



Damon A. Dozier to succeed Ronald L. Kelley, MRS Office of Government Affairs, who announces retirement

Dozier succeeds Kelley effective September 16, 2014

Ronald L. Kelley, a long-time consultant for the Materials Research Society's (MRS) Office of Government Affairs, has announced his retirement. In his 23 years of service, Kelley has seen the MRS presence in Washington, DC, grow from a Society learning how the political system works to forming a robust MRS Government Affairs Committee that guides the Society's advocacy activities.

Kelley recently said, "The [MRS] Government Affairs Committee has created new opportunities in letter writing to Congress and the Administration through [the] Materials Voice software; arranged for visits to the offices of Members of Congress through our Congressional Visits Day programs; supported the development of over 19 years of selecting and assigning Congressional Fellows to work on Capitol Hill and then to maintain this knowledge and expertise within MRS; initiated opportunities for federal program directors to present at all major MRS meetings; [and] created and supported policy sessions for congressional staff and Members on the Hill." Kelley also credited MRS with supporting policy studies in energy critical materials and follow-on legislation and developing a forum for federal materials leaders to have a chance to collaborate.

As president of Strategic Partners, Inc., Kelley has provided guidance to the Society on science and technology programs, funding, and policy primarily in the high-tech sector for over three decades. For the past 14 years, he has also been associated with The Livingston Group, LLC, a government relations firm

in Washington, DC. Kelley's clients have included Dow Corning Corporation, The Dow Chemical Company, Goodyear Tire and Rubber Company, Case Western Reserve University, Verizon Communications, Verizon Wireless, Soitec, Echo Star, Energy Conversion Devices, Current Group, Cetacean Networks, MTI Micro Fuel Cells, US Advanced Ceramics Association, and



Damon A. Dozier (left) and Ronald L. Kelley (right)

Genesis Microchip. He has worked on projects relating to nanotechnology, semiconductors, photonics, materials science, hardware and software, information systems, biotechnology, stem cells, electrical smart grids, fuel cells, solar energy, protective armor, light-emitting diodes, helium, satellite communications, Internet protocols, wireless telecommunications, and information networks.

Alan J. Hurd, who has served as MRS president and as a Franklin Fellow for The US State Department, said, "Ron Kelley is in the top tier of professional advocates

in Washington. He is truly the dean of science policy consultants. Ron's expertise in creating effective advocacy for important science legislation is second to none. As a result, MRS imprint can be seen on individual pieces of legislation over the years. However, it is Kelley's expert sculpting, training, and growing of our politically smart cadre, both volunteer and professional, that is his greatest legacy."

In recent years, MRS has expanded its relationship with Kelley's Strategic Partners, Inc. as a result of volunteer and community demand for an increased voice in Washington, DC. With Kelley's retirement, MRS has hired **Damon A. Dozier**, formerly the Director of Public Affairs for the American Anthropological

Association, as the Director of Government Affairs. In his new post, Dozier will be responsible, in conjunction with the MRS Government Affairs Committee, for the overall direction of all advocacy and public policy activities of the Society. His duties will include developing government relations strategies and programs, informing MRS members about legislative developments, and serving as a chief advocate on interdisciplinary materials research and technology issues.

"I am both pleased and excited to be a member of a strong MRS team that includes a talented and respected staff, strong volunteer leadership, and a well-deserved reputation for

successful advocacy in the Washington, DC, legislative and regulatory community," Dozier said. "My plan is to build upon the strong work that Ron has done for the past 23 years and, in conjunction with the MRS Government Affairs Committee, raise our level of engagement with all of our partners in the nation's capital."

In his most recent post, Dozier was responsible for providing leadership to the American Anthropological Association in conceptualizing, planning, and directing government affairs, media



relations, and international policy functions. He coordinated the Association's responses to public policy issues of concern to the membership, and advised the organization on strategic priorities for long-term engagement on public policy issues. He monitored Congressional and Executive Branch actions relevant to the field's research and education; advocated for their interests with policymakers; prepared and submitted testimony to government groups; identified experts in the field to serve in federal policy roles; and cultivated relationships with international institutions, including the United Nations. He also produced the Association's biweekly podcast, a monthly column in

the organization's printed newspaper, and its Annual Report.

