A publication of The Forum on Outreach and Engaging the Public - A forum of the American Physical Society

Vol. 9 No. 1 March 2024

PHYSICS OUTREACH & ENGAGEMENT

Letter from the Chair

Spring is almost here and so are the March and April APS meetings. We have an exciting program lined up for both events and we look forward to seeing you at our sessions.

At the March meeting, we have two free pre conference events at the convention center planned to engage the wider Twin Cities community.

- **LabEscape** (LabEscape.org/APS-HS/) will be March 2 - 8 during the conference. Due to space limitations, sign up is advised. This activity is appropriate for ages 12 and up.
- **Squishy Science Sunday** (march.aps.org/events/squishy-science-sunday) will take place on March 3, from 11 - 3 pm. There will be activities for all ages. Fun slime, sand, and other squishy material experiments. Group sponsorship between DBIO, DPOLY, DSOFT, GSNP, FEd, and FOEP made this event possible.

When it comes to science, we are a pretty passionate bunch. Come and learn from some of the best in our community at engaging the public. At the March meeting, we will have the opportunity to hear from the Nicholson Prize winner and FOEP 2019 Fellow Tatiana Erukhimova from Texas A&M University. We will also hear from the 2022 Fellow Emily Edwards of the University of Illinois Urbana-Champaign, 2022 Fellow Robert Nemiroff of Michigan Technological University, 2021 Fellow Chad Orzel of Union College, the 2020 Fellow, Vincent G. Rodgers and the 2023 Fellow,

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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.

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Dale E. Stille, both from the University of Iowa. At the April meeting, 2021 Fellow Gerceida Jones of NYU and 2022 Fellow Michael G. Albrow from Fermilab will tell us about their passions for outreach.

We are excited to welcome our newly elected FOEP members, Vice-Chair Bellave S. Shivaram, Member-at-Large Tatiana Erukhimova and the new executive member position Early-Career-Member-at-Large Darsan Swaroop Bellie.

As we welcome our new executive committee members, a special thanks must go out to our out-going Members-At-Large: Michael S. Smith and Michael B. Bennet and to our Past Chair: Shireen Adenwalla. These three members have helped shape so many of our events and features, especially the Physics Fiesta.

2025 is the Year of Quantum and we are looking forward to a joint March and April meeting. Please keep an eye out for upcoming FOEP events and opportunities.

Respectfully,
Taviare L. Hawkins

Taviare Hawkins
Wagner College

Letter from the Chair, continued

Spotlight on Outreach and Engaging the Public with 2023 Nicholson Medal for Outreach Winner

This newsletter's spotlight is on the 2023 Dwight Nicholson Medal for Outreach Recipient, Dr. Tatiana Erukhimova of Texas A&M University with the following citation:

> *"For leadership in bringing the excitement of physics through innovative education programs, summer boarding schools for public high school teachers, the TAMU Physics and Engineering Festival, the Real Physics Live program, and online physics videos with more than 400 million views."*

Could you introduce yourself to our readers?

I am Instructional Professor and inaugural holder of Marsha L. and Ralph F. Schilling Endowed Chair in the Department of Physics & Astronomy, Texas A&M University. Throughout my career at Texas A&M, I have taught both large introductory physics classes and small upper-level classes, and mentored hundreds of graduate students through outreach programs and teaching assistant training.

How did you find your passion for physics outreach and communication? Did you have any experiences with professors or science communicators that shaped this passion?

I was hired by a legendary department head Ed Fry. He understood that a great physics department must have a prominent outreach program. He is the one who founded our flagship outreach event, Texas A&M Physics & Engineering Festival, where thousands of people come together to celebrate physics. His passion for outreach undoubtedly impacted me and set me on this course.

The festival happens once per year. To keep up the enthusiasm for outreach throughout the year, we run many other programs. In 2007, I started a new program - the Physics Show - for K-12 students. While putting it together, I learned so much from Dr. Glenn Agnolet, who ran the Low-Temperature Extravaganza before me. Now I do 30-40 Shows per year. My passion for outreach has been shaped by my colleagues' dedication to outreach, our incredible staff members who have helped me run the program over the years, and, most importantly, by students. Over the years, I have been inspired by graduate and undergraduate students with whom we brought our physics demonstrations to football games and cultural festivals, built new demonstrations, and filmed them. We run a large outreach program and have an incredible team.

