FORUM ON GRADUATE STUDENT AFFAIRS

AMERICAN PHYSICAL SOCIETY

The APS Forum on Graduate Student Affairs encourages a free exchange of ideas among graduate students and the greater scientific community by providing opportunities for meetings, electronic discussion, and access to a permanent archive of member ideas and programs.

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The articles in this issue represent the views of the Forum on Graduate Student Affairs (FGSA) and are not necessarily those of individual FGSA members or the APS.

NEWSLETTER
DECEMBER 2013

Greetings from the Editor

Vikram Singh Prasher

Dear FGSA members,

Welcome to another issue of the FGSA Newsletter. As the end of year approaches, it's time to reflect back and celebrate our accomplishments over the past year. This has been a fantastic year for FGSA; we showed strong presence at numerous APS sponsored meetings, and had the opportunity to work in close collaboration with APS associated units such as FIP, FPS & FIAP.

One of the most important events for FGSA in 2013 was helping to organize, and participating in, the Canadian-American-Mexican Graduate Student Physics Conference (CAM2013), held at Waterloo, Ontario, Canada in August. This issue highlights the CAM Conference in two articles; emphasizing the importance and usefulness of the CAM conference series in promoting international collaboration in physics, and in sharing experiences of physicists from different countries. Currently, the next CAM conference (CAM2015) is scheduled to be held in Mexico. Stay tuned for updates, and hope to see you there!

In our sincere efforts to publish articles relevant and interesting to our members, this edition spotlights information on important and eclectic topics, including: academic freedom and rights of scholars to physics jobs beyond academia.

On this note, I would like to extend a special thank you to Dr. Sarah M. Milkovich who agreed to share some of her personal experiences in the article "Science Careers Off the Beaten Path", ranging from her graduate life to the present. I also appreciate time and willingness of FIAP fellows/executive members to participate in an email interview, and I am sure that our members will find these accounts both interesting and valuable as they move forward in their career paths. Overall, I would like to thank everyone who contributed to this edition and helped to make it great.

Finally, I hope everyone is planning to attend the 2014 APS Annual March and April meetings. While there, make sure you check out FGSA sponsored sessions! More information on these activities will be included in a special newsletter edition, which will be printed and distributed during these conferences. Also, remain informed on what's happening with updates on our Facebook page.

On behalf of the FGSA executive committee I wish you all a happy and prosperous 2014.

Thank you and kind regards.

Vikram Singh Prasher
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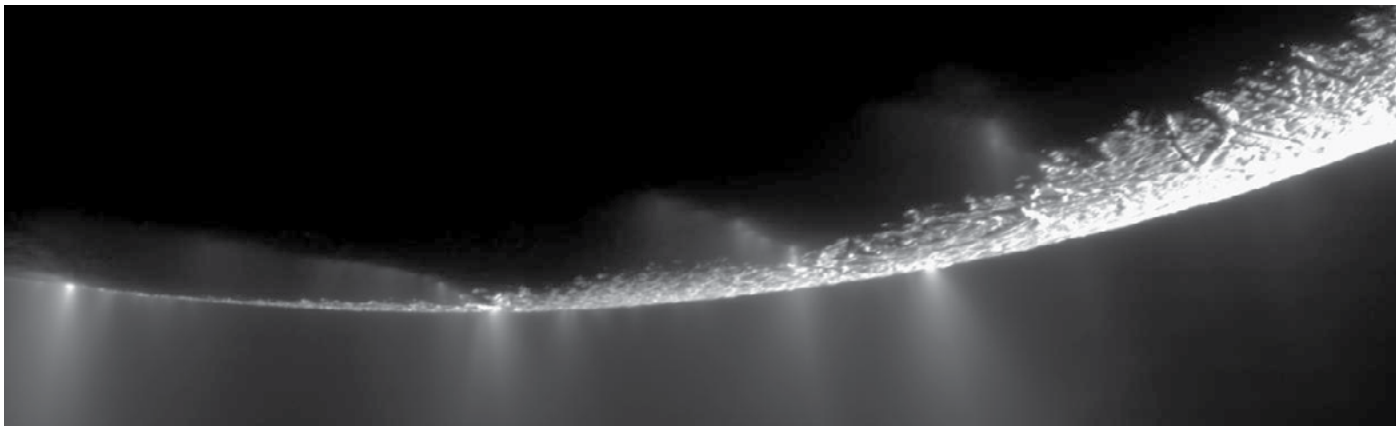
Science Careers Off the Beaten Path

Dr. Sarah M. Milkovich



Dramatic plumes, both large and small, spray water ice out from many locations along the famed "tiger stripes" near the south pole of Saturn's moon Enceladus. The tiger stripes are fissures that spray icy particles, water vapor and organic compounds. The view was obtained at a distance of approximately 14,000 kilometers (9,000 miles) from Enceladus and at a sun-Enceladus-spacecraft, or phase, angle of 145 degrees. Image scale is 81 meters (267 feet) per pixel.

