2018 NSF Career Development Workshop in Ceramics

October 13 – 14, 2018

Columbus, OH, United States

DMR-1833207

Workshop Overview

The primary goal of the 2018 NSF Professional Development Workshop in Ceramics is to enhance the career development of the next generation of leaders in ceramic materials research and education. This workshop brings together recent awardees of the National Science Foundation (NSF) CAREER grant with a group of U.S.-based and international experts in their respective research areas in a forum that promotes technical and non-technical discussions. The workshop provides a platform for the CAREER awardees to hone their research ideas, address potential challenges that might be encountered in their research plans, and build a strong professional network with an international component. In addition to the panel discussions for each of the CAREER awardees, the workshop includes presentations and facilitated panel discussions on topics such as mentoring success stories, managing graduate students and collaborators, navigating the tenure track, and an open discussion of the future of ceramics research and education. The workshop is open to not only recent NSF Ceramics CAREER awardees and their mentors, but also other interested members of the ceramics community, especially junior faculty, post-doctoral researchers, and senior graduate students.

The 2018 Professional Development Workshop in Ceramics will be held on Oct. 14, 2018 at the Columbus Convention Center to coordinate with the Materials Science and Technology Technical Meeting and Exhibition, Oct. 14-18, 2018, in Columbus, Ohio (MS&T18). A welcome reception is planned for Oct. 13, 2018.

The 2018 NSF Career Development Workshop is **FREE**, but does require registration at the link below. ACerS nonmembers will be prompted to create a New Visitor Registration. If you wish to register by phone, contact customer service at (240) 646-7054.

http://ceramics.org/nsf-career-development-workshop-in-ceramics

For more information, please contact Candace K. Chan, Arizona State University, (480) 727-8614, candace.chan@asu.edu

About the NSF CAREER Award Program

The NSF Faculty Early Career Development Program (program solicitation NSF 17-537), better known as the CAREER program, is the agency's most prestigious award for early-career faculty. The program is designated for untenured assistant professors who are beginning their independent research careers. Proposals for the CAREER program are expected to contain sections devoted to research, teaching, and the integration of research into education. Applicants are encouraged to have assessment plans for both the research and education efforts to determine if the goals described in the proposal are met. CAREER proposals may also include an international component, if the activities and benefits of the international interaction are clearly defined.

Ceramics NSF CAREER Awardee Presenters

Matthew McDowell of Georgia Institute of Technology, and **Jessica Krogstad** of the University of Illinois at Urbana-Champaign received CAREER awards in 2017 and will be the featured presenters at the 2018 workshop.

Dr. Matthew McDowell is an Assistant Professor at Georgia Institute of Technology in the Woodruff School of Mechanical Engineering and School of Materials Science and Engineering. His group strives to understand how materials behave and transform in real-life environments within energy devices, so that they can engineer improved materials for new energy technologies. The goal of Matt's CAREER project ("Interfacial Transformations in Ceramic Ion Conductors for Solid-State Batteries") is to understand the spatiotemporal evolution of structure, chemistry, and morphology of ceramic electrolyte interfaces within solid-state batteries and to determine how these factors influence ionic conductivity and stability of ceramic electrolytes. To improve lifetime and stability, this research uses novel experimental techniques to understand interface degradation processes in real time and to determine how to protect these interfaces from degradation. Multiple *in situ* experimental techniques probe nanoscale transformations at ceramic electrolyte/alkali metal interfaces before and during battery operation and examine the influence of tailored protection layers on interfacial transformations.

Dr. Jessica Krogstad is an Assistant Professor in the Materials Science and Engineering department at the University of Illinois at Urbana Champaign. Her group focuses on understanding materials in nonequilibrium configurations and the evolution thereof, so as to generate and optimize unique functionality for operation in dynamic and extreme environments. Jessica's CAREER project ("Enhanced Ferroelastic Toughening in Electroceramic Composites through Microstructural Coupling") establishes a fundamental relationship between otherwise stochastic morphological features and intrinsic toughening mechanisms to systematically design highly durable, ferroelastic/ferroelectric functional composites. Ferroelastic switching is one of a limited number of intrinsic toughening mechanisms available for advanced ceramics, yet it is not fully utilized due to a largely uncharacterized relationship among localized morphological features, efficient activation of domain nucleation and motion, and resultant improvements in toughness. By bridging this gap using *in situ* microscopy and targeted micromechanical probes, this research provides the foundation for accelerated physics-based design of more durable ceramic composite systems. The state of the art characterization and processing methods used in this project in combination with a data-driven integrated computational materials engineering perspective is enhancing the overall development of graduate students, preparing them for an ever more digitally-reliant materials science industry.

Workshop Agenda (updated Sept. 11, 2018)

Saturday, Oct. 13, 2018

Time	Activity	Description
7 – 10 pm	Evening Reception	Informal discussions and networking Location: *Gordon Biersch* 401 N Front St #120, Columbus, OH

Sunday, Oct. 14, 2018
Location: ***Columbus Convention Center (Room A114), 400 N High St, Columbus, OH***

Time	Activity	Description
7:30 am	Continental Breakfast	Informal discussions and networking
8:00 am	Welcome and Overview	*Alexis Lewis, National Science Foundation* Program Director, Advanced Manufacturing - Division of Civil, Mechanical and Manufacturing Innovation
8:15 am	Participant Introductions	Self-introductions to promote networking throughout workshop
8:45 am	(Avoiding) Common Pitfalls of New and Junior Faculty	Panel of senior CAREER awardees: *Claire Xiong, Boise State* *Corrinne Packard, Colorado School of Mines* *Candace Chan, Arizona State University*
9:30 am	CAREER Awardee Session I	*Matt McDowell, Georgia Tech* "Understanding the spatiotemporal evolution of structure, chemistry, and morphology of ceramic electrolyte interfaces within solid-state batteries"
10:00 am	CAREER Awardee I Panel, Q&A	Panel of senior expert faculty: *Scott Barnett, Northwestern* *Jacob Jones, North Carolina State University* *Nancy Dudney, Oak Ridge National Laboratory*
10:30 am	Break	Coffee
11:00 am	Managing Students (and Collaborators) and Working with Balance	Panel of senior faculty: *Ivar Reimanis, Colorado School of Mines* *Liping Huang, Rensselaer Polytechnic Institute* *Scott Barnett, Northwestern*
12:00 pm	Lunch	Group lunch onsite (Room A115)
1:00 pm	Mentoring Success (and Failure) Stories	Panel of senior faculty: *Kathy Lu, Virginia Tech* *Jürgen Rödel, Technical University Darmstadt* *Jacob Jones, North Carolina State University*
2:00 pm	CAREER Awardee Session II	*Jessica Krogstad, University of Illinois at Urbana-Champaign* "Enhancing ferroelastic toughening in electroceramic composites through microstructural coupling"
2:30 pm	CAREER Awardee II Panel, Q&A	Panel of senior expert faculty: *Anil Virkar, University of Utah* *Jürgen Rödel, Technical University Darmstadt* *Jennifer Lewis, Harvard University*

3:00 pm	Break	Coffee
3:30 pm	Life-long Learning and What Comes After Tenure	Panel of senior faculty: *Yue Qi, Michigan State University* *Shyue Ping Ong, University of California, San Diego* *Anne Co, The Ohio State University*
4:30 pm	Future of Ceramics Research and Education	*Lynnette Madsen, National Science Foundation* Program Director, Ceramics - Division of Materials Research
5:30 pm	End of formal programming	
6 – 9 pm	Dinner	Informal discussions and networking Location: *Park Street Tavern* 501 Park St, Columbus, OH

Faculty Panelists and Speakers

Scott Barnett	*Northwestern University*
Candace Chan	*Arizona State University*
Anne Co	*The Ohio State University*
Nancy Dudney	*Oak Ridge National Laboratory*
Liping Huang	*Rensselaer Polytechnic Institute*
Jacob Jones	*North Carolina State University*
Jessica Krogstad	*University of Illinois at Urbana Champaign*
Alexis Lewis	*National Science Foundation*
Jennifer Lewis	*Harvard University*
Kathy Lu	*Virginia Tech*
Lynnette Madsen	*National Science Foundation*
Matt McDowell	*Georgia Institute of Technology*
Corrinne Packard	*Colorado School of Mines*
Shyue Ping Ong	*University of California, San Diego*
Yue Qi	*Michigan State University*
Ivar Reimanis	*Colorado School of Mines*
Jürgen Rödel	*Technical University Darmstadt*
Anil Virkar	*University of Utah*
Hui (Claire) Xiong	*Boise State University*

Workshop Locations:

Oct. 13, 2018	Evening Reception (7 – 10 pm) *Gordon Biersch Brewery & Restaurant*; 401 N Front St #120, Columbus, OH
Oct. 14, 2018	Continental Breakfast and Workshop (7:30 am – noon, 1 – 5:30 pm) Greater Columbus Convention Center, Room A114
Oct. 14, 2018	Lunch (12 – 1 pm) Greater Columbus Convention Center, Room A115
Oct. 14, 2018	Dinner (6 – 9 pm); *Park Street Tavern*; 501 Park St, Columbus, OH

Maps of Workshop Locations