrons feeding some 40 state-of-the-art instruments. Research focuses primarily on fundamental materials science in a variety of fields: condensed matter

physics, chemistry, biology, nuclear physics and materials science, etc.

The ILL was founded on January 19th 1967 with the signing of an agreement between the French government and the Federal Republic of Germany. The collaboration and influence of Louis Néel and Heinz Maier-Leibnitz within their own countries brought this project to fruition in Grenoble. In 1974 the United Kingdom became the institute’s third Associate member country, accounting now for 12 additional country partnerships (11 European and India.). The construction and operating budget are based on cash contributions from the member states according to usage. Additional in-kind contributions are supporting the budget. Every year, some 1500 researchers from over 40 countries visit the ILL. More than 800 experiments selected by a scientific review committee are performed annually.

Finally, a more recent example of international collaboration in the building of large-scale physics facilities, staying with neutron sources, is the European Spallation Source (ESS) in Lund, Sweden. The limitations of reactor technology have long been known, as a consensus among neutron scientists that increased spallation capacity is a necessary step forward. With an improved source there is also the need for ESS to develop increasingly sophisticated detector instruments. A 5 MW long pulse proton accelerator, composed mainly of superconducting Radio-Frequency components, is used to achieve these goals. The ESS will be up to 30 times brighter than today’s leading facilities and neutron sources. Like the ILL and CERN, the ESS will be a multi-disciplinary research center and user institute, which makes its facilities and expertise freely available to visiting scientists from member states. The ESS will enable new opportunities for researchers in the fields of life sciences, energy, environmental technology, cultural heritage and fundamental physics.

This new facility is funded by a collaboration of 17 European countries and Scandinavia is providing 50 percent of the construction cost whilst the other member states are providing financial support mainly via in-kind contribution from institutes, laboratories or industries of the given countries. Scientists and engineers

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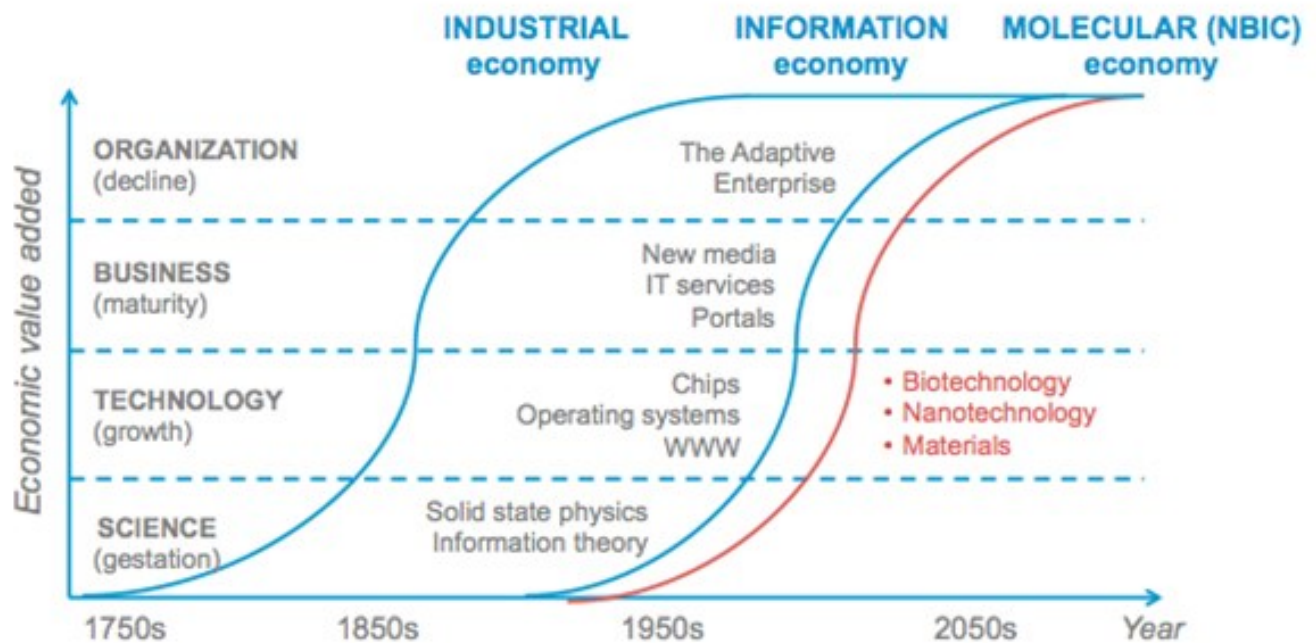
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from 32 different countries are members of the workforce in Lund who participate in its design and construction.

such large-scale projects, as CERN, ILL or ESS. Science is a tool for understanding in the world, bringing people from many diverse cultures together and thereby helping to create a harmonious modern society.