When I was a graduate student, sometimes it felt like someone else had decided what my career path was supposed to be, defining my entire future: Ph.D., postdoc, postdoc, and the ultimate goal – tenure-track faculty position. It felt constricting, especially because I had a different goal in mind: I wanted to fly spaceships.

I was bitten by the NASA bug early on; I have always been fascinated by both space science and geology. Through a series of fortunate internship and research experiences in high school and college, I realized that I wanted work with the spacecraft that explore our solar system. So I became a scientist, getting my Ph.D. in planetary geology, and joined NASA's Jet Propulsion Laboratory (JPL) as a postdoc to do research on the polar deposits of Mars. Along the way, I was frequently buffeted by the unspoken assumption that we were all in this to settle down as faculty somewhere. Even on my first day at JPL, one of the researchers down the hall told me: "if you intend to go into academia, you should immediately start looking for a way out of here." But I had realized that I didn't want to be the kind of planetary scientist that waits for the data to arrive. I wanted to get my hands dirty and dig into spacecraft operations.

I stayed at JPL, and I am now a science planning systems engineer. That's a long job title, but it contains the core of what I do. Every spacecraft has two teams: the science team and the engineering team. The scientists and the engineers have very different priorities; scientists want as much and as good quality data as possible, and engineers want to minimize risk to the spacecraft hardware. These two perspectives frequently come into conflict, and that's where I come in. My job is to straddle the divide between scientists and engineers. I am embedded in the engineering team, paying attention to how the different engineering subsystems interact with and affect the quality of the data that we take (that's the systems engineering part) but I am fundamentally an advocate for the scientists, and I push to get the best science data that we can within the engineering constraints (that's the science planning part). Because I have the same background as they do, the science team knows that I understand their concerns and priorities, and so they trust me to go negotiate on their behalf with the engineers. The engineers rely on me to translate the science into terms they can work with – such as requirements on precision of spacecraft pointing for image, or the priorities of the list of science requests so they know which task to tackle first and which one can be dropped if time and money run short or risk grows too great.

In my five years at this job, I have been fortunate to be on the operations team for many different spacecraft, and have had different roles on each but I am always fundamentally a bridge between science and engineering. I have planned flybys of the moon Enceladus for the Cassini spacecraft at Saturn. This involves going from a blank slate of "here's the spacecraft trajectory during the two days around the flyby" to "here's exactly which instruments are on and where the spacecraft is pointing for every moment of those two days," and then working with the engineering teams to get the commands built and onboard the spacecraft. This work has led to awe-inspiring images such as this one: (http://photojournal.jpl.

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Science Careers Off the Beaten Path

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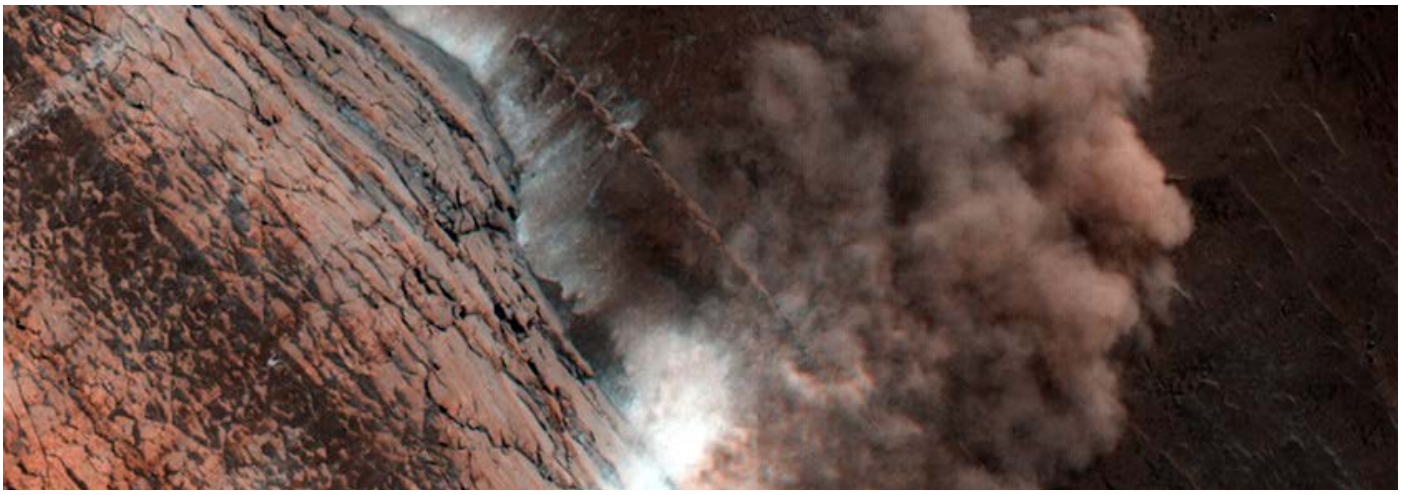