After receiving his BA degree in 1989 from Howard University, Dozier embarked on his long career of working in government relations and public affairs, including as an Assistant Advocate for Environmental Policy with the Small Business Administration, a Legislative Assistant on the Senate Committee on Small Business and Entrepreneurship, where he worked on numerous small business-related regulatory issues for Ranking Member Senator John F. Kerry of Massachusetts, and the Director of Government and Public Affairs for the National Small Business Association. He

also spent three years as the Legislative Director for former Congressional representative Juanita Millender-McDonald. In that capacity, he had an active role in shaping the Congresswoman's legislative profile, including a very extensive science and scientific research portfolio that included securing appropriations for institutions of higher learning in the Congresswoman's district.

Dozier is an active member of several societies, including the American Society of Association Executives (ASAE) and the Council of Engineering and Social Science Executives (CESSE). □

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Merrilea Mayo Founder, Mayo Enterprises, LLC.
MRS Congressional Fellow 1998-1999
Office of Senator Lieberman

"At the end of the fellowship year I found that I was enjoying "doing" science policy more than just teaching about it, and I ended up staying on in Rep. Honda's office as a member of the staff where I have remained for over a decade. I would not have had that opportunity without the Congressional Fellowship. I encourage anyone who wonders about how federal policies are developed or wants to have a greater role in that process to apply to be a Congressional Fellow."

Eric Werwa Legislative Director, Congressman Mike Honda
MRS Congressional Fellow 2001-2002
Office of Congressman Mike Honda

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Applications for the 2015-2016 MRS Congressional Science and Engineering Fellowship Program are posted on the MRS website. **Deadline for submission is January 2, 2015.**

Materials Research Society®

University Chapters

The Materials Research Society® (MRS) University Chapter Program is a passionate and talented network of students from universities around the world. Supported by the Materials Research Society Foundation, the program fosters an environment for collaboration and open exchange of ideas across all scientific disciplines, spanning campuses and continents. These students represent the next generation of materials research and are preparing to carry the torch forward, advancing materials and improving the quality of life.

You'll find starting an MRS University Chapter is a fun and exceptionally valuable experience. Working through your Chapter—hosting events, creating special projects and connecting with experts from around the world—will prepare you for future professional and leadership roles in the materials community. Your Chapter can also play a vital role in bringing science to a broader audience. Now more than ever, the goal is to successfully bring research out of the laboratory and into the classroom and to the general public ... to show how materials have changed our history and continue to shape our future.

MRS continues to explore new ways to effectively foster growth of virtual global materials communities, using emerging technologies that are smart, fresh and innovative ... and that includes our University Chapters. With social media, MRS OnDemand® and two-way live streaming, we're already tapping into today's technologies to engage Chapters unable to attend our Meetings, but with the promise of new innovations, tools and devices, we continue to look ahead. **Help us build the Chapter of the Future!** Together we can design and develop virtual events to better collaborate, educate, participate and fascinate—across Chapters, across disciplines, across borders.

Now's the time to use your excitement, expertise and unique scientific perspectives to forge a new path. Join this international student community.

Start an MRS University Chapter today!



An International Community

One of the main objectives as graduate students and future researchers is to acquire the ability to build scientific networks for enhancing our vision, mission and scientific cooperation. MRS offers multiple tools to accomplish this with annual meetings, workshops, the MRS Bulletin and useful applications such as career connections or MRS OnDemand. Our MRS Student Chapter allowed us to obtain support from the Sociedad Mexicana de Materiales (SMM) that expands our national network. The formation of MRS Cinvestav Student Chapter not only allows us to integrate and exchange ideas as materials science students at Cinvestav, but also have the opportunity to know the science beyond our borders.

