SYMPOSIUM BI02

The Future of Materials Science Academia—Preparing for a Career in Higher Education
November 26 - November 28, 2018

Symposium Organizers
Allen Kimel, The Pennsylvania State University
Victoria Miller, North Carolina State University
Lisa Rueschhoff, Air Force Research Laboratory
Davey Theresa, Tohoku University

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* Invited Paper

SESSION BI02.01: Preparing a Successful Faculty Application
Session Chairs: Allen Kimel and Victoria Miller
Monday Afternoon, November 26, 2018
Sheraton, 3rd Floor, Dalton

1:30 PM *BI02.01.01
NFL Pros vs MSE Profs—Sizing Up the Competition for MSE Faculty Positions Mark D. Losego; School of Materials Science & Engineering, Georgia Institute of Technology, Atlanta, Georgia, United States.

Professional athletes are often described as "elite" – reaching a level of athletic excellence that most of us agree we can never achieve. At each level, from Pop Warner to High School to College, football players are cut from teams based on performance until an "elite squad" of 1,696 Pros play each Sunday in the U.S.'s National Football League (NFL). Interestingly, materials science and engineering (MSE) departments across the U.S. employ roughly the same number of professors (~1700), and unlike an NFL player whose average career is only 3 years, MSE professors often retain their position for 30 years. Considering these numbers, it is fair to ask: Who is more elite NFL Players or MSE Profs?

This talk will provide a light but insightful look comparing the competition and process for reaching both the NFL field and an MSE professorship. While elite performance and "total commitment to one's craft" are obvious similarities, many parallels in "intangibles" come into play when making that final hiring decision, including: specialization / flexibility (e.g., every football team only needs 1 place kicker), character (e.g., Johnny Manziel), your pedigree (DI vs. DIII) and your network (e.g., Christian Hackenberg's recent move to the Raiders). Perhaps most importantly, though, we must remind ourselves that the faculty hiring committee (like NFL coaches) are human and use a mix of logic and emotion (unless you are Bill Belichik) to reach a final hiring decision – so bringing the proper mix of substance and excitement along with a little luck is usually what's necessary to land that perfect job. But if you decide that a position outside of academia suits your lifestyle better, that's ok – then you can relax on Sundays while both the NFL Pros and the MSE Profs practice their craft (only one of which provides millions of fans amusement).

2:00 PM *BI02.01.02
Finding and Landing an Academic Position Michael L. Chabinyc; University of California, Santa Barbara, Santa Barbara, California, United States.

After many years of academic training, one's main priority turns to finding a job. Of the many career options available for materials researchers, finding an academic position is one of the most challenging. The application process for an academic position requires significant preparation, but it does not need to be a Sisyphean task. This talk will discuss the expectations for faculty candidates, provide tips for preparing the components of an applications, and outline what to expect from the interview process. One of the key messages is that time management is critical.

2:30 PM *BI02.01.03
From Application to Appointment—First Steps Towards a Faculty Position in Materials Engineering David F. Bahr; Purdue University, West Lafayette, Indiana, United States.

The initial stages of embarking on a career in academia can be daunting to the candidate (like any career path choice), and at times may seem opaque. This presentation will address some of the common stages that occur in becoming a faculty member in a materials engineering program, and compare and contrast positions within an MSE program, and when a materials researcher is joining a unit which does not offer an MSE (or related) degree. Common points in application materials for faculty positions for a range of departments, schools, and universities will be noted; in particular the presentation will highlight the need to demonstrate independent thought and ownership of research activities, maturity and dedication to education at the appropriate level of the institution, and articulating a vision of career success at both short and long term time scales. Discussion will be prompted on topics which often arise during phone and in-person interviews, ranging from student advising vision, balancing teamwork versus independence within a unit, to identifying audiences in the hiring process. Finally, some details of perceived pitfalls in the process will be presented.

3:00 PM BREAK

3:30 PM *BI02.01.04
Embracing Internationality—Becoming a Faculty Member Abroad Daniel R. King[1,2]; [1]Hokkaido University, Sapporo, Japan; [2]Global Station for Soft

Matter Research, Sapporo, Japan.

