American Institute of Chemical Engineers

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# Materials Engineering and Sciences Division Newsletter

**Volume 40 Issue 2**
**September 2009**

## *Notes from the Chair*

Dear MESD Members and Friends,

Welcome to the division election edition of the MESD Newsletter! Inside you will find biographies and statements of excellent candidates for the various MESD positions, including Second Vice-Chair, Director and Secretary-Treasurer. We sincerely appreciate these individuals for their time and effort in preparing their statements and their interest in MESD. We also want to remind you of the importance of casting your votes for selecting a Second Vice President and two Directors from these candidates and encourage you to take time to vote. The Second Vice-Chair will coordinate programming for the 2011 Fall Annual Meeting and eventually progress to the position of Chair of the division. Our Directors do a tremendous job of promoting the Division to the rest of AIChE, the chemical engineering community, and prospective members. The Secretary-Treasurer keeps minutes of the Executive Committee meeting and oversees division finances. These candidates will replace some excellent individuals who have given much of their time and energy to the division. The outgoing Directors are Sharon Glotzner (U. Mich.) and Alon McCormick (U. Minn.) I have very much enjoyed my time as Chair and turn the task over to Ed Seebauer (U. Illinois) who I know(based on his thorough and efficient handling of the programming for the 2009 meeting) will do an excellent job. The rising First Vice-Chair is Lynn Loo (Princeton). Brian Mitchell (Tulane) will continue as Newsletter editor, while Pete Ludovice (Georgia Tech) will continue as Webmaster, and Christine Schmidt (U. Texas) and Lonnie Shea (Northwestern) will continue as Directors. Doug Kalika (U. Kentucky) will continue as the secretary-treasurer and is running unopposed for the position. This is a demanding position and requires considerable effort to maintain the finances and keep the minutes of the executive meetings. We sincerely appreciate Doug's efforts and his contributions from his experience as previous Chair of MESD. It should also be mentioned that John Eckert (U. Texas) will take over as the Awards Coordinator replacing Dennis Hess(Georgia Tech) who has held the position for the last eight years. Again we sincerely appreciate Dennis' contribution to MESD for coordinating the selection of the Stine Award winner and keeping contact with DuPont who provides the financial backing for the award.

INSIDE *this issue*



I would also like to acknowledge CPChem for their financial support of the poster session and DuPont for their financial support of the Stine Award. It has been a difficult year for many companies, and Universities as well, and we sincerely appreciate the fact that these two companies have continued to maintain support of these two activities.

In closing, I would like to remind you that an important change in the by-laws has made the current Area Chairs members of the MESD Board, enabling more communication between the Board and the individual programming Areas. Programming is one of the primary activities of the Division, and this change is extremely important to the ability of MESD to make adjustments in programming and keep the program topics at the forefront of materials research.

I look forward to seeing you all in Nashville in November.

With Kindest Regards,

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**"Accessing Facilities at National Centers, Laboratories, and Synchrotron Radiation Sources"**
Session 08000
Monday, November 9, 2009, 8:30am
Belle Meade A/B (Gaylord Opryland Hotel)
Sponsored by MESD and cosponsored by Education Division

This session features a series of invited talks highlighting both experimental and computational facilities at various national centers, laboratories, and synchrotron radiation sources available to the academic community. Representatives will detail available facilities and provide information on accessibility, and in some cases, even funding opportunities to support travel. Early-career faculty members as well as post-doctoral associates and graduate students thinking about academic careers are encouraged to attend. An extended Q&A session with the speakers will provide ample opportunity to ask questions.

Confirmed invited speakers include Barry Lai (Advanced Photon Source, Argonne National Laboratory), Jamie Messman (Center for Nanophase Materials Sciences, Oak Ridge National Laboratory), Christian Kisielowski (National Center for Electron Microscopy, Lawrence Berkeley Laboratory), Michael Toney (Stanford Synchrotron Radiation Laboratory, Stanford Linear Accelerator Center), Chris Soles (Polymer Division, National Institute of Standards and Technology).