The figure below illustrates the connections between science, technology, and the economy discussed in our article.

Accomplishments in fundamental and applied physics are driven by synergy between discoveries and societal values. There are no geographical borders to establish



It's Alive - The Coming Convergence of Information, Biology, and Business - Christopher Meyer 2003

Materials science facilities are keys to the new economy

Christine Darve, a member of the FIP Executive Committee, is an Engineering Scientist, Lead Engineer for the Superconducting Linear Accelerator (704 MHz) of the European Spallation Source (ESS AB P.O. Box 176, SE-221 00 Lund, Sweden). Dr Darve has been the main organizer of the biennial African School of Fundamental Physics and its Applications.

Colin Carlile, has been lately the Director General of the European Spallation Source in Sweden and before that of the Institute Laue-Langevin. He is Guest Professor of Physics, Lund University, and Honorary Professor of Physics, University of Birmingham. Professor Carlile has been awarded the Order of the Polar Star in June 2013 (Swedish royal order).

CAM2013, Canadian-American-Mexican Graduate Students Conference

Laura Boon

The Canadian-American-Mexican Graduate Students Conference (CAM) is held biennially, rotating between the three participant countries. This year the conference was at the University of Waterloo, in Ontario, Canada from August 15th -18th 2013. CAM is a unique conference because it is organized by graduate students for graduate students and encompasses all areas of physics research. The physics program consisted of plenary sessions and panel discussions in addition to the student parallel talks and poster session. The plenary sessions and panel discussions featured well-known scientists representing all three countries. However the graduate students were still the focus of the conference, presenting their work in both parallel talks and a poster session Saturday evening.

Students arriving Wednesday evening quickly bonded over flat pillows and a lack of hot water. But as the conference started the next day the conversations quickly turned to physics research and our individual projects.

The conference started with an opening reception at Communitel, a company designed to assist high tech start-up companies make connections. With almost half of Physics Ph.D. graduates going into private sector jobs, it was good to see a focus on high-tech companies. It was also a great experience as a graduate student to get to talk to scientists who are not following the academia track in their career.

The talks began the next morning with a plenary session on Space Physics; Dr. Jaime Urrutia Fucugauchi discussed impact cratering on planetary surfaces. He did a great job describing the cratering on our moon and planets in our solar system, including meteorites on Earth.

The conference banquet Saturday evening featured a talk by Marc Garneau, the first Canadian Astronaut and a Member of Parliament. Marc spoke on Big Science, and International Collaborations. Although he focused on the International Space Station, Marc also talked about the collaboration effort needed to design and build other big science projects such as the Large Had-

ron Collider and various Mars rovers. All the attendees were glad Marc Garneau was able to take the time out of his busy schedule to join us.

CAM2013 was the first year to feature a plenary talk on accelerator physics. Dr. James Safranek of SLAC National Accelerator Laboratory, gave a plenary talk on the uses and production of synchrotron radiation, and ended with a quick overview on the parts of a synchrotron light source. Synchrotron light sources have become a widely used tool in many areas of research, from pharmaceuticals to materials and many areas in-between. James was joined by a few students who also gave accelerator physics related talks in the parallel session.

The local organizing committee took advantage of the visiting scientists to organize a public lecture. Dr. Miguel Albuierre, a theoretical physicist from the Universidad Nacional Autónoma de México, gave the lecture. The talk was titled 'Faster than the Speed of Light', and he discussed special relativity, faster than light travel and its implications on time travel. With the talk open to the public there were a few school-aged kids who attended and asked great questions. They are physicists in the making.

Throughout the conference, parallel sessions highlighted the work of the graduate students attending. Although I was unable to listen to all the talks, the sessions I attended had great speakers and a variety of projects. As a participant at CAM2013, I was able to make connections and friendships with other graduate students in both Canada and Mexico that will stay with me throughout my career in physics. The conference was a great experience and I was glad to be a part of it.

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CAM2013. Panel discussion 'Doing Physics in Times of Austerity'. The panelists include (from left to right) Marc Garneau (Canada), Fernando Mendoza Santoyo (Mexico), John Dutcher (Canada) and Kate Kirby (United States). Photo credit: Robert Henderson.



CAM2013. Canadian-American-Mexican Graduate Student Conference, full conference picture. Photo credit: Robert Henderson.

Laura Boon is the Chair of the APS FGSA, the Forum on Graduate Student Affairs. She is a Ph.D. student at Purdue University, working on accelerator physics at Argonne National Laboratory's Advanced Photon Source.

Funding Opportunities in International Science Collaboration Research and Education

Cathy Campbell

CRDF Global has many funding and reviewer opportunities related to our work in international science and technology engagement, as well as the new gateway to international research collaboration, Newton's List, created by CRDF Global in partnership with the National Science Foundation.