How do you come up with such creative physics demonstrations? What elements do you think a "good" physics demo should include?

Tatiana Erukhimova
Texas A&M University College Station

YouTube:
https://www.youtube.com/@tamuphysastr
Instagram:
https://www.instagram.com/tamuphysastr/
Facebook:
https://www.facebook.com/TAMUPhysAstr/
Twitter (X):
https://twitter.com/TAMUPhysAstr

Honestly, I don't think there are bad physics demonstrations, unless they cannot be shown in a safe manner. I like to bring demonstrations to every class; they motivate students and help them connect abstract physics concepts with real life situations. Over the years, we accumulated hundreds of physics demonstrations built by our faculty and staff. Some of these demonstrations were built by students! Our undergraduate students work in teams throughout the year under the leadership of graduate students and build new, interactive hands-on demonstrations that they present to the public at our outreach events. We also show some of these demonstrations in our classes. Students graduate but their demos, their legacy, lives on in the department.

One way to get creative ideas is to attend professional meetings like APS and AAPT. We always exchange ideas on new demonstrations at these annual meetings. I like interactive demonstrations. Having a physics toy in your hand makes it easier to connect with people, get them interested, and listen to your explanations.

A lot of people have bad experiences with physics classes. Often, students encounter professors that do not communicate the material effectively, leaving students with the impression that physics is uninteresting and/or too difficult to understand. What are the biggest mistakes that science educators can make when it comes to teaching, and how can these mistakes be fixed?

Of course, well-thought-out physics instruction comes first, we would all agree with that. However, if the students do not want to listen to you, then what's the point? No one wants to listen to a monotonic and boring lecture or presentation. This is especially true for undergraduate students and for the service classes that many of us teach. I believe that we all must put in effort to make our classes interactive and memorable. Learning students' names even in large classes, making your instructions personal, showing demonstrations, telling historic anecdotes, talking with students before or after class, collecting anonymous early feedback about your class, walking the stairs in the lecture hall as you speak and making yourself approachable – those are just a few obvious things that could help any instructor if they care about the success of their students. It is difficult to make every class a highlight of the day for your students, but we can lean into it. Motivated and inspired students learn better.

Q: What do you think causes people to see physics as an unapproachable and/or uninteresting subject? How do we, as science communicators, fix that?

The biggest change must be made at the grade school level. Physics needs to be taught in middle school and then again in high school by highly qualified teachers. Good teachers are key in making physics accessible and enjoyable for students. At the university level, I believe that making physics accessible to the public must be a mission of every physics and astronomy department. There are thousands of researchers and educators who are passionate about communicating science to the public. Some people think that communication with the public is not for everyone. I disagree. There are so many ways and opportunities to do that: public talks, blogs, vlogs, videos, and the easiest one: hands-on demonstrations. If someone doesn't want to allocate time for any of those activities, then you can encourage your graduate students or your local Society of Physics Students to participate in events that promote science. At our department we run outreach programs of all scales and for all audiences: from annual Physics Festivals attended by thousands of visitors to Physics Shows for K-12 students, summer schools for Texas high school teachers, Real Physics Live videos (funded by the APS), and engaging people with physics at home football games and community festivals.

It is unfortunate that outreach is often considered to be low priority by the university and by students because it is viewed as part of service which benefits the general public only. This perception has to change. Those of us who run outreach programs with our students have first-hand knowledge on how impactful and enriching the facilitation of these programs can be for both undergraduate and graduate students. Our students facilitating these programs benefit enormously. The exciting, and often less structured, environment of physics outreach programs helps our students build up motivation,

resilience, and a sense of belonging. They start thinking of themselves as science professionals and ambassadors for science. Explaining physics concepts that are behind hand-on demonstrations improves their communication skills. Teamwork, design skills, networking within the department, getting recognition from their peers, their professors and

from the general public – all of this is provided by the programs historically called outreach. This is not anecdotal evidence; we ran a collaborative study based on our programs. We included all groups of students in our study. However, emergent in our analyses were unique impacts of outreach programs on female students who are traditionally underrepresented in physics. Recently we received NSF funding to expand our study to the national level in collaboration with the colleagues from TLU, UT-Austin, and the AIP.