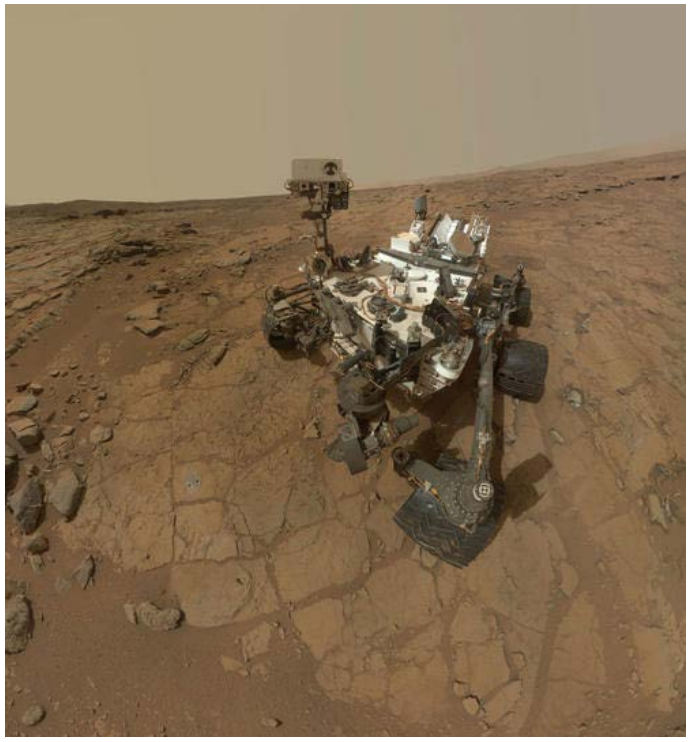
Since HiRISE first started finding avalanches on Mars, we have continued searching for them in the most likely places: steep cliffs at the edges of the layered deposits at the North Pole. These layers are exposed in the scarp face that cuts through them diagonally across this subimage. The bright smoother material at the lower left is at the top of the cliff, and here we have caught another avalanche as it falls down the steep slope towards the upper right of the image.

nasa.gov/catalog/PIA11688). I have been the science operations systems engineer for Mars Science Laboratory (the Curiosity Rover, http://mars.jpl.nasa.gov/msl/multimedia/images/?ImageID=5297), and helped to work out how (and then train) the rover scientists and engineers would together build and implement the rover's science plan every day.

Currently, I work on two spacecraft. I am the investigation scientist for HiRISE, the high resolution camera on Mars Reconnaissance Orbiter (capturing many spectacular images of Mars http://www.uahirise.org/ESP_016228_2650). The operations team for the camera is located at the University of Arizona, and the science team for the camera is from all over the world. But the orbiter itself is managed from JPL, and so I am the HiRISE team's representative here at JPL, and I keep the lines of communication open between science, instrument operations, and spacecraft operations. I am also a science systems engineer for NASA's next Mars rover, which launches in 2020 and will look for possible signs of past life on Mars. I am helping to translate what the science community wants to do with the rover into requirements that the engineers will use when they build flight hardware, design the computer ground systems, design the process by which we operate the rover, and so much more.

Scientists pop up in unexpected places, and there are many exciting, unusual jobs out there that need scientists; my job is just a single example. I hope as you persevere through graduate school that you keep an eye out for what opportunities lay off of the beaten path.

Dr. Sarah M. Milkovich is a science planning systems engineer at NASA Jet Propulsion Laboratory, California Institute of Technology. She received her B.S. in planetary science at Caltech and her M.S. and Ph.D. in planetary geology at Brown University.



This self-portrait of NASA's Mars rover Curiosity combines dozens of exposures taken by the rover's Mars Hand Lens Imager (MAHLI) during the 177th Martian day, or sol, of Curiosity's work on Mars (Feb. 3, 2013), plus three exposures taken during Sol 270 (May 10, 2013) to update the appearance of part of the ground beside the rover. The updated area, which is in the lower left quadrant of the image, shows gray-powder and two holes where Curiosity used its drill on the rock target "John Klein."

Standing Together: Scholars and Universities Work Together to Help At-Risk Scholars

Robert Quinn

Around the world today, scholars are attacked because of their words, their ideas and their place in society. Those seeking power and control work to limit access to information and new ideas by targeting scholars, restricting academic freedom and repressing research, publication, teaching and learning. **The Scholars at Risk Network, or SAR**, is an international network of scholars and universities dedicated to responding to these attacks, promoting academic freedom, and defending the rights of scholars and their communities worldwide.

SAR is a unique organization: We promote human rights by engaging a growing network of universities and colleges in the defense of academic freedoms via direct assistance to threatened intellectuals. Through our network, SAR arranges short-term academic positions for scholars of any discipline and from any country who suffer violence or other threats because of their work, their prominence, or the exercise of their basic rights. Because of these positions and the sanctuary they provide, scholars are able to continue their important work in safety, and universities are able to demonstrate concretely their commitment to academic freedom, as well as frustrate those who seek to destroy knowledge and repress thought.

