PHYSICS OUTREACH & ENGAGEMENT

Letter from the Chair

I did not think I’d still be writing to FOEP members from my “home office” (which is an old Ikea table shoved in a corner of my bedroom). I suspect most members of the Forum on Outreach and Engaging the Public are like me and enjoy, well, engaging with the public, and are feeling more than a bit bummed that most engagement is still virtual. That being said, the virtual environment has opened access to engagement opportunities that would never have been possible in person. Virtual classroom visits and public talks are on the rise. I, myself, gave a presentation to a girls’ STEM program (STEM4elle) in India. International engagement and reaching community and school groups who are either geographically removed from research facilities or lack the funds for a field trip are much more commonplace. But also, in the spirit of true public engagement - that is, two-way communication - scientists are talking to folks they wouldn’t otherwise. Social media use increased during the pandemic as people strived to find connection and information on what was happening all around them. Engagement on these platforms between scientists and the public increased and scientists engaged with experts outside their field more. As people grappled with a firehose of information about COVID-19 and their governments’ responses to the new public health crisis, experts did their best to put out accurate, reliable information, but the mistrust of experts and government sponsored research runs deep. The situation was ripe for conspiracy theories and alternative prevention and treatment methods for COVID-19. That non-scientists were engaging with science in unprecedented ways, reading journal articles, asking public-figure scientists questions, etc. is heartening, so I hate that I’m tempted to say, “Engage with the research... No, not like that.”

Continued on page 2

JOIN US

To join FOEP at no cost prior to renewing your APS membership, send an email to membership@aps.org with your request to add FOEP to your membership. Please note that if you currently belong to two or more forums, FOEP will be added at no charge for the remainder of your membership term. On your next membership renewal notice, you will see a Forum subtotal that will include $10 for every Forum membership over two.
We are reaping what we’ve sown. Times of societal upheaval and uncertainty almost always lead to conspiracy theories and that is certainly bigger than us, as scientists. However, decades (centuries?) of low public engagement in scientific research has bred mistrust. We have a big job to do, and we had better do it right. Fortunately, there is robust research into how to effectively engage the public and how to create mutual benefit for all involved. I’m excited that Dr. Claudia Fracchiolla has joined APS as the Head of Public Engagement. Dr. Fracchiolla’s research into effective public engagement and how to evaluate it is inspiring and immensely useful to our community. Over the summer, her office produced several virtual workshops addressing typical concerns and introducing new ideas to positively impact the scientific community and society. Some of these workshops will be offered again at the March and April APS meetings, sponsored by FOEP.

Speaking of March and April! Lab Escape will once again be offered! We couldn’t do this in the virtual setting, but, fingers crossed, some folks will be able to attend in person and the general public will be able to enjoy Lab Escape, too. Lab Escape is a physics-based escape room developed by Prof. Paul Kwiat, quantum physicist at the University of Illinois, and it was a huge hit in 2019. We’re currently working on lining up speakers for the 2022 meetings, but we hope to have the Nicholson Medal winner give a talk. The Nicholson Medalist has not yet been announced as I write this, but perhaps the winner will be announced by the time this letter is published. And on the topic of awards… Please consider nominating someone you know (or yourself!) for the Nicholson Medal or the APS Fellowship through FOEP. We know the nomination process can be a bit daunting, so we hope to offer guidance to those who are unfamiliar with the process. We see this “hidden curriculum” of letters of recommendation, etc. as a barrier to a diverse pool of candidates. Please know that the criteria allows for any APS member to be considered - they do not have to be a research scientist! In fact, if someone is doing great work in public engagement or humanitarian work related to physics and they’re NOT an APS member, encourage them to join! (And join FOEP while they’re at it!)

All of the FOEP Executive Committee members are eager to help shepherd in unconventional nominations - for the Nicholson Medal, for the APS Fellowships, and also for new members of the FOEP Executive Committee! The members are: Shannon Swilley Greco (Chair), Shireen Adenwalla (Chair Elect), Roxanne Hughes (Vice Chair), James Kakalios (Past Chair), Dan Dahlberg (Secretary/Treasurer), and Members at Large Christy Love, Artemis Spyrou, Becky Thompson, and Duwage Perara. Also eager to help is Heide Doss, editor of this fabulous newsletter! We’re in FOEP because we are passionate about broadening the conversation about physics and the mutual benefits of that conversation. We hope you’ll join us.

Wishing you health and strength to overcome your own challenges,

Shannon

PS - That was my sign off last time. Still holds. Now and forever, pandemic or no.
Questions & Answers with Paul Halpern, astrophysicist and author.

Q: You have written quite a few books for a general audience. How do you decide what to write about?

