

Message from the Newsletter Editor



Kevin Ludwick

Season’s Greetings, FECS members! We are excited to present to you our newsletter for Fall 2020. We hope you find it informative and interesting during these interesting times. I hope and pray that you all have been able to cope well with all the struggles and blockades the have accompanied the pandemic, especially as we head into winter.

In these newsletters, in general, we aim to provide you with useful information about basic research in different fields of physics, information about our activities at conferences and elsewhere, opportunities to actively participate in FECS, and helpful guidelines toward furthering your career. This issue includes a summary of the FECS virtual activities for the upcoming March Meeting in 2021; the results of the recent FECS election of new members to the executive committee; a report on what the APS Office of Government Affairs (OGA) is doing to advocate for international students, postdocs, and early career scientists; and an article highlighting the activities of the COVID Research & Resources Group (CRRG) and how to get involved.

I offer my sincere gratitude to all the contributors for this issue of the FECS newsletter, who worked hard to provide useful and engaging content, and many thanks to all the FECS members for reading. Suggestions, comments about the newsletter, and article contributions are always very welcome, and you can reach me with these at kludwick@lagrange.edu or on our Facebook group (called “APS FECS | Forum for Early Career Scientists”, <https://www.facebook.com/groups/apsfecs>). You can also reach me and other FECS members on APS Engage (<https://engage.aps.org/fecs/home>). I hope to connect with you in the future!

Sincerely,

Kevin Ludwick

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Views and opinions expressed in articles are those of the author and are not necessarily shared by the editor or the APS/FECS.

Kevin obtained his Ph.D. from the University of North Carolina at Chapel Hill. After a two-year postdoc at the University of Virginia, he became an assistant professor at LaGrange College in 2015, and he is the Pre-Engineering Dual Degree advisor there. His research is in theoretical cosmology, pertaining to dark energy and dark matter models.

Message from the Chair

Ben Ueland, Chair



Ben Ueland

Dear Colleagues,

Welcome to the Fall 2020 FECS newsletter! Thank you all for your continued support and participation in the Forum for Early Career Scientists. Needless to say, this has been a unique year full of surprising events and challenges. Nevertheless, the scientific community has shown the world the power of strong collegial bonds and strong commitment to work and service. FECS membership continues to grow, our activities remain to be well received by the APS, and FECS continues to work for you.

Past-Chair Jason Gardner and the election committee did a terrific job putting together a well-qualified and diverse list of candidates for the 2020 FECS elections, and I congratulate and thank all of the participants. This election sees the expansion of the FECS executive council with the positions of Communications Officer, Secretary, and International Affairs Officer being filled. These positions are vital for the continued growth of FECS activities and engagement with the community.

The executive committee continues to focus on ways to engage with and serve the community. To that end, we have put together a survey for FECS members. The results will be used to identify issues that are of supreme importance to the community and allow the executive committee to tailor FECS activities. As an example, the executive committee has started to make plans towards establishing travel awards for FECS members to attend conferences and/or for in-person collaboration with colleagues. Your answers to the survey will help develop these awards. As an incentive, you have the option of entering a drawing for a gift card upon completion of the survey.

Organizing sessions at the APS March and April meeting are FECS' biggest annual activities, and incoming Chair Shaowei Li has put together a great program of FECS sponsored sessions at the 2021 meetings. A description of these sessions appears later in the newsletter. In 2020, FECS had its first solo sponsored session for the APS March Meeting which the presenters organized into a virtual session (<https://virtualmarchmeeting.com/sessions/topics-in-diversity-wellness-and-inclusion-for-early-career-scientists>) after the in-person meeting was cancelled. The FECS sponsored session for the APS April Meeting was also held virtually (<https://aps-april.onlineeventpro.freeman.com/sessions/15336077/B08-Invited-Session-A-Sampling-of-Career-Paths-Available-for-Early-Career-Scientists>) and was extremely well attended. In addition, FECS cosponsored two sessions for the 2020 March Meeting that were unfor-

tunately cancelled due to the pandemic. The first FECS Postdoctoral Poster Competition was also planned for the 2020 March Meeting and would have awarded a \$500 prize for the best poster and several \$100 runner-up prizes. FECS has put out a call for a virtual poster session at the 2021 March Meeting with a similar prize scheme. We hope that this session will encourage collaboration and engagement.