Since it's founding in 2000, SAR has received over 1500 requests for assistance from professors, lecturers, researchers, human rights defenders and other intellectuals in over 100 countries. These scholars tell us about the wide range of threats they face, including surveillance, unjust imprisonment, torture, and violence. SAR has recently, or is currently, extending career- and life-saving assistance to scholars from Belarus, China, Iraq, Iran, Georgia, Mexico, Zimbabwe, and the DRC, among many others, and is helping those threatened scholars to reach member institutions in Europe, Australia, North America, Africa and the Middle East. Last year alone over 60 threatened scholars from over 20 countries were placed in host universities and colleges within our network.

By providing these courageous scholars with temporary positions in safe locations, our partners in the network are saving lives and strengthening voices every day, even in the face of profound repression and danger.

By building a strong global support network, SAR not only creates opportunities for at-risk intellectuals, but we leverage financial contributions from host institutions and an ever-increasing number of sources. We expand and diversify the community of advocates for academic freedom and university values. We shrink the gap between the human rights and higher education sectors.

SAR's growing international network of intellectuals, institutions and activists not only responds to attacks on academic freedom, but works proactively to address the root causes of intellectual repression and to effect systemic change through education and advocacy. Together with local partners, SAR is developing new tools and strategies for researchers and advocates to raise the economic, political and social costs of attacks on scholars, academic freedom and university values, hoping by doing so to deter some threats and reduce the severity of others.

This is an exciting moment for our organization. In its first ten years, Scholars at Risk successfully delivered life-saving assistance to hundreds of scholars and expanded from 20 institutions to over 330 institutions in 35 countries. Over the next ten years we anticipate even more significant growth in the network, services for threatened individuals, advocacy partnerships, visibility and, most importantly, in long-term impact. We hope that you can join us in this important work.

Robert Quinn is the Executive Director of Scholars at Risk, an international network of over 330 higher education institutions in 35 countries working to protect threatened intellectuals and promote academic freedom and related values. Scholars at Risk is based at New York University. Higher education institutions and researchers in any country are invited to get involved in network activities by contacting scholarsatrisk@nyu.edu, www.scholarsatrisk.org , or @ScholarsAtRisk (Twitter).

The Who, What, Why & How of Industrial & Applied Physics for Graduate Students

Interviews with Steven Lambert, Mark Bernius and John Rumble conducted by Katherine Davis

STEVEN LAMBERT

Q: Why/How did you decide the traditional academia route wasn't for you…

STEVEN: I started graduate school intending to become a college professor, but changed my mind after a couple of years. I saw that the academic research path was very difficult, and I was not motivated by a burning desire to pursue some particular topic. I wanted to do interesting work and apply my skills to solve experimental problems, and I realized there were other places than academia to do that. My adviser was quite successful in getting grants and publishing, and gave excellent technical advice. However, overall his job did not appeal to me since I wanted to spend more time in the lab and doing technical work, and less on administration. That worked well for me in industry. I was quite hands on technically throughout my career, in some periods taking data in the lab even after being a manager for 20 years.

And what methodology did you use to find your first job?

STEVEN: I was fortunate that many corporate recruiters came to my school, so I met with several of them every year. My adviser had many collaborators at national labs and they were useful sources for leads. I also connected with former grad students who were already working in industry. Various combinations of these resources landed me several job offers.

Q: What new challenges do you think the current generation of FGSA graduate students will face transitioning into industrial positions?

STEVEN: Two issues come to mind, neither of which is new:

A. Physicists come with an excellent toolbox that can be applied to solutions for many different problems. However it can be disorienting to join the industrial world where schedule is usually more important than a detailed understanding. Learn to summarize what you know even if it's not complete. Sometimes you'll have the opportunity to tie up loose ends, especially if better understanding will help avoid similar problems in the future. However some questions never get answered because they are simply no longer significant. This can be frustrating, but I also found it enjoyable to have steady stream of new problems to work on.

B. Industry talks about deliverables- what is the expected outcome from a project. Companies are in business to make money, and in the end your work must advance that objective. It can be somewhat esoteric (explore the technology limits for future products) or more immediate (why are product yields lower than expected). Make sure you understand your deliverables, the schedule that is needed, and check in to be sure things haven't changed while you are working on the problem.

And, what advice would you give regarding applying for jobs, or the industry versus academia debate?

STEVEN: Try very hard to get an industrial internship, usually during a summer. You will learn a lot about how work is organized, what is valuable, and you'll get to observe how others succeed (or not). You may decide you would never work for that particular company or you may find great colleagues and accept a job offer when you graduate. It may confirm that you want to be a professor rather than work in industry. In the end industry vs academia is about your personal preferences and an internship is the best way to collect data about the industrial career path.

Q: What do you do on a daily basis, and what are you responsibilities?

STEVEN: (I'll answer this for the job I had in June before joining the APS) I manage a small group that studies the magnetic recording performance of new disk designs for hard disk drives. My team and I interface with our internal customers to understand their requirements, analyse data from prototype drives to understand details of the performance, and develop new measurement methods to improve our understanding. People on my team either take data themselves or direct very capable technicians to do this, analyse those results, then share their data and conclusions in meetings. There's a lot of interaction and teamwork with the people who actually make the new disk designs. My key deliverables are results and analysis clearly showing the performance benefits (or not) of new designs.