I base the topics of my books on the intersection of my personal interests with what I think would be accessible and recognizable by general audiences. For example, for my book The Great Beyond, I had developed a scholarly interest in the history of higher dimensions in physics, for which I was awarded a Guggenheim Fellowship. I could have written an academic book on the topic, but, rather, I felt that the topic would lend itself well to a popular treatment. Around the same time, I began to work with a literary agent who encouraged me to pursue the history of science in books aimed for the lay public, and that subject proved suitable. It is gratifying for me when my books find a wide audience, and are cited, nevertheless, in scholarly works as well.

Q: How do you go about framing the physics you select for a general audience?

I enjoyed explaining physics topics by means of memorable anecdotes and metaphors. Sometimes I find that the sillier stories about science are the ones that stick. For example, in one of my early books, Cosmic Wormholes, I wanted to describe the experience of astronauts approaching various types of black holes, so I imagined a hapless commander, which I named Floyd G. Nevish, being sent on such missions. Apparently that character was memorable, because it is listed on the Wikipedia page “List of Fictional Astronauts.” In another book, What’s Science Ever Done For Us? about the science of the Simpsons, the science stories were drawn from episodes of that television show.

Q: How has the process of writing for a general audience changed from your first book to your most recent book, Flashes of Creation: George Gamow, Fred Hoyle, and the Great Big Bang Debate, published this August

I first started writing in the late 1980s, well before the Web and electronic data bases. So, for my first book, Time Journeys, I spent a lot of time in libraries. I would browse through every book on the topic I could find, and organize the material in a way accessible to general audiences. I wrote the entire book before I even contacted publishers. Luckily I found one that was interested. By the time I wrote Flashes of...
**Creation**, I had long decided to base my books almost completely on primary source material, rather than on other books. That includes interviews and archival material. Even in this connected age, some of the archival material is not yet online, so I browsed through boxes of correspondence by George Gamow (located at George Washington University and the Library of Congress) and Fred Hoyle (at St. John’s College, Cambridge). I also contacted family members and friends of Gamow and Hoyle, and other scientists from that era, by any means possible—phone calls, email, and postal mail.

**Q: How does doing outreach affect you as a scientist?**

I love to convey science and science history to eager audiences of all ages. I’ve spoken to middle school kids in their preteens and groups of senior citizens in their 80s and 90s, and been delighted by all of the interesting comments and questions. One of the coolest experiences I’ve had was participating in a discussion of the play Q.E.D. at the Lantern Theater Company in Philadelphia, a one-man show about Richard Feynman, and have Jamie Wheeler, the son of Feynman’s supervisor John Wheeler, raise his hand while sitting in the audience, and proceed to tell a personal story about a soup can experiment Feynman performed in his kitchen when Jamie was a child. That interplay helped inspire me to write the book *The Quantum Labyrinth*, about Feynman and Wheeler. Outreach can lead to surprising, memorable, and informative experiences.

**Q: What advice do you have for our readers on doing outreach?**

My advice is to write about and speak about topics which fall within the range of one’s expertise, and to resist the temptation to speculate in areas in which one is not very familiar. Now if one is well-read, one’s expertise can be broad. But if someone asks a question about an unfamiliar topic, it is always OK to say “I don’t know” or “that’s not my field.” That way, general audiences remain trustful of scientists.
Origin Story
Educators interested in student development analyze career paths travelled in our area to improve advising, mentoring, and teaching abilities. Often for us, being students of physics existed long before we joined a program or declared a major. It is difficult to identify events leading to a healthy self-efficacy as it unconsciously entered our psyche over time. Many “hands on” physical experiences indicate we have permission to explore and discover. Chemistry sets, computers, electronics kits, hacking, robotics, etc. establish a license in experimental domains. What can we offer in portions of theoretical sciences such as physics? The Summer Student Theoretical Physics Research Session (SSTPRS) responds to a question posed by an Iowa City high school student, “What do you mean by you work in theoretical particle physics?” The question was laden in confusion as to how and where theoretical physics and mathematical physics emerged, how does one train for them, and is there anything left to figure out? SSTPRS provides a “hands on” equivalent to coding, soldering, etc. in experimental sciences to give precocious physics learners license to explore, appreciate efforts of others, and balance creativity with mathematical rigor.

Doctrine & Ethos
SSTPRS traditionally involves questions beyond the boundary of solved problems in space-time supersymmetry (SUSY) and string theory. Though SUSY is half a century old, numbers of foundational puzzles remain. By contrast, the increased understanding of hadron physics by the “Eightfold Way” of Gell-Mann and Ne’eman has no analog for SUSY. The hadronic matter patterns the “Eightfold Way” observed in Nature align with deeper concepts of Sophus Lie and Elie Cartan, among other mathematicians. SUSY-representations, invented by physicists, have no such pre-existing mathematical foundations. This presented an unusual, perhaps unique, opportunity outside of “normal pathways.”

