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Newsletter
American Physical Society Forum on Industrial & Applied Physics

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Comments and questions can be sent to fiap_newsletter@aps.org.

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Engaging with DOE Labs for Industrial Projects

Steven Lambert & John Rumble

Industrial physicists can leverage leading edge capabilities and the advanced facilities at DOE laboratories by applying for access to those sites. FIAP has heard from many members who would like access to use those facilities but find the approval process slow and overly bureaucratic. FIAP raised such concerns in two recent meetings with the DOE.

In May a FIAP Past Chair John Rumble made a presentation to the CRENEL commission which is chartered by Congress to review the effectiveness of the DOE labs. It was an ideal opportunity to raise the concerns FIAP had heard, and a means for continuing engagement with CRENEL.

On June 25th, Francis Slakey (APS DC office) and Steven Lambert (Industrial Physics Fellow) met with acting director Jetta Wong of the newly-formed DOE Office of Technology Transitions (OTT). The OTT was founded in February 2015 with the mission of expanding the commercial impact of the DOE's $10B science budget. The role of OTT is to facilitate commercializing of the research done at DOE labs further enabled by a webpage listing the facilities with capabilities that might be useful to industry. The webpage includes the following statement:

"The DOE National Laboratories maintains cutting-edge experimental and computational capabilities that can provide unique opportunities for partners from the commercial sector to develop and test new technologies."

Jetta told us that two of her priorities are:

1. Enlisting industry as early partners when starting programs
2. Streamlining the application and IP issues for industry projects at DOE facilities

She volunteered these goals at the beginning of our discussion. FIAP didn't need to convince her that these issues are important. Although bureaucracy moves slowly, FIAP hopes to see improvements for engaging with DOE labs. We proposed some options for working with OTT in the future and we'll report on those as things develop.

Jetta also commented, "No one is going to Capitol Hill saying 'we want applied programs to have funding'. " This could be an activity for technology-focused companies that hire many physicists and should benefit from DOE's investments in applied research. Please contact Francis Slakey, John Rumble, or Steven Lambert if you or others in your company would like to discuss any of these issues.

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NREL, LBNL and DOE Lead Workshop Focused on Acceleration of Advanced Building Materials Development Through the Materials Genome Initiative

By Robert Tenent

Earlier this summer, the National Renewable Energy Laboratory (NREL) in conjunction with the Lawrence Berkeley National Laboratory (LBNL) and the Department of Energy Buildings Technologies Office (BTO) hosted a discussion and workshop focused on application of the Materials Genome Initiative (MGI) -https://www.whitehouse.gov/mgi to the development of next generation building materials. The MGI approach is based on the application of high throughput screening techniques using computational, experimental and analytical tools to accelerate new materials development and seeks "to double the speed at which we discover, develop and manufacture new materials."

The MGI addresses four key challenges consisting of:

1. Leading a culture shift in materials science research to encourage and facilitate an integrated team approach, including close cooperation between the national laboratories, academia, and industry
2. Integrating experiment, computation, and theory and equipping the materials community with advanced tools and techniques to rapidly bring new material solutions and products to market
3. Making digital data accessible
4. Creating a world-class materials science and engineering workforce that is trained for careers in academia or industry.

The aforementioned workshop was attended by a broad range of participants including thought leaders from industry, universities as well as the national laboratories. Discussions and presentations focused on the fundamentals of the MGI approach as well as unique elements of building materials development that may necessitate adoption of additional approaches to accelerate new materials development. Breakout discussions focused on identification of key materials development needs as well as mapping those needs to key elements of the MGI approach in areas of building

envelope (including fenestration), HVAC systems and advanced lighting technologies. Several important follow on discussions also focused on identifying ways in which the MGI approach may be augmented to understand the implications of new materials development. This included discussions on considering the integrated building system rather than materials development in isolation as well as how to better engage industry to rapidly transition new materials to high technical readiness.

Currently, NREL and LBNL are preparing a joint report from information gathered during the workshop as well as earlier research to help detail how a MGI approach may be most beneficial to the development of next generation building materials. It is anticipated that appropriate application of MGI tools in conjunction with existing methods for gaining insight into integrated building systems has the potential to dramatically reduce time and expense in development of advanced building materials products. NREL and LBNL are still actively seeking input, especially from industrial partners, interested in MGI and the application of these techniques to advanced building materials design, development and manufacturing. Interested parties are encouraged to reach out to Robert Tenent at the National Renewable Energy Laboratory at robert.tenent@nrel.gov.

Industry Mentoring for Physicists

By Steven Lambert

The APS is preparing a mentoring program targeting physics graduate students who want more information about careers in industry. FIAP and other APS members with industrial experience are encouraged to sign up as mentors for short-term discussions with interested students. The website to manage signups and to match mentors and students is under construction, and a pilot program will begin in the fall. Watch for an announcement about signing up as a mentor later this year.