Q: How do you plan to improve the visibility of industrial physics within the APS? More specifically how do you envision future collaborations between FIAP and the FGSA?

STEVEN: 1. Most important is that someone with an industrial background is now working in the APS headquarters. It's a great opportunity to give input from a non-academic viewpoint and I'm often asked to share my perspective.

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Ten Years of CAM: Highlights from the CAM 2013 Conference

Erin O'Sullivan and Laura Boon

It is hard to believe another CAM has come and gone! This conference was the third CAM that I attended and I was fortunate to be one of the main organizers this year.

The CAM (Canadian-American-Mexican) Conference is a joint meeting of the Canadian, American and Mexican Physical Societies, which is held every second year, cycling between locations in each of the three countries. The main purpose of CAM is to give students an opportunity to present their research to their peers, as well as to network with students from various backgrounds and fields.

CAM 2013 was the tenth anniversary of the conference, and it took place from August 15th to 18th in Waterloo, Ontario. Graduate students Evan Meyer-Scott and Chris Pugh headed up the local organizing committee. A total of 119 delegates from the three participating countries attended. Graduate students contributed oral and poster presentations and experienced faculty gave plenary presentations and participated in panel sessions.

The conference kicked off on Thursday afternoon with tours of the physics laboratories at the University of Waterloo. A reception was held that evening at the Communitech Hub where students were able to tour the startup company incubator space as well as the Hive virtual reality room.

On Friday, the conference events took place at the Perimeter Institute. In addition to the contributed oral presentations, plenary sessions on space physics and atomic, molecular, and optical physics were presented. A panel discussion on the topic of physics in times of fiscal austerity gave delegates some food for thought on a timely subject. That evening, a banquet was held in the Perimeter Institute Bistro where Canadian astronaut-turned-politician Marc Garneau gave the keynote speech.

On Saturday, the conference moved to the newly opened Mike & Ophelia Lazaridis Quantum-Nano Centre. The day's events included a plenary session on particle, nuclear, and accelerator physics as well as a panel session on the topic of collaborating across borders. In the afternoon, Miguel Alcubierre delivered a public lecture entitled: Faster than the speed of light. The tickets for this event sold out and the lecture turned out to be one of the highlights of the conference. The packed schedule continued with a poster session after the public lecture. The evening event was an "Ask a Theorist" session where graduate students could grab a pint with theorists and ask questions about their research.

The conference closed on Sunday with more parallel student talks, as well as a plenary session on material physics. After the closing

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The Inevitable Question: "So… what do you want to do after graduate school?"

Eric Sorte

It is a question many of us have heard over and over during our graduate school careers. We ask it of each other in the lab. We meet someone on a plane or at a party, and after the predictable initial reaction upon learning that you are a physics grad student, it is only a matter of time before you are faced with that question. For those close to graduation or just finishing post-docs, it is constantly present.

The answer, I'm afraid, is not obvious to all of us. In my case (and I suspect this is true for others), I knew wanted to go to graduate school in physics, but it didn't seem to make sense to plan much beyond that, since I had no way to know if I would enjoy graduate school at all. It was only once it became clear to me that I would be successful in graduate school that I really began to consider the question of what I wanted to do in the future. Whether we love or hate graduate school, it inevitably draws to an end, and the question of what to do next looms ever larger.

Broadly speaking, we have something like three categories for our future employment as physicists: academics, national labs, or industry. I talked to many people and thought a lot about these options when I finished my PhD two years ago, and I have been thinking more about them now as I face the choice again as my post-doc position comes to a close. Here, I'll briefly share with you some of what I've learned from discussions with physicists in each of these areas of physics and as well as my observations about the pros and cons of each.

Academics: Almost all of us are in graduate school or have received PhDs from universities. So it's not all that surprising that academic jobs are assumed by many of us to be the highest ideal. And it indeed has some impressive benefits. There is the prestige of being a professor, the satisfaction of training the next generation, to teach courses, and the oft-stated "ability to work on whatever you want." If/when you make tenure, there is also job security unrivaled by any other choice. You can end up with a great lifestyle, the flexibility to set your own schedule, and the freedom to follow your heart in research interests.

On the downside, starting pay for new academics is at the bottom of the list, and while it may increase with promotion, many professors end their careers making salaries that an industry physicist would get to start a first job. Then there are the grants. A professor once told me that when he got his academic job long ago, getting a grant from the NSF was a matter of making a phone call and cashing a check a week later. Today, we see very senior physicists with great track records often finding it difficult to get even the most modest of grants. Additionally, with few exceptions, professors find most (if not all) of their time is not spent doing science at all, but working hard to find that next grant and the myriad of administrative tasks that confront them. Finally, to get an academic post today, you need a very well thought out, specific research plan that looks well into the future and clearly lays out your plans and contingency plans. You also need to find the school that wants someone with your subspecialty, and if you have a two-body problem like I do, that gets tricky. According to the latest AIP data, approximately 58% of us will seek and find an academic post directly after graduation, most of those in temporary postdocs.