There exists a surfeit of calculations amenable to precocious students…given their proper guidance and onboarding. For potential future research physicists, such work builds skills, portfolio acquisitions, and possible career advancement. In the affirmative, they can answer the question, “Does this student possess research capacity?” Shepherding students to make research contributions, with publication possibilities in refereed journals, provides “hands-on” training in the collaborative process around complicated and large theoretical problems for students.

The student objectives of SSTPRS are to:
- permit participants, particularly undergraduates, gaining greater knowledge of specific sets of calculational capacities, responsibilities, organizational structures in a mathematically enabled theoretical portion of the field,
- increase sophistication and mathematics mastery levels,
- develop appreciation for the work of others and what it takes to master a body of knowledge, and
- often become a co-author of a research paper published in a refereed journal.

The possibility to create/operate the SSTPRS model has leveraged existing trends among researchers. Over several decades, two main examples have been: a wide establishment of remotely-accessible, information-technology enabled researchers (RAITER), and continuing development and accessibility of increasingly IT powerful platforms and tools for collaborative activities and computation capacity.

Long distance research activities commonly use apps such as Google Chat, Zoom etc. to connect diverse geographic locations and collaborations. However, a noted observation is an initial co-location of participants for an introductory face-to-face gathering often ignites a successful collaboration. In the SSTPRS model, this has been met by a one-month ‘residency’ component of the program historically held during the month of June. To date, the locations of the University of Maryland, University of Iowa, and Brown University have served as hosts.
Collaborative theoretical physics research takes advantage of e-mail, the world-wide-web, etc. being hosted and available on foundational information technology platforms. Upon these are apps that are RAITER tools:

- scientific publication software, such as LaTeX,
- computational and conceptualization software, such as Mathematica, Python, Maple, etc.,
- spreadsheet apps such as Excel and similar packages,
- video conference apps such as Google Chat, Zoom, etc.,
- the existence of high quality on-line resources of mathematical and physics content such as Wikipedia, YouTube, etc., and
- the existence of on-line publication resources for the output of research ranging from the arXiv, to websites of major commercial and non-profit publishers.

These resources fundamentally change the ecosystem emergence of the RAITER mode engaged in mathematical/theoretical physics research (and many areas beyond). Indications have appeared with newer versions of artificial intelligence (AI), and deep learning tools coming on-line. An example of this are papers in theoretical high-energy particle physics that rely in part on Google’s “Tensorflow” app.

The RAITER society is one of strong collaboration over long distances. Calculations made either by hand or using algorithms/computers can be completed and given independent checks by sending results back-and-forth via electronic means. For especially extensive calculations, “modularized” parts allow different teams to complete different portions. This resembles activities in social media. It seems on-line networked communities can be built around the execution of theoretical physics calculations.

The combined attributes of the society and the tools of RAITER individuals suggest the traditional REU can be invigorated by these attributes within an intentional design based on the leveraging of these features. The SSTPRS experience of over twenty years has evolved in response to these two drivers.

Among young persons entering research domains, aspects of the RAITER society are “indigenous” due to the ubiquitous presence of social media platforms and the molding these provide for the approaches, framework, on-line personality, and character of emerging scholars. The wide use of such applications suggests the potential of a generation of researchers who can leverage their presence as “digital natives” to enhance collaboration.

The SSTPRS goal is to extend education by including both RAITER learners and collections of “RAITER pods” capable of coherently, with minimal guidance (semi-autonomously), attack problems usually judged well beyond the reach of undergraduate research. This is the fundamental philosophy of SSTPRS editions, and the program experiences over two decades constitute an on-going verification of its successful utilization.
Components: ‘Residency’ & ‘Pods’ Phases

There are two components of SSTPRS: a residency phase lasting one month, and a “pod” phase which can last for two years.

In the first phase, participants gather in an intense period where a finite set of mathematical “widgets are downloaded.” This is the closest SSTPRS comes to a conventional course. However, it is not. Richard Feynman once said, “Study hard what interests you the most in the most undisciplined, irreverent and original manner possible,” and SSTPRS embodies this spirit. A typical classroom day, (10:00 - 5:00 with breaks) may see a senior person at the board, followed by a group of students at the board, followed by a single student presenting, or transitions to individual and/or group efforts at their seats. Elements of ‘flipped classrooms’ are invoked. Assignments are given essentially every evening. In real world (as opposed to the two virtual editions) SSTPRS editions, participants are hosted together in living groups on campus. Research ‘pods’ are created and specific targets for results are identified at the end of this period. The concepts covered introductory-level presentations (group theory, Lagrangian dynamics, differential geometry, classical field theory, General Relativity, and SUSY) as well as the IT platforms to function in the RAITER mode.

