

FIAP

Fall 2020

Newsletter

American Physical Society Forum on Industrial & Applied Physics

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Opinions expressed represent the views of the individual authors and not the American Physical Society or author’s employers.

Letter from the Editor

With the cancellation of the 2020 March Meeting due to concerns about the spread of the coronavirus, the American Physical Society and the Forum on Industrial and Applied Physics confronted the same unprecedented circumstances facing people all over the world. In hindsight, this was an incredibly prudent, albeit difficult, decision, and while we are all saddened to not have had the March Meeting and regret the disruption it caused, we are happy that everyone could remain safe, and that the APS did its part in fighting the spread. That said, planning for March Meeting 2021 continues, including sessions from 2020 that will be reprised, along with the new science from the latest in Industrial and Applied Physics. In this letter, we will update on next year's program, welcome our

new Director of Industrial Physics engagement, learn about the APS outreach concerning proposed rule changes to visa policy due to coronavirus, hear about the experiences of a longtime industrial physicist and FIAP board member, and feature the FIAP Chair's thoughts. As always, FIAP distributes the newsletter to apprise the FIAP community of developments within the Forum, esp. at APS Meetings, to highlight recent activities and to engage with the Industrial and Applied Physics community. Any additional contributions are welcome, and we would like the newsletter to provide an outlet for discussions of interest to the FIAP membership. To submit articles, letters to the editor, or ideas for discussion, please contact me at fiap_newsletter@aps.org.

March Meeting 2021 Preview

APS March Meeting 2021 abstract deadline is November 6, and we strongly encourage contributed abstracts in the FIAP-focused sorting categories **8 (Semiconductors, Insulators, and Dielectrics)** and **22 (Applications)**

March Meeting 2021 will be held virtually 15-19 March, keeping the CDT time of its originally scheduled Nashville, TN, location. FIAP and other APS units are preparing for a robust scientific program on Industrial and Applied Physics, to include and featuring Industry Day on Wednesday March 17th. With all the changes in the world since March 2020, industrial and applied physicists continuing to generate creative solutions to difficult problems, including to those due to coronavirus SARS-CoV2. On that note, we have organized two sessions in collaboration with both the Topical Group on Medical Physics (GMED) and the recently formed Topical Group on Data Science (GDS) that focus specifically on the intersection of Industrial, Medical, and Data physics to address the ongoing pandemic. In light of the cancellation of March Meeting 2020, some sessions will be carried over as sessions in 2021, but we are happy to announce a new theme, "Viewing the Future with Physics", which will include multiple invited sessions:

- *Physics of COVID-19*, organized jointly with GMED (Topical Group on Medical Imaging)
- *Seeing our Career in a New Light*, organized jointly with FECS (Forum on Early Career Scientists)
- *Infrared Sensing and Imaging*, organized jointly with GIMS (Topical Group on Instrument and Measurement Science)

- *Physics and Data Science of Quantitative Medical Imaging*, organized jointly with GMED
- *Seeing the Energy Future*, organized jointly with GERA (Topical Group on Energy Research and Applications)
- *Imaging in Industry*, with latest in industrial research using applied physics
- *Fellows of FIAP* – showcasing the work of recently elected FIAP fellows
- *New Ways of Seeing with Data Science (incl. COVID-19)*, organized jointly with GDS (Topical Group on Data Science)
- *Viewing the Future, with Electrons* – an exploration of modern electron microscopy applications
- *Innovations from Industry* – including the Pake Prize and Distinguished Lectureship on the Applications of Physics Lecture Talks

FIAP will also virtually present a forward-looking program of career-oriented content like the annual Meet Your Future career panel and many opportunities to make new connections. While we expect vigorous, possibly more so than normal absent the rigors of travel, science content, we are acutely aware that the social aspects of the March Meeting can be equally important to the science presented. FIAP leadership is especially concerned about providing, as best as can be expected, the cohesiveness and comradery of an in-person meeting and will coordinate with APS to provide as many virtual networking activities as possible.

New Director of Industrial Physics Engagement, Dr. Daniel Pisano

We are happy to welcome Dr. Dan Pisano as our new Director of Industrial Physics Engagement, following the retirement of Dr. Steven Lambert from the FIAP Industrial Physics Fellow on May 8th. Dr. Pisano received his B.A. at Columbia and his PhD from Yale, and has decades of experience in industrial & applied physics, running the gamut from national lab postdocs, start-up companies

(some his own), consulting positions, and at large corporations. We are lucky to have such an accomplished physicist running our engagement efforts and look forward to working with him. Please extend a warm welcome to Dr. Pisano, and if you have ideas about, concern for, or interest in Industrial Physics Engagement, he can be reached at pisano@aps.org.

March Meeting Cancellation – Impact on Students

The cancellation of the March Meeting due to COVID-19 has affected students in several ways. Presenting one's research, attending talks, asking questions, receiving input from peers, exchanging ideas, and networking are usually major goals of students and early career scientists who attend the March Meeting.