Working in academia in a foreign country provides for unique opportunities and experiences that would be difficult to achieve through a traditional domestic position. While teaching and training young students anywhere can be fulfilling, introducing students to the benefits of "internationality" is something that is best experienced away from one's home country. Japan, while possessing the third largest economy on Earth, is still ethnically homogenous, with foreigners making up less than 2% of the total population. Combined with a declining birth rate, the need for foreigner workers will continue to increase, resulting in more opportunities for foreigners to access positions in academia. In this presentation, I will outline the path I followed from being a PhD candidate in the United States (University of Massachusetts Amherst) to the position I have today, as an Assistant Professor at a *National University* in Japan (Hokkaido University). Specifically, I will address the following topics: finding positions in foreign countries; overcoming and dealing with language barriers; forming a research group and "fitting in" in a foreign environment; understanding and applying for funding; and the future of international faculty working abroad. I hope to express the successes as well as the struggles I have encountered through my journey. Through this presentation I aim to demonstrate the type of people who could be successful in this type of career, and hope to introduce a new path as faculty members at international universities.

4:00 PM *BI02.01.05
A Perspective on Pursuing the Academic Path Rebecca Kramer-Bottiglio; Yale University, New Haven, Connecticut, United States.

In this talk, I will discuss my path to academia, experiences with proposal writing, and insights on pursuing an academic career. I will also discuss young investigator and career award opportunities. I intend to keep the talk brief to allow for an engaging interactive session based on topics of interest to the audience.

4:30 PM PANEL DISCUSSION: MARK LOSEGO, MICHAEL CHABINYC, DANIEL KING, DAVID BAHR, REBECCA KRAMER-BOTTIGLIO

SESSION BI02.02: Reaching Tenure through Research, Teaching and Service I
Session Chairs: Allen Kimel and Lisa Rueschhoff
Tuesday Morning, November 27, 2018
Sheraton, 3rd Floor, Dalton

8:30 AM *BI02.02.01
Navigating Your Career with Confidence Susan B. Sinnott; The Pennsylvania State University, University Park, Pennsylvania, United States.

As you prepare for a career in higher education, it is not always clear how best to navigate the choices available. This presentation will summarize the ways in which materials science and engineering in academia has changed over the last decade, the implications for the field more broadly, and projections for the future. In addition, thoughts on best practices for navigating the career landscape will be discussed that should be helpful for your current job search or to prepare you for future opportunities.

9:00 AM BI02.02.02
Women in Physics in Ireland—Role Models are Out There Yvonne Kavanagh[1], Sheila Gilheany[2], Eilish McLoughlin[3], Miriam Byrne[4], Miryam Arredondo[5] and Katja Poppenhaeger[5]; [1]Institute of Technology Carlow, Carlow, Ireland; [2]Institute of Physics, Dublin, Ireland; [3]Dublin City University, Dublin, Ireland; [4]National University of Ireland Galway, Galway, Ireland; [5]Physics, Queens University, Belfast, United Kingdom.

Physics is one of the core disciplines in Materials Science and Engineering. Therefore, it is important for the next generation of researchers, especially females, to see that there are successful pathways to a sustainable career in academia.
Successful pipelines must be supported. As each stage of the pipeline, it has been shown that females are less likely to engage unless they can see what success looks like. This is evidenced in a sense of belonging and exposure to successful role models. It is therefore essential to highlight the success of women in physics, in order to inspire the next generation.
Research carried out in Ireland has shown that females are successful when they engage with physics. In particular female researchers are very successful in obtaining research funding when compared to other disciplines. Ireland has seen strong females in academia challenge the status quo and this has resulted in positive initiatives to encourage the promotion of females in academia. A study carried out in 2016 by the Higher Education Authority in Ireland captured the typical scissors view, where women are in the majority in the lower paid jobs in academia and greatly underrepresented when looking at the professor and the senior executive management level. This has resulted in the Higher Education Authority making gender equality in higher education a national priority as part of its funding compact with higher education institutions. It has also resulted in the linking of national funding to the attainment of Athena Swan Bronze Awards. This has focused attention on women in STEM, in particular. The Minister for Higher Education has highlighted the lack of movement towards gender equality in STEM and is responsible for the creation of a National Taskforce on Gender Equality. The Taskforce have reported and produced an action list to target inequality setting specific targets for the higher education sector.
This presentation tells the story of where women in Physics in Ireland are currently. It demonstrates how this is enabled by government policy. It reinforces the role the International Conference for Women in Physics has in tracking the journey and how Project Juno is enabling the physics community to improve gender equality.