In the second phase, participants disperse to numerous localities. The pods are instantiated as self-directed research sub-groups. They function in a semi-autonomous mode according to internal social dynamics, but with the possibility of consultation with the senior SSTPRS personnel. During this period calculations are done with error-correcting mechanisms designed and implemented by pods. When the calculations are completed, they are returned to the senior personnel for evaluation and eventually incorporated into the text of a research paper that is submitted.

Closing Comments

Like Prof. Carino Curto, most SSTPRS alums do not become string theorists or even university professors. That was never the point of the program. The objective of SSTPRS was and is to create mathematically enabled researchers capable of out-the-box thinking via the ‘magic’ of “thinking like a physicist,” to use her phrase. Physics is data science! However, some SSTPRS alums do go into academia. Examples include professors Antonio Boveia (Ohio State University), Leo Rodriguez (Grinnell College), and Christina Zelano (Northwestern University)...and of course string theorist, Ibrahima Bah (Johns Hopkins University).

Is it possible to replicate SSTPRS away from its intellectual ‘birthing ground” of SUSY and string theory?

Associated Links

- [https://cmns.umd.edu/news-events/features/3598](https://cmns.umd.edu/news-events/features/3598)
- [https://www.aapt.org/Membership/spotlight_july2020.cfm](https://www.aapt.org/Membership/spotlight_july2020.cfm)
- [https://btpc.brown.edu/2020/08/05/a-virtual-spin-on-a-summer-program-connects-students-from-atf-ar](https://btpc.brown.edu/2020/08/05/a-virtual-spin-on-a-summer-program-connects-students-from-atf-ar)
- [https://sites.brown.edu/sjgates/sstprs/](https://sites.brown.edu/sjgates/sstprs/)
FOEP at the 2021 March Meeting

This past March the APS meeting was held entirely on-line, and public engagement was featured throughout the meeting. There were three separate invited symposia, organized by different Divisions and Forums, devoted to outreach and science communication at the 2021 March Meeting. First up on Wednesday was a session organized by the Forum on Physics and Society titled: Communicating Science to the Public, with three speakers who are indeed experts on this subject. Ann Merchant, spoke about the National Academy of Sciences program The Science and Entertainment Exchange, of which she was the founder. Here the Academy essentially matchmakes scientists with television and film creators. In this way the scientists can provide guidance on how Hollywood can improve both the science content and the representation of scientists, helping to create a more believable fake reality. These consultations are done on a volunteer basis, but they can sometimes lead to significant opportunities for outreach. Your humble correspondent has provided physics consultation for the Warner Bros. film Watchmen and Sony’s The Amazing Spider-Man, and these experiences led to the production of videos on the underlying science in these films that have been viewed millions of times on youtube.com. The next speaker in this session was Dennis Overbye, the science editor for the New York Times, and he discussed what makes for a compelling newspaper story. The session was rounded out by NPR’s Ira Flatow, host of Science Friday, who joined a panel discussion on the challenges of science communication.

So much for Wednesday. On Thursday the Division of Materials Physics hosted a symposium on Physics for Everyone. For the past several years the DMP has sponsored a session with this title, though every year the theme is different. One year the speakers described the research that went into inventions that impact our daily lives, from blue light LEDs (enabling the production of white light LEDs), to Magnetic Resonance Imaging, to Lasik eye surgery. This year the theme was “Physics and Popular Culture.” The underlying premise was leveraging the public’s interest in one form of popular culture, from Star Wars to NASCAR, to then engage with them about real world physics. Patrick Johnson of Georgetown University (and author of The Physics Star Wars) spoke about alien biology and physiology, and hyperdrive in a galaxy far, far away (Perhaps Ann Merchant can connect Disney+ with Patrick for the next Star Wars series?). David Weitz talked about his popular Harvard class “Science and Cooking,” where students learn that at its heart, much of cooking involves managing phase transitions. And thanks to all of the cooking shows I’ve streamed during the lockdown, I knew the names of many of the famous chefs who have guest-lectured in David’s class! Ainissa Ramirez used historical tales from her new book The Alchemy of Us to described how simple narratives can be used to engage with the public. Dr. Ramirez focused on materials science and condensed matter physics, which, as noted separately by the two other speakers in the session (once again, your humble correspondent, and Diandra Leslie-Pelecky, the author of The Physics of NASCAR) is particularly challenging to relate to a general audience. Astrophysics and Particle Physics have visuals and graphics which instantly draw the public’s attention. The imagery for condensed matter physics, operating on the human length scale, is much less striking. Leslie-Pelecky and Kakalios, using car racing and superheroes respectively, showed how condensed matter physics underlies the technology that surrounds us in our everyday lives.

The symposium organized by FOEP was held on Friday, saving the best for last (well, as the Past-Chair of FOEP, I may be slightly biased). The speakers, Prof. Michael Mann of Penn State University

Double your exposure by giving an outreach talk in addition to your science talk!