While the on-site sessions and events were canceled, numerous sessions moved online. Live virtual meetings are still a great opportunity to give a presentation, listen to talks, and ask or answer questions. However, face-to-face discussions of an oral or poster presentation in between or after sessions are not possible and the experience of a more personal conversation with other researchers is lost.

Besides communicating science, receiving information about how to plan a career is invaluable for prospective researchers. Various events for students and early-career scientists organized by FIAP

and other APS units take place every March Meeting, which are ideal for networking, getting to know experts from industry and academia, asking questions about career opportunities, and receiving valuable tips on how to succeed in the job market. Unfortunately, these events had to be called off and students missed important chances of face-to-face networking.

In the time of the pandemic when unemployment rates are high, students feel especially insecure about their future. The APS Summer Webinar Series is a helpful resource and online networking has become especially important these days. However, the extensive program of the March Meeting cannot be completely replaced by virtual seminars and networking platforms, but they are undoubtedly important alternatives if a conference has to be canceled.

Carola Emminger, PhD candidate at New Mexico State University & Graduate Student Liaison to the FIAP Executive Committee

APS Provides Input on COVID-19 Issues Affecting Industry

Since our last newsletter, the COVID-19 pandemic has turned our world upside down. Physics students and faculty have had to adapt to learning and teaching remotely. Temporary stay-at-home orders in nearly all 50 states severely curtailed research and development activities. And graduates, who in many cases expected to move into new positions as postdocs or as full-time employees in industry, have had their plans disrupted.

The American Physical Society during the past three months has been working aggressively to address these issues. In April, APS President, Phil Bucksbaum, sent a letter to the House Committee on Science, Space, and Technology, in which he provided “input and ideas related to future economic stimulus packages aimed at addressing and mitigating the near- and long-term impacts of the COVID-19 crisis.” (The full letter can be found [here](#).) Along with support from numerous other organizations, Congress enacted several stimulus packages and is considering more to help address these concerns.

In May, the APS Office of Government Affairs (OGA) learned that the Trump Administration has been considering the suspension

of the Optional Practical Training (OPT) program, which permits non-citizen graduates who have been on a student visa at a U.S. institution to work in the United States while they apply for a more permanent visa or green card. It is also used by these graduates who plan to return to their home country to gain additional practical experience prior to leaving the U.S. Industry, in particular, depends heavily on this program for much needed highly skilled individuals with physics degrees, from the bachelor level through the Ph.D.

The Administration has considered this probable OPT suspension as a means of addressing the high unemployment rate in the United States brought on by COVID-19. There has been fear that international students would be filling positions that U.S. citizens might otherwise fill. While the general unemployment rate has been the highest since the 1930s, the Bureau of Labor and Statistics recently reported a 2.8 percent unemployment rate in the tech sector.

The tech sector requires talented, highly skilled individuals to maintain its competitiveness. The companies competing for this talent are not just those headquartered here in the U.S. but they

are also located internationally. The OPT program provides a more level playing field for U.S. companies to attract the best talent.

In response to this threat, the APS Office of Government Affairs (APS OGA), working with Republicans in the House of Representatives, issued an alert to all APS members in Republican districts to contact their Representative and urge them to support a letter that Rep. Stivers (R-OH) was developing to defend OPT. Thanks to the advocacy of more than 2,900 APS members -- who together made more than 6,000 contacts to congressional offices over the last two weeks and wrote a well-timed OpEd, OPT was not suspended in this latest White House Proclamation.

The organization of these “behind-the-scene” efforts by APS to protect and promote the interests of our current and future indus-

trial physics members is just one example of the tangible benefits of membership. With more than 70% of physics majors ultimately employed by the private sector, they are a vital constituency, and APS OGA is increasingly engaged in advocating for issues that address the interests of our private sector members.

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Daniel Pisano, Director of Industrial Engagement

Reflections on decades in Industrial and Applied Physics

I graduated in 1993 from Stanford with a PhD in Applied Physics and have worked in over 10 different companies since then. At the March Meeting 2019 in Boston, I hosted a table at the “Lunch with the Experts” event. But I didn’t talk about a specific field or emphasis in Physics, I titled my discussion “From Start-Ups to Fortune 500: Working in Industry – Things never ever taught in a classroom” Much to my surprise, my table “sold out” instantly and several students and the like came up to express regret they hadn’t signed up in time. While March Meeting 2020 didn’t happen in Denver this year, my 2019 experience gave me some take-aways that I’d like to share in this note.

First, what I talked about was, as the title implied, working in Industry. And I should know! In 1993, there had been 60 tenure track hires in the US in Physics and Applied Physics, and the Universities had issued 1800 PhDs. Worse, only 15 of those 60 slots went to people who had received their PhD in the previous 5 years or less. That’s less than a 1% placement into the tenure track, pretty bleak. My first job was at Burleigh Instruments in Upstate New York making STMs and AFMs. I’ve founded a start-up, I’ve been involved with other startups, and I’ve worked in companies like MKS Instruments, a large organization with global reach.