We all worry about retention for physics and STEM majors. It is known that student motivation, their identity as future STEM professionals, and their sense of belonging could be the leading factors in students' persistence in physics and other STEM fields. We talk a lot about how to amplify these factors in formal settings such as classrooms and labs. What we often overlook is the educational experience that our students receive in informal outreach programs that they facilitate. Hopefully, this will change and these informal outreach programs will be considered as an important part of the university student educational experience.

You're Tik Tok and YouTube famous! Has reaching such a large audience in this manner changed your perspective on science communication in any way?

We are very grateful that so many people are watching our physics videos. It is funny that on some social media channels Texas A&M Physics is more popular than Texas A&M football. What I really like is that people do the same experiments at home. I have been doing these demonstrations for years. One day our very talented marketing team came and filmed me at the Physics Show and posted the clip on the departmental TikTok channel. Unexpectedly, it went viral. We reached out to millions of people. When Texas public universities were banned from TikTok, we moved to YouTube shorts and have built a successful following there. This success is recognition of our departmental teaching and outreach programs and our team effort. It undoubtedly helps the recruitment efforts. These videos are short, you cannot explain much there, but it is so important that people don't see physics as a scary subject. They learn to enjoy it and maybe want to learn more. This success shows that we should keep trying different ways to bring physics to people and expand our audience.

What has been your most rewarding experience with science communication and outreach?

It's hard to select one. It's not always easy to run an outreach program, there are obviously ups and downs. However, there are some experiences that keep you going. One impactful experience happened when I just started running the Physics Shows and was an inexperienced science communicator. One group that came to the Physics Show had about 50 middle school black female students whose mothers were in prison. After the Show, two girls came up to me, asked how long I studied to have my job, and one of them said: "I'll go to school, I'll learn how to do these demos, I'll become like you." Unfortunately, I don't know where this student is now, but I always remember her words. Encounters like this recharge your battery and keep you running.

You're super busy! What plans do you have for the future in terms of physics communication?

I just have been elected to be a member-at-large at the APS Forum on Outreach and Engaging the Public (FOEP). I will work with FOEP members to promote both physics outreach as an integral part of physics education and the importance of early engagement of students in physics outreach.

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 Nicholson 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 Nicholson Medal is sponsored by the friends of Dwight Nicholson, and through generous gifts from Professor Herb Berk, the Nicholson Medal will be awarded with a stipend of $3,000.

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: 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 June 1. We strive to have a diverse group of nominees and encourage the nomination of members of all underrepresented groups

How

Nomination is done entirely on-line. Complete instructions for the nomination are available at: http://www.aps.org/programs/honors/fellowships/nominations.cfm

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 under-valued. 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.

Deadline: June 1, 2024

Contributed by: Ivan K. Schuller

Wiki Scientist Program Feedback

I am deeply appreciative of the transformative learning experience provided by the collaborative courses offered by APS and Wiki Education, empowering me to leverage my scientific expertise to enhance the accessibility and visibility of critical scientific information. This newfound knowledge will undoubtedly enrich my future career as a physics education researcher and my commitment to championing underrepresented voices in the field.

Enamul Haque
Monash University
APS CIP Member

The APS Wiki Scientist course was an enriching experience for my academic career as well as for learning how to effectively engage the public. We learned about how Wikipedia articles are created, bolstered by citation, and strictly vetted for adherence to the truth. As the free encyclopedia available on the Internet, science articles on Wikipedia are frequently accessed by the public. Through the APS Wiki Scientist course, we wrote articles that effectively convey science topics while knowing that they are accessible to a broad audience.

Arya Afshari
University of Iowa

To learn more about the Wiki Scientist program and its impact, visit https://www.aps.org/programs/outreach/wiki-course.cfm. For additional information including sponsorship of students and financial assistance, contact public-engagement@aps.org.

FOEP at the March and April Meetings 2024

FOEP is sponsoring two sessions at the March meeting this year.