The Forum for Outreach and Engaging the Public will have contributed talk sessions at the March and April meetings. Importantly, these talks do not count against you, so you can still submit a scientific presentation. We look forward to hearing about your work!
Jeanna Bryner of LiveScience.com and Mark Miodownik of University College London, all emphasized that if science is not communicated clearly, the people who rely on scientific knowledge are left confused and less likely to trust scientists and science in general. Prof. Miodownik related how he came to write his New York Times bestselling general readership book on materials science, Stuff Matters. He then described the public engagement undertaken by the Institute of Making, of which he is a co-founder and current director. (Perhaps David Weitz should contact Mark, who has a Netflix series Chef versus Science where his materials science expertise is pitted in the kitchen against a Michelin star chef?) Jeanna Bryner, the editor-in-chief of LiveScience.com discussed science communication in the digital world, from on-line news sites to social media. Prof. Mann addressed the challenges facing, and the responsibilities of, science communicators to counter misinformation about climate change, whose impact grows every day.

I mentioned at the top of my report that the March Meeting was virtual this year, due to the COVID pandemic. As I write this new, more contagious variants of the COVID virus wend through the population, while many of our fellow citizens still resist vaccinations and other precautions. The very existence of an APS March Meeting held exclusively on-line drives home the message that science communication and public engagement have rarely been more important. Members of FOEP know full well how vital, and also how difficult, effective outreach can be, and it is reassuring that other units in the APS are in agreement on this score. With the difficulties facing society, for which science plays an important role, we need all hands on deck!

There was also a contributed session co-sponsored with FED on Friday called Rethinking Who and Where: Broadening Participation through Physics Outreach, with eleven presentations. The session started off with the successful outreach program at Texas A&M University led by Tatiana Erukhimova, and how it impacts the graduate students participating in the program. This was followed by a presentation showcasing the effects of an on-line hub of physicists of Hispanic and Latin American heritage, along with information of career pathways, advice, hurdles, and ideas on how to overcome them. Another presentation focused on underserved minority students by bringing the universe to the k-5 age group in economically disadvantaged regions. An study was shared concerning physics students’ identity which found that the more aligned a student’s personal values with program missions was, the more likely the student was to retain membership, and interactions with the community increased integration. Another presentation compared informal physics before and during the pandemic, and another narrowed in on key components to model in informal physics programs. A presentation highlighting the effective educational activities designed by Yale’s Graduate Society of Women Engineers that lesson math phobia by introducing math, as well as coding and electronics as part of a creative process. Pavel Shibayev shared a virtual summer physics program designed to reach the more than 40% of US high schools that do not offer physics courses. An invited talk by Kathy Aidala was toward the end of the session, who presented ways she has utilized the atomic force microscope for mentoring undergraduate students. Another group presented their outreach efforts by construction of muon detectors that were located in popular locations of a state park. The session closed with a presentation of insights from a ten year physics Friday outreach program carried out by Cleveland State University students to a K-8 school in the Cleveland area.
FOEP sponsored two sessions at the virtual April 2021 Meeting. The first session of invited talks, titled *Connecting with the Public*, opened with the 2020 Dwight Nicholson Medal for Outreach winner Michael Barnett who brought the audience through a quick history of his beginning outreach efforts in 1986 working with high school teachers, to his latest impactful outreach project – a planetarium show called *Phantom of the Universe – Hunt for Dark Matter*. We learned of his many efforts to achieve this feat. Virginia Trimble gave a memorable, fast-paced, walk through the impact of WWI on the sciences. It was eye-opening to view old photos, newsarticles, and advertisements that displayed science’s role in this rich history. This session closed with the 2019 Dwight Nicholson Medal for Outreach winner, Lucy Fortson, who gave an insightful and inspiring presentation of her work creating the crowdsourced big data program known as Zooniverse, with thanks to the many who helped make it happen. Dr. Fortson noted what makes a good task, how citizen scientists were trained, and how the data from the Zooniverse project could be mined.