My main topics were the things I learned when I became an Industrial Physicist in 1993. For some reason, PhD granting institutions just want to create more academic researchers, despite the fact that (in 1993) about 25% of US PhD graduates would end up working as government scientists, about 50% went into industry, and only 25% ended up in the academic pipeline. But whatever.... There was a shortage of classes in my program about the economics of technology, IP protection and the like.

Without going too far into the weeds, one of the subjects I spent some time on during our Lunch is known as “Managing from Below,” a technique that is often needed when one’s boss is lacking, distracted, or just stupid. It’s surprising how often one runs into this..... Anyway, this is the art of giving only the information needed to constrain your manager into making the right decision even though their nature would be to choose something else. It’s very,

very common, especially for new smart employees with poor management. It’s never talked about in school. And it’s a skill set that all of us will need to use at some point in our career.

I also talked about maintaining integrity in a profit-driven endeavor, and how to deal with organizations that will choose every short-term win despite the long-term losses that corner-cutting is sure to create. **Go with integrity every time.** It can harm your current employer-employee relationship (and has hurt mine more than once) but it’s a long-term win. My job with Atonarp, Inc. (which manufactures compact mass spectrometers for industrial applications) came about because a co-worker hunted me down after 14 years. He called and said “Matt, I need your magic!” He remembered me for keeping the best interests of the customers and the organization at heart, even if it annoyed my bosses from time to time. Also, maintaining integrity lets you sleep better at night.

What I learned from those fresh PhDs (or soon-to-be minted PhDs and Masters students) had nothing to do with any of the above, though they did eat it up! At the end of one’s education, BIG CHANGE is coming. And it’s SCARY because change is hard, and jobs are scarce. Often, this is compounded by insecurity created by not being the best in one’s class, or not coming from a highly-pedigreed University or Degree Program (I was a middle of the pack PhD from Stanford, for example.)

The first point I made to address the students concerns: **Don’t forget what you have done!** Sure, I wasn’t Stanford’s #1 grad student or researcher. But each and every person who achieves an advanced degree has done something that is rare in this world, and most people couldn’t have done what these degree recipients had done. According to the US Census Bureau, just over 1% of people 25-30 years old have a PhD. And that’s in all fields..... (Educational Attainment in the United States: 2018) It’s like being a brick near the top of a huge pyramid: one may not be at the very tip, but we all forget to look back down at how far we have come. And in any advanced degree program, one has come a very, very long way. In Physics, one has come even farther. Never, ever forget that.

During our Lunch, the next point I made was that apprehension arises because one is moving into a new area where one has no experience or network to speak of. I'd get asked "What else do I need to make the move to industry?" or questions like that. It was as if people knew that the academic training hadn't covered a huge swath of knowledge required to succeed in Industry. Yes, there are things in industry that weren't covered in your Group Theory class, but they are not difficult concepts. So my advice? Jump In! **You can't get a yes to questions never asked.** And if you achieve a degree in Physics, you are more than capable of learning these things on the job. Also, when one gets a "No", follow up on why.

Some won't say, many will. A "No" is an opportunity to learn! Maybe it was company internal stuff, or maybe it was a poor fit, or maybe it was something one can address so it's not a problem next time.

I'm not trying to say getting hired into industry is easy or that today's current situation isn't worrisome. I am saying that it's better than you fear, and that with less effort than getting a Physics degree, you will find a position, and a good one too! Take heart, and acknowledge your accomplishments as you seek more.

Matt Richter, PhD

FIAP Fellowships, Lectureships, Awards and Prizes

Despite the impact of coronavirus and quarantine, the Forum on Industrial and Applied Physics continues to recognize exceptional physicists from the Industrial and Applied Physics com-

munity through [Fellowships](#), [Awards](#), and [Prizes](#). Announcements will come in the Winter Newsletter preceding the (virtual) March Meeting 2021.

FIAP Chair's Thoughts

It was with mixed feelings when I heard that the March Meeting 2020 was cancelled late the night before I was scheduled to leave for Denver. In fact, I was checking into my flight when I saw the email from APS mentioning that the conference was cancelled. I called several of my coworkers to alert them of the news. The following Monday we traded stories, "where were you and how did you find out that the meeting was cancelled?" Several people were already in Denver when they heard that the conference had been cancelled. Anyway, knowing what we know now, cancelling the meeting was *definitely* the right thing to do. Obviously, we didn't know about "social distancing" back then and from past conferences we all know that some of the rooms with popular talks are overcrowded as we had been seated shoulder to shoulder or standing at the back of the room.

We've all been affected to various degrees, from distance learning in schools and colleges, to making Webex or Zoom conference calls rather than hosting or attending in-person meetings. In fact, several of us in the FIAP Executive committee had met for the past couple of years in the early summer in Philadelphia to plan for the invited talks for the March Meeting. We didn't have the meeting this summer. No cheese steaks.

Going forward, we are currently planning for an exciting 2021 March Meeting with the theme of "View the Future with Physics." It's just been announced that the conference will be virtual. Please see the titles for the invited sessions later in this newsletter.

Stay safe,

Michael Gordon, Chair FIAP