Industry: This seems to be a catch-all term for any non-academic, non-lab job. While the industry-funded curiosity-driven research centers like Bell Labs are increasingly harder to find, there are still many options for physicists in industry. I have talked to physicists who work at car companies, oil companies, insurance companies, and medical companies, and all involved in doing extremely different tasks. This variety has to be viewed as a benefit and a curse; while we may be able to find something that exactly fits what we want to do, we may also be overwhelmed with too many choices over too wide a range of possibilities. Industry often has the highest starting pay rates of any of the options considered here, but on the flipside, you are certainly losing the security blanket of tenure with such a job, and you will likely not have the freedom an academic does to work on problems of your choice. Finally, the main fear of taking an industry job for many of us is the commitment: the feeling that, once you take that road, you can never go back to academics. While there are certainly exceptions to this rule, I think it remains the rule. AIP says that 19% of us will find "private sector" jobs out of grad school. The overwhelming majority of people finding permanent positions, however, where here in industry.

National Labs: This seems to be a middle ground between academics and industry. I know of numerous cases of people switching back and forth between academics and the labs; it appears to be true that such a job does not burn the bridges that industrial jobs might. There is often the need to find funding for projects you might wish to do in labs, but it is often true that your career does not depend on it in the way that it does in academics, where if you can't hire and pay graduate students it is difficult to get tenure. One

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The Inevitable Question

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frustration I have heard from people in national labs is the boredom of navigating the intricacies of a government job. Anecdotes abound about scientists who were forced to take classes on how to walk properly after someone had slipped on the snow and people who spent their whole post-doc positions at a lab unable to do any work at all while they waited to get through all the safety classes necessary. A common complaint is that there is plenty of money for equipment, but little money for people to run the equipment. On the positive side, if you choose a national lab, you will more than likely have access to all kinds of state-of-the-art equipment and work with very good researchers. National labs typically pay much better than their academic counterparts, and you can still publish and present your work in a way that is often impossible in a private corporation. AIP says that 19% of us will find government jobs out of grad school, of which national labs are a part.

When I was in graduate school, there was a poster in the physics department with the statement on it to the effect that, with a physics degree, there are endless possibilities are open to you. I do believe this is true. I know physics PhDs who are lawyers, engineers, chemists, professors, statisticians, quantitative analysts, R&D scientists, astronauts, insurance risk assessors, and the list goes on and on. It's not true, in contrast, that you find many people who trained in law, for example, practicing physics. The challenges of finding the right job for you do not evaporate when you have a graduate degree in physics, to be sure, but the choices available to you with such a degree are many.

It might sound like obvious advice, but as you and I myself go through the process of deciding on a final career path, I think the most important thing for us to keep in mind is to be clear to ourselves what we want. Does what your PI does everyday look like your ideal job? Is money more important to you, or security, or intellectual freedom? Where is it most likely that you can get the things you think will make you the happiest?

To end on a personal note, I have not resolved yet where I will ultimately end up, but I have decided that "academics, labs, or industry" is something of the wrong question. For me, the most important thing is simple: I want to spend my career working on problems that I feel are important to me, important to society, and that are interesting. If I can find that project, then perhaps it doesn't matter what address I go to in order to work on it. If I can spend my life thinking about and solving problems that I think are important, I will believe I am making a difference, and I will be happy.

Eric is currently a postdoctoral researcher at Washington University in St. Louis, working on complex metal hydrides for hydrogen storage. Eric has formerly served on the Executive Committee for the Forum on Graduate Student Affairs, and is currently serving as Councillor for the American Physical Society.

FGSA Gearing up for APS MARCH & APRIL 2014 Meetings

Brock Russell

FGSA has several activities at both the March and April Meetings in 2014. In March, there will be the ever-popular student reception on Tuesday evening, and on Wednesday we will be sponsoring a panel discussion entitled 'Postdocs and the Application Process'. It will feature several panelists, including current and former recipients of postdocs and fellowships as well as at least one member of a fellowship selection committee. Each panelist will speak briefly, followed by an open panel discussion in which you can ask any question you might have.

In April, during the weekend of the meeting, we will have a panel discussion focusing on careers outside of the traditional research institution. We will have an industrial physicist, a data scientist, and a faculty member from a small liberal arts school. This will also be an open discussion, so come with questions. During this meeting, we will also be co-sponsoring a session with the Topical Group on Gravitation about some physicists in that field who obtained PhDs and went on to non-academic careers.

We hope to see you at one (or all) of these sessions.

Brock is a Physics PhD candidate at the University of Maryland College Park. He studies high energy astrophysics, in particular the physics of supernovae and clusters of galaxies via X-rays, at NASA Goddard Space Flight Center.

Industrial & Applied Physics

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2. Help to organize and participate in job fairs and industrial symposia at national and section meetings. This is a good place to interact with FGSA. APS also has career resources on our website that could be expanded to give more information about industrial career paths.

