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Guest Editor for this issue of MRS Bulletin UNC/NCSU, Joint Department of Biomedical Engineering, Raleigh, NC, USA; tel. 919-696-8488; and email roger\_narayan@msn.com. Narayan is a professor in the joint department of Biomedical Engineering at the University of North Carolina and North Carolina State University in Raleigh, North Carolina. He is an author of more than 100 publications as well as several book

chapters on nanoscale and microscale process-

ing, characterization, and modeling of biological

and biomedical materials. He currently serves as an editorial board member for several academic journals, including as editor-in-chief of Materials Science and Engineering C: Materials for Biological Applications (Elsevier).



**Peter Goering** 

Guest Editor for this issue of MRS Bulletin

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Goering is a research toxicologist with the Center for Devices and Radiological Health at the U.S. Food and Drug Administration in Silver Spring, Maryland. His research interests include understanding mechanisms of metal toxicity, evaluating toxic injury to the liver and kidney produced by chemicals, elucidating new and more predictive

biomarkers of toxicity, and assessing adverse health effects of nanomaterials. He has published more than 80 peer-reviewed publications and book chapters; in addition, he serves on the editorial board of *Toxicological Sciences*, a premier scientific journal in the field of toxicology.



ing of micro-droplet ejection.

Muhammad Ali INSERM, University Bordeaux Segalen, France; tel. +33557571488; and email amuhammadali@gmail.com.

Ali is a physicist and graduated from QAU, Pakistan and also earned a MS degree in medical physics from PIEAS, Pakistan. He has worked using radiations for the diagnosis and treatment of cancer. Current projects aim to develop new methodologies for bio-manufacturing and tissue laser artificial organs. His study focuses on the formation of micro-droplets of biological elements using lasers and the physical model-



Joëlle Amédée-Vilamitjana

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Amédée-Vilamitjana studied cell and molecular biology at Bordeaux University and obtained her PhD in 1985 on RNA polymerase II and transcription factors. She worked as a post-doc with the CEA (Marcoule, France) and Inserm U306 on normal and osteoarthritis cartilage. In 1992, she started research on human stem cells from bone marrow for bone tissue engineering. In 1999, as an INSERM research professor, she

initiated work on cell-cell communication to study the coupling between osteogenesis and angiogenesis in 2D and 3D matrices. Since 2007, she has managed the Inserm Unit on Tissue Bioengineering.



stress on cell differentiation.



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Bareille earned her PhD degree in cell biology. She currently serves as a research engineer in biology and is responsible for cell biology facilities. Her research deals with stem cell fate in bone and vascular tissue-engineered products using osteoprogenitors from bone marrow and adipose tissue, and endothelial precursors from cord blood, peripheral blood, and bone marrow, respectively. She also studies the effect of shear



**Sylvain Catros** 

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Catros is a post-doctoral fellow at UConn Health Center (Farmington, CT, USA). He trained in dentistry and oral surgery at Bordeaux University, France, and earned his PhD degree in laser assisted bioprinting at the same University in 2010. His studies focus on bioprinting, biofabrication, and bone tissue engineering.



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Chen is a professor in the NanoEngineering Department at the University of California, San Diego (UCSD). He also is a faculty member in the Institute of Engineering in Medicine at UCSD. Before joining UCSD, Chen had been a professor and a Pearlie D. Henderson Centennial Endowed Faculty Fellow in Engineering at the University of Texas at Austin. From 2008 to

2010, Chen served as the program director for the Nanomanufacturing Program in the National Science Foundation (NSF). His primary research interests include biomaterials and biofabrication, nano-regenerative medicine, laser nanomanufacturing, nanophotonics, and plasmonics. Chen received the CAREER award from NSF in 2001 and the Young Investigator award from the Office of Naval Research in 2004. In addition, he was elected fellow of the American Society of Mechanical Engineers in 2007, fellow of SPIE in 2008, and fellow of the American Association for the Advancement of Science in 2011.