Finally, as my term as Chair is coming to an end, I thank the FECS executive committee for their hard work, counsel, and great service. They have made my term productive and fulfilling, and I encourage all those interested in service to run for the committee next year. As always, the executive committee appreciates hearing about current issues and suggestions on ways FECS can support our members. Remember to keep engaging with your colleagues and pushing forward with your careers.

Best Wishes,
Ben Ueland

Ben Ueland is a condensed matter physicist specializing in neutron and x-ray scattering studies of strongly correlated electron materials. He earned a Ph.D. in Physics from the Pennsylvania State University in 2007 for work examining cooperative magnetic relaxation in geometrically frustrated oxides via very-low-temperature magnetization, magnetic susceptibility, and heat capacity measurements. He joined the NIST Center for Neutron Research in 2007 as an NRC Postdoctoral Associate to learn neutron scattering techniques while examining multiferroic and magnetoresistive materials. In 2010, he moved to Los Alamos National Laboratory and became a G. T. Seaborg Institute Postdoctoral Associate where he studied magnetic frustration effects in actinide compounds. He joined Ames Laboratory at the Iowa State University in 2012 and is currently an Associate Scientist in the Magnetic Interactions and Excitations in Quantum Materials group and the Center for the Advancement of Topological Semimetals.

2021 APS March Meeting Going Virtual

Shaowei Li, Chair-Elect

The health and wellness of early career scientists is always a top priority of FECS. In light of the COVID-19 pandemic, APS will hold its first virtual March meeting in 2021. From March 15 to 19, attendees representing 30 APS units and committees will convene for the 2021 APS March Meeting. We invite you to showcase your work for a global audience of physicists, scientists, and students and explore groundbreaking research from industry, academia, and major labs. Although we are not meeting in person, FECS will spare no effort on ensuring a meeting that is as successful as before. We are hosting the following three invited sessions to highlight the contributions from early career scientists in science, industry, and international collaboration:

Young Investigators in low dimensional quantum materials

Invited speakers:

Andrew J Mannix, Stanford University
Fang Liu, Stanford University
Dillon Wong, Princeton University
Chenhao Jin, UCSB
Guorui Chen, Shanghai JiaoTong University

What Do Early-Career Physicists Do? A Diversity of Career Options (co-host with FIAP)

Invited speakers:

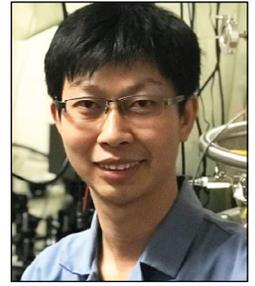
Monica Cheng, Amazon
Calvin J Patel, Morgan Stanley
Yue Zhang, Facebook Inc
Maika Takita, IBM
Kenneth Gotlieb, University of California, Berkeley

Top Quality Early Career Science in Europe (co-host with FIP)

Invited speakers:

Toma Susi, University of Vienna, Austria
Alessandro Casaburi, University of Glasgow, UK
Damien Voiry, University of Montpellier, France
Francesco Di Stasio, Istituto Italiano di Tecnologia, IIT
Angelo Bassi, University of Trieste, Italy

We look forward to meeting all of you in the APS Virtual March Meeting 2021!



Shaowei Li

Shaowei Li is a Heising-Simons Postdoctoral Fellow in the Physics Department, University of California Berkeley. His research focuses on developing a novel imaging technique combining laser and a scanning tunneling microscope (STM) to shatter the diffraction limit and probe the inhomogeneous properties in low dimensional materials. The desire for observing finer details using optical microscopy particularly in bio-science and material-science is pushing technology developments beyond the diffraction limit. The coupling of photon excitation with electron tunneling at the junction of a scanning tunneling microscope combines the femtosecond sensitivity of a laser and the Angstrom resolution of tunneling electrons. The joint fs-Å resolution will provide a new window for viewing the unique ultrafast dynamics of individual nano-scale objects. Shaowei received his Ph.D. in physics from UC Irvine in 2017. Prior to that, he received his bachelor's degree in physics from Nankai University in 2010. He spent a year as a postdoctoral fellow at Northwestern University before joining UC Berkeley. His past work involves probing the physical and chemical properties of single molecules and low-dimensional materials with optical techniques and STM.