9:15 AM *BI02.02.03
"*Insert cliché here*…"—Extracting Needles of Useful Guidance from Haystacks of Career Advice Geoff L. Brennecka; Colorado School of Mines, Golden, Colorado, United States.

One of the most important lessons learned during grad school is that the vast majority of literature is either incorrect, incomplete, and/or so limited in its applicability to be of little use. The same can be said of career advice, no matter how well-intended or hard-earned. As with literature, the trick—often only recognized in hindsight—is separating signal from noise and synthesizing new insights from multiple inputs plus the researcher's own datasets, experience, perspective, and interests. As in research, outliers can be incredibly useful, pointing to a need to recast the question and/or reinterpret the data using a different model. They can also be distracting and frequently over-weighted during analysis. Unfortunately, a career is an experiment with too many variables and too few data points to be effectively optimized; fortunately, there are many paths to (and definitions of) a successful academic career.

With the above caveats in mind and far too much reliance on the life-as-an-experiment analogy, a case study involving a transition from a national lab to academia will be presented as a vehicle for discussing and interpreting advice and guidance that too often went unheeded. Your mileage may vary, and free advice is worth what you paid for it, but close inspection will hopefully enable the identification of useful needles of guidance from a haystack of clichés.

9:45 AM BI02.02.04
Training the Next Generation of Materials Scientists to Embrace Broader Impacts and Share Their Work with the General Public Julie Nucci; Cornell Univ, Ithaca, New York, United States.

The Pew Research Center surveyed AAAS scientists in 2014 to inquire about the public's limited knowledge of science. 86% of respondents stated this is a major societal problem. A second question drilled down into the reasons for this lack of science literacy in the general population. AAAS scientists were asked to rate "not enough K-12 STEM", "lack of public interest in science news", "lack of media interest in science", and "too few scientists who communicate findings" as major or minor reasons. Not surprisingly, the AAAS scientists list their lack of communication as the least important reason for this public shortcoming. I disagree. If the majority of scientists and engineers deemed public communication as important as their research or professional practice, then the public understanding of STEM topics would surely be much better than it is now. This is particularly true for materials scientists, given the dearth of public knowledge of MSE. In an effort to change this at Cornell University, I partnered with WSKG, my local NPR/PBS affiliate to create a new course, ENGRG 3360: Developing Communicative Practice Through Transmedia and Community Engagement. I co-developed and co-taught the course with WSKG's Director of Science Content, Services, and Programming and we launched it in S2018. Students created publically accessible presentations/videos, leveraged social media platforms to share their science and engineering endeavors, and mentored local high school students. We used the PechaKucha as an innovative presentation format to develop students' abilities to identify and communicate their key idea in a clear message tailored to a target audience. The video phase of the course was a team effort, with teams composed of high school students, undergraduates, and graduate students. Our high school population, a group of twelve local students spending their entire senior year on the Cornell campus exploring engineering, participated in video production and played the very valuable role of assessing the suitability of the content created for teenagers and the general public. Students were also required create technical social media posts throughout the semester. While they are comfortable with social media in their social lives, it is paradigm shift for them to use these platforms for professional endeavors. We trained the students to do so and gave them ample opportunity to hone these skills. #CornellEngComm was created to track the content created and Twitter emerged as the social media platform of choice. Video and presentation content created by the students is being aligned to NYS and national education standards and lesson plans are being created for PBS Learning Media, a web-based resource used by students and teachers nationwide. In this talk, I will discuss course development and the partnership with public media. Samples of student work will be shown and opportunities for leveraging the content created will be discussed.