** This session is partially sponsored by the Polymers Program, National Science Foundation**
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## The ELECTION SLATE: FALL 2009

### Candidates for Position of Second Vice-Chair (vote for one):

(i) Jane P. Chang (ii) Joel R. Fried (iii) Stevin H. Gehrke

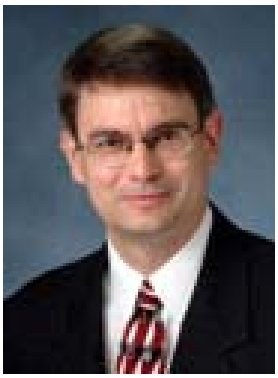
**JANE P. CHANG** is a Professor in the Chemical and Biomolecular Engineering and the Associate Dean of Research and Physical Resources at the Henry Samueli School of Engineering and Applied Sciences at UCLA. She received her B.S. in Chemical Engineering from the National Taiwan University in 1993, her M.S. in Chemical Engineering Practice from Massachusetts Institute of Technology in 1995, and her Ph.D. in Chemical Engineering from MIT in 1998. She was a postdoctoral member of technical staff at Bell Labs, Lucent Technology at Murray Hill, NJ from 1998-1999 and then joined the faculty of the Chemical and Biomolecular Engineering Department at UCLA in 1999 and was appointed the William F. Seyer Chair in 2000. Her research focuses on the synthesis and chemical processing of novel electronic materials, atomistic understanding of solid state interfaces, and their applications in microelectronics, optoelectronics, and microsensors. Specifically, her research group studies the synthesis of inorganic thin films and nanostructures with tailored electronic, ionic, chemical, and thermal properties by novel atomic layer controlled thermal, radical, and plasma enhanced deposition techniques and hydrothermal processing, develops highly selective plasma etching processes for patterning nano-metered thin films, and integrates these materials into nano-electronics, photonics, nano-phosphers and micro-batteries. In addition, her research group integrates the experimental and first-principle theoretical approaches to elucidate the fundamental physical and chemical origins of superior material and electronic properties. She is the author of more than 85 journal publications, including a book and a book chapter, holds 4 U.S. patents, and has given more than 100 invited presentations at many international conferences, academic institutions, and industry throughout the world. She received the Faculty Career Development Award from the National Science Foundation in 2000, a Chancellor's Career Development Award from UCLA in 2000, a Young Investigator Award from the Office of Naval Research in 2003, the Peter Mark Award from AVS in 2005, the TRW Excellence in Teaching Award in 2002 and the Professor of the Year Award from the Chemical Engineering Department at UCLA in 2003, 2004, and 2009. She is a member of AIChE, AVS, MRS and ACS. She is actively involved in the plasma science and materials communities, and organized many symposia at the annual AVS, APS, and AIChE meetings. The plasma symposium she organized at the AVS 2008 meeting had the record and the highest attendance for the Plasma Science and Technology Division and the AVS. Jane is also an active member of AIChE member since 1993 and has organized many symposia for the Electronic and Photonic Materials Area of MESD since 1999. She is currently the Chair the Electronic and Photonic Materials Area and serves on the Executive Committee of MESD. As second vice chair, Jane plans to strengthen MSED's excellence in multidisciplinary research and professional interactions, promote the dissemination of basic and applied research through national conferences, increase the interactions with other AIChE divisions, and energize the MESD base with more young researchers from academia and industry.

**JOEL R. FRIED** is Professor of Chemical Engineering, Dual Professor of Genome Science, and Fellow of the Graduate School at the University of Cincinnati. He received BS degrees in Chemical Engineering and Biology and a ME in Chemical Engineering from RPI. He also received a MS and PhD in Polymer Science and Engineering from UMASS (Amherst). Industrial experience includes positions at the Corporate R&D labs at GE (Schenectady) and Monsanto (St. Louis). From his initial appointment as Assistant Professor of Chemical Engineering in 1978, Joel has at the University of Cincinnati served in a number of administrative roles including the second Director of the Polymer Research Center and as Department Head from 1998 to 2002. He has served as Editor of the NAMS Quarterly and Associate Editor of Computational and Theoretical Polymer Science (Elsevier, incorporated into Polymer). He is the founding editor of Polymer Contents (Elsevier) and is on the Editorial Boards of Polymer and the Journal of Polymer Engineering. In additional to about 150 papers, book chapters and patents, he is the author of Polymer Science and Technology (Prentice Hall, 3rd edition to be published in 2010) and Computational Chemistry and Molecular Simulations (Wiley, scheduled for 2010).