CRDF Global is an independent not-for-profit organization that supports international science and technology cooperation through grants, technical assistance and training. The organization was established in 1995 to support US cooperation with scientists and engineers in Russia, Ukraine, Kazakhstan and other countries of Eurasia. At that time, our immediate focus was to provide civilian research opportunities that would enable Eurasia's world-class scientists to continue research in their home country. Beginning in 2003, CRDF Global's work expanded to other regions. Today we are working in over 40 countries in Eurasia, the Middle East, Africa and Asia. CRDF Global's headquarters are in Arlington, Virginia and it has four overseas offices in Moscow, Kyiv, Almaty and Amman.

CRDF Global's mission is to promote peace and prosperity through international science cooperation. We understand that advances in science and technology are critical to solving pressing challenges in health, agriculture, energy and climate. But no single country can solve all their challenges alone. In this increasingly globalized world, scientists, engineers and innovators must be able to connect, collaborate and create with counterparts around the world. This is where CRDF Global plays a critical role by catalyzing international partnerships in science, technology and innovation. We do that through a range of programs that seek to modernize science and technology capabilities; enable international research partnerships; and foster innovation and technology-based entrepreneurship.

Our work covers all natural sciences disciplines. For example, our Collaborative Research Grants programs with Eurasian countries awards funding to teams of US-Eurasian scientists working in chemistry, mathematics,

ecology, physics, engineering, biology, and other domains. Approximately 23% of the 1,258 joint research projects funded under this program are in the physical sciences. Under another program, CRDF Global sponsored joint research competitions with four independent foundations that we established in Moldova, Armenia, Azerbaijan and Georgia. Sixty-seven of the 220 research projects supported through these initiatives were in physics.

One project involved a team led by Dr. Alexander A. Aculinin, a senior scientist with the Atmospheric Research Group (ARG) at the Institute of Applied Physics of the Academy of Science of Moldova. Dr. Aculinin partnered with a US team headed by Dr. Alexander Smirnov, a senior research scientist with the Goddard Earth Sciences and Technology Center at the University of Maryland, to establish Moldova's first-ever solar radiation monitoring station. The station has been in operation since 2003, is installed on the roof of the Institute of Applied Physics and is equipped with state-of-the-art radiometric instrumentation, an automatic weather station and an ozonometer. All radiometric and ozone data acquired at the monitoring station are freely accessible to research centers and universities worldwide.

CRDF Global's support of physics is not limited to Eurasia. Under our Iraq Science Fellowship Program (ISFP), CRDF Global, with funding from the US Department of State, supports three-six month fellowships for Iraqi scientists and engineers at US universities or businesses. Two of our current ISFP fellows have physics backgrounds. One has a background in physics of materials and serves as the chief physicist of an Iraq ministry. His fellowship has taken him to the University of California, San Diego, where he is working with different ceramic nano-composites to improve the strength and quality of dental implants. A second fellow, who directs a research center at an Iraqi university, specializes in surface science. He is currently on fellowship to the University of New Orleans doing re-

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search on synthesizing nano-wires to improve sensing technology for gaseous pollutants.

Opportunity for you

These examples provide just a sampling of the many projects CRDF Global has supported over its 18 year history. For more information about CRDF Global, please visit us at www.crdfglobal.org. If you are interested in applying for a grant or getting involved with CRDF Global as a reviewer, please visit the “Connect With Us” section of our website

(<http://www.crdfglobal.org/connect-with-us>).

For information on other funding opportunities for international collaboration in research or education, please visit Newton’s List (newtonlist.crdfglobal.org). This website is a tool for funders and grant seekers interested in collaborative international research and education. If you’re interested in international science and technology engagement, we hope to hear from you.

Cathy Campbell is President and CEO of CRDF Global.



Dr. Alexander A. Aculinin, a senior scientist with the Atmospheric Research Group (ARG) at the Institute of Applied Physics of the Academy of Science of Moldova

Photo Credit: Atmospheric Research Group <http://www.arg.phys.asm.md/>



Forum on International Physics

The Forum on International Physics is an association of APS members interested in encouraging cooperative activities between physicists of all countries. FIP supports the development of physics worldwide.

The FIP organizes invited and contributed paper sessions at APS meetings, nominates FIP members to be recognized as APS Fellows, and for the annual John Wheatley Award, communicates with its members via the FIP web site and a periodic Newsletter, and works to affect policies and procedures at the APS deemed favorable to the large number of APS members working abroad.

For more information visit the FIP web site at <http://units.aps.org/units/fip/>

APS members who wish to support the work of the Forum are invited to become members of the FIP. To join go to:

<http://www.aps.org/membership/units/join-unit.cfm>



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