


Christian Hellmich

Guest Editor for this issue of *MRS Bulletin*

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Hellmich is a professor of computational mechanics, strength of materials, and biomechanics in the Department of Civil Engineering and is the director of the Institute for Mechanics of Materials and Structures at the Vienna University of Technology (TU Wien). He received both his master's (1995) and PhD (1999) degrees from

TU Wien, held a postdoctoral position at Massachusetts Institute of Technology from 2000 to 2002, and completed his habilitation at TU Wien in 2004. His awards include the 2008 Zienkiewicz Award of the European Community on Computational Methods in Engineering and Applied Sciences, a Starting Grant awarded by the European Research Council in 2010, and the 2012 Walter L. Huber Prize of the American Society of Civil Engineers. Hellmich was named Fellow of the Engineering Mechanics Institute in 2014, and he co-edits the *Journal of Engineering Mechanics* and the *Journal of Nanomechanics and Micromechanics*.


Dinesh Katti

Guest Editor for this issue of *MRS Bulletin*

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Katti is a professor and interim chair of the Department of Civil and Environmental Engineering at North Dakota State University. His research expertise is in the area of multiscale modeling of materials, including materials systems such as swelling clays, nacre, bone, polymer clay nanocomposites, bone-tissue engineering,

and oil shales. He has authored and co-authored over 140 papers, three books, and seven book chapters. He was awarded the 2011 John R. Booker Excellence Award from the International Association for Computer Methods and Advances in Geomechanics for major contributions to geomechanics.


Stéphane Avril

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Avril is a professor of biomechanics at École Nationale Supérieure des Mines de Saint-Étienne, where he heads the Center for Biomedical and Healthcare Engineering. From 2003 to 2009, he pioneered inverse methods based on full-field optical methods in solid mechanics by developing the virtual fields method. Since 2010, he has applied these approaches to quantify

local distributions of material properties in blood vessels and other soft tissues. His research group promotes patient-specific numerical simulations into clinical practice. In 2014, he was a visiting fellow at Yale University. Avril was awarded a Consolidator Grant by the European Research Council in 2014.


Jacques M. Huyghe

Department of Mechanical Aeronautical and Biomedical Engineering, University of Limerick, Ireland; tel. +35361202009; and email jacques.huyghe@ul.ie; and Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands; tel. +31 402 473 137; and email j.m.r.huyghe@tue.nl.

Huyghe is the Bernal Chair of Biomedical Engineering at the University of Limerick. He holds a secondary appointment in the Department of Mechanical Engineering at Eindhoven

University of Technology. He is the recipient of the Interpore Procter and Gamble Award for swelling materials in 2013; a steering member of the Poromechanics Committee of the American Society of Civil Engineers, and a member of the Solid Mechanics Committee of the European Society of Mechanics.


Alicia R. Jackson

Department of Biomedical Engineering, College of Engineering, University of Miami, USA; tel. 305-284-2135; and email a.jackson2@miami.edu.

Jackson is an assistant professor of biomedical engineering at the University of Miami, College of Engineering, where she received her BS (2005), MS (2007), and PhD (2010) degrees in biomedical engineering. She is the director of the Orthopedic Biomechanics Laboratory, which focuses on research in orthopedic soft-tissue biomechanics, transport properties, nutritional supply,

mechanobiology, and theoretical modeling, particularly in the intervertebral disc and fibrocartilaginous meniscus.


Sinan Keten

Northwestern University, USA; tel. 847-491-5282; and email s-keten@northwestern.edu.

Keten is an assistant professor of civil and environmental engineering and mechanical engineering and leader of the Computational Nanodynamics Laboratory at Northwestern University. He obtained his PhD degree in civil and environmental engineering from the Massachusetts Institute of Technology in 2010. His research expertise is in computational materials science and mechanics with an emphasis on biological and bioinspired systems

such as spider silk, nanocellulose, and novel nanocomposites. He serves as the principal investigator for several federally funded projects broadly related to the Materials Genome Initiative and has received awards from the Materials Research Society and the American Society of Mechanical Engineers.


Andrea Malandrino

Department of Mechanical Engineering, Massachusetts Institute of Technology, USA; tel. 617-253-1000; and email m_andrea@mit.edu.

Malandrino is a Marie Skłodowska-Curie postdoctoral fellow at the Massachusetts Institute of Technology. After obtaining his MSc degree in mechanical engineering at the University of Bologna, Italy, he worked at the Rizzoli Institute (2006–2007) on the validation of subject-specific finite element bone models. He obtained his PhD degree in 2012 from the Universitat Politècnica de Catalunya, Spain. From 2008 to 2013, he focused on the intervertebral disc

biotransport and mechanobiology through multiscale finite element modeling as a researcher at the Institute for Bioengineering of Catalonia, Spain. He has also explored the microporomechanical characterization of the human vertebral bone.