10:00 AM BREAK

10:30 AM *BI02.02.05
Navigating a Career in Academia—From Application to Pre-Tenure and Early-Tenure—Lessons Learned Along the Way Nazanin Bassiri-Gharb[1,2]; [1]George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia, United States; [2]School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia, United States.

Getting ready for a career in academia can seem at times a dauting task, but after years of preparation through doctoral studies and subsequent post-doctoral work, multiple applications to open positions and interviews, finally a match is made. In many cases, however, the process leading to this point is not only the beginning of a lifetime of learning, but also (and maybe even more so) the beginning of an even bigger challenge. The challenge is that of establishing oneself as a new and independent researcher, educator and mentor… and of course, along the path, make it through the tenure process. While tenure is still seemingly the biggest hurdle to pass in the academic career, the process need not to be necessarily an obstacle. The pre-tenure and early tenure years can be instead some of the most satisfying and fulfilling time in the academic life of an early-stage scientist.
This talk will address some of the approaches to tenure – from the start of the tenure-track, through the critical review, tenure, and finally early-tenure stages – that will allow you to enjoy the process and not lose the spirit of wonder: because losing the sense of wonder is much worse than not making tenure. The author will draw on her personal experience through the pipeline, as well as some of those of her close friends and colleagues. She promises to not embellish the truth (yes, chances are things will get tough at some point!), but also not to depress the attendees with endless counts of "a series of unfortunate events". And while there is no such a thing as "happily ever after", she will share some of the ways of keeping the happy before and after tenure.

11:00 AM *BI02.02.06
Future Faculty Expectations Bryan D. Huey; Materials Science and Engineering, University of Connecticut, Storrs, Connecticut, United States.

An academic's day has changed very little in the last several centuries--you think, share ideas with others, critique, and occasionally sleep. Of course the scope, structure, and finances of universities have shifted more dramatically, but still the expectations of faculty members remain remarkably similar: create knowledge; serve your institution and more broadly your profession; teach and mentor the next generation. The practical reality, though, is that we are all essentially small business owners, keeping our 'product' viable through publications, talks, student dissertations, funded grants, outreach, and even tangible results. The merit systems (financial, tenure, and respect of your peers) reward and indeed demand excellence in these important areas--all of them. But will universities, and faculties, function the same in the future? Increasing trends towards online learning may be particularly disruptive to the traditional model. How can prospective and new faculty, and their institutions, harness this trend instead of fighting it?

11:30 AM PANEL DISCUSSION: GEOFF BRENNECKA, SUSAN SINNOTT, NAZANIN BASSIRI-GHARB, BRYAN HUEY, YVONNE KAVANAGH

SESSION BI02.03: Reaching Tenure through Research, Teaching and Service II
Session Chairs: Allen Kimel and Victoria Miller
Tuesday Afternoon, November 27, 2018
Sheraton, 3rd Floor, Dalton

1:30 PM *BI02.03.01
From "Being Taught" to "Teaching"—A Personal Perspective of a Young Faculty Member Eva Hemmer; University of Ottawa, Ottawa, Ontario,

Canada.

This presentation will provide a snapshot on the journey of a materials scientist from Germany moving via Japan to Canada. It will not only tell about the geographical, but also about the scientific and academic journey, and how studying materials science and engineering can lead to an academic position in a chemistry department, conducting research on multifunctional lanthanides in molecules and nanomaterials. In this context, some experience from the time being a PhD student, from the period discovering new countries and research areas as a postdoctoral fellow, and the recent ongoing adventure of starting an independent research group as assistant professor will be shared with the audience. Also, first teaching experiences will be illuminated: another potential (and unexpected) source of culture shock. While the search for the ultimate recipe for the straight forward achievement of a scientific and academic career is still going on, some of the basics that may be required for a scientific trip by any young researcher or scientist will be suggested for discussion. These basics clearly include curiosity, self-motivation and an open mind, not to forget about endurance as well frustration tolerance, while great mentors are found to play a very important role at each stage of career.