Natalia Tapia, Chapter President
Centro de Investigación y de Estudios Avanzados
del Instituto Politécnico Nacional (Cinvestav-IPN)
Mexico City, MEXICO

Interdisciplinary Collaboration

The MRS Student Chapter at WSU was organized by students who recognized the need to bring together a diverse group of students who were working in materials science. The campus is spread out geographically and students pursuing PhD degrees in MSE can be advised by chemistry or physics professors who are located far from the MSE department located in the engineering buildings. There is no distinction made between students whose advisors are in different departments or colleges, and the MRS Student Chapter has been a great vehicle to promote unity within the disciplines here.

David Field, Chapter Faculty Advisor
Washington State University
Pullman, Washington, USA

HELP US BUILD THE FUTURE

The MRS University Chapter Experience

The MRS University Chapter Program provides invaluable experiences and benefits for student members, but don't take our word for it. **Our Chapter Members Say It Best!**

Leadership Development

The Materials Research Society, along with our local Binghamton University Chapter, has positively influenced my commitment to materials science and technology. We were inspired by our advisor, Professor M. Stanley Whittingham, to start this Chapter ... and motivated by his enthusiasm and our faith to bring science to the general public, we continue to hold numerous events taken from MRS, i.e. MAKING STUFF and NanoDays. As our organization grows, we keep growing our events, and have found a solid and welcoming place in our community. Apart from the target audience, our events also benefit the volunteers, who gained valuable experience both from preparation, interaction, and activities. We feel proud and grateful to be part of an MRS University Chapter.

Tianchan Jiang, Chapter President
Binghamton University
Binghamton, New York, USA

Education Outreach

Our Chapter has enabled us to establish collaborations among the scientists on campus through informal social events, in addition to providing opportunities to participate in outreach. Integrating the science outreach efforts of Vanderbilt's community into our local community is one of our primary goals. As a University Chapter, we received a grant through the Materials Research Society Foundation to bring emerging materials science and hands-on activities to disadvantaged students and teachers in rural Tennessee. Without these seed funds, our Vanderbilt program, Materials Outreach for Rural Education (MORE), would not have been possible.

Amy Ng, Chapter President
Vanderbilt/Fisk Universities
Nashville, Tennessee, USA

Professional Growth

Starting and advising an MRS University Chapter is truly a rewarding experience. One can see professional growth of students, who start feeling like members of the worldwide materials research community. I come to MRS meetings with a "team," not just a couple of my students. Exciting initiatives and project ideas generated by students are amazing. Not surprisingly, some of the most prominent materials scientists, such as Millie Dresselhaus (MIT) or Stan Whittingham (SUNY Binghamton), have been acting as Faculty Advisors for many years.

Yury Gogotsi, Chapter Faculty Advisor
Drexel University
Philadelphia, Pennsylvania, USA

Building Chapters of the Future

I had the chance to present at the 2012 MRS Fall Meeting's Sustainability Forum, while being over 9000 km away from the meeting venue. I felt as if I was actually in Boston, being able to take questions, address them and getting into discussions with the committee. Thanks to the Materials Research Society and our local MRS-KAUST University Chapter for making this possible.

Ahmed E. Mansour, Chapter Vice President
King Abdullah University of Science and Technology (KAUST)
Thuwal, SAUDI ARABIA

Chapter Support

As a graduate student, it is key to broaden your spectrum of what is taking place in the research world in real time. MRS opens up many avenues, especially when working from a University Chapter. Direct contact with MRS associates helps keep everyone abreast of conferences, Chapter opportunities and activities that otherwise may not have been as easily accessible. MRS also rewards student memberships with rebates and travel expenditures, helping promote student involvement as well as Chapter building. We were able to host a multitude of meetings and seminars as well as send students to attend MRS conferences to promote their research.

