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MESD
Materials Engineering & Sciences Division
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MESD Division Newsletter

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Notes from the Chair

Dear MESD Members and Friends,

With this newsletter, I would like to highlight the vitality of MESD and thank the MESD members for their contributions, hard work, and participation! We have an exciting meeting planned for Minneapolis. We had a strong slate of nominees for our Division awards that will be presented on the morning of Wednesday, November 1, in our Division plenary session. The Braskem Award for Excellence in Materials Engineering and Science will be presented to Prof. Shaoyi Jiang (University of Washington) for his "seminal contributions to the molecular understanding, design, and development of zwitterionic materials and coatings for a broad range of applications." Prof. Rodney Priestley (Princeton University) will receive the Owens-Corning Early Career Award for "novel experiments illuminating the glass transition, for a method to create ultrastable glassy polymer films, and for a scalable route to structured colloidal particles." In addition, the Division plenary will feature talks by Prof. Karen Winey (University of Pennsylvania), Prof. James Engstrom (Cornell University), and Prof. Yushan Yan (University of Delaware), who are representing different facets of MESD. In addition, many MESD Areas have plenary and graduate student award sessions, and I applaud the efforts of the Area chairs and co-chairs for their work in putting together great sessions and raising funds to support these efforts. I also appreciate the efforts of our MESD director, Prof. Wei Fan (University of Massachusetts Amherst), who has kept track of the efforts among the MESD Areas to raise funds.

My thanks go to our 1st vice chair, Prof. Joe Elabd (Texas A&M University), for his excellent work on MESD programming in Minneapolis. Due to his efforts, we were able to expand our programming to include new sessions that highlight cutting-edge research in MESD. MESD has continued to follow the lead of AIChE to increase the quality of the poster sessions. My gratitude goes to MESD directors Prof. Megan Robertson (University of Houston) and Prof. Jeffrey Rimer (University of Houston) who took charge of organizing the poster session and the judging. This year, we will feature the poster session on Monday, October 30, from 3:15-4:45 p.m. No other MESD oral sessions will run during this time slot so that our members have the time to engage with the poster presenters. In addition, AIChE is providing refreshments during the poster session to encourage attendance, and I hope that you will join us there!

Inside this issue

As you know, the MESD election is currently underway, and I urge you to cast your vote! Biographies and statements are included in the ballot and in this newsletter. I appreciate all who are running in the election and are willing to serve MESD. Thanks to MESD director Prof. Shelly Peyton (University of Massachusetts Amherst), who led the efforts of the nominating committee. We are always looking for enthusiastic MESD members to contribute, and I hope that you will attend your Area's business meeting on Tuesday, October 31, from 6-7 p.m. to give input into future programming and elect Area leaders.

In closing, I want to thank the MESD Executive Council and Area chairs and co-chairs. I have enjoyed working with all of you these past few years, and I am confident Prof. Elabd and Prof. Elizabeth Lipke (Auburn University) will continue to improve MESD programming and operations. I look forward to seeing you in Minneapolis!

Julie C. Liu

Chair, MESD 2016-2017

Associate Professor, Davidson School of Chemical Engineering, Purdue University

MESD Plenary and Poster Awards

At the 2016 MESD Plenary, Prof. Bradley Chmelka (University of California, Santa Barbara) received the Braskem Award for Excellence in Materials Engineering and Science, and Prof. Jeffrey Rimer (University of Houston) received the Owens Corning Early Career Award.

Presentation of the Braskem Award for Excellence in Materials Engineering and Science. Robert Balsam (Braskem America) (left) and Prof. Michael Kilbey (right) present the award to Prof. Bradley Chmelka (middle).

Presentation of the Owens Corning Early Career Award. Prof. Michael Kilbey (left) and Prof. Don Baird (Virginia Tech, Owens Corning Early Career Award chair) (right) present the award to Prof. Jeffrey Rimer (middle).

Graduate Student Poster Award and MESD Undergraduate Student Poster Award winners were announced. Both competitions gather contributions from all five areas of the division: polymers, biomaterials, inorganic materials, electronic and photonic materials, and composites.