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Chou is currently an associate professor in the School of Mechanical and Aerospace Engineering at Nanyang Technological University, Singapore. He received his bachelor's and PhD degrees in mechanical engineering from the University of Strathclyde, Scotland, UK. His research interests include biomechanics and

buckling of cold-formed thin-walled structures. Chou has been involved in the training and organization of Orthopaedic Biomechanics Course in conjunction with the Orthopaedic Advance Surgical Training Syllabus in Singapore since 1999. He is currently the director of the MSc (biomedical engineering) program.



Douglas B. Chrisey

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Chrisey is a professor of materials science and biomedical engineering at Rensselaer Polytechnic Institute. After receiving his PhD degree in physics from the University of Virginia in 1987, he spent the next 17 years at the Naval Research Laboratory. His current research interests include the laser fabrication of thin films of advanced electronic. sensor. biomate-

rial, and energy storage. These materials were used in device configurations for testing. His research has resulted in more than 300 citable publications and over 7,000 citations, an h-index of 45, and 18 patents.



Chee Kai Chua

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Chua is an associate professor and is currently chair of the School of Mechanical & Aerospace Engineering (MAE) at Nanyang Technological University. He obtained his bachelor's degree in mechanical engineering, his MSc degree in industrial engineering from the National University of Singapore, and his PhD degree from

Nanyang Technological University. His research activities are concerned mainly with geometric modeling, rapid prototyping or additive manufacturing, reverse engineering, biomedical engineering design, and biomedical imaging. He has made a number of major contributions in these areas, specifically, his re-design and re-modeling of rapid prototyping processes for fabrication of innovative products and devices such as drug delivery devices, tissue engineering scaffolds, stents, heart pumps, and facial prostheses.



David T. Corr

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Corr is an assistant professor of biomedical engineering at Rensselaer Polytechnic Institute (RPI). After earning his PhD degree in mechanical engineering at the University of Wisconsin, Corr was a postdoc and Ernst & Young Fellow in Joint Injury and Arthritis Research at the University of Calgary. He joined the RPI faculty in 2006, and his current research explores how microenvironmental factors influence stem cell

fate decisions and the role of chemo-mechano-electrical stimuli on tissue development utilizing a scaffold-free technique to engineer single fibers.



### Rodica Cristescu

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Cristescu is a senior scientific researcher at the National Institute for Lasers, Plasma and Radiation Physics (NILPRP), Lasers Department, Laser-Surface-Plasma Interactions Laboratory, Bucharest-Magurele, Romania. She received her PhD in physics from the University of Bucharest in 2005. Her research interests include materials

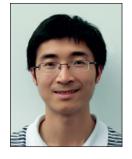
science, surface engineering by excimer lasers, and laser-material interactions and processing, in particular, those relevant to matrix-assisted pulsed-laser evaporation as applied for the growth of thin films and structures.



**Andrew Dias** 

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Dias is a graduate research assistant at Rensselaer Polytechnic Institute in the Department of Biomedical Engineering. He received his BS degree in biomedical engineering at the University of Wisconsin-Madison. His research interests include combining approaches to defining stem cell microenvironments, directing stem cell fate decisions and lineage commitment, and novel biomaterials processing.



in Duan

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Duan currently works as a post-doctoral associate at Cornell University. He obtained BSc and MSc degrees in polymer science from Tianjin University, China. He received his PhD degree from The University of Hong Kong in 2010. From his MSc and PhD research, he has published 15 refereed journal articles, two book chapters, and many conference papers. His current research interests include biofabrication of tissueengineered constructs for hard and soft tissue regen-

eration, effects of mechanical signals on cell phenotype, and cell-substrate interaction.



Aurélien Fontaine

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Fontaine graduated from the National Engineering School of Physics in Strasbourg. His works aims at understanding the phenomenon of droplet ejection by laser induced forward transfer using a time-resolved imaging process.



Jean-Christophe Fricain

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Fricain earned his doctor of dental surgery in 1992 and his PhD degree in biology and health in 1997 from the University of Bordeaux. He is currently a professor of oral medicine and oral surgery at the University Bordeaux Segalen. His main areas of interest are bone substitutes, animal models, bone tissue engineering, induced membranes for mandibular reconstruction, and bioprinting.



**Fabien Guillemot** INSERM, University Bordeaux Segalen, France; tel. +33557571488; and email Fabien.guillemot@inserm.fr.