Supporting Early Career Physicists by Building Connections with Industry

By Crystal Bailey, Careers Program Manager, APS

Contrary to what many early career physicists (and their faculty mentors) may believe, the majority of physics graduates of all degree stages will find permanent careers in the private sector. According to the AIP Statistical Research Center (SRC) Focus reports on employment of physics graduates, 64% of the potentially permanent initial hires of PhDs are in the private sector[1]; the NSF Survey of Doctoral Recipients has put the total percentage of PhDs working in the private sector at between 40% and 55% over the past three decades.[2] Even many of those graduates at the Bachelor's and Master's Degree levels, will go straight into the workforce after receiving their degrees; including over half participating in the private sector[3,4].

Many physics students emerge from their degree programs with myriad technical and scientific training; however, we know that they often lack familiarity with basic workforce-relevant concepts (e.g. intellectual property, project management, and communicating to audience), as well as a robust non-academic network to help them discover new opportunities. In addition, while there are many well-intentioned faculty mentors who are interested in supporting their students' future careers outside of academia; most do not have any private sector experience themselves, nor do they have many colleagues with industry experience. Thus to help bridge this gap, APS has been working with FIAP's executive committee and the APS Industrial Fellow, on developing resources and experiences for early career physicists which are explicitly centered on careers in the private sector.

At every March Meeting since 2013, a special session has been held in which a panel of industry speakers speak about their careers and answer questions from the audience. In 2015, this event (called "Meet Your Future: Industrial Careers for Physicists") attracted an estimated 280 undergraduates, graduate students, and postdocs. This event continues to be one of the most popular events for early career physicists at the Meeting. FIAP also sponsored several new tables at the Graduate Student Lunch with the Experts at this year's Meeting, and hosted a panel discussion with six technical entrepreneurs in conjunction with its regular Prize Session.

APS has also supported an increased presence of industrial careers at Section and Division Meetings, such as the Division of Plasma

[1] AIP Statistical Research Center, *Focus on Physics Doctorates Initial Employment,* December 2014.

[2] NSF Survey of Doctoral Recipients and Integrated Survey Data, 1971 – 2010.

[3] AIP Statistical Research Center, *Focus on Physics Bachelor's Initial Employment,* September 2012.

[4] AIP Statistical Research Center, *Focus on Physics and Astronomy Master's Initial Employment*, April 2011.

Physics Meeting, which frequently holds career panels involving representatives from industry. In 2014, Paul Grant, winner of the APS Distinguished Lectureship on the Applications of Physics (DLAP), spoke about his lifelong career at IBM at four APS Section meetings last year. The current award recipient, James Wynne (also of IBM) has already made plans to speak at several APS Section Meetings beginning this fall. By encouraging more industrial speakers at APS Division and Section meetings, we are able to reach thousands more students than by focusing on the Annual Meetings alone. To learn more about the Distinguished Lectureship Award, or to nominate a colleague, please visit http://www.aps.org/careers/lectureship/index.cfm.

APS has created a number of resources on our Careers website explicitly targeting non-academic careers for physicists. Our Online Professional Guidebook provides information on how to successfully apply for jobs outside of academia, such as self-assessment and planning, building a network, resume writing, interviewing and negotiation, and more (http://www.aps.org/careers/guidance/development/index.cfm). APS has also hosted a number of webinars focused on industrial careers, which are archived and freely available to physics students (http://www.aps.org/careers/guidance/webinars/archive.cfm).

APS recognizes the need to more effectively disseminate information on the broad spectrum of career paths in physics to our membership, and that the industry-focused resources, programs, and experiences which APS and FIAP leadership have been building over the past several years have an important role to play in preparing our students for future success. We plan to continue supporting existing activities over the coming years, as well as expanding programs such as the already-successful APS Local Links, and promoting the Industry Mentoring for Physicists which is expected to launch in Fall 2015.

For more information about any of the activities described here, or other APS Careers programs, contact Crystal Bailey (bailey@aps.org).

Talking to Students about Industrial Careers

By John Rumble

One of the most rewarding projects that FIAP participates in (with the APS Careers Program) is talking to students at national and Sectional APS meetings about careers in the private sector, especially in industry. Here is a great chance for FIAP members to share their experiences and knowledge about careers in industry with a receptive audience. We usually hold these sessions at lunch time (lunch sponsored by FIAP), allowing plenty of time for questions and answers. For most of the students, this is their first exposure to a possible industrial career, and they love the opportunity to learn more about this path. In recent years we have had sessions at the Texas, Southeastern, Mid-Atlantic, and Four Corners. Help us reach out to Sections near you.

If you are interested, please contact Matt Kim (MK@quantera.com), Steven Lambert (lambert@aps.org) or Crystal Bailey (bailey@aps.org). It's fun, it's rewarding, and it's useful.