Joel's research activities include computational polymer science and computational biology, with particular focus on the simulation of transport properties. Joel has mentored over 50 graduate students and postdocs many of whom have been extremely successful in academic positions including several serving as department heads and deans. Others PhD students have founded their own very successful companies in the materials area. Joel is currently PI and director of the NSF IGERT program on Bioapplications of Membrane Science and Technology and the co-PI of a NSF REU program in Membrane Science and Technology at the University of Cincinnati.

Joel has been an active member of AIChE since 1971 and has organized many technical sessions. Recently, he has served on the Books sub-committee of the AIChE Publications Committee and as a Director of MESD. As Second Vice-Chair, Joel will strive to maintain the excellent quality of MESD programming including expanding coordination with other societies such as the materials divisions of the ACS and APS and with related societies such as NAMS. Joel will also work to promote active involvement of members in industry and governmental labs with the Divisions, to expand MSED membership, and to encourage active participation of members new to AIChE.

**STEVIN H. GEHRKE** is Professor of Chemical Engineering and Bioengineering with a courtesy appointment in Pharmaceutical Chemistry at the University of Kansas. Steve received a B.S. from Kansas State University (1980), and an M.S. (1983) and Ph.D. (1986) from the University of Minnesota; all in chemical engineering. In 1986 he joined the chemical engineering faculty at the University of Cincinnati. In 1998 he was named head of the chemical engineering department at Kansas State University. Upon completion of his term in 2003, he moved to KU to help develop the first graduate bioengineering program in Kansas. He has been a member of AIChE, ACS (including PMSE and POLY Divisions) and the Controlled Release Society for over 20 years, and served as the Secretary/Treasurer of MESD from 1993–2007. He is an editorial board member of the Journal of Pharmaceutical Sciences and served over ten years on the board of Chemical Engineering Progress. From 2001 – 2004, he served on the Fundamentals of Engineering Examination Content Review Committee. Steve has ~70 publications, 6 patents, 50 invited presentations and 60 conference presentations. His current emphasis is on nanostructured hydrophilic networks, currently funded by NSF and NIH. Steve has been actively involved with MESD planning since 1987. As Secretary/Treasurer he helped MESD grow account balances to over $35,000 with a combination of dues, corporate sponsorships and investment income. He also prepared the minutes for Executive Council meetings, worked on membership development, and prepared and analyzed the first membership survey. As a result, Steve is intimately familiar with the division history and personnel.



Steve has identified three areas of effort if elected: continuing excellence in technical programming; aiding professional development of members who do not attend the annual meetings; and making effective use of the Division's financial resources. MESD has always done an excellent job in annual meeting programming; Steve would strive to maintain this success while using his predecessor's experience for continuing improvement. Steve is also concerned about how to support members who do not attend the Annual Meeting and those not working in R&D. In the past, the most tangible benefit of membership was the newsletter. Going to web-only distribution of the newsletter has made benefits of membership dues less clear. Steve will explore how to merge the newsletter and web presence to enable effective member networking. To develop this idea may require expenditure of accumulated division funds. However, the goal is to set up a process that could be maintained with the dues or subsidized by corporate sponsors. He will be looking for ideas that provide the broadest support of members, expand the membership base, and ensure that dues and benefits are properly matched.