3. There is already an intention within the APS to improve engagement with physicists early in their careers. I will participate in those activities and work to tie in physicists who are already working in industry. This is a natural focus for interactions between FIAP and FGSA.

4. A new journal Physical Review Applied is being launched so industrial or applied research will have a publication home within the APS family of journals. I will help to highlight this new publication to physicists in industry.

5. I'm looking at past survey results to determine other ways we can serve industrial physicists. This is a diverse group that is also very busy, so I intend to identify useful services that people might actually use.

MARK BERNIUS

Q: Why/How did you decide the traditional academia route wasn't for you and what methodology did you use to find your first job?

MARK: My requirements in academia for bringing in $350,000 per year in grant funding as a pre-requisite for tenure decision left me thinking the students were being thought of as an afterthought. So I walked on over to the universities placement office, and started looking at what companies were visiting campus.

Q: What new challenges do you think the current generation of FGSA graduate students will face transitioning into industrial positions? And, what advice would you give regarding applying for jobs, or the industry versus academia debate?

MARK: Challenges: The de-emphasizing on "excellence in genius" behaviors and outcomes and an emphasis on team-led, team results of fast solutions to corporate problems.

Advice: Try to take the long-view, and clarify what you see yourself doing 10 and 20 years from now. I know some bored fully-tenured professors. Realize that tastes and preferences change as you get older. What climate (academia, industry) offers more potential in opportunities?

Q: What do you do on a daily basis, and what are you responsibilities?

MARK: That varies with the day and market needs. I am Head of technology at my manufacturing location, so any problem in the factory, or with a customer's use of our product, becomes my responsibility. Being able to identify team members, assemble them quickly, focus on the problem, and solve it saves on lost time and sales. In between "emergencies" are the goals of long-term R&D for improving product or developing new product.

Q: How specifically do you see the relationship between physics and industry evolving in the future? And, how will FIAP attempt, if necessary, to address these changes?

MARK: Good question. Hard to predict. I personally favor the model practiced in Germany, but I don't see that being embraced in the US any time soon. (There, graduate students are encouraged to reside in industry for their thesis project area and solution, and afterwards are hired by the participating industry.) FIAP is currently engaged to identify how we can best address the needs of our constituents. Got any suggestions for consideration?

JOHN RUMBLE

Q: Why/How did you decide the traditional academia route wasn't for you and what methodology did you use to find your first job?

JOHN: My father had a friend who worked for IBM and when I was in college, he had dinner with us. He talked about how in industry, you get to form long term working relationships with colleagues, unlike academia where you get a new group of graduate students each year. I have always had an interest in working with teams on long-term problems and his remarks resonated with me. In addition, I did not go to graduate school immediately and worked in industry for two years before returning to school. That experience was very rewarding. Lastly when I finished my Ph.D. in chemical physics, there were very few professor job openings. I started working in international organizations and national labs, rather than doing a series of post docs and never went back to academia.

Q: What new challenges do you think the current generation of FGSA graduate students will face transitioning into industrial positions? And, what advice would you give regarding applying for jobs, or the industry versus academia debate?

JOHN: Every generation likes to think they are unique and that their challenges have never been faced before. Sorry folks, my generation was the last unique one! More seriously, the biggest change is likely to be the fact that most people are going to work for several (four or more) companies in their career and will also likely change careers at least a couple of times. In reality that is somewhat different than previously, but not as much as people make it out to be. We have had plenty of economic downturns that have forced professional people, including scientists, to change jobs and careers.

The best advice I can give young people going into any career is to do some serious planning, sooner than later. What do you like to do? What kind of situation do you like to work in: small vs. large organization, new business (high risk) vs. established company, teaching or research or other things, etc.? There are many tools available on the web to help you do such planning. Use one you like but then pay attention to your plans.

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Industrial & Applied Physics

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Finding a job that matches your real interests can be hard, and you won't necessarily get it right the first time. It is much easier, however, if you have a plan.

One last note: If you find your planning leads to the conclusion that you want to have flexibility and don't need to settle down immediately, then don't dismiss opportunities to work overseas, try something totally different, or take a risk. I sometimes think young people get too locked into finding the perfect job and settle on a career too young and too soon. Life is too cool to be rigid – have some fun and gain some life experience.

Q: What do you do on a daily basis, and what are you responsibilities?

JOHN: Presently I own a small business so every day I have to do everything from finding new work (marketing and writing proposals) to accounting and ordering supplies and everything in between. I find that what I do now is very similar to what I have done for the last twenty years, first running a major program at a national laboratory and then being an Executive Vice President of a $20M business and being in charge of all operations. That means specifically coming to work and never knowing exactly what is going to confront you today. At the same time, I have been able to maintain some scientific activity (in my field of scientific data), which is both intellectually rewarding and provides me with interactions with long-time colleagues here and abroad.

Q: As a physicist in industry how did you hear about the APS and what made you decide to get involved with FIAP?