Session K44: How FOEP Nicholson and Fellow Awardees Engage in Public Outreach

Considerations for a Successful and Long Running Outreach Program
Dale Still, University of Iowa

Making Physics Viral
Tatiana Erukhimova, Texas A&M University

Engaging the public of all ages in quantum physics
Emily Edwards, University of Illinois Urbana Champaign

A Brief History of Brief Histories: Narrative as a Tool for Engaging the Public
Chad R. Orzel

Astronomy Picture of the Day and other Physics Outreach Efforts
Robert Nemiroff, Michigan Technological University

Session N61: Outreach and Engaging the Public

"Quantum Physics and Research Opportunities": a summer program for high school students
Evgeniy Khain

How scientists can lead the effort to solve STEM education inequity in America
Amy H. Kim

LabEscape: Science-based escape room for fun and (non-)profit
Paul G Kwiat

Glass Art, Physics, and Marine Biology: Outreach using the Glass Shop as a Laboratory for Tissue Biophysics in Marine Animals
Gopika Madhu, Carolyn Delli-Santi, Jenna Effrein, Prannoy Suraneni, Vivek Nagendra Prakash

Physics Wonder Girls Program: Celebrating Ten Years of Supporting Middle School Girls in STEM
Roberto C Ramos, Deryk McGarry, Shayna Sit

Using ChatGPT-4 to help engage the public in your writing
Leigh M Smith, Xiaoshan Xu, Jocelyn Bosley, Shireen Adenwalla

Women Supporting Women in the Sciences: Outcomes from design and delivery of low-cost science laboratory kits for primary- and secondary-level classrooms in eastern Africa
Jill K Wenderott, Joyce Elisadiki, Julie Fornaciari, Danielle Butts, Cecilia China, Gloriana Monko, Sossina M Haile

FunSize Physics is here to help you share your science
Xiaoshan Xu, Shireen Adenwalla, Leigh M Smith, Jocelyn Bosley

Bringing the Public into the Quantum Realm: Marvel Magic Meets Mind-Bending Science
Katie Yurkewicz

Sharing STEM YouTube Content with China Through the Bilibili Video Platform
Hanyu Alice Zhang

Outreach mini-grant report: Physics of bicycles
Abigail Plummer, Carolyn Bull, Leah Plummer

Public Quantum Network
Keshav Kapoor, Jaehoon Choi, Yujie Zhang, Benjamin E Nussbaum, Shoroush Hoseini, Emily Edwards, Rebecca Wiltfong, Paul G Kwiat, Virginia O Lorenz

FOEP is also sponsoring LabEscape at the March meeting!

Sponsored by Forum on the History and Philosophy of Physics -- Session P20: Staged Reading of the Play: Delicate Particle Logic

If you've seen the film Oppenheimer then you must see the play Delicate Particle Logic by Jennifer Blackmer about the life and times of physicist Lise Meitner. This play explores the relationship between science and art through the story of the discovery of nuclear fission. Staged Reading: Session 4.0001: Wednesday, March 6th at 8 PM – 10:00 PM in the Minneapolis Conference Center, Ballroom B.

ABSTRACT

If you've seen the film ***Oppenheimer*** then you must see the play ***Delicate Particle Logic*** by Jennifer Blackmer about the life and times of physicist Lise Meitner. This play explores the relationship between science and art through the story of the discovery of nuclear fission. Under the harshly male-dominated science elite of the time, Lise Meitner broke through to become the leader of a major scientific institute, and the first woman to have the title of ``Professor'' in all of Germany. Along with her long-time research colleague, chemist Otto Hahn, she began a series of experiments that led to the discovery of nuclear fission. The play also presents a meeting between Dr. Meitner and Hahn's wife, Edith, a painter. The complicated swirl of their intertwined lives, two women and one man, mixes with the violent upheavals in the world, as the Nazi's take over Germany and everything changes. Edith Hahn and Lise Meitner discuss the Bomb, the Nazis and Otto Hahn's Nobel Prize as an imagined friendship blossoms between the physicist and the artist. The playwright Jennifer Blackmer (www.jenniferblackmer.com) is a faculty member in theatre at Ball State University. The staged reading is performed by the Frank Theatre Company (www.franktheatre.org) of Minneapolis. After the performance there will be a talk-back with the director and cast. Produced by Brian Schwartz, Brooklyn College and The Graduate Center of the City University of New York.