## Candidates for Position of Director (vote for two):

(i) David Green (ii) Vijay John (iii) Thomas F. Kuech (iv) Holly A. Stretz

**DAVID GREEN** is an Assistant Professor in the Department of Chemical Engineering at the University of Virginia. He received a BS in Mechanical Engineering from Boston University, and subsequently an MS in Civil (Environmental) Engineering and a PhD in Chemical Engineering from the University of Maryland. David was an IPRIME Postdoctoral Fellow at the University of Minnesota with Alon McCormick in the Department of Chemical Engineering and Materials Science and an NSF International Postdoctoral Fellow with Jan Mewis in the Department of Chemical Engineering at the Katholieke Universiteit Leuven in Belgium. David joined UVa in 2005 and he is currently the co-Director of Graduate Admissions. David is a recipient of the NSF CAREER Award in 2007. His research spans the fields of nanoparticle synthesis, polymer chemistry, colloid and polymer physics. David was the first to elucidate mechanistically how the grafting polymers to nanoparticles control their dispersion in polymer solutions and melts, and these studies form the basis of his research. His group employs bottom-up methodologies to formulate advanced polymer nanocomposites for biomedical, aerospace, and defense applications. Their use of various reaction chemistries to synthesize well-controlled nanoparticles, controlled/living polymerizations to tailor nanoparticle interfaces with graft polymers, and theoretical and computational approaches to predict nanoparticle self-assembly has led to seminal publications in Langmuir, Macromolecules, and Soft Matter and two pending patents on new ways to produce highly-reinforced polymer nanocomposites through the stretching of graft polymers.


David has been actively involved in the materials community. He has organized several seminars including three at the ACS Colloid and Surface Science Symposia and the Society of Rheology. He has been a session coordinator for two Gordon Conferences, and has been involved in AIChE programming. As Director, David will work to expand interdisciplinary programming on advanced materials for nanomedicine, energy, and the environment. The expansions will occur primarily through topical conferences in addition to joint programming between MESD and other materials-centric divisions outside AIChE such as PMSE-ACS and DPOLY-APS. David will strive to enhance industrial involvement in MESD by providing specialized forums and opportunities for networking and discussion. Ultimately, David will emphasize the recruitment of graduate students and young faculty, to ensure a strong future for MESD.

**VIJAY JOHN** is the Leo S. Weil Professor of Engineering and Chair of the Chemical and Biomolecular Engineering Department at Tulane University. He has been at Tulane since 1982 and has served as Department Chair from Jan. 2002. He received a B.Tech in Chemical Engineering from IIT Madras, an MS from the Pennsylvania State University and a D. Eng. Sci. from Columbia University, all in Chemical Engineering. Vijay works in the area of self-assembled and templated materials synthesis with applications to vaccine and drug delivery, and to the solution of problems in environmental remediation. He has published 140 journal articles and reviewed book chapters, and has graduated 20 Ph.D students. He has received funding from NSF, the U.S. Army, DoE, EPA and the NIH. Vijay served as a Program Director at the NSF during the years 1996-98. He is active in the AIChE and has helped organize the NSF workshops at the AIChE for the past 4 years. Vijay's leadership experience primarily stems from his position as Department Chair during a critical time when Tulane and the City of New Orleans were ravaged by the effects of hurricane Katrina. During this period, he was involved in rebuilding the research and educational infrastructure of the Department, working to bring back students and to sustain faculty and staff well-being and motivation. He is particularly proud of the fact that young faculty have flourished in their careers at Tulane. His mentorship of junior faculty was cited by University administration in his investiture as the Weil Professor. He is also proud of helping build collaborations across the university and in developing joint projects between the School of Science and Engineering and the Medical School. He will bring the same dedication to service as a Director of MESD. Vijay sees MESD playing a pivotal role in the future of chemical engineering. Materials science and engineering is crucial to the development of technologies that will lead to a better quality of life throughout the world, and chemical engineers have the fundamental skills to make significant contributions in this field. As Director, Vijay will work towards enhancing collaborations between the various AIChE divisions and MESD, and towards providing avenues for research visibility of new researchers through workshops and symposia established by strategic programming at the AIChE.