Chinedu Okoro, Chapter President
Tuskegee University
Tuskegee, Alabama, USA

FOR MORE INFORMATION

on the MRS University Chapter Program,
visit www.mrs.org/university-chapters

Superhydrophobic surfaces by laser ablation of rare-earth oxide ceramics

Gisele Azimi, Hyuk-Min Kwon, and Kripa K. Varanasi, Massachusetts Institute of Technology, USA

Robust superhydrophobic surfaces can improve the performance of various applications. Considerable research has focused on developing superhydrophobic surfaces, but in these studies, superhydrophobicity was attained using polymeric materials, which deteriorate under harsh environments. Recently, it has been shown that rare-earth oxide ceramics are hydrophobic and since they are ceramics, they withstand harsh environments including high temperature. Here we fabricate a superhydrophobic surface by texturing a ceria pellet using laser ablation. We demonstrate water repellency by showing an impinging water droplet bouncing off the surface. This study extends the possibility of producing robust superhydrophobic ceramics using accessible techniques for industrial applications. DOI:10.1557/mrc.2014.20

Thermodynamic models of low-temperature Mn-Ni-Si precipitation in reactor pressure vessel steels

Wei Xiong, Huibin Ke, Ramanathan Krishnamurthy, Leland Barnard, and Dane Morgan, University of Wisconsin-Madison, USA, **Peter Wells and G. Robert Odette**, University of California-Santa Barbara, USA

Large volume fractions of Mn-Ni-Si (MNS) precipitates formed in irradiated light water reactor pressure vessel (RPV) steels cause severe hardening and embrittlement at high neutron fluence. A new equilibrium thermodynamic model was developed based on the CALPHAD method using both commercial (TCAL2) and specially assembled databases to predict precipitation of these phases. Good agreement between the model predictions and experimental data suggest that equilibrium thermodynamic models provide a basis to predict terminal MNS precipitation over wider range of alloy compositions and temperatures, and can also serve as a foundation for kinetic modeling of precipitate evolution. DOI:10.1557/mrc.2014.21

Microbial induced synthesis of hollow cylinder and helical NiO micro/nano-structure

Shashi B. Atla, Chien-Yen Chen (also Univ. of Cambridge, UK), **Ching-Wen Fu, Ting-Che Chien**, National Chung Cheng University, Taiwan, **An-Cheng Sun, Chuan-Fa Huang**, Yuan Ze University, Taiwan, **Chien-Jung Lo**, National Central University, Taiwan, **Tsui-Chu Yang**, Chia-Nan University of Pharmacy and Science, Taiwan

Bacillus pasteurii was used as synthesis director for the formation of hollow cylinder and helical NiO micro / nano-structure under urea hydrolysis conditions. Bacteria were capable of precipitating nickel product from nickel solution by metabolic processes. An appropriate amount of both water and bacterial solution were required to precipitate the nickel product in good yield. The average crystallite size of calcined NiO was 11.45 nm and length of cylinder and helices were non uniform (~2-7 μm) and varied with bacterial body structure template. The present study demonstrates a feasibility of synthesizing bacteria-guided metal oxide crystals for various functional applications DOI:10.1557/mrc.2014.24

Comparison of the Young's moduli of polymers measured from nanoindentation and bending experiments

Ricardo Martinez, University of Texas at El Paso, USA, **L. Roy Xu**, New Mexico State University, Las Cruces, USA

Spherical and conical nanoindentation experiments were performed for the same polymer specimens in order to compare Young's moduli measured from the elastic loading and unloading curves, and bending experiments. Finite element simulation was employed to ensure pure elastic deformation during spherical nanoindentation. The moduli measured from the elastic loading curves using Hertz's contact law are very close to the bending moduli, because both measurements were conducted under the same elastic deformation. However, the moduli measured from the elastic unloading curves are up to 60% higher than the bending moduli due to plastic deformation close to the sharp conical indenter tip. DOI:10.1557/mrc.2014.19

Mechanical annealing of Cu-Si nanowires during high-cycle fatigue

Charlotte Ensslen, Oliver Kraft, Reiner Mönig, and Reinhard Schneider, Karlsruhe Institut of Technology, Germany, Jin Xu and Guang-Ping Zhang, Chinese Academy of Sciences, China