2:00 PM BI02.03.02
From a Personal Experience as a Teacher of an Advanced Course on Materials Micromechanics—How the Background Gap Between Basic Materials Education and Advanced Topics Can be Filled with the Aim of Not Disappointing Enthusiasm of Students Not Suitably Informed on the Preliminary and Basic Notions Needed to Know Roberto Contro; Chemistry, Materials and Chemical Engineering 'Giulio Natta', Politecnico Milano, Milano, Italy.

The aim of this paper is showing that the student expectations can be not disappointed if they are personally involved in a learning itinerary where firstly their passion, ambition and intelligence are appreciated and stimulated. As consequence they will consolidate their self confidence and will accept to measure their real capability to learn notions indispensable to acquire a sufficient and rewarding preparation, not as a tool to overcome the profit examination but mainly to acquire consciousness of being able to win a challenge, sometimes sounded very difficult because of lacks in a previous basic background. In this way this experience might be useful to approach other challenges that unavoidably will met in their study a professional career. The word of order of a teacher should be identifying best talents and mainly discovering talents which often are hidden in a mass of students who, for several reasons like their familiar and cultural environment or also for a certain personal shyness, tend to do not recognize even to themselves.
The main step of such a learning itinerary, applied to a master course of materials micromechanics will be described with reference to the adopted textbook: FUNDAMENTALS OF MICROMECHANICS OF SOLIDS, Jianmin Qu and Mohammed Cherkaoui, Wiley, 2006.
Meaningful home-works will show as examples of final course results and a related brilliant career promoted as well.

2:15 PM BI02.03.03
How Materials Science Research in Secondary Schools Prepares the Next Generation of Materials Innovators Holly Golecki; The Haverford School, Haverford, Pennsylvania, United States.

Educational institutions that foster inquiry and innovation prepare students for future careers in science and engineering. Inviting students, as young as high school age, to engage in materials science research is mutually beneficial to aspiring scientists, as well as the university faculty who engage them. A case study for such work details research performed by high school students contributing to the Soft Robotics Toolkit. The open source nature of the soft robotics field presents opportunities for students outside of a university research lab to participate and advance the field. Exposing secondary school students to this rapidly growing field allows for evolution of the soft robotics industry in new and imaginative ways. Students at The Haverford School in Pennsylvania are developing materials-based approaches to soft robotics problems. From this, they gain fundamental knowledge in materials, develop technical communication skills, and are empowered to innovate in the future. As a co-curricular program, secondary school students, ranging in age from 13 to 18 years, collaborated to successfully design and build solutions to fundamental materials issues and prototype a soft robotic device to achieve a goal meaningful to them. In year one of the program, students developed gelatin-based actuators which are biodegradable and edible. In year two, the team developed a simple, one-step fabrication process for building actuators and applied them in a glove. The students collaborated with an art teacher to program the glove to transfer motion from accomplished to novice artists. This group now has a new skill set and confidence in the field to allow them to approach larger problems. This presentation will discuss the technical merits of their work as well as the broader benefits to the field of materials science. In a controlled study, we found that when students were presented with an opportunity to innovate: synthesizing a novel solution to authentic problems without the constraints of a prepared kit, common at the high school level, they were more creative and less constrained in future projects or design challenges. Outreach programs like this generate interest in the field of materials science and present opportunities for faculty to perform outreach that will generate the creative and prepared students they want in their laboratories. Soft robotics is just one application of accessible materials science outreach. This presentation will detail methods of developing this type of unique outreach initiative across the materials science field. Making students aware of what is possible will inspire the next generation of materials scientists, while stimulating the current practitioners with creative new ideas.

2:30 PM BREAK

3:00 PM *BI02.03.04
Understanding the Impact of Design in High School Outreach Camps Kaitlin Tyler, Nicole Johnson-Glauch, Leon Dean and Jessica A. Krogstad; University of Illinois at Urbana-Champaign, Urbana, Illinois, United States.

Outreach camps are an effective route to increasing interest in STEM disciplines, especially for underrepresented groups. They are also common components in the broader impact plans for many early career researchers. However, there is very little basis for understanding which aspects of outreach camps lead to positive outcomes. This is due in large part to the difficulty in comparing existing camps both within specific STEM disciplines and across them. As a result, there is little science-based guidance for the development of effective outreach camp structure or content. Because of this, we specifically target the process of design in outreach camps due to its importance in engineering degree programs. By comparing different methodologies for incorporating design thinking through a qualitative multi-case study across four engineering disciplines, we have begun to assess whether design can be used to positively affect outcomes of STEM outreach camps and provide guidance for outreach development.