The polls for MESD elections will be open from:
October 1st – October 15th
To vote for candidates use the following web site with the division pass code for login "MES":
www.aiche-xtranet.org/divisions/

**THOMAS F. KUECH** is the Shoemaker Professor of Chemical Engineering in the Chemical and Biological Engineering Department at the University of Wisconsin – Madison. He received a B.S. in Physics and a M.S. in Materials Science from Marquette University and later a M.S. and Ph.D. in Applied Physics from the California Institute of Technology. He worked for 9 years as a research staff member and a research manager at the IBM T.J. Watson Research Center in the area of semiconductor growth and processing and provided an interface between the semiconductor science and device activities there. He has been involved in the study of the chemical and physical processes underlying the synthesis of semiconductor materials and structures. A particular focus has been the formation of semiconducting structures from the gas phase chemical reactions, nanostructured materials for sensing, photovoltaics and the formation of new materials integration technologies based on solid-solid interfaces. Tom has been honored with the American Association for Crystal Growth Society Award, is a Fellow of the American Physical Society, has held several named lectureships, and was the MESD 2003 Stine Awardee.

Tom has been very active in professional service and leadership. While at UW-Madison, he was the inaugural director of the NSF UW-Madison Materials Research Science and Engineering Center. He has served as an executive officer in several professional societies: president of the American Association for Crystal Growth, secretary of the International Organization for Crystal Growth and chair of national and international conferences. He is a member of the topical programming and the inter-society cooperation committees of the Materials Research Society. As MESD director, he would push for greater student involvement and engage industrial participation from those areas now recruiting chemical engineering grads but not active in the programming of our division. The AICHE/MESD needs to continually franchise both academic and industrial researchers now active in other technical organizations serving both established and emerging areas in order to broaden and enrich the field as well as our chemical engineering community.

**HOLLY A. STRETZ** recently served as programming vice-chair and chair for Area 8F (Composites), and observed the extraordinary transitions occurring in both chemical engineering industries and in materials research and development in the last years. These transitions reflect simultaneously the feverish competition of emerging markets (energy, health, nanomaterials) matched by the steady march of process/product safety issues and challenging economics. Chemical engineers are uniquely prepared as professionals to contribute in both of these venues. Communication and teamwork have always been an essential part of the chemical engineering enterprise, and yet current economic pressures on industry, academics and the engineering workforce are limiting our opportunities to engage in conferences and professional networking. As a Director, I will work hard to attract innovative industrial involvement and support; to find new ways to promote efficient, effective communication and networking among our members. Joint programming with the topical conferences is certainly one avenue to explore. Additionally, given the extraordinary career pressures on our next generation of engineers, I will target the continued growth and vitality of MESD membership by working with the Young Professionals Advisory Board.

I am currently an Assistant Professor of Chemical Engineering at Tennessee Technological University. I received the BS in chemistry at Texas A&M University, the MS in polymer chemistry at Texas State University, and the PhD in chemical engineering at the University of Texas-Austin in 2005. Concurrent with my PhD work, I developed new products as a laboratory manager/grant specialist at Texas State University. I have experience in industry for 5 years, including polymer compounding/nylon intermediates production with Celanese Plastics and later chemical vapor deposition/chip fabrication with Advanced Micro Devices. I have served for 11 years teaching secondary advanced placement chemistry, returning to research after receiving the PhD. My research group at Tennessee Technological University is currently focused on solving processing problems in the development of hierarchal assemblies of nanoparticles in polymer-based composites, with applications in aerospace, flammability, and proteomics. The research is focused on processing and modeling, as manufacturing issues often represent a significant bottleneck for polymer nanocomposites development. Additionally we have initiated studies in environmental fate and transport of anthropogenic nanoparticles. In addition to industrial contributions, I have published 12 full papers, 1 patent, and over 70 scholarly proceedings, and hold numerous awards for communication in materials science publications. The group now employs 2 PhD students, and is very active in supporting undergraduate research (15 such projects in 4 years), diversity, workforce development and outreach with funding through NIST and NSF. I am a member and technical reviewer for the Society for the Advancement of Materials and Process Engineering, and a member of SWE, ACS, ASEE and Sigma Xi.

**Upcoming Meetings and Events**

AIChE has its national meeting November 8-13th in Nashville, TN.

# MESD Officers

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