Monotonic and cyclic tension-tension tests with an upper stress in the GPa regime have been performed on Cu-Si nanowires. The results show that the exceptional high strength of these nanomaterials is maintained or even improved upon cyclic loading. Post mortem transmission electron microscopy (TEM) gives insight in the microstructural evolution. Fatigue induced grain growth correlates with an observed increase in compliance, the formation of dislocation networks and an increase in tensile strength. DOI:10.1557/mrc.2014.18

Quantifying plant cell-wall failure *in vivo* using nanoindentation

Elham Forouzesch, Ashwani K. Goel, and Joseph A. Turner, University of Nebraska-Lincoln, USA

Nanoindentation experiments have been carried on Arabidopsis thaliana using spherical tungsten tips. Load-displacement plots obtained from experiments suggest that there is an optimum diameter of tip size which can be used to safely penetrate the tip through the cell wall. Based on the exact tip size used in the experiments and the measured load-displacement response, the failure stress was calculated by using the experimental data in conjunction with the computational model. The value of failure stress is investigated in hypertonic (plasmolyzed), isotonic and hypotonic (turgid) samples. DOI:10.1557/mrc.2014.22

Thickness dependence of flow stress of Cu thin films in confined shear plastic flow

Yang Mu, Ke Chen, and Wen Jin Meng, Louisiana State University, USA

Compression loading on CrN/Cu/Si(100) micro-pillars containing 45deg-inclined interfaces yielded unequivocal evidence of shear plastic flow within Cu thin films confined between non-deforming Si and CrN. Confined shear plastic flow occurred over Cu thicknesses between ~100nm and ~1200nm, with a monotonically increasing flow stress as thickness decreases. The demonstration of a significant dependence of the shear flow stress on the confined Cu film thickness offers a new example of scale-dependent plasticity, and a new experimental test case for non-local plasticity theories. DOI:10.1557/mrc.2014.25

Crystallographic controlled dissolution and surface faceting in disordered FCC FePd

Derek John Horton, Ai Wu Zhu, Matthew Neurock, and John R. Scully, University of Virginia, USA

Electrochemical dissolution of a solid solution fcc material by congruent oxidation was strongly controlled by crystallographic orientation. Anodic dissolution was characterized over a wide variety of grain surface plane orientations providing a detailed view of the crystallographic nature of oxidative dissolution and surface facet evolution as a function of grain orientation. The overall corrosion depth of a grain possessing an initially irrational crystal orientation depended linearly on crystallographic angle. Computations of alloy surface energies and surface atom coordination as a function of crystal orientation explain findings. DOI:10.1557/mrc.2014.23

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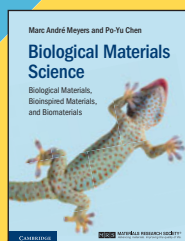
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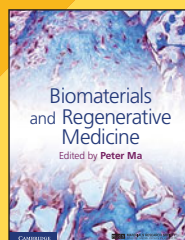
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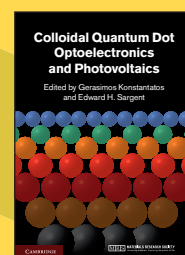
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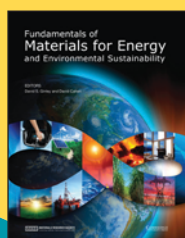
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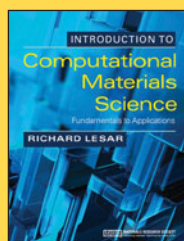
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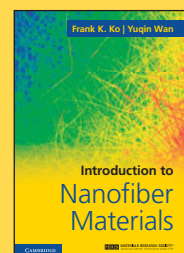
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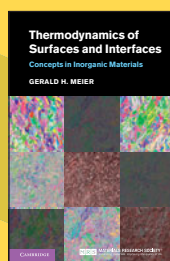
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