FECS Election Results

Kevin Ludwick, Newsletter Editor and Secretary/Treasurer

FECS recently held an election for six executive committee positions for next year: the Chair-Elect, two Members-at-Large, the Secretary, the Communications Officer, and the International Affairs Officer. Many exceptional candidates applied for these positions, and we thank them all for their willingness to apply and serve. We encourage those who were not selected this year to apply next year as well!

The selected officers will start their positions in 2021, and we look forward to working with them, and they are eager to serve. Thank you for voting, and please welcome these well-qualified officers. Below is some more information about them. Congratulations to them!



Adam Iaizzi (Chair-Elect), who is finishing his term as a FECS Member-at-Large this year, is a condensed matter physicist focused on using computational methods, chiefly quantum Monte Carlo, to understand quantum phase transitions

in magnetic materials. Adam earned his PhD from Boston University in 2018; his dissertation, “Magnetic field effects in low-temperature quantum magnets”, won a Springer Thesis Award. After his PhD, he worked as a postdoc at National Taiwan University. Like many early career scientists, Adam is now exploring nontraditional career options. This year he was selected for a highly-competitive AAAS Science and Technology Policy Fellowship and has been placed in the Department of Energy Office of High Energy Physics, where he will work on the international legal agreements that support international scientific collaborations like the LHC.



Nicole Benker (Member-at-Large) graduated with a B.S. in Physics and Mathematics in December 2018 from the University of Nebraska-Lincoln, during which time she was a Materials Research Science and Engineering Centers (MRSEC) and

NASA Nebraska Space Grant fellow. Her undergraduate research included a solar neutron calorimeter payload flown aboard the International Space Station for which she was the project manager and payload developer focal. Results from

the experiment were published in *Radiation Measurements* in 2019, with other articles in preparation. Additionally, while she was completing her undergraduate studies, Nicole contributed to projects involving preparation and characterization of novel neutronvoltaic and photovoltaic devices. In her senior year, she also oversaw the development and management of a new semiconductor research laboratory specializing in the highly sensitive measurements required for the development of materials like carbon nanotube FETs. She previously worked as an operator at the ATLAS heavy ion accelerator at Argonne National Laboratory (ANL) where, when not tuning ion beams, she developed upgrades for the beamline and coded utilities for the controls system. Now, Nicole works at Pacific Northwest National Laboratory as a physicist in the Applied Radiation Detection Group.



Eva Kostadinova (Member-at-Large) obtained her Bachelor’s degree in Physics and a Bachelor’s degree in Political Science from Furman University in 2014. She received her Doctoral degree in Physics in 2017 from Baylor University. The

focus of her dissertation was employing new mathematical techniques in the study of energy transport in two-dimensional disordered systems. Her dissertation work received a Springer award for outstanding PhD research, which led to her publishing a book by Springer Nature, titled *Spectral Approach to Transport Problems in Two-Dimensional Disordered Lattices*. Currently, Dr. Kostadinova works as an assistant research professor at Baylor University’s Center for Astrophysics Space Physics and Engineering Research (CASPER). Her primary research interests lie along the intersections of fundamental physics and applied mathematics. Those include anomalous diffusion in disordered media with nonlocal interactions, self-organization and stability of dusty plasmas in gravity and microgravity, and the thermodynamics of driven-dissipative systems. A primary focus of Dr. Kostadinova’s current work is studying the dynamics of dusty plasmas in the Plasmakristall-4 facility on board the International Space Station. Kostadinova is also developing a spectral approach to the onset of turbulence in dusty plasma liquids. Most recently, her portfolio of projects has expanded to include topics related to magnetic fusion confinement, lunar dust mitigation techniques, and material ablation in extreme plasma conditions.