Graduate Student Winners:

1st place: **Jaclyn Lock**, Northeastern University
Title: *Dextran Sodium Sulfate Exposure Affects Intestinal Mucus Integrity.*
Coauthors: Taylor Carlson, Albert Chen, and Rebecca L. Carrier

2nd place: **Kristopher Kolewe**, University of Massachusetts Amherst
Title: *Zwitterion-Poly(ethylene glycol) Hydrogels Prevent Bacterial Adhesion.*
Coauthors: Todd Emrick and Jessica D. Schiffman

3rd place: **Melissa Gordon**, University of Delaware
Title: *Dynamic Bonds for Mechanically-Triggered Crosslinking and Healing.*
Coauthors: Norman Wagner and Christopher J. Kloxin

Recognition of the Graduate Student Poster Awards. Pictured (from left to right) are Prof. Michael Kilbey, Kristopher Kolewe, Melissa Gordon, Jaclyn Lock, and Prof. Megan Robertson (Chair of MESD Poster Session).

Undergraduate Student Winners:

1st place: **Trevor Jones**, Vanderbilt University
Title: *Screening Chemical Parameter Space of Self Assembling Monolayers.*

2nd place: **Aiden Coffey**, University of Colorado-Boulder
Title: *Stabilization of Silicon Carbide Via Nano-Structured ALD Thin Films*.

3rd place: **Christopher Serfass**, Bucknell University
Title: *A Microfluidic Method for the Simultaneous Quantification of Hydrogel Erosion and Drug Release.*

Area 8B (Biomaterials) Plenary and Awards

Speakers from the 8B plenary session: "Leaders in Biomaterials." Pictured from left to right are Prof. Paula Hammond (MIT), Prof. Erin Lavik (University of Maryland, Baltimore), and Prof. Brendan Harley (University of Illinois at Urbana-Champaign).

Area 8A (Biomaterials) hosted a new Graduate Student Award Session.

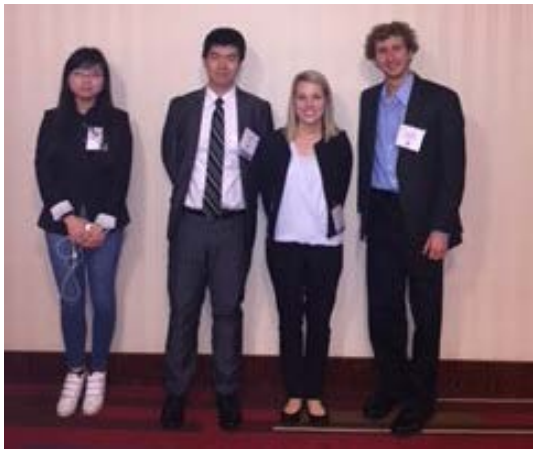
1st place: **Christopher Madl**, Stanford University
Title: *Maintenance of Neural Progenitor Cell "Stemness" in 3D Hydrogels Requires Matrix Remodeling.*
Advisor: Prof. Sarah Heilshorn

2nd place: **Kayla Sprenger**, University of Washington
Title: *Combining Simulation and Spectroscopy to Determine the Structure and Orientation of a Carbohydrate Binding Module (CBM)-Inspired Model Peptide on Cellulose.*
Advisor: Prof. Jim Pfaendtner

3rd place: **Norman Truong**, University of California Los Angeles
Title: *Sustained Transgene Expression Via Substrate Mediated Gene Transfer Results from Multiple Transfection Events.*
Advisor: Prof. Tatiana Segura

Honorable Mention: **Yue Lu**, University of North Caroline at Chapel Hill and North Carolina State University
Title: *Transformable Liquid-Metal Nanomedicine.*
Advisor: Prof. Zhen Gu

Honorable Mention: **Hok Hei Tam**, MIT
Title: *Ligand-Targeted Conjugate Systems for Delivery of siRNA to Tumors.*
Advisor: Prof. Daniel G. Anderson



Recognition of the 8B Graduate Student Award Winners. Pictured (from left to right) are Yue Lu, Hok Hei Tam, Kayla SPrenger, and Christopher Madl.

2016 Graduate Student Awards in Area 8A: Polymers

Area 8A (Polymers) continued its Excellence in Polymer Graduate Polymer Research symposium. This session was sponsored by Wiley; Macromolecular Journals; *Journal of Applied Polymer Science; Journal of Polymer Science, Part A: Polymer Chemistry*; and *Journal of Polymer Science, Part B: Polymer Physics*.