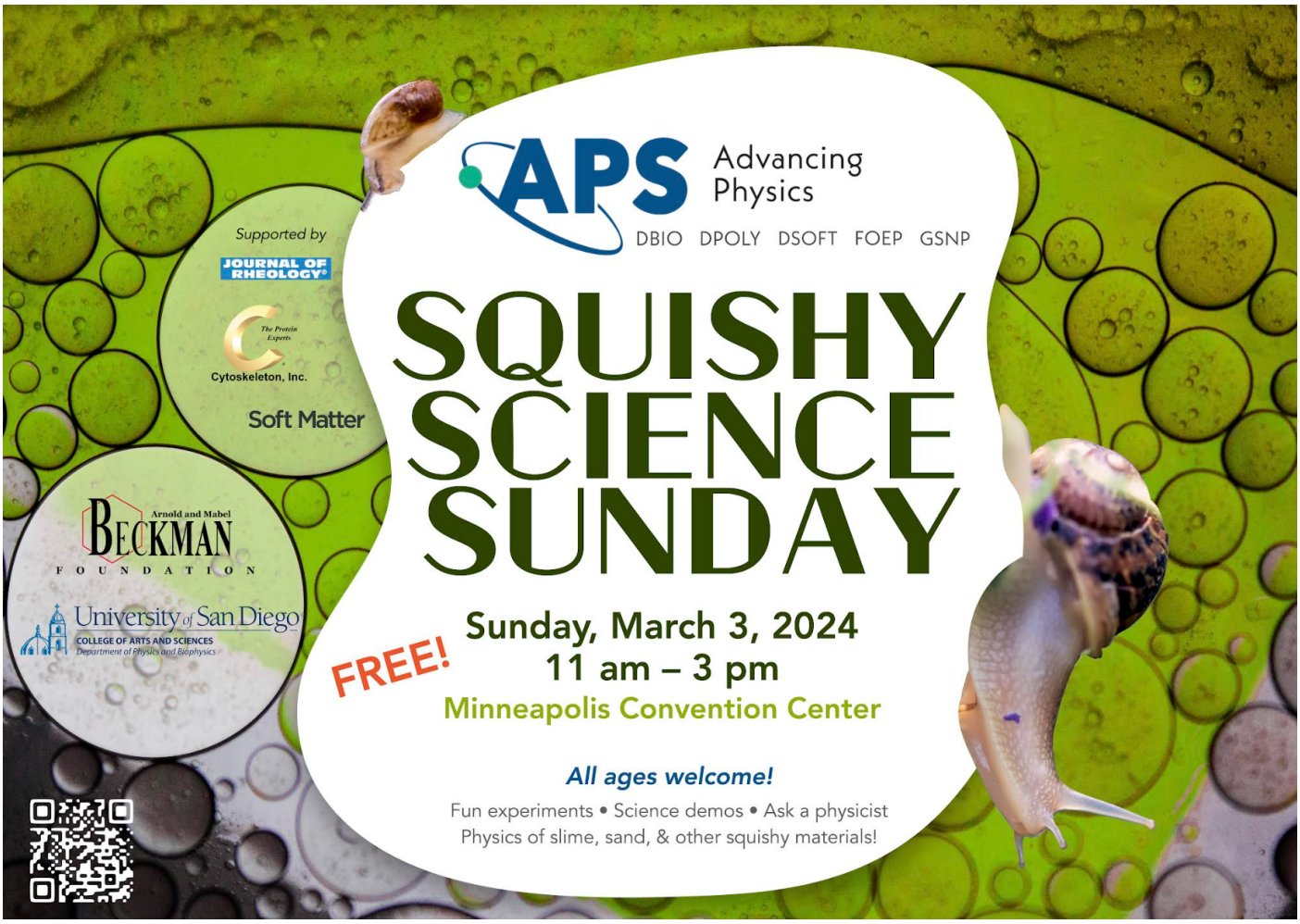
FOEP is sponsoring the "Engaging the Public in Science" symposium at the April meeting this year.

Connecting the Universe to the Community
Speaker: Gerceida Jones, FOEP Fellow 2021, New York University.

Particles in Collision as Art with Music
Speaker: Michael Albrow, FOEP Fellow 2022, Fermi National Accelerator Laboratory

Title: TBD
Speaker: Jessica Esquivel

FOEP is also sponsoring the Squishy Science Sunday event at April meeting!



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Executive Committee

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