Guillemot obtained his PhD degree in materials science from the National Institute for Applied Sciences (Rennes, France) in 2000. He worked from 1998 to 2005 on the development of new titanium alloys for biomedical applications and laser surface treatments of Ti alloys. He started as an assistant research professor at INSERM in 2005 and initiated the project Tissue Engineering Assisted by Laser (TEAL), which aims at devel-

oping laser-assisted technologies for fabricating artificial tissues into which cells are organized into defined 3D microenvironments.



**Bertrand Guillotin** INSERM, University Bordeaux Segalen, France; tel. +33557571488; and email bertrand.quillotin@inserm.fr.

Guillotin is a post-doctoral research associate at the University Bordeaux Segalen. He obtained a PhD degree in molecular and cell biology in 2004. His project aims at the fabrication of organotypic tissue from the bottom up, according to a layer-by-layer approach. He works at the lab to print cells with respect to a cell level resolution to favor cell-to-cell communication, tissue function, and homeostasis. His research

interests include vasculogenesis modeling and physiological interfaces.



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Hsieh is currently a senior lab officer at the Institute of Bioengineering and Nanotechnology (IBN) and is working toward his PhD degree in electrical and computer engineering at the National University of Singapore. He pursued research in biomimetic tissue scaffolds and precision cell patterning using engineering approaches to find solutions to biomedical

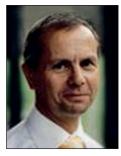
problems. Hsieh was the recipient of *The Wall Street Journal's* Asian Innovations Award in 2011, Award of ASEAN Virtual Instrumentation Applications Contest in 2009, and the Scientific Staff Development Award in 2006. He is author or co-author of more than 15 publications, conference proceedings, and 10 patent applications in the field of polymeric biomaterials, microfluidic systems, molecular diagnosis, and tissue engineering.



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are advanced tissue fabrication, precision engineering, and manufacturing process monitoring. He is the recipient of the 2005 ASME Blackall Machine Tool and Gage Award, the 2006 SME Outstanding Young Manufacturing Engineer Award, and the 2008 NSF CAREER Award.



## John A. Jansen

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Jansen is a full professor in biomaterials, experimental implantology, and experimental periodontology and acts as Head of Dentistry in the Department of Biomaterials. He also is a professor for the Dental Implant and Osseointegration Research Chair at King Saud University, Riyadh, Saudi Arabia. In 2004, the Society for Biomaterials awarded him the Clemson Award for Outstanding

Contributions to the literature, and he was elected as Fellow of Biomaterials Science and Engineering (FBSE). Jansen has contributed to over 500 publications, is the originator of six patents, and is an editorial board member of several international scientific journals.



### Virginie Kériquel

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Kériquel is a doctor in dental surgery and is working to complete her PhD degree at the Tissue BioEngineering Lab (INSERM U1026) at the University Bordeaux Segalen. Her project deals with the study and development of new strategies for bone tissue engineering. More precisely, it aims at developing in vivo applications of laser-assisted bioprinting.



## **Edwin Lamers**

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Lamers is a PhD candidate at the Department of Biomaterials, Radboud University Nijmegen Medical Center. His research interests include biomaterials research and advanced microscopy. Current research is focused on the boneregenerative response toward nanoscale patterned surfaces.



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Leong is an associate professor in the School of Mechanical and Aerospace Engineering at Nanyang Technological University. He obtained his bachelor's degree in mechanical engineering from the National University of Singapore and MSc degrees in engineering product design and mechanical engineering from Stanford University. His principal areas of research interest are in rapid

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Liu is currently a postgraduate student in the School of Mechanical and Aerospace Engineering at Nanyang Technological University. She received her bachelor's degree in materials science and engineering from Nanyang Technological University. Her research area includes the development of protein-based tissue engineering scaffolds using rapid prototyping technology.



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Prodanov is a PhD candidate at the Department of Biomaterials, Radboud University Nijmegen Medical Center. Research interests include micro- and nano-textured biomaterial surfaces and cell biomechanics (stretch, compression, fluid flow, and hyper- and micro-gravity).