1st place: **Jeffrey Lopez**, Stanford University
Title: *Crosslinking in Self-Healing Polymers for Improved Performance in Li-Ion Batteries.*
Advisor: Prof. Zhenan Bao

2nd place: **Kelly M. Meek**, Texas A&M University
Title: *Chemical Stability and Ion Transport in Polymerized Ionic Liquid Anion Exchange Membranes.*
Advisor: Prof. Yossef A. Elabd

3rd place: **Vivek Yadav**, University of Houston
Title: *Exploring the Dispersity-Enhanced Stimulus Response and Bacterial Release in Polyelectrolyte Brushes.*
Advisor: Prof. Jacinta C. Conrad

Area 8E: Electronic & Photonic Materials 2015 Graduate Student Awards

Area 8E (Electronics and Photonics) hosted a Graduate Student Award Session

1st place: **Jihyeon Yeom**, University of Michigan
Title: *Inorganic Chiroptical Nanomaterials: Design Strategies and Origin of Homochirality.*
Advisor: Prof. Nicholas A. Kotov

2nd place: **Ankit Agrawal**, University of Texas at Austin
Title: *Influence of Crystalline Anisotropy on Localized Surface Plasmon Resonance of Semiconductor Nanocrystals.*
Advisor: Prof. Delia J. Milliron

3rd place: **Seung Hyun Sung**, Purdue University
Title: *Electrochemical Gating of Charge Transport in Radical Polymers for Colorless, Transparent, and Ambipolar Organic Transistors.*
Advisor: Prof. Bryan W. Boudouris

Recognition of the 8E Graduate Student Award Winners. Pictured (from left to right) are Seung Hyun Sung, Jihyeon Yeom, and Ankit Agrawal.

Kilbey Recognized for Service to MESD

At the conclusion of the 2016 Executive Council meeting, we thanked Michael Kilbey for his service to MESD as chair (2015-2016), vice chair (2014-2015), and 2nd vice chair (2013-2014).

Recognition of Service to MESD. Prof. Joe Elabd (right, 2nd Vice Chair, 2015-2016) presents a plaque commemorating Prof. Michael Kilbey's (left, Chair 2015-2016) service to MESD.

Biographical Sketches and Statements of Nominees

CANDIDATES FOR 2ND VICE CHAIR
(VOTE FOR 1)

Jodie L. Lutkenhaus, Texas A&M University

JODIE L. LUTKENHAUS is the William and Ruth Neely Faculty Fellow and an Associate Professor in the Artie McFerrin Department of Chemical Engineering at Texas A&M University. Lutkenhaus received her B.S. in Chemical Engineering in 2002 from The University of Texas at Austin and her Ph.D in Chemical Engineering in 2007 from Massachusetts Institute of Technology. Following a postdoctoral position at University of Massachusetts Amherst, she joined the faculty at Yale in 2008. In 2010, she moved to Texas A&M University and was promoted to Associate Professor in 2015. Current research areas include polyelectrolytes, redox-active polymers, energy storage, and anti-corrosion coatings. She has received recognitions including the NSF CAREER, AFSOR YIP, 3M Non-tenured Faculty Award, ACS PRF Doctoral New Investigator, Kaneka Junior Faculty Award, and an ACS PMSE Young Investigator. She serves as an ACS PMSE Member at Large, an Editorial Advisory Board Member for ACS Macro Letters and Macromolecules, and an Editorial Board Member for Scientific Reports.

Jodie has been an active member of AICHE, attending meetings annually since 2007. She served as the Area Chair and Area Vice Chair for Area 8a (Polymers) 2015-2016 and 2014-2015. In addition, she has often served as a chair for numerous sessions and has co-organized and raised funds for the Area 8a plenary session. As second vice chair, Jodie's goals are to continue the tradition of excellence in MESD, while expanding outreach through social media. The purpose would be to highlight the accomplishments of MESD members, award recipients, and ongoing activities, while connecting with new prospective members. Jodie's second goal is to expand industry participation, which has seen recent gains in Area 8a. This may be accomplished through strategically inviting industrial speakers and chairs and by developing special interest sessions.

Sankar Nair, Georgia Institute of Technology

SANKAR NAIR is Professor, James F. Simmons Faculty Fellow, and Associate Chair for Industry Outreach in the School of Chemical & Biomolecular Engineering at Georgia Tech. His research interests are in the chemistry and engineering of nanoporous materials and membranes for separations and catalysis. He received his B. Tech. and Ph.D. degrees in chemical engineering from IIT Delhi and UMass Amherst, respectively.