**Claire Morin**

Center for Biomedical and Healthcare Engineering, École Nationale Supérieure des Mines, France; tel. +33477499739; and email claire.morin@mines-stetienne.fr. Morin is an assistant professor of biomechanics at École Nationale Supérieure des Mines de Saint-Étienne, conducting research in the domain of constitutive behavior and strength of materials. She received her PhD degree in 2011 from École Polytechnique. Since 2011, Morin has specialized in applying the concepts of homogenization theory to multiscale mechan-

ics of living tissue; first on the elasticity and strength of bones at the Vienna University of Technology, and since 2013, on the mechanical behavior of soft biological tissues.

**Jérôme Noailly**

Department of Information and Communication Technologies, Universitat Pompeu Fabra, Spain; tel. +34 93 542 21 73; and email jerome.noailly@upf.edu.

Noailly has been a researcher at the Universitat Pompeu Fabra, Spain, since 2015. He began his doctoral studies in 2002 at the Universitat Politècnica de Catalunya (UPC), Spain, exploring mechanical communications within the lumbar spine through finite element modeling and addressing model approximation and reliability issues. In 2009, this work received the Best

PhD Thesis Award in engineering from UPC. From 2007 to 2011, Noailly focused on soft tissue and multiphysics modeling and was a Marie Skłodowska-Curie postdoctoral fellow, first at the AO Research Institute and then at the Institute for Bioengineering of Catalonia (IBEC), Spain. In 2012, he became the head of IBEC's group of biomechanics and mechanobiology.

**Ko Okumura**

Department of Physics, Ochanomizu University, Japan; tel. +81-3-5978-5321; and email okumura@phys.ocha.ac.jp.

Okumura has been a full professor at Ochanomizu University since 2003. He received his PhD degree in physics in 1994 from Keio University. After working on theoretical studies, including quantum field theory, non-equilibrium statistical mechanics, and molecular spectroscopy in the condensed phase, his current focus is in soft matter physics, particularly toughness of biological composites, dynamics of liquid drops and bubbles, wetting on textured surfaces, and granular materials.

**Bernhard Pichler**

Laboratory for Macroscopic Material Testing, Vienna University of Technology, Austria; email bernhard.pichler@tuwien.ac.at.

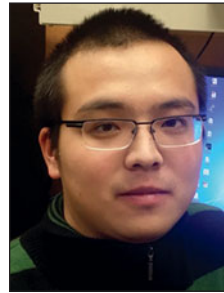
Pichler is an associate professor at the Vienna University of Technology (TU Wien), where he directs the Institute for Mechanics of Materials and Structures Laboratory for Macroscopic Material Testing. He holds master's (1999) and PhD (2003) degrees from TU Wien, and has been a visiting professor at École des Ponts ParisTech, France. He has created experimental techniques for elasticity, creep, and strength

determination, combined with advanced poro-micromechanics-based material modeling.

**Xin Qin**

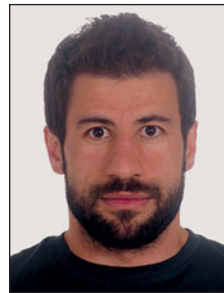
Northwestern University, USA; email xinqin2013@u.northwestern.edu.

Qin is pursuing a PhD degree in theoretical and applied mechanics at Northwestern University. He received his BEng degree in engineering mechanics in 2011 and MSc degree in solid mechanics in 2013 from Xi'an Jiaotong University, China. His research includes the mechanics of cellulose and polymer nanocomposites with molecular dynamics simulations.

**Tao Qu**

School of Aeronautics and Astronautics, Purdue University, USA; tel. 765-496-1990; and email qut@purdue.edu.

Qu is a doctoral candidate in the Interfacial Multiphysics Laboratory at Purdue University's School of Aeronautics and Astronautics. He is working in the area of simulations of bioinspired and composite materials with an account of interface properties.

**Mehran Shahidi**

Boku–Vienna University of Natural Resources and Life Sciences, Austria; email mehran.shahidi@boku.at.ac.

Shahidi holds a postdoctoral position at Boku–Vienna University of Natural Resources and Life Sciences. He is a graduate of Shomal University of Technology, Iran, and recently finished his doctoral studies at the Vienna University of Technology (TU Wien). His interests focus on interface micromechanics and creep of materials.

**Robert Sinko**

Northwestern University, USA; email robert.sinko@u.northwestern.edu.