Shreyashi Chakdar (Secretary) received her BSc in Physics honors from Lady Brabourne College, University of Calcutta and MSc in Physics from Indian Institute of Technology (IIT), Roorkee in India before completing PhD in

theoretical particle physics from Oklahoma State University. Later she transitioned to University of Virginia as a Pirrung postdoctoral fellow and Colby College, Maine as a visiting assistant professor. Currently she is serving as an Assistant Professor (tenure track faculty position) in the Physics department, College of the Holy Cross in Worcester, MA. At Holy Cross Physics department, she established the DARKvEST research lab which studies theoretical particle physics with an emphasis on model building and collider phenomenology in the sector of Beyond the Standard Model (BSM) physics on dark matter, neutrinos, cosmology, astroparticle physics and effective field theories. Chakdar has taught courses all across the undergraduate curriculum, both within and outside the physics major requirements and is an advocate for learning physics using active learning methods and making physics accessible to everyone. She is the founder of the Women in Physics at Holy Cross and leads the group's various activities providing support, mentorship, and career development opportunities to all its members and is a strong proponent to foster diversity and inclusion in physics. Other than FECS, she is also a member of the Forum for Diversity and Inclusion (FDI) and American Association of Physics Teachers (AAPT), and she has co-organized the Conferences for Undergraduate Women in Physics (CUWiP) several times in the past.



Taylor Juran (Communications Officer) is trained as a computational physicist, currently holding a position as an Applications Scientist at Materials Design Inc., an atomistic modeling software company based out of San Diego and Paris.

Earning her B.S. and Ph.D. in Physics from Binghamton University, State University of New York, she has expertise in first-principles methods and solid state physics. While

in graduate school, She was a recipient of the GAANN fellowship in smart energy. She has extensively studied multivalent ion battery materials. Taylor has held appointments as a student intern at the US Department of Energy's Argonne National Lab and Sandia National Labs, where she worked on developing new capabilities in the field of electrolyte modeling. Taylor enjoys science communication and working towards the goal of making STEM a more inclusive and collaborative environment. She has held several roles within APS, including: Student Ambassador, APS Member Acquisition & Retention Strategy Study Group Member, and APS Career Mentoring Fellow. While in graduate school, she chaired the graduate physics journal club, and volunteered to teach pre-schoolers to code.



Mehmet Dogan (International Affairs Officer) graduated from Middle East Technical University (Ankara, Turkey) with B.S. degrees in Physics and Mathematics in 2010. While studying at METU, he taught in the International Physics

Olympiads training camps and co-founded the Science and Technology Student Group. He got his Ph.D. in Physics from Yale University in 2017, where he specialized in computational materials physics, specifically structural phase transitions in thin films and interfaces. During graduate school, he was active in science outreach, and served as an instructor and judge for New Haven Science Fair between 2012 and 2017. After a 10-month delay in receiving his research scholar visa, he started a postdoctoral position at University of California, Berkeley in 2018, where he focuses on studies of two-dimensional materials and high-pressure superconductivity. Since November 2018, he has been serving as an elected Head Steward for the Union of Postdocs and Academic Researchers at UC, which represents over 11,000 researchers. In June 2020, he co-founded the International Scholars Working Group, which focuses on providing information and support to the larger postdoc community and engaging in advocacy for international scholars.

With New Report, APS Fights Trump Administration's Plans to Restrict Visa Categories

Tawanda W. Johnson

Pushing back against the Trump Administration's plans to restrict certain visa categories that are crucial to science and economic competitiveness, the APS Office of Government Affairs (APS OGA) released a new report titled "How International Students and Researchers Benefit the United States: Their Experiences, Their Stories."

The report highlights the importance of the Optional Practical Training (OPT) and J-1 visa programs—both viewed as vulnerable under a Trump Administration—through stories about talented international students and scholars who chose to study and work in the United States.

The OPT program enables highly skilled international students who completed their studies in the United States to gain work experience for a period of time and is used as a recruiting tool by high-tech companies. Businesses such as Amazon, Microsoft, and Intel are among numerous tech firms that annually employ thousands of recently graduated international scientists and engineers under the OPT program. J-1 visa holders are typically researchers, students, and professors who participate in work- or study-related programs in the United States.

Despite their benefit to the United States, the future of these programs is uncertain following the release of a series of executive actions targeting key visa programs. For example, in June, the White House issued a proclamation that included suspending entry to the United States for international workers in certain J-1 categories.