3:30 PM BI02.03.05
Nanovation—An Interdisciplinary Outreach Program to Train the Next Generation of Scientists and Entrepreneurs Rita Blaik[1] and Sarah Tolbert[2, 3]; [1]California NanoSystems Institute, University of California, Los Angeles, Los Angeles, California, United States; [2]Chemistry and Biochemistry, University of California, Los Angeles, Los Angeles, California, United States; [3]Materials Science & Engineering, University of California, Los Angeles, Los Angeles, California, United States.

Entrepreneurship plays a crucial role in economic development by promoting technological innovation and job creation. A lack of experience and training in technology entrepreneurship is a problem that often persists up to and including doctoral training, and many universities are at a loss as to how to prepare students interested in an entrepreneurial career path. In order to address this pain point, the California NanoSystems Institute at UCLA created the

Nanovation Competition outreach program in the 2016-2017 academic year. In this after-school competition, teams of middle and high school students in Southern California compete with the help of UCLA STEM graduate student mentors to generate nanotechnology-based product ideas and develop business plans which they then pitch in a "Shark Tank"-style event. The nanotechnology topics are primarily based on CNSI's Nanoscience Institute program led by Professor Sarah Tolbert, which is a teacher training program now its 14th year aimed at bringing cutting-edge nanoscience concepts to classrooms in the greater LA area. The larger goal of the Nanovation program is to introduce the growing culture of technology and entrepreneurship to students at an earlier age, which can foster economic growth in Southern California.

In addition to explaining the nature and goal of our Nanovation competition, this presentation will discuss the outcomes of this program over the last two years and cover strategies for fostering positive volunteer and mentoring experiences, creating robust professional development for graduate students and K-12 teachers in STEM and entrepreneurship, and winning financial support to sustain these programs over the long-term.

3:45 PM BI02.03.06
Collaboratively Creating Research-Inspired Materials Science and Engineering Outreach Activities Anne Lynn Gillian-Daniel, Matthew Stilwell, Wendy Crone and Nicholas Abbott; MRSEC, University of Wisconsin–Madison, Madison, Wisconsin, United States.

The emphasis that NSF places on meaningful, effective Broader Impacts can be challenging for researchers developing research proposals. An effective strategy for dealing with the challenge is to collaborate with groups who focus on science, technology, engineering, and math (STEM) outreach to the public. By integrating research and education, the University of Wisconsin Materials Research Science and Engineering Center's (UW MRSEC) works with researchers to create research-inspired materials science and engineering (MSE) educational resources and programs. These resources, including classroom laboratory experiments, hands-on outreach activities, and research programs for teachers, are designed to inform and excite K-12 students, teachers, and public audiences about MSE research and its applications to their world. The UW MRSEC works with researchers to develop broader impacts plans that align with their goals and interests. For example, some faculty members have collaborated with us to develop outreach activities by modeling the cutting-edge instrumentation funded through an equipment proposal. Other faculty members have supported and hosted a teacher in the Research Experience for Teachers (RET) program. Through the RET, Wisconsin teachers perform research in the laboratory of the faculty members and develop new classroom curriculum based upon their summer research experiences. The new curriculum modules are implemented and evaluated in the RET fellow's classroom the following school year. The modules can then be adapted for other audiences and outreach venues. Following development and adaptation, UW MRSEC members work with faculty to field test new resources, evaluate them for engagement and efficacy, and iteratively improve them. The faculty members and their students then present the completed activities at outreach events both on and off the UW campus. These activities can also be disseminated online on the MRSEC education website, in-person during workshops, and in professional education journals. Examples of research-inspired educational resources developed by faculty for NSF proposals and the UW MRSEC, along with avenues for dissemination, will be shown as part of the presentation.

4:00 PM BI02.03.07
Funsizephysics—A New Tool for Presenting Your Research to the Public Leigh M. Smith[1], Jocelyn Bosley[2] and Shireen Adenwalla[2]; [1]Department of Physics, University of Cincinnati, Cincinnati, Ohio, United States; [2]Department of Physics and Astronomy, University of Nebraska–Lincoln, Lincoln, Nebraska, United States.

During our scientific training we spend much time preparing ourselves for writing scientific papers, proposals and teaching students. In contrast we spend very little time (almost none) on preparing ourselves to communicate our ideas to the public, and these are extremely different tasks. This is truly unfortunate since our communications to the public are becoming a more important and essential part of our outreach efforts. In this presentation I will describe a new NSF-funded effort to develop a new website (funsizephysics.com) which makes it particularly straightforward to develop graphically pleasing web-based presentations to the public. While it is certainly not easy to design a good and informative page which gets across the excitement and importance of your research in an accessible way, working within your research group can make the process easier and at the same time help to train your students. Funsizephysics now makes it easy to have multiple authors for a page. Have a graduate student draft their work and then have other members critique the good points and bad points of the web page. Then iterate with an eye to improving the presentation. In this presentation we will provide some simple guidelines and hints which we think can help your outreach efforts.

We acknowledge the support of the National Science Foundation through grants DMR-1725823 and DMR-1726026.

4:15 PM PANEL DISCUSSION: EVA HEMMER, JESSICA KROGSTAD, RITA BLAIK, HOLLY GOLECKI, MATTHEW STILWELL, LEIGH SMITH

SESSION BI02.04: Navigating the Funding Pipeline
Session Chairs: Victoria Miller and Lisa Rueschhoff
Wednesday Morning, November 28, 2018
Sheraton, 3rd Floor, Dalton

9:00 AM *BI02.04.01
Funding Opportunities in Materials Engineering at the US National Science Foundation Alexis C. Lewis; Civil, Mechanical and Manufacturing Innovation, National Science Foundation, Alexandria, Virginia, United States.

This presentation will describe funding opportunities related to Materials Science and Engineering at the National Science Foundation, including current programs, new opportunities, and planned focus areas. Additionally, the NSF Merit Review process will be discussed, including components of a successful proposal, finding the right home for your research, and proposal writing tips for early career faculty.

9:30 AM *BI02.04.02
The U.S. Army Research Office—Why We Do, What We Do and How We Can Help You David M. Stepp; U.S. Army Research Office, Research Triangle Park, North Carolina, United States.

Maneuvering the diverse and complex funding pipelines has become a significant challenge for even the most promising researcher, and poses a threat to the future of materials science in academia. David Stepp brings nearly twenty years of experience at the U.S. Army Research Office to provide insight and perspective on the "why," the "what" and the "how" underpinning one of the preeminent materials science funding agencies worldwide. This talk will focus on suggested approaches that apply to all funding agencies, both in the U.S. and abroad. It will also include a discussion of some of the most common misunderstandings held by materials science researches when soliciting funding.

10:00 AM BREAK

10:30 AM *BI02.04.03
Aerospace Materials for Extreme Environments Ali Sayir; Air Force Office of Scientific Research and NASA Liaison, Arlington, Virginia, United States.

Transformative breakthroughs most of the time do not originate from the investigations of materials in the equilibrium state but in contrary at the margins of stability, in a regime at the limit or outside of the textbook knowledge within the discipline. In this context, this presentation will embrace materials and processing science approaches that are far from the thermodynamic equilibrium domain; i.e., directionally solidified eutectic structures, highly doped piezoelectric and thermoelectric materials, and other oxide materials with cage structures for electron emission. The intent is to elucidate the complex interplay between phase transitions for electronic/magnetic phase separation and untangle the interdependence between structural and electronic effects. I will also discuss what I consider to be promising research concentration areas within ceramics research for the aerospace materials for extreme environments portfolio of Air Force Office of Scientific (AFOSR), including the focused development of a ceramics processing science laboratory for ceramic matrix composites, the development of materials for use in the hypersonic regime.

11:00 AM PANEL DISCUSSION: ALEXIS LEWIS, DAVID STEPP, ALI SAYIR