Sinko is a graduate student pursuing a PhD degree in mechanical engineering at Northwestern University. He received BS degrees in both mechanical engineering and statistics from Miami University in 2012. His research focuses on the mechanics of biological and biomolecular materials using atomistic simulations, with a current focus on nanocellulose. His awards include the Tau Beta Pi Fellowship and a National Defense Science & Engineering Graduate Fellowship from the US Department of Defense.

**Vikas Tomar**

Purdue University–West Lafayette, USA; tel. 765-494-3423; and email tomar@purdue.edu.

Tomar is an associate professor at Purdue University–West Lafayette. His research focuses on understanding how interfaces contribute to failure of complex materials with specific emphasis on microstructural issues. He has developed three multiscale modeling methods and a new experimental scheme called nano-mechanical Raman spectroscopy. Tomar has received multiple research awards, including the inaugural *Material Science and Engineering C*

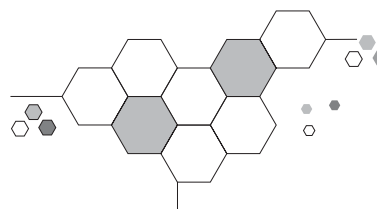
Young Researcher Award. Additionally, he is an associate fellow of AIAA, editor-in-chief of the *International Journal of Experimental and Computation Biomechanics*, and associate editor of the *Journal of Engineering Materials and Technology*.

**Devendra Verma**

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Purdue University, USA; tel. 765-421-5060;
and email vermad@purdue.edu.

Verma is a doctoral student in Aeronautics and Astronautics Engineering at Purdue University. His research focuses on understanding the interfacial properties of bio/biomimetic materials. He also works on the nanomechanical and thermal properties characterization of materials at the nanoscale using nanoindentation and Raman spectroscopy to develop an understanding into the structure-based properties. He received the

Purdue Graduate Student Excellence Award in 2013 and a National Science Foundation Fellowship for a workshop on materials genome development.



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▶ FEATURED EVENTS

Fred Kavli Distinguished Lectureship in Nanoscience

Hongyou Fan, Sandia National Laboratories and The University of New Mexico
Nanomaterials under Stress—A New Opportunity for Nanomaterials Synthesis and Engineering

Symposium X—Frontiers of Materials Research

Alexandra Navrotsky, University of California, Davis
Energetics at the Nanoscale—Impacts for Geochemistry, the Environment and Materials

Lionel Vayssieres, International Research Center for Renewable Energy
Advanced Low Cost Energy Materials from Aqueous Solutions

Daniël Vanmaekelbergh, Debye Institute for Nanomaterials Science, University of Utrecht
Colloidal Nanocrystals: From Individual Quantum Objects to Building Blocks for Honeycomb Semi-conductors Hosting Dirac Carriers

▶ TUTORIAL SESSIONS

Tutorial P

Nanogenerators and Piezotronics—From Working Principles to Applications

Tutorial Y

Overview of Phase-Change Materials, Their Physics and Applications

Tutorial CC

Reliability and Materials Issues of Semiconductor Optical and Electron Devices and Materials

Tutorial OO

Introduction to Metal-Assisted Chemical Etching—Chemistry and Applications

Tutorial WW

Measure Ultrafast Dynamics—How and Why

▶ SELECT TALKS FROM 12 TECHNICAL SESSIONS

▶ AWARDS OF THE MATERIALS RESEARCH SOCIETY

Mid-Career Researcher Award

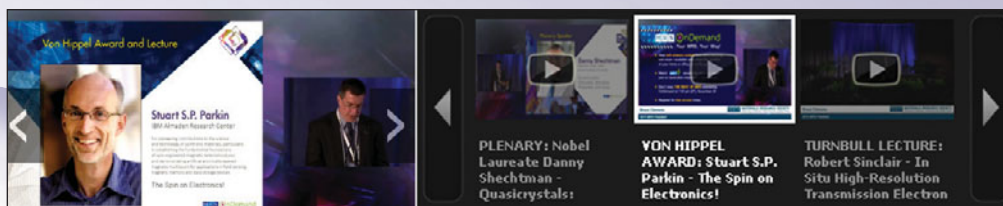
Seth R. Marder, Georgia Institute of Technology
The Design of Organic Molecules and Materials for Nonlinear Optical Applications

Innovation in Materials Characterization Award

John M. Carpenter, Argonne National Laboratory
History, Development and Applications of Neutron Sources

Outstanding Young Investigator Award

Karena W. Chapman, Argonne National Laboratory
Accelerating the Development of Energy Materials Through Advanced X-ray Tools



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