JOHN: I have been a member of APS for over 40 years. I think I first joined because I wanted to attend DAMOP meetings and because APS had a good life insurance program, which I needed for my new family. I can't remember why or when I joined FIAP, but in terms of getting involved, Phil Wyatt, then Chair-elect sent out an e-mail asking for volunteers to help with the organization. I had just finished some other volunteer activities and replied and said I would be interested. As they say, the rest is history.

Steven Lambert is the first APS Industrial Physics Fellow, a newly created position at APS headquarters. He will focus on relations with physicists working in industry. He worked in the hard disk drive business for 27 years after earning a PhD in superconductivity and magnetism at UC San Diego. You can contact Steven at lambert@aps.org with questions about physics in industry.

Mark Bernius earned his PhD from Cornell University and after a career as a member of the faculty of a University and then as Technical Fellow in a large industry, is now working in Morgan Advanced Materials, a specialty thermal and electrical materials company in Ohio. He is currently Chair of the Forum for Industrial and Applied Physics (FIAP) in the APS.

John Rumble was trained as a Chemical Physicist, but has spent most of his professional career working with scientific data of all sorts. He has long been interested in how the advent of the Information Revolution and its large collections of data has changed scientific discovery and the conduct of science itself. After spending 24 years at NIST, Dr. Rumble moved into industry and presently owns a small data-oriented company—R&R Data Services.

Interview conducted via email by Katherine Davis. Katie Davis is the current Secretary for the FGSA. She is a fifth year PhD student in the physics department at Purdue University. You can contact her at davis260@purdue.edu.

Announcements

Collaboration

The APS Forum on Physics and Society is excited to begin working with the FGSA to keep you up-to-date with our latest news and opportunities for those of you interested in the intersection between physics and societal issues. We also want to hear back from you! If you have a submission for the newsletter highlighting your work that is of interest to our readership, a comment or a suggestion to share with the Forum on Physics and Society, we would love to hear from you! - Matthew Parsons, FPS Electronic Media Editor, msp73@drexel.edu; Andrew Zwicker, FPS Newsletter Editor, azwicker@pppl.gov

Future Conference

Physics of Sustainable Energy III: Using Energy Efficiently and Producing It Renewably.

Sponsored by: The American Physical Society's Forum on Physics and Society, Topical Group on Energy Research and Applications & the American Association of Physics Teachers

Saturday/Sunday, March 8-9, 2014
University of California at Berkeley

This third workshop on Physics of Renewable Energy continues the tradition begun by two successful predecessors, held in 2008 and 2011. Once again, experts will give the technical background to understand current energy issues. The talks will be aimed at college professors and students wanting to teach or do research in this field. For information, see http://rael.berkeley.edu/apsenergy2014

Highlights from CAM 2013

FROM PAGE 6

remarks, delegates said their goodbyes, exchanged contact information, and departed Waterloo.

I would like to extend a special thanks to all of the participants of CAM 2013. I am always impressed with how easily people come together to network and socialize at CAM conferences. A thank you also goes to all of the CAM 2013 organizers, most of whom were graduate students organizing a conference for the first time. This event would not have been possible without the army of people working behind the scenes to make this conference happen.

CAM13: An American Perspective

The tenth anniversary of the Canadian-American-Mexican Physics Graduate Student Conference (CAM) was held this August in Waterloo, Canada. As a member of the International Organizing Committee I had the opportunity to work with students from Canada and Mexico before the conference began. The responsibilities of the International Organizing Committee are to invite plenary speaker who represent a range of research areas, in all three participating countries. We also invited panelists to give insight to the student attendees.

Because CAM is such a small conference graduate students who attend have more opportunities to interact with the plenary speakers and other attendees. However many research groups are unable to provide the funds for students to get this opportunity, so an additional goal of the American members of the International Organizing Committee was to provide travel grants to all participants from U.S. Universities and plenary speakers. Therefore our work began over a year before the conference writing grants for travel funds. With the help of an NSF grant we were able to provide travel grants to all the students attending from U.S. universities who applied for one.

This conference would not have been possible without the hard work from all of those in the Local and International Committee specifically the Local Organizing Committee Chairs Evan Meyer-Scott and Chris Pugh, and the Conference Chair Erin O'Sullivan. I enjoyed the opportunity to work with everyone involved.

Erin is a PhD student in the field of neutrino physics at Queen's University in Kingston, Ontario, Canada. She has been the Director of Graduate Student Members on the Canadian Association of Physicists council since 2009.

Laura Boon is the Chair of the APS FGSA, the Forum on Graduate Student Affairs. She is a Ph.D. student at Purdue University, working on accelerator physics at Argonne National Laboratory's Advanced Photon Source.

FORUM ON GRADUATE STUDENT AFFAIRS

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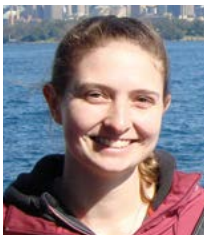
NEWSLETTER

DECEMBER 2013

2013 FGSA Executive Committee



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