Although STEM categories for the J-1 visa were spared any negative impact—due in part to the overwhelming response of APS members in a grassroots campaign—the opposite was true for the H-1B program, which enables colleges and businesses to hire highly skilled international workers. The proclamation suspends entry to the United States of anyone who seeks to enter using an H-1B visa but does not currently have a valid visa.

Further, a recent White House action will create a disincentive to the current and future employment of international workers on H-1B visas. Companies, associations and universities are fighting the H-1B rules with lawsuits. Meanwhile, the science community remains concerned that OPT and STEM categories for J-1 could be curtailed.



Tawanda W. Johnson

The APS OGA report states how important international students and scholars are to the US scientific enterprise.

"The benefit these international students and researchers provide to the United States is clear and measurable. As of 2018, immigrants had founded more than half (50 of 91) of the privately-held billion-dollar startup companies in the United States, and 21 of these 91 companies had a founder who first came to the United States as an international student," the document notes.

The highlight of the report, as previously noted, is the more than 100 compelling stories from APS members about the positive impact OPT and J-1 visa programs have had on their or peers' careers. The following are general themes and highlights from those stories:

OPT and J-1 visas can attract the world's top talent

"In 1973, Michael Kosterlitz came to the United States from the United Kingdom for a postdoctoral position at Cornell University on a J-1 visa. This experience started a long career in the United States, as he became a physics professor at Brown University and a US citizen. He was awarded the Nobel Prize in Physics in 2016 and one year later was elected to the US National Academy of Sciences. As he puts it, "This would not have happened without my getting a J-1 visa in 1973, so I owe my success to the J-1 visa and (the) USA owes the J-1 visa program for yet another Nobel Prize to an American citizen."

OPT and J-1 visas produce strong and positive outcomes for the United States

"Forty-three years ago, James Myra came to the United States from Canada to pursue a PhD in plasma and fusion physics. After completing his doctorate, Myra was able to transition to a career in the United States through OPT and eventually became a US citizen. 'It has been a career in which I could apply my research skills to the benefit of the American people and indeed the world.' His contributions to US economic and scientific competitiveness include: starting a business in Colorado; hiring US citizens; and publishing research publications that have been cited by other scientists around the world an astonishing 6,800+ times."

OPT and J-1 visas generate critical contributions far beyond academia

“Jennifer Ross is chair of the Physics Department at Syracuse University, and her high-impact work focuses on the physics of cells. She highlighted the contributions that foreign-born scholars have made in her lab, especially one of her former postdoctoral researchers who came to the United States on a J-1 visa from Mexico: ‘He taught everyone in the lab about molecular biology, protein purification (and) microscopy. He wrote our first paper that came exclusively from my lab. I probably wouldn’t have tenure without his work.’ This same postdoctoral fellow, after leaving her lab, contributed to the private sector: ‘He worked on a start-up company focused on using local RNA delivery to boost wound healing. It has major ramifications for basic science and applications for medical research. In particular, it should be of interest to the military — to help our wounded soldiers to heal faster without scar tissue.’”

Diverse perspectives greatly benefit the US R&D communities

“Laurel Anderson is currently a physics PhD student at Harvard University advancing our understanding of nanomaterials: ‘Although I am a US citizen, I have benefited immensely from the knowledge, expertise and mentorship of J-1 visa recipients. My research lab has postdoctoral researchers from Israel, Finland, Turkey, Brazil, South Korea and other countries. They bring a wealth of specialized skills and scientific insight about our field to help our lab perform cutting-edge experiments. There are very few people in the world with these skills, and losing these postdocs due to visa difficulties would set our research back years... Their

advice and support have been truly invaluable to me. They bring so much to our country beyond just their expertise.’”

In concluding, the report lays out several themes:

- A small but critical number of programs attract top international talent to the United States, including OPT and the J-1 visa program.
- International students and scholars want to come to the United States to study and pursue their careers, but to do that, they must overcome challenges to acquiring a visa, the growing perception that the United States is becoming increasingly unwelcome to international talent, and uncertainties with being able to stay and have a long-term career in the United States.
- The stories highlighted illustrate a broad range of measurable benefits: from Nobel Prizes to patents, from attracting more international talent to guiding domestic talent, and from starting companies and hiring US citizens to establishing research dominance in areas of critical US need. In short, they enable US economic competitiveness, national security, and global scientific leadership.