The second FOEP sponsored session, titled *Reaching Out to Broader Audiences*, consisted of six contributed talks. Robert Hayes started the session with a discussion on issues concerning outreach and informing the public concerning nuclear energy. Baris Altunkaynak and Paul Champion had a wonderful presentation about public science kiosks designed, focusing on a running cloud chamber with an interactive display. The kiosks will be installed at public libraries, and I hope to see them some day at metro stations. Magdalena Waleska Aldana Segura and Julián Félix Valdez from the Universidad de San Carlos de Guatemala, presented on their face-to-face seminars turned into an online seminar program due to covid, which reached a broader audience and promoted science by reaching over 400,000 people from all over the Americas. A special mention was made to the continuously kind and gracious Nobel Laureate William D. Phillips. The fourth talk in the series was delivered in an engaging and well choreographed effort by Sarah Gaiser, Naomi Davis, Adrian Gaborek, Kamil Serafin, Alberto Aceituno, Vincent Mathieu, Robert Skrzypczak, and Adam Szczepaniak. This talented team developed two storylines concerning the discovery of the J/psi meson: the first focuses on the scientists’ point of view, and the second on the particle’s point of view. The team discussed their efforts organizing and creating this international virtual reality project. Steven Goldfarb presented outreach efforts with the International Particle Physics Outreach Group, which focuses on active research scientists working with education and communication specialists to develop and share best practices in outreach. Dr. Goldfarb shared the group’s successes and strategies. This session ended with an engaging discussion by Vitaly Pronskikh of who studied strategies of international collaboration using concepts of trading zones (that trade across language and cultural differences) and actor-network theory (network shifts occur due to relationships). From analysis of historical international collaborations Dr. Pronskikh found evidence suggesting strategies that would work well in international collaboration projects in the field of high energy physics.

**Double your exposure**

*by giving an outreach talk in addition to your science talk!*

The Forum for Outreach and Engaging the Public will have contributed talk sessions at the March and April meetings. *Importantly, these talks do not count against you, so you can still submit a scientific presentation. We look forward to hearing about your work!*
Report from APS Council

The governance of APS includes the Council of Representatives, which is how its 49 units (Divisions, Topical Groups, Sections, and Forums) participate in running the Society. I have the honor of representing the Forum on Education (FEd), the Forum on Outreach and Engaging the Public (FOEP), and the Topical Group on Physics Education Research (GPER). The Council focuses on all matters of science and membership, including science policy. I attended my first Council meeting in April (virtually, of course), and learned that an overarching concern for APS is the climate of the society and its meetings in regard to diversity, equity and inclusion. As APS President Jim Gates noted, “For an individual, it has been said that character is destiny. For an organization, perhaps it can be said that culture is destiny.” He has launched an initiative he is calling ΔΦ (Delta Phy, “change physics”), which functions like a “temporary Forum” to work on a shorter timescale than an existing unit can. He has organized four webinars on “Making Physics Inclusive & Equitable” with more to come. The Ethics Committee is also concerned with this issue, and asks that units draw attention to and promote APS policies; focus on diversifying candidates in unit leadership roles; focus on diversifying invited guests at sessions and unit activities; consider creating an Allies program, and consider forming unit-level committees dedicated to diversity, equity, and inclusion.

One of the main strengths of APS is our scientific meetings, which were greatly disrupted by the global pandemic. Some of the lessons learned from the virtual meetings held since March 2020 are that collaboration and networking are vital and much easier face-to-face, and that each meeting has different needs that can be met with a variety of platforms. It is clear that virtual and hybrid meetings are here to stay, and so APS will be hiring a Virtual Events Manager and will explore the best ways to offer them. The American Institute of Physics has produced a report, Future of Association Convening: Envisioning for The Sciences (FACETS) that offers ideas on how scientific conferences can integrate lessons learned from retooling in-person meetings to virtual formats. The meetings of the future will look different from those of the past, but it is still unclear exactly how. The focus of the Council for the next year will be on how all APS activities, not just meetings, should look in the post-pandemic era.

On the education and outreach front, the first nine sections of Effective Practices for Physics Programs (EP3) have been released; all 35 sections will be complete by early 2022. EP3, produced in concert with AAPT, provides guidance for implementing effective departmental change in areas such as recruitment and retention, advising and mentoring, career preparation, community engagement and outreach, instruction, departmental culture and climate, and much more. APS has also established two new positions in support of education. Michael Wittmann of the Univ. of Maine, a Fellow of the APS from GPER, has been appointed Head of Education at APS effective 1 June. And of particular interest to members of FEd, Geraldine Cochrane will take a sabbatical from Rutgers to serve as the Acting Head of Diversity at APS. Geraldine was elected a Fellow of the APS last year upon nomination by FEd “for scholarly advocacy around equitable access that pushes the boundaries of physics education.” I am sure that both of these distinguished physicists will be very effective inaugural holders of these important staff positions.

Throughout the rest of my term (which continues through 2024) I will continue to report on Council activities of interest to FEd, FOEP, and GPER. Feel free to contact me at mcneil@physics.unc.edu if you want to discuss how I can best represent these units in APS governance. I look forward to hearing from you!

Laurie McNeil, Univ. of North Carolina at Chapel Hill, mcneil@physics.unc.edu
Dwight Nicholson Medal for Outreach

This award recognizes the humanitarian aspect of physics and physicists created through public lectures and public media, teaching, research, or science related activities. Recognition consists of a stipend of $3,000, the Nicholson medal, and a certificate which includes the citation for which the recipient has been recognized. Up to $1,500 will be available for the recipient's travel expenses to the meeting at which the Medal is presented. It will be presented annually.