Murielle Rémy

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Rémy is a research engineer in biology. She previously worked on the elaboration of an artificial vascular prosthesis (PhD, 1998, France) followed by postdoctoral training on the physiology of the tissue-engineered blood vessel (TEBV) (1999/2002, Canada), then worked in LEMI on European projects on tissue engineering (2006, France). Her current research deals with cell culture and cell differentiation in contact with bio-

materials, under classic and stress conditions, for *in vitro* and *in vivo* experiments.



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Riggs is currently a graduate student at Rensselaer Polytechnic Institute in the Department of Materials Science in Troy, NY. His undergraduate work was completed at RPI in materials science and engineering in 2010. His research focuses on biomimetic materials and the development of impedance-based biosensors, advised by Douglas Chrisey.



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Schiele is a PhD degree student in the Biomedical Engineering Department at Rensselaer Polytechnic Institute in Troy, NY. He received his BS degree in mechanical engineering from the University of Dayton in 2007, and his MS degree in biomedical engineering from RPI in 2010. His research interests include laser direct-write for cell patterning, laser micromachining, tendon tissue engineering, and mechanical characterization of soft tissues.



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Sudarmadji received her bachelor's and PhD degrees from the School of Mechanical and Aerospace Engineering, Nanyang Technological University. Her thesis was on the development of functionally graded tissue engineering scaffolds using selective laser sintering. In 2010, she joined the Tech and Field program in Schlumberger.



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Sugioka is a senior research scientist at RIKEN and a guest professor at Tokyo University of Science and Tokyo Denki University. He received his PhD degree in electronics from Waseda University in 1993. He joined RIKEN in 1986 and has been working on laser materials processing. His current research interests are the development of advanced laser micro/nano-

processing, with applications related to lab-on-a-chip, photonic, and electronic devices. His accomplishments include seven awards, ~130 articles, and ~80 invited talks at international conferences. He is the editor-in-chief of the *Journal of Laser Micro/Nanoengineering* and a board member of the Laser Institute of America and Japan Laser Processing Society.



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Walboomers' research deals with the microtexturing of biomaterial surfaces and the tissue engineering of bone. After obtaining his PhD degree, he continued to work in the Department of Biomaterials at Radboud University Nijmegen Medical Center as a post-doc, and currently as an associate professor. He maintains intensive collaboration with many international research

groups and acts as course coordinator for tissue engineering education at the School of Biomedical Sciences of the Radboud University Nijmegen Medical Center. Walboomers has contributed to more than 100 publications.



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Wan is a team leader and principal research scientist at the Institute of Bioengineering and Nanotechnology, Singapore. He received his PhD degree from the National University of Singapore (1998), followed by postdoctoral studies at IMRE, Singapore (1998–2001) and Johns Hopkins University, Baltimore (2001–2004), as a recipient of an A\*STAR National Science

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#### Min Wang

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Wang is a professor in The University of Hong Kong. He earned his BSc and PhD degrees in materials science and engineerig at Shanghai Jiao Tong University, China, and the University of London, UK, respectively. He started biomaterials research in 1991 and has worked on a wide range of biomaterials. He has many publications in peer-reviewed journals and conference proceedings, as well as chapters on biomaterials

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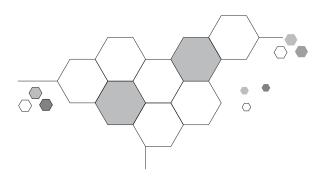


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Ying received her PhD degree from Princeton University. She was a professor of chemical engineering at Massachusetts Institute of Technology (1992-2005). She has served as the executive director of the Institute of Bioengineering and Nanotechnology in Singapore since 2003. For her research on nanostructured materials, she has been recognized with the Ameri-

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Zhang is a PhD student and a research assistant in the Bioengineering Department at the University of California, San Diego (UCSD). He received his MS degree from the Biomedical Engineering Department at the University of Texas at Austin. Zhang's primary research interests include fabrication of micro/nanoscale tissue engineering scaffolds using a femtosecond laser, investigation of laser-biomaterial interaction, laser optics,

and femtosecond laser-induced DNA transfection of human and plant cells. Zhang has two peer-reviewed publications on applications of the femtosecond laser.