Sankar is an AIChE member since 1999, and an active organizer of MESD (Section 8D) and NSEF sessions on inorganic materials and thin films at Annual Meetings since 2004. He also serves the Materials community in a number of other roles. He is a staff member of the Institute for Materials (IMat) at Georgia Tech, and contributed substantially to the organization of the Southeast Regional Materials Genome workshop and the National Materials Accelerator workshop (2014). Sankar is an Executive Editor of Chemical Engineering Science since 2013, and is focused on the Materials Engineering content of the journal. He edited a Special Issue on Metal-Organic Framework (MOF) Materials for Emerging Chemical Technologies, published in 2015. He was the chair of the 14th International Conference on Inorganic Membranes (ICIM) in 2016. Through these avenues, he has been active in promoting the strong role that chemical engineers can play in next-generation materials discovery and development.

As 2nd Vice Chair of MESD, Sankar's immediate interest will be to help maintain an impactful programming effort in the traditionally strong areas as well as address emerging new issues. For example, in view of the noteworthy impact of accelerated materials design approaches, he established in 2015 an MESD session on "Accelerated Discovery and Development of Inorganic Materials" in the AIChE Annual Meetings. Sankar is also interested in the longer-term goals of increasing MESD outreach to industrial researchers, young faculty, and postdocs/students; and in finding ways to improve the scientific and professional value of MESD membership.

As a Materials researcher, Sankar has authored more than 100 journal publications and holds 16 US patents. He has advised/co-advised more than 40 Ph.D./M.S. students and postdoctoral fellows at Georgia Tech. Recognitions of his research work include the CAREER award (NSF, 2008), the Sigma Xi Outstanding Young Faculty Award (Georgia Tech, 2008), and the FRI/John Kunesh Award (AIChE Separations Division, 2012). His work on scalable MOF membranes and metal oxide nanotubes has been extensively highlighted by the news media.

CANDIDATES FOR DIRECTOR (VOTE FOR 2)

Bryan W. Boudouris, Purdue University

BRYAN W. BOUDOURIS is the Robert and Sally Weist Associate Professor and the Director of the Professional M.S. Program in the Charles D. Davidson School of Chemical Engineering and an Associate Professor of Chemistry (by courtesy) at Purdue University. He earned his B.S. in Chemical Engineering from the University of Illinois at Urbana-Champaign in 2004 and his Ph.D. in Chemical Engineering from the University of Minnesota in 2009. From 2009 – 2011, Bryan was a postdoctoral fellow at the University of California, Berkeley and the Lawrence Berkeley National Laboratory working on a project that was supervised by Professor Rachel Segalman. In 2011, he started his independent career at Purdue University. His group's research interests include the design, synthesis, nanostructural characterization, and implementation of homopolymers and block polymers in applications that include: polymer-based photovoltaic, thermoelectric, and memory devices; enhanced oil recovery; nanostructured membranes with high fluxes and high selectivities based on both size and chemistry; and improved sampling and detection of trace explosives for heightened security of the homeland. Due to the impact of the group's work and his commitment to education, he has been recognized with a number of internal and external awards including the Air Force Office of Scientific Research Young Investigator Program award, the Defense Advanced Research Projects Agency Young Faculty Award, the National Science Foundation CAREER Award, the American Physical Society Division of Polymer Physics – UK Polymer Physics Group Lectureship, and the Exceptional Early Career Teaching Award at Purdue University.

Bryan has been active within Area 8A since 2011, chairing and co-chairing numerous sessions within the area. In addition, he was one of the two inaugural chairs for the 8A Graduate Student Awards Session for the 2014 AIChE Annual Meeting. This allowed him to help initiate and shape the process and criteria associated with this awards session. In 2016, he served as vice-chair for Area 8A, and he is currently serving as the chair of Area 8A for the 2017 AIChE Annual Meeting. In addition to his roles associated with the national AIChE and the AIChE Annual Meeting, Bryan also served as the advisor for the AIChE student chapter at Purdue University from 2012 – 2016. During this time, he helped mentor the students in such a manner that allowed their chapter to receive an Outstanding Student Chapter Award in 2016. If elected as a director of MESD, Bryan will work with the rest of the division leadership team in order to continue to strengthen the MESD poster session, increase the participation of a diverse group of presenters with a focus on engineers from national laboratories and industrial entities, and build upon previous fundraising successes in order to strengthen the fundraising efforts of the division. By uniting these critical components, it is anticipated that the division will be able to expand its impact on early-career, materials-focused chemical engineers, increase the number of awards programs in the division, and continue to lead innovation with respect to the overall vision of the AIChE community.

Julianne Holloway, Arizona State University

JULIANNE HOLLOWAY is an Assistant Professor of Chemical Engineering at Arizona State University. Julianne completed her Ph.D. degree in Chemical Engineering at Drexel University under the advisement of Professors Giuseppe Palmese and Anthony Lowman. In 2012, Julianne continued her training in Jason Burdick's Laboratory at the University of Pennsylvania as a postdoctoral fellow. During this time, she was awarded the National

Institute of Health Ruth L. Kirschstein National Research Service Award Postdoctoral (NIH NRSA F32) Fellowship for her research developing hydrogels for bone tissue engineering. In January 2016, Julianne started her own laboratory as a faculty member at Arizona State University, where her research focuses on designing biomimetic materials for orthopedic tissue engineering and regenerative medicine. Julianne's research has been recognized through several awards, including: University of Washington's Distinguished Young Scholars Seminar Participant (2014); Most Promising Graduate Student Commencement Award (Drexel University, 2012); National Defense Science and Engineering Graduate Fellowship (2009-2012); and First Place in the Society for Advancement of Material and Process Engineering University Research Symposium (2010).

Julianne is a senior member of AIChE and has been active since 2006. As an undergraduate student, Julianne served as the CHEM-E-CAR Team Leader and later as the President for Drexel University's AIChE Student Chapter. Since, Julianne has served as a session chair for numerous sessions, presented or co-authored more than a dozen AIChE abstracts, and served as a poster and oral presentation judge. Julianne is currently the Fall Programming Chair for the Women's Initiative Committee (WIC), where she is responsible for developing career development programming for women, as well as, planning WIC's 20th anniversary celebration in Fall 2019.

Throughout her career, AIChE has played a critical role in Julianne's growth as an engineer and educator. If elected as a director of MESD, Julianne will use her experiences to prioritize the following: 1) Promote opportunities for and recognition of young scientists, including student awards and career development programming; 2) Facilitate the engagement and presence of scientists from industry, national laboratories, and federal regulatory and grant agencies with targeted programming and 3) Improve cross-talk among the different areas within and beyond MESD to facilitate co-sponsored sections and foster multidisciplinary collaboration.

Holly Stretz, Tennessee Technological University

HOLLY STRETZ is full Professor in the Department of Chemical Engineering at Tennessee Technological University (TTU). She studied for her PhD at University of Texas – Austin with Dr. Donald R. Paul, graduating in 2005. After her BS, she spent five years in industry as a process engineer, working for Celanese on the Texas Gulf Coast and later for Advanced Micro Devices. She also taught high school in Texas and Indiana while raising her family. She continues to enjoy employing active learning and entrepreneurship in her classrooms, and has been recognized for pedagogy by the TTU College of Engineering Awards committee during three separate competitions. Holly's research since her PhD has been in understanding process engineering of nanoparticle assembly and interactions with polymers, mentoring 23 MS and PhD students. Her grants and research have ranged from DOD work with rocket nozzle ablatives to EPA work with environmental fate and transport of engineered nanoparticles to NIH work with organic hydrogel nanoparticles for drug delivery. Holly has been a member of AICHE since 2004, and has been active every year since that time chairing symposia, serving as Area 08f chair multiple times, advising new Area 08f area chairs, and was elected as MESD director in 2009-2011. In her previous director service, she oversaw the MESD poster session and served on the committee chaired by Dr. Don Baird which created and managed the first Owens Early Career Award competition. She also has served as the TTU student chapter AICHE faculty advisor during the years in which TTU won the AICHE car competition.

As a current director, her goals will be to 1) help all the areas consider and find funding and management for new awards for small yearly early career presentation recognition, which can then serve as a funnel for nominations for the Owens Corning Early Career Award, and 2) examine ways to get industry and national laboratories more involved in the symposia in materials. These activities will raise the awareness of the AICHE membership of the value of MESD as a home for sharing advances and for robust network building / generation of collaborative opportunity.