Establishment & Support
The Nicholson Medal was established in 1994 by the Division of Plasma Physics and the Forum on Physics and Society. It was originally named the Nicholson Medal for Humanitarian Service, and is currently administered by the Forum on Outreach and Engaging the Public. The Medal is sponsored by the friends of Dwight Nicholson, and through generous gifts from the University of Iowa’s Physics and Astronomy Department and Professor Herb Berk, the Medal will be awarded with a stipend of $3,000, beginning in Spring 2022.

Rules & Eligibility
The Nicholson Medal for Outreach shall be awarded to a physicist who either through public lectures and public media, teaching, research, or science related activities,

1. has successfully stimulated the interest and involvement of the general public on the progress in physics, or

2. has created special opportunities that inspire the scientific development of students or junior colleagues, or has developed programs for students at any level that facilitated positive career choices in physics, or

3. has demonstrated a particularly giving and caring relationship as a mentor to students or colleagues, or has succeeded in motivating interest in physics through inspiring educational works.

Nominations are active for up three years.

Nomination & Selection Process
The nomination must include:

- A letter evaluating the nominee’s qualifications and how the nominee has gone above and beyond in meeting one or more of the three criteria above should be no more than 5,000 characters.

In addition, the nomination should include:

- A biographical sketch.
- A list of the most important publications.
- At least two, but not more than four, seconding letters.
- Up to five reprints or preprints.

To start a new or update a continuing nomination, please see the Prize & Award Nomination Guidelines.

Deadline: Usually June 1
FOEP Nominations for APS Fellows

What
APS Fellowship constitutes recognition by one’s professional peers of exceptional contributions to the physics enterprise. Only a small fraction of the APS members reach the level of fellows and therefore this is an important recognition.

Who
Only APS members who are members of FOEP can be nominated for fellowship through FOEP. The deadline for Fellowship nominations is usually in May. We strive to have a diverse group of nominees and encourage the nomination of members of all underrepresented groups.

How

The process consists of: providing the nominee’s contact and professional information, uploading nomination letters documenting the accomplishments of the nominee and explain why he or she is deserving of recognition. Note that it is the responsibility of the nominators to provide a compact however complete nomination.

Evaluation
Nominations are evaluated by the FOEP nomination committee, reviewed by the full APS Fellowship Committee, and finally submitted for approval to the APS Council.

Subject
Outreach is a broad enterprise, spanning academia, industry and national laboratories, as well as freelance professionals such as writers, journalists and bloggers. Outreach activities are often overlooked and undervalued. Thus it is important to think about and propose people who have an exceptional track record in this area.

Why
Nominating someone for APS fellowship takes time; however, it is a great way to emphasize the importance of reaching out to and engaging with the public. At the personal level it is very satisfactory to get recognition of your peers.

Contributed by: Ivan K Schuller
Outreach Info & Resources

APS Physics Central has an “Outreach Guide!”
The guide provides ideas, opportunities, and information on how to conduct various types of outreach. Check it out! https://www.aps.org/programs/outreach/guide/
And within this guide you’ll find information about:

Are you interested in inspiring young minds to develop a passion for science? Sign up for our Physicists To-Go program as a physicist and visit classrooms across the country to present on topics related to physics, quantum science topics, or your career path. Join a classroom virtually for an hour out of your day! Sign up Here

You can opt to join classrooms either through a live video call with the teacher and students, or you can answer questions over a pre-recorded video. Sign-up forms will be accepted on a rolling basis.

We will be in contact with you in early 2022 to pair you with a teacher based on matching experience and interest. When you sign up, be on the lookout for further communications regarding tips and best practices for recording and being on video.

Jobs in Outreach & Broader Impacts
If you are interested in an outreach position or learning more about broader impacts, this website may be helpful: https://researchinsociety.org/jobs/

Double your exposure by giving an outreach talk in addition to your science talk!
The Forum for Outreach and Engaging the Public will have contributed talk sessions at the March and April meetings. Importantly, these talks do not count against you, so you can still submit a scientific presentation. We look forward to hearing about your work!