Francis Slakey, Chief External Affairs Officer for APS, said the Society looks forward to using the report as part of a roadmap toward keeping the “United States as the destination of choice for the world’s best and brightest.”

He added, “These stories have been shared with staffers at the US State Department, and the goal is to have them use the information to preserve OPT and the J-1 visa program.”

Tawnda W. Johnson is Senior Press Secretary in the APS Office of External Affairs. This story first appeared in the December edition of APS News.

APS COVID Research & Resources Group Building Collaborations among Physicists

Wennie Wang, Member-at-Large

What is the role that physicists can play in tackling COVID, and how can collaborations be facilitated? This is the question that the newly formed APS CRRG ([COVID Research & Resources Group](#)) seeks to answer. Ranging from fluid dynamics to biophysics, many APS physicists are already pivoting their research to address the many facets of overcoming the COVID crisis but often work in isolation or in limited collaborations. Thus, APS CRRG provides a critical platform for physicists to share ideas and build collaborations across institutions and disciplines.

Headed by [Robert Jeraj](#), a professor of medical physics at the University of Wisconsin-Madison, CRRG was formed as part of the APS Topical Group on Medical Physics ([GMED](#)) and serves as a platform for anything related to COVID research, including fortnightly webinars and doing a “post-review” of recently published papers to highlight high-impact research. The longer-term vision for CRRG is to evolve into a global initiative that connects physicists, biochemists, engineers, and other medical professionals.



Want to know more and get involved?

- Join the over 150 CRRG members in COVID-discussions on the APS CRRG Engage website. The community is open to APS members and non-APS members alike.
- [Sign up](#) to get reminders for webinars.
- Register for the fortnightly [APS COVID webinars](#), presented by experts in the field for a broad audience.

Wennie Wang is a computational materials scientist and currently a postdoctoral scholar at the Pritzker Institute for Molecular Engineering at the University of Chicago. She earned her B.S. in Materials Science and Engineering at MIT in 2013 and her PhD in the Materials Department from UC Santa Barbara (UCSB) in 2018. Her research interests include first-principles methods for energy applications and currently encompass the study of complex oxides for water-splitting applications.



Wennie Wang

Upcoming webinar:

Immune interactions and SARS-CoV-2 evolution

Date: December 16, 12pm ET

Speaker: Ben Greenbaum, MSKCC

Moderator: Nicolas Vabret, Mt. Sinai

Past webinars:

Understanding and harnessing the immune system for better vaccines: a crossroad of physics and biology

([View Webinar Recording](#))

Date: November 18, 2020 12 Noon ET

Speaker: Arup Chakraborty, Massachusetts Institute of Technology

Moderator: Mehran Kardar, Massachusetts Institute of Technology

What we know and don't know about the role of droplets and aerosol in transmission of SARS-CoV-2

([View Webinar Recording](#))

Date: October 21st, 2020, at 12 Noon ET

Speaker: Adriaan Bax, NIH

Moderator: Jose L. Jimenez, University of Colorado Boulder

What we know and don't know about SARS-CoV-2: origins and evolution

([View Webinar Recording](#))

Date: October 7th, 2020 at 12 Noon ET

Speaker: Raul Rabadan

Moderator: Hossein Khiabani

Epidemiology of COVID-19: Implications for Control

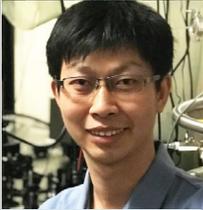
([View Webinar Recording](#))

Date: September 23, 2020 at noon ET

Speaker: Marc Lipsitch

Moderator: Thomas Bortfeld

FECS 2020 Executive Committee on the Forum for Early Career Scientists

	Chair: Dr. Benjamin Ueland
	Chair-Elect: Dr. Shaowei Li
	Past Chair: Dr. Jason Gardner
	Secretary/Treasurer: Dr. Kevin Ludwick
	Member-at-Large: Dr. Eric Sorte
	Member-at-Large: Dr. Adam Iaizzi
	Member-at-Large: Dr. Wennie Wang
	Member-at-Large: Dr. Daniel Borrero-Echeverry