Mark Snyder, Lehigh University

MARK SNYDER is an Associate Professor of Chemical and Biomolecular Engineering at Lehigh University. He obtained his B.S in Chemical Engineering with highest honors from Lehigh University in 2000, and his Ph.D. in Chemical Engineering in 2006 from the University of Delaware. Before his return to Lehigh in 2008, Snyder spent two years as a postdoctoral associate in the Department of Chemical Engineering and Materials Science at the University of Minnesota. Mark's research at Lehigh focuses on the design and engineering of functional inorganic nanoparticles, nanoparticle assembly, and porous particles and thin films for applications spanning separations, catalysis, and energy technologies. His research has been recognized with an NSF CAREER Award (2014) and a Doctoral New Investigator Award from the ACS Petroleum Research Fund (2010). While at Lehigh, Mark has received Lehigh's Early Career Award for Distinguished Teaching, and has held both a P.C. Rossin Assistant Professorship (2009-2011) and a Frank Hook Assistant Professorship (2011-2013) in recognition of his teaching and research.

Mark has been an active member of AIChE since his undergraduate enrollment in 1996 and election to various officer positions in Lehigh's Student Chapter of the AIChE. Since joining the faculty at Lehigh, Mark has served as the faculty advisor to Lehigh's AIChE student chapter for a period of 5 years. At the national level, Mark chaired or co-chaired many sessions in Area 8D (Inorganic Materials) since 2007, and he served as the Vice-Chair and Chair of Area 8D programming in 2011 and 2012, respectively. Mark also served as the Chair of the 18th Northeast Corridor Zeolite Association (NECZA) in 2014. If elected as a director of MESD, Mark will collaborate with other Directors to grow industrial sponsorship and to foster academic-industrial-national lab interactions and contributions to the division. Mark is keenly interested in developing support for 1) expanding division awards specifically for young investigators and travel awards for graduate students and postdocs, and 2) for at least partial funding of keynote speakers in technical sessions across the MESD areas.

CANDIDATES FOR SECRETARY/TREASURER
(VOTE FOR 1)

Ryan Toomey, University of South Florida

RYAN TOOMEY is an Associate Professor in the Department of Chemical and Biomedical Engineering at the University of South Florida (USF). Ryan Toomey received his Bachelor's degree in Chemical Engineering from the University of California Berkeley in 1995 and his PhD in Chemical Engineering at the University of Minnesota in 2002, followed by a post-doctoral position at the University of Freiburg in 2003. He joined USF in 2005. His research is in the area of polymers and gels, especially the physics of polymers that deform under external stimuli, including electric, magnetic, and thermal cues. His main technological interest involves the development of polymer coatings that can change properties on command. He is the recipient of a Camille and Henry Dreyfus New Faculty Award and an NSF CAREER Award.

Ryan has been active with AIChE since 2005 and has chaired numerous sessions in Area 8A. He is currently the 2016-2017 secretary-treasurer of the Materials and Engineering Sciences Division (MESD), chair of the Students Chapter Subcommittee (SCC) of AIChE, and co-organizer of the undergraduate poster competition for the 2016 National AIChE student conference. He has also been the faculty advisor for the AIChE student chapter at USF since 2007, which has received the AIChE Outstanding Chapter Award for the last 5 years in a row.

2016-2017 MESD Officers

Chair & Newsletter Editor
Julie Liu
Purdue University
(765) 494-1935
julieliu@purdue.edu

1st Vice Chair & Program Committee Chair
Joe Elabd
Texas A&M University
(979) 845-7506
elabd@tamu.edu

2nd Vice Chair
Elizabeth Lipke
Auburn University
(334) 844-2003
elipke@auburn.edu

Past Chair
Michael Kilbey
University of Tennessee-Knoxville
(865) 974-3403
mkilbey@utk.edu

Secretary/Treasurer & Webmaster
Ryan Toomey
University of South Florida
(859) 257-5507
toomey@usf.edu

Directors (term ends 2017)
Shelly Peyton
University of Massachusetts Amherst
(413) 545-1133
speyton@ecs.umass.edu

Megan Robertson
University of Houston
(713) 743-2748
mlrobertson@uh.edu

Directors (term ends 2018)
Wei Fan
University of Massachusetts Amherst
(413) 545-1750
wfan@ecs.umass.edu

Jeffrey Rimer
University of Houston
(713) 743-4131
jrimer@central.uh.edu

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