Questions and Ideas
Want to get more involved?
Email someone on the executive committee. Contact info can be found on the last page of this newsletter or online at:
The Forum on Outreach and Engaging the Public at http://www.aps.org/units/foep/governance/officers/index.cfm

Newsworthy Items?
Have an idea for something to include in the Newsletter: An outreach activity, an idea for an article, best practices, what does and doesn't work, or something else? Please send your ideas to the newsletter editor at FOEPAPPSnewsletter@gmail.com
Web Sites that Engage and Inform the Public

Fun Size Physics:  https://funsizephysics.com/
Seeker:  https://www.youtube.com/channel/UCzWQYUVCpZqtN93H8RR44Qw
Minute Physics:  https://www.youtube.com/user/minutephysics
Veritasium:  https://www.youtube.com/watch?v=c6wuh0NRG1s
Mathologer:  https://www.youtube.com/watch?v=YuIIjLr6vUA
The Particle Adventure:  https://www.particleadventure.org/
Contemporary Physics Education Project:  https://www.cpepphysics.org/
Phantom of the Universe:  http://phantomoftheuniverse.com/
Physics Tutorials:  https://www.physicsclassroom.com/Physics-Tutorial

APS Physics Central:
Physics in Action, Physics in Pictures, Physics +, Physics@Home, and more
http://www.physicscentral.com ,

OSA’s Optics for Kids website:
Activities, Celebrities, Timelines, and more
http://www.optics4kids.org/home/

IOP Physics.org:  http://www.physics.org

NASA Outreach Resources
http://science.nasa.gov/researchers/education-public-outreach/

Expanding your Horizons Network
http://www.eyhn.org/aboutmain

International Particle Physics Outreach Group

Let FOEP Post Your Outreach Links

Do you have a favorite web site, web article, and or video you like, or perhaps your own outreach website? Send it to us for consideration of inclusion on this page so everyone can enjoy it. Send ideas to: FOEPAPSnewsletter@gmail.com
Funding Information

**APS grants for public outreach and informing the public**
APS annually awards several grants up to $10,000 to help APS members develop new physics outreach activities. Programs can be for traditional K-12 audiences or projects for engaging the public.

**Marsh W. White Awards** are made to Society of Physics Students Chapters "to support projects designed to promote interest in physics among students and the general public."
[https://www.spsnational.org/awards/marsh-white](https://www.spsnational.org/awards/marsh-white)

**SPIE education and outreach grants for photonics and optics**
As part of its education outreach mission, SPIE provides support for optics and photonics related education outreach projects.
[http://spie.org/education/education-outreach-resources/education-outreach-grants](http://spie.org/education/education-outreach-resources/education-outreach-grants)

**AAPT - American Association of Physics Teachers**
**Bauder Fund Grants for Physics Outreach Programs**
Can provide funds to obtain and or build and support traveling exhibits of apparatus.
[http://www.aapt.org/Programs/grants/bauderfund.cfm](http://www.aapt.org/Programs/grants/bauderfund.cfm)

**Alfred P. Sloan Foundation**
The Alfred P. Sloan Foundation offers grants toward promoting science and science understanding to the general public.
[https://sloan.org/grants/apply](https://sloan.org/grants/apply)

**IOP Institute of Physics**
Public Engagement Grants – open to all but only for projects that take place within the UK and Ireland
[https://www.iop.org/about/support-grants](https://www.iop.org/about/support-grants)

**EPS European Physical Society**
Two grants that can fall into the outreach category are the EPS grant for Regional Physical Society Meetings that include items outside their usual grant categories, and EPS Award for Pre-University International Physics Competitions.
[http://www.eps.org/?page=support_grants](http://www.eps.org/?page=support_grants)

Many institutions have their own internal outreach funding programs.
PHYSICS OUTREACH & ENGAGEMENT

Executive Committee

CHAIR: SHANNON SWILLEY GRECO (01/21 - 12/21) PRINCETON PLASMA PHYS LAB
CHAIR-ELECT: SHIREEN ADENWALLA (01/21 - 12/21) UNIV OF NEBRASKA - LINCON
PAST CHAIR: JAMES KAKALIOS (01/21 - 12/21) UNIV OF MINN - MINNEAPOLIS
VICE CHAIR: ROXANNE HUGHES (01/21 - 12/21) NATIONAL HIGH MAGNETIC FIELD LAB
SECRETARY/TREASURER: E. DAN DAHLBERG (01/20 - 12/22) UNIV OF MINN - MINNEAPOLIS
MEMBER AT LARGE: REBECCA C THOMPSON (01/20 - 12/21) FERMILAB
MEMBER-AT-LARGE: DUWAGE C PERARA (01/20 - 12/21) UNIV OF MAINE
MEMBER-AT-LARGE: CHRISTINA E. LOVE (01/21 - 12/22) DREXEL UNIV
MEMBER AT LARGE: ARTEMIS SPYROU (01/21 - 12/22) MICHIGAN STATE UNIV

FOEP Membership – Join Today

To join FOEP at no cost prior to renewing your APS membership, you can get your ID badge scanned at a meeting, send an email to membership@aps.org with your request to add FOEP to your membership, or send a letter requesting membership to APS membership department. Please note that if you currently belong to two or more forums, FOEP will be added at no charge for the remainder of your membership term. On your next membership renewal notice, you will see a Forum subtotal that will include $10 for every Forum membership over two.