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Editorial

4th TMS Symposium on Biological Materials Science

This special issue includes a selection of original papers that were presented at the 4th Biological Materials Science (BMS) Symposium at The Minerals, Metals and Materials Society (TMS) 2008 Annual Meeting in rejuvenated New Orleans, Louisiana. The BMS Symposium is intended to provide a unique venue for researchers exploring the intersection of materials science and biology. Materials science and engineering is expected to play a highly significant role in the foreseeable future of biomedicine (Langer, 2006; Whitesides and Wong, 2006). Conversely, noting that materials science finds its roots in solid state physics and chemistry, biology is logically the next great frontