Giving Online Job Searching a Personal Touch

BY LEAH POFFENBERGER

For students or early career members, career fairs at APS Meetings have provided a crucial opportunity to build connections with potential employers. At the 2021 March Meeting, which took place entirely online, the APS Careers team rolled out a virtual career fair to reproduce a traditional job fair as closely as possible. Following the success of that event, another online job fair—the 2021 APS Virtual Career Fair—will be held for the first time from September 13 to 15.

The career fair at the March Meeting was held across three days, drawing around 300 attendees over the course of the event to a virtual space on Gather.Town, which was set up to mimic the usual conference environment with customized booths for each employer. For the first time, the March Career Fair was open to all early career, undergraduate, or graduate student members of APS, and extract into a slow beam,” recalled Steele, who added that technical findings in Physical Review Letters and Physical Review A were instrumental in guiding him as he launched his business.

APS Publisher Matthew Salter said he was pleased that Steele found the Society’s journals useful. “The Physical Review journals publish some of the most impactful and important research in physics and physics-related research, serving a wide range of user communities ranging from theoretical and experimental physics through to topics of interest to applied physicists in academia and industry,” explained Salter.

“We are proud of the role that Physical Review journals play in supporting all researchers and entrepreneurs who are inspired to develop and commercialize new technologies that utilize laser-cooled focused ion beams for nanomaching, said Physical Review Letters played an integral role in helping him start his business.

“It helped answer the question of how many atoms could we capture from a background vapor and reproduce a slow beam,” recalled Steele, who added that technical findings in Physical Review Letters and Physical Review A were instrumental in guiding him as he launched his business.

APS Publisher Matthew Salter said he was pleased that Steele found the Society’s journals useful. “The Physical Review journals publish some of the most impactful and important research in physics and physics-related research, serving a wide range of user communities ranging from theoretical and experimental physics through to topics of interest to applied physicists in academia and industry,” explained Salter.

“We are proud of the role that Physical Review journals play in supporting all researchers and entrepreneurs who are inspired to develop and commercialize new technologies that utilize laser-cooled focused ion beams for nanomaching, said Physical Review Letters played an integral role in helping him start his business.

“It helped answer the question of how many atoms could we capture from a background vapor and reproduce a slow beam,” recalled Steele, who added that technical findings in Physical Review Letters and Physical Review A were instrumental in guiding him as he launched his business.

APS Publisher Matthew Salter said he was pleased that Steele found the Society’s journals useful. “The Physical Review journals publish some of the most impactful and important research in physics and physics-related research, serving a wide range of user communities ranging from theoretical and experimental physics through to topics of interest to applied physicists in academia and industry,” explained Salter.

“We are proud of the role that Physical Review journals play in supporting all researchers and entrepreneurs who are inspired to develop and commercialize new technologies that utilize laser-cooled focused ion beams for nanomaching, said Physical Review Letters played an integral role in helping him start his business.

“It helped answer the question of how many atoms could we capture from a background vapor and reproduce a slow beam,” recalled Steele, who added that technical findings in Physical Review Letters and Physical Review A were instrumental in guiding him as he launched his business.
to go back to the old way of doing things, but the important thing that Gather has allowed is a lowered barrier to participation. You don’t have to find money to come to an event or negotiate visas.

The 2021 APS Virtual Career Fair is looking to capitalize on the success of the March Meeting fair by launching a similar event, this time combined with a grad school fair. The three-day event will welcome students and early career scientists to network with employers in industry, national labs, and academia, as well as graduate programs.

“This event will be very similar to March, with tables, literature, promo videos, and private conversation times. The format will also be at best mechanisms for posting jobs or advertising specific jobs,” says Bailey. “We’re also combining the career fair with a grad school fair. A downside of grad fairs at March Meeting is that a lot of students have already decided where they’re going, but September is an ideal time to recruit.”

According to Bailey, following a slight dip in hiring last year due to the pandemic, hiring activity in physics-related jobs has bounced back. “Things are looking great,” she says. Still, for job seekers worried about job hunting in a virtual setting, Bailey suggested that “you should be intentional, and use the resources on the APS Careers website, which has a lot of great information to prepare job seekers.”

To learn more about the Virtual Career Fair or to register as an attendee, visit go.aps.org/CareerFair.

Meet with representatives from graduate schools, and companies currently hiring!

Attendees, graduate schools, and employers all must register by August 27.

evel physics professor Rosalyn Susman Yalow became the first American-born woman to receive the Nobel Prize in Physiology or Medicine in 1979. It was one half of a 22-year scientific partnership with physician Solomon Berson that resulted in the development of the radioimmunoassay (RIA) technique. The creation of RIA, which allows for the detection of small quantities of substances such as insulin or enzymes in blood, was influential in opening doors for the field of endocrinology.

Yalow was born on July 19, 1921, in the Bronx, New York, to Clara (née Zipper) and Simon Sussman, and was the youngest of their two children. Neither Clara, who immigrated to New York at the age of four, or Simon, who was born on the Lower East Side, had high school educations, but they expected both of their children to go to college. Yalow, in her Nobel biography, described herself as a “stubborn, determined child,” with a fondness for reading and a dedication to mathematics, which developed steadily by grade. By the age of eight, she had aspirations of being a scientist. She attended high school at Walton High School, at the time an all-girls institution, where she became interested in chemistry.

After high school, Yalow attended Hunter College, an all-female, tuition-free school, where her family hoped she would study to become a teacher. Instead, Yalow was drawn to physics, in part by the excitement surrounding the field of nuclear physics in the late 1930s. Irene Curie’s biography of her mother, Marie Curie, was a source of inspiration for Yalow. Her professors at Hunter College encouraged her to pursue a career in physics, despite Yalow’s worry that good graduate schools would not offer a woman in physics a position or financial support. In September 1940, during her senior year, one of her professors secured her role as a secretary for a leading biochemist at Columbia University, which was supposed to allow her the ability to take graduate courses. The only catch was that she had to commit to taking stenography. However, in February 1941, Yalow received an offer of a teaching assistantship in physics at the University of Illinois Urbana-Champaign, the most prestigious physics school she had applied to. In September 1941, Yalow entered the University of Illinois, becoming the only woman among the 400-member faculty of the College of Engineering, and the first woman there since 1917, according to the Dean of Faculty at the time. In her Nobel biography, Yalow describes that of draft of college-aged men into the armed forces leading up to World War II likely opened up space for her to attend graduate school. Her first year was difficult: since Hunter College had not offered many physics courses, Yalow sat in on two undergraduate courses without credit in addition to taking three graduate courses and working as an assistant teaching freshman physics. Yalow would receive straight A’s in all of her courses, except in an optics laboratory course, where she received an A-, prompting the chair of the physics department to remark, “That A- confirms that women do not do well at laboratory work.”

At the University of Illinois, Yalow would also meet her future husband, Anton Yalow, who was also a graduate student in physics, the first day of school. They would marry in 1943, with some delay caused by anti-semitic rules that prevented married couples from being employed by the same university. In January 1945, Yalow received her PhD in nuclear physics and moved back to New York City without her husband (he would join her later that year) to work as an engineer at the Federal Telecommunications Laboratory. In 1946, she returned to Hunter College to teach physics, whose student body now included returning veterans. While teaching at Hunter College, Yalow influenced a young Mildred Dresselhaus to pursue a career in physics instead of becoming a primary school teacher. Although she would continue teaching at Hunter College until 1950, Yalow began consulting at the Bronx Veterans Association Hospital in 1947 as part of a research program to explore the medical uses of radioactive substances. It was there she would meet Solomon Berson who would become her chief collaborator for the
The US-Bangladesh Conference on Physics featured Nobel Laureate Eric Cornell as the public keynote lecturer. Cornell was awarded the 2001 Nobel Prize in Physics, along with Carl Wieman and Wolfgang Ketterle, for experimental verification of the existence of Bose-Einstein condensates. The conference also featured presentations by seven speakers from Princeton University, University of Florida, The Ohio State University (OSU), the Joint Institute for Laboratory Astrophysics (JILA), and NIST, and by seven of the APS News staff.

The First US-Bangladesh Physics Conference

BY SULTANA N. NAHAR

T he Frontiers of Physics (FOP), a US-based collaborative program, held the first US-Bangladesh Conference on Physics in partnership with University of Dhaka and the Bangladesh Physical Society (BPS) in Dhaka, Bangladesh on February 5 and 6, 2021. FOP was founded in 2010 for the purpose of advancing science and education in Bangladesh by Charles Clark (University of Maryland, College Park, and Technology), and the author (The Ohio State University). Clark’s interest in promoting science in Bangladesh was inspired by his collaborator, well-known Bangladeshi American neutron spectroscopist Mohammad Zafarul Islam Lendor, who passed away recently. Clark provided the start-up funds for FOP and I am the FOP liaison for APS activities including BPS. BPS covered the expenses for the conference.

The annual conference year of 2021 was chosen to coincide with the centennial anniversary of the University of Dhaka and of Satyendra Nath Bose, a founding father of Physics Department. It was there that Bose, while giving lectures on radiation ideas, introduced the concept of particles with integer spin, now called bosons. This concept led to the development of Bose–Einstein statistics and the prediction of Bose–Einstein condensates.

The US-Bangladesh Conference on Physics featured Nobel Laureate Eric Cornell as the public keynote lecturer. Cornell was awarded the 2001 Nobel Prize in Physics, along with Carl Wieman and Wolfgang Ketterle, for experimental verification of the existence of Bose–Einstein condensates. The conference also featured presentations by seven speakers from Princeton University, University of Florida, The Ohio State University (OSU), the Joint Institute for Laboratory Astrophysics (JILA), and NIST, and by seven of the APS News staff.

Another change from last year was the return of Congressional Visits Day (CVD), which allows chairs to Capitol Hill for meetings with their congressional representatives. This time chairs had the opportunity to meet with representatives or staffers online to discuss issues facing the physics community.

As far as (CVD) being online, you don’t have that experience of walking around in Washington and being in the room where it happens,” said Monika Kress, a member of the steering committee and professor and chair at San Jose State University. “It was still a great experience to do online. I felt like we made good impressions and got as much accomplished over Zoom. Ultimately it is a time you can’t replace with real people in a room or real people at the conference. It is unique.

The main portion of the conference kicked off the morning of June 3 with a New Chairs Workshop, designed for newly appointed chairs interested in learning how to effectively lead a department. Attendees were able to learn about best practices gathered from previous Chairs Conferences.

Following the New Chairs Workshop, the theme of the first day of the conference was on thinking about equity, diversity, and inclusion (EDI) as a department chair. The opening plenary session on “How to be Intentional About Equity, Diversity and Inclusion as a Department Chair” was led by Martha-Elizabeth “Marty” Baylor, Carleton College; Taviane Hawkins, University of Wisconsin-La Crosse; and Jonathan Pelz, Ohio State University. They shared their personal experiences of promoting equity, diversity, and inclusion in their respective departments before asking attendees to break into groups and reflect on three different scenarios through an EDI lens.
use their scientific talent to address global challenges." Saltner continued, “Although all of the Physical Review journals are world-leading in their fields, our core focused journals, Physical Review Applied, launched in 2014, as well as Physical Review Fluids and Physical Review Materials, launched in 2016 and 2017, respectively, are likely to be of particular interest to industrial researchers and entrepreneurs.”

APPS meetings and conferences offer additional avenues for entrepreneurs to gain insight into launching new businesses, with the meetings representing opportunities to test new ideas as novel scientific results are shared and discussed among attendees. Steele first presented his invention of a focused ion-beam system at the APS Division of Atomic, Molecular, and Optical Physics (DAMOP) meeting a few years ago. “I found the DAMOP meeting useful in the same way that I found the journals; it was a chance to learn about the latest scientific results in laser cooling,” he said, adding that he thinks the meeting is also a great way to recruit future employees.

Similarly, entrepreneur Gil Travish, who developed field-enhanced detectors for X-ray detection, said that keeping up with information for his company Vibe Health while attending the APS March Meeting in 2019 helped fuel his findings with colleagues and with vendors with experience on X-beam guns. The Society has also utilized career and professional development programs to encourage and support entrepreneurship among its members. Launched in 2016, the purpose of the NSF-funded PIPELINE program is to develop and disseminate new curricular and co-curricular approaches to physics instruction and entreprenuership (PEI) education. Examples include relating physics content to its real-world applications, building students’ communication skills, and familiarizing students with basic business concepts.

“Motivation for this project stems from the fact that 90 percent of physics graduates, including half of all PhD recipients, find employment outside of traditional physics positions—yet there are very few experiences incorporated into the standard undergraduate physics degree that explicitly help to prepare students for these career eventualities,” said Crystal Bailey, Head of Career Programs at APS. “There is also strong evidence that physics programs that provide engaged learning environments focused on future career development have higher retention rates and improved student experiences, and that future employability is an especially important factor for students from underrepresented groups when choosing a major.”

A newly released report, Educating Physicists for Impactful Careers, provides an overview of the PIPELINE project, including curricular approaches that were designed and tested among the institutions participating in the three-year project.

“We hope that this report helps (faculty members) build the case for what they are trying to do. We also hope that we can build a community of practice so that educators can share the approaches they are developing more broadly,” added Bailey.

APPS Government Affairs (GA) also does its part to support APPS members on the entrepreneurial path by advocating for robust budgets for federal science agencies that support projects “across the R&D continuum, from foundational and use-inspired research to tech transfer and commercialization,” said Mark Elsesser, GA Director.

The author is Senior Press Secretary of the APS Office of External Affairs.

**GOVERNMENT AFFAIRS**

**APPS Members Help Move Needle in Reversing Rollback of Methane Emissions Regulations**

BY TAWANDA J. W. JOHNSON

The United States House of Representatives recently approved a reversal of the Trump Administration’s rollback of methane emissions regulations, following robust advocacy by APPS members to support the change. The resolution, which was passed by the Senate in April, will now head to President Biden for his signature.

“We are extremely happy about this development, which will help reduce methane emissions from the oil and gas industry in a significant way. APPS members have consistently railed climate change as one of the issues most important to them, and they deserve credit for dedicating their time to reaching out to their members of Congress to urge action on this matter,” said Mark Elsesser, Director of APPS Government Affairs.

In response to recent scientific results indicating that the negative environmental impacts of methane emissions are significantly higher than previously estimated, the Society submitted a public comment in fall 2019 to the US Environmental Protection Agency (EPA), opposing the agency’s proposed policy amendments to curtail regulation of greenhouse gas emissions. The amendments would have eliminated requirements on oil and gas companies to install technologies to monitor methane leaks in pipelines, wells, and storage facilities. APPS had urged the EPA to instead carry out a rigorous assessment of methane emissions—a major contributor to climate change.

“With the risks of methane emissions now determined to be higher than previously estimated, this is not the time to be relaxing regulations,” APPS stated in the comment.

Unfortunately, regulations concerning methane leaks were put into place when new EPA rules were finalized during the last few months of the previous administration. But with support from APPS Government Affairs, Society members pushed back by asking their congressional members to support a reversal of the rollback.

Both the House and Senate had recently introduced a joint resolution of disapproval via the Congressional Review Act, which provides an opportunity to quickly address the issue rather than going through the lengthy rulemaking process.

**METHANE CONTINUED ON PAGE 7**

---

**FYI: SCIENCE POLICY NEWS FROM AIP**

**FYI CONTINUED ON PAGE 6**

---

**Host a Conference for Undergraduate Women in Physics in 2023**

APPS is now accepting expressions of interest and applications for host site institutions for the 2023 conferences.

**Expression of Interest Due**

September 1

**Application Deadline**

November 1

**APS physics 2023 CUWiP**

Learn more go.apso.org/cuwip-host

Host a Conference for Undergraduate Women in Physics in 2023

Congress Seeks Compromise on Landmark Competitiveness Legislation

BY MITCH AMBROSE

This century’s biggest US science policy debate to date has reached a pivotal phase, with the House and Senate preparing to iron out differences between their distinct visions for expanding federal science agencies.

In June, the Senate passed the sprawling US Innovation and Competition Act (USICA), a 2,376-page legislative package that is primarily aimed at countering the Chinese government’s growing technological and geopolitical clout. The package includes the Endless Frontier Act, which would add a new directorate to the National Science Foundation dedicated to advancing a periodically refreshed set of 10 technology focus areas.

Through an at-times chaotic amendment process, the Senate assigned the Department of Energy and Defense Advanced Research Projects Agency a major role in supporting the same set of technology areas. It also added $52 billion for domestic semiconductor manufacturing incentives and R&D to implement the recently enacted CHIPS for America Act.

Rather than take up the USICA, the House passed the first pieces of its own legislative vision in June, starting with the NSF for the Future Act and the DOE Science for the Future Act. These and other bills will form the basis of negotiations with the Senate over a compromise package that will likely take months to complete.

The House Science Committee began developing the NSF bill soon after Senate Majority Leader Chuck Schumer (D-NY) first introduced the Endless Frontier Act last year with Sen. Todd Young (R-IN), unconvinced of the senators’ technology-centric vision for expanding the agency.

Work on the DOE bill predates the Endless Frontier Act and reflects the committee’s longstanding interest in providing comprehensive policy direction to the DOE Office of Science.

The NSF for the Future Act would add a directorate to NSF focused on addressing a range of “societal challenges,” including ones not amenable to technological solutions or motivated by geopolitics. The bill also proposes Congress increase the annual budget of the new directorate to $1.4 billion over five years, whereas the Senate bill sets a target of nearly $50 billion.

A Democratic staff member for the committee told FYI the gap between the bills reflects “key philosophical differences.”

The staff member explained, “I still see the Senate approach as, ‘We have this gap in technology development. We don’t know how and where to fill it. We’re just going..."
Each year, the Physics Teacher Education Coalition (PhysTEC) recognizes outstanding physics educators with the PhysTEC Teacher of the Year award. The winner of the 2021 PhysTEC Teacher of the Year award is David Wirth, who teaches at Millennium High School in Goodyear, AZ.

PhysTEC is a joint initiative between APS and the American Association of Physics Teachers (AAPT) to address a critical shortage of qualified physics teachers in the United States through improved teacher education programs. Alumni of PhysTEC member institutions are selected for the Teacher of the Year award to highlight exemplary educators who demonstrate the value of teacher preparedness. Each year, PhysTEC names one national Teacher of the Year as well as local Teachers of the Year—this year, ten local winners were selected.

Wirth, an alum of PhysTEC, member institution Arizona State University, has spent a 29-year teaching career bringing students unique opportunities to take their enthusiasm for physics beyond the classroom. Through co-founding an annual math and science expo for nearly 500 students in its 10th year, and participation in the “I am a Scientist” campaign, Wirth has inspired students to pursue careers in science.

In the classroom, Wirth uses the Modeling Instruction method, as well as the latest pedagogical best practices, to create an exceptional learning environment for his students. He has also raised over $50,000 in grants to purchase equipment to give students opportunities to explore physics in hands-on ways and build confidence in their physics skills. Wirth also mentors fellow teachers, sharing techniques he has tested in his own classroom.

Beyond the classroom, Wirth continues to provide students with opportunities to learn and grow their enthusiasm for science.

**Programs**

**APSS to Launch New Open-Access Energy Sciences JOURNALS**

David Wirth Named 2021 PhysTEC Teacher of the Year

**Meetings**

Celebrating Sakharov

**Journals**

APS to Launch New Open-Access Energy Sciences Journal: PRX Energy

As part of its strategy to provide expanded open-access offerings in the Physical Review journal portfolio, APS is launching PRX Energy, a new selective journal featuring papers on energy sources, storage, and utilization research. Submissions will be accepted starting in late summer 2021 with the first papers published in the fall.

“The physics community has long been central to fundamental energy science and many resulting applications,” said APS Editor in Chief Michael Thoennessen. “But communication and collaboration across traditional boundaries is now critical, as researchers and stakeholders from a diverse array of disciplines and regions focus their efforts on achieving a sustainable future energy.”

PRX Energy will continue the path set by Physical Review X (PRX), the society’s selective multidisciplinary access journal, which celebrates its 10th anniversary this year, and PRX Quantum, which launched one year ago with a focus on quantum information science. Publication charges will be waived for submissions until 2023.

“PRX Energy is the latest in a series of selective topical journals that draw on the strength of the Physical Review brand,” said APS Publisher Matthew Salter. “This new journal will enable APS to better serve scientists working at the interface of physics, engineering, and materials science.”

In addition to broadening the open-access options for authors in energy science, the journal launch will enhance the ways that APS serves applied and industrial physicists.

“By seamlessly connecting the communities that conduct fundamental and applied research, such as physics, chemistry, materials, engineering, technology, biology, environmental studies, and policy, we can move more quickly toward discovering the necessary energy solutions for the future, a primary motivator of the next generation of physicists and the catalyst for industry,” said APS Chief External Affairs Officer Francis Slaley.

APSS CEO Jonathan Bagger emphasized the breadth of the Society’s commitment to all areas of physical science research, saying that “any physicist who is inspired to use their scientific talent to address global challenges should feel at home at APS.”

For more information on the Physical Review journals published by APS, visit journals.aps.org.

**PhysTEC CONTINUED ON PAGE 6**
Call for Nominations
APS Committee Members

Call for Nominations

APS Committee Members

Help steer the progress and development of APS by nominating a fellow member (or yourself) with relevant experience for a seat on an APS Committee in 2022.

Submit your nomination by
Friday, August 13, 2021.

Learn more:
go.aps.org/apscommittees

He started a Science Olympiad club on campus and encourages students to compete at the state level. He also supports student participation in AAPT contests such as Physics Bowl and the High School Physics Photo Contest.

In addition to his work at Millennium High School, With also teaches at the local Nature Center and the Mountain Community College. He has also been developing a middle school STEAM program with Jeff Andretti to encourage diversity in science. Andretti persuaded him to write his memoirs, which he uses as a source of inspiration for his students and his own life.

The PhysTEC Teacher of the Year National Winner receives special recognition at the PhysTEC conference, funding to attend two professional physics conferences focused on education and teacher preparation, and a grant for classroom materials of $3,000.

Local PhysTEC Teachers of the Year will receive a certificate of recognition as well as a spotlight on the PhysTEC website and in local press.

These winners are:

Kayla Lewis: Wachusett Regional High School, Massachusetts
Laura Ernst: Perryville High School, Kentucky
Bruce Ratcliffe: Edison High School, New Jersey
Wesley Morgan: Springville High School, Brigham Young University
Mimi Pfo: Peachtree Ridge High School, Georgia
Bruce Ratcliffe: Edison High School, California State University, Fresno
Craig Ulbrich: Depew High School, State University of New York (SUNY) Buffalo State College
Paul Wolf: Haas Hall Academy, University of Arkansas
Thomas Zook: Marina High School, California State University, Long Beach

Wesley Morgan: Springville High School, Brigham Young University
Mimi Pfo: Peachtree Ridge High School, Georgia State University
Bruce Ratcliffe: Edison High School, California State University, Fresno
Craig Ulbrich: Depew High School, State University of New York (SUNY) Buffalo State College
Paul Wolf: Haas Hall Academy, University of Arkansas
Thomas Zook: Marina High School, California State University, Long Beach

There is a problem with hype in China about quantum computing. I think the hype is everywhere, as startups are launching throughout the world.

What's your assessment of the startups in China?

In China, I am not sure whether startups have a clear strategy to building successful and truly useful quantum computers.

What is the next egg that quantum computing should lay?

We have been talking about an application using a noisy intermediate scale quantum device [See APS News, May 2022]. The project is the first of its kind and the nearest term applications of quantum computers is to study quantum mechanics itself—many-body problems, quantum chemistry, and quantum materials.

What are you working on now?

A company in Canada called Xanadu has proposed a number of applications related to boson sampling. These applications are linked to graph-based problems, quantum chemistry, and machine learning. The conundrum is that these applications can actually work. Last year, I also started a new company—based on atomic arrays in optical tweezers.

You did your PhD at the University of Cambridge. What is your perspective on the different working styles in China versus the UK?

There is not much difference. A vast majority of our faculty has spent time overseas, and when we return to China, we bring working styles from Cambridge, Heidelberg, Stanford, and so on. One difference is that in the UK, our culture is more Confucius-like. We call it Zhong yong—seeking balance. Students are more modest and self-preserving, and they challenge their professors less.

You've been working in this field for around 20 years. How much has it met your expectations?

Looking back 10 years, I'm surprised at the number of breakthroughs that have achieved. There is a saying in Chinese: People are usually overly optimistic what they can do in the next year, but overly pessimistic about what they can do in the next 10 years. I'm very optimistic about the next 10 years.

This interview has been edited and condensed for clarity.

The author is a freelance science writer based in Columbus, Ohio.
Do our instructional activities and techniques help build class- room environments that promote diversity and inclusion, as well as equity and appreciation of science? How can we support faculty who would like to implement new strategies or social approaches in their classrooms? High school teachers are critical for shaping the future of the physics community, so what do we need to do to prepare and support them better?

While PER represents a relatively young sub-field of physics, it is one of the most well-established and growing fields in the education research community, more mature than corresponding education research in the context of other sciences. GPER is a fast-growing field into the broader physics community. Since then, the field has continued to thrive and expand, both in terms of interest and impact. It is not uncommon anymore to see a physics education researcher on a faculty roster in a department of physics,” according to Kryjevskaia. “Often, PER faculty contribute substantially to the academic preparation of students by bringing in knowledge in education to the department, as well as contributing to generalized knowledge about teaching and learning physics.”

Methane CONTINUED FROM PAGE 4

Khandker Muttalib (Florida) spoke on the successful presentation of unpaired Dirac fermion can give rise to topological phases of matter with experimental topological concepts of quantum gravity and studying matter-wave phases of matter with experimental gravitational waves created during the merging of two neutron stars. M. Idris Miah (Chittagong), who does research on collective behavior of liquid metallic binary alloys. M. Ziauddin (Chittagong), who does research on superconductors, liquid metallic binary alloys. M. Ziauddin (Chittagong), who does research on superconductors, liquid metallic binary alloys, and the creation of jobs through the capture and utilization of methane issue via a joint study with the Office of External Affairs. The organizing committee selected the conference venue that would best accommodate its goals for the study of the stomach, lungs, and other regions of the body and the characterization of breast tumors to determine malignancy. Syed M. Hossain (BAEC) described the nuclear infrastructure in Bangladesh. Golam Mohammad Bhuyan (Dhaka) reported his theoretical study of the behavior of liquid metallic binary alloys. M. Idris Miah (Chittagong), who does their research in Australia whenever the opportunity arises, spoke on multiphoton spin generation and detection in semiconductor.

The session devoted to helping students and researchers find information on US universities, exchange programs, and funding sources was introduced for the first time at a Bangladesh Physics conference. This session included EducationUSA Director Iqbal Sohel (US State Department). At the concluding ceremony, General Clark, Nahar, and Hasan were honored as new Fellows of the BPS by its President Mehshudin Ahmed. The impact of the conference was very inspiring. Audience questions indicated high interest in opportunities for research in the US and exchange research programs. However, students and researchers who would like to find their qualifications, particularly in research, do not match the standards of the universities they would like to attend or visit. It would be highly beneficial to initiate an International School of Young Physicists (ISYP), similar to the International School for Young Physicists run by International Astronomical Union (see APS News, October 2010), for students and young researchers in developing countries.

Sultana Nahar is a research professor of astronomy at The Ohio State University, co-author of the textbook Atomic Astrophysics and Spectroscopy, creator of the NOARAD—Atomic Data, cosponsor of the International School for Young Physicists, and adjunct professor of physics at Aligarh Muslim University and the University of Dhaka. She has served on the Board of Directors for over a dozen educational and research programs in Bangladesh.

A. A. Mamun (Jahangirnagar) discussed identification of new nuclear-acoustic waves in cold degenerate quantum plasma. Khondkar Asif (Dhaka), founder of the Department of Medical Physics at the University of Dhaka, spoke about imaging techniques that he has developed for the study of the stomach, lungs, and any small region inside the body and the characterization of breast tumors to determine malignancy. Syed M. Hossain (BAEC) described the nuclear infrastructure in Bangladesh. Golam Mohammad Bhuyan (Dhaka) reported his theoretical study of the behavior of liquid metallic binary alloys. M. Idris Miah (Chittagong), who does their research in Australia whenever the opportunity arises, spoke on multiphoton spin generation and detection in semiconductor.

The session devoted to helping students and researchers find information on US universities, exchange programs, and funding sources was introduced for the first time at a Bangladesh Physics conference. This session included EducationUSA Director Iqbal Sohel (US State Department). At the concluding ceremony, General Clark, Nahar, and Hasan were honored as new Fellows of the BPS by its President Mehshudin Ahmed. The impact of the conference was very inspiring. Audience questions indicated high interest in opportunities for research in the US and exchange research programs. However, students and researchers who would like to find their qualifications, particularly in research, do not match the standards of the universities they would like to attend or visit. It would be highly beneficial to initiate an International School of Young Physicists (ISYP), similar to the International School for Young Physicists run by International Astronomical Union (see APS News, October 2010), for students and young researchers in developing countries.

Sultana Nahar is a research professor of astronomy at The Ohio State University, co-author of the textbook Atomic Astrophysics and Spectroscopy, creator of the NOARAD—Atomic Data, co-sponsor of the International School for Young Physicists, and adjunct professor of physics at Aligarh Muslim University and the University of Dhaka. She has served on the Board of Directors for over a dozen educational and research programs in Bangladesh.

A. A. Mamun (Jahangirnagar) discussed identification of new nuclear-acoustic waves in cold degenerate quantum plasma. Khondkar Asif (Dhaka), founder of the Department of Medical Physics at the University of Dhaka, spoke about imaging techniques that he has developed for the study of the stomach, lungs, and any small region inside the body and the characterization of breast tumors to determine malignancy. Syed M. Hossain (BAEC) described the nuclear infrastructure in Bangladesh. Golam Mohammad Bhuyan (Dhaka) reported his theoretical study of the behavior of liquid metallic binary alloys. M. Idris Miah (Chittagong), who does their research in Australia whenever the opportunity arises, spoke on multiphoton spin generation and detection in semiconductor.

The session devoted to helping students and researchers find information on US universities, exchange programs, and funding sources was introduced for the first time at a Bangladesh Physics conference. This session included EducationUSA Director Iqbal Sohel (US State Department). At the concluding ceremony, General Clark, Nahar, and Hasan were honored as new Fellows of the BPS by its President Mehshudin Ahmed. The impact of the conference was very inspiring. Audience questions indicated high interest in opportunities for research in the US and exchange research programs. However, students and researchers who would like to find their qualifications, particularly in research, do not match the standards of the universities they would like to attend or visit. It would be highly beneficial to initiate an International School of Young Physicists (ISYP), similar to the International School for Young Physicists run by International Astronomical Union (see APS News, October 2010), for students and young researchers in developing countries.
Two Points of Light

BY S. JAMES GATES, JR., ROXANE HUGHES, LAURA H. GREENE, AND PAUL COTTLE

The underrepresentation of Blacks and women in physics, from the undergraduate level all the way through to the senior ranks, is among the most stubborn and frustrating issues facing the physics community. According to the AIP Statistical Research Center [1, 2], Black students received 3% of the 2018 physics bachelor’s degrees in the US, falling from 5% in the 1990s. The number of Black students earning PhDs in the 2018–19 academic year was only half of what it was in 2011–2012. Today, fewer than 1% of new physics PhDs are Black.

The mindset surrounding physics degrees has stagnated. The percentage of women earning bachelor’s degrees has been below 21% since 2000. There was a slow increase until 2012, but since it has remained at 20%.

There are no easy, sweeping solutions to this stunning lack of representation. If we are to make progress, work needs to be done at multiple educational and career levels including middle and high schools where students are determining what careers fit with their interests and identities. Educators and science engagement outcomes outside of school have great potential for sparking youth’s interest in STEMM (science, technology, engineering, math, and medicine), and maintaining that interest as they begin to make decisions on careers. Through these supportive and engaging physics experiences, the goal is for all students to feel like welcome members of the physics community—where they can learn to identify themselves as aspiring physicists.

Orlando’s Jones High School

The British computer scientist Alan Turing once said, “Sometimes it is the people no one imagines anything of who do the things that no one can imagine.”

Jones High School in Orlando, Florida, is one of the most socioeconomically challenged schools in its county. Of its 1,600 students, more than 250 took on learning physics during the 2020-21 school year. As one of us found (Cottle), the percentage is higher than any other high school in that county, and one of the highest in the state.

Why is this important? With the tremendous pandemic uncertainties in the state and national economies, it is more important than ever that students be given the opportunity to pursue careers in economically resilient fields like engineering, computer science, the physical sciences and the like. With the uncertainties in the state and national economies, it is more important than ever that students be given the opportunity to pursue careers in economically resilient fields like engineering, computer science, the physical sciences and the like.

Those raised in the traditional hierarchical nature and culture of STEMM might portray these fields as spaces where only a small percentage of the privileged few can succeed, putting students from low-income families at a disadvantage from seeing themselves as succeeding in high-powered STEMM careers. As a result, students and even high school counselors do not see higher-level degrees like physics as well-prepared to major in STEMM fields, students need to take challenging high school-level math and science courses, including physics.

The plan for the next academic year is for every senior student to take physics! The majority of the activities are led, and designed, by women scientists, graduate students, and postdocs, with help from the SciGirls’ lead educators led by one of us (Hughes).

The goals of the camps are: (1) to provide a safe space for girls to do science (authentic, relevant, hands-on, and interactive activities where they gather evidence to solve problems); and (2) to introduce participants to a diverse array of careers and role models in STEMM. Throughout the camp, the majority of the activities are led, and designed, by women scientists, graduate students, and postdocs, with help from the SciGirls’ lead educators led by one of us (Hughes).

Highlights over the years include designing a Ruba Goldberg machine, extracting DNA, and visits to labs on local college campuses. Each year the camp begins with an informal luncheon with women STEMM professionals, and concludes with a panel discussion which includes STEM professionals.

Her skills in STEMM education research allowed Hughes to measure the impact of this program on students’ STEMM identity. She also understood many of the girls’ stories about their camp experiences, specifically the empowering impact of sharing space with women interested in and succeeding in STEMM. One young woman explained: “I have a very clear memory of sitting at one of the lunch panels that we had where women scientists [came] to talk to us...I don’t remember what they said but I do remember that I was there and I was sitting in there and being like, ‘Oh, this is really cool’.”

Other young women have expressed the value of the authentic and relevant activities that they engaged in during the camps. One student, a junior who was still deciding the direction of the camp, indicating that without SciGirls, “I don’t think I ever would have taken an advanced science class. SciGirls made me realize that I’m capable of doing something that’s interesting, and easy to comprehend”.

The SciGirls program has expanded to over 400 students, with 30% from underrepresented groups in STEMM (Black, Hispanic, Pacific Islander, Indigenous Peoples) and three separate summer camps, including the SciGirls Coding Camp. The SciGirls program has expanded to over 400 students, with 30% from underrepresented groups in STEMM (Black, Hispanic, Pacific Islander, Indigenous Peoples) and three separate summer camps, including the SciGirls Coding Camp.

And yet, even with these empowering stories, some of our alumnae have told us about negative experiences in high school that made them question whether they could succeed, or if they even belonged in STEMM. Their stories reinforce the need for programs that help to maintain interest and a sense of belonging throughout middle and high school to persist in STEMM careers. It also points to the need for enhanced teacher training such as that provided by the PhysTec and the APS STEP U programs. One of us (Greene) is also inspired by the SciGirls program, and notes that in her high school years, no such programs existed, and she had no mentors for her to pursue a career in science.

Both women and people of color struggle to feel they belong even if they persist through high school into college. The intersectionality of marginalized identities makes their reasons for not persisting different [3] as Greene and Gates’ stories show. For women, even if they persist to a physics major in college, they have to overcome sex harassment [4, 5] and the isolation of sometimes being the only women. For women and men with multiple marginalized identities (e.g., race, income, class, ethnicity, sexual orientation), their isolation in multiple realms makes it difficult for them to feel like they belong in a majority White, middle class, and male field, like physics. This means that to help students and early career scientists thrive and make physics inclusive we need to incorporate multiple strategies [6, 7].

References

7. APS Statement on Promoting an Inclusive Workplace, APS Committee on Minorities in Physics, APS Committee on the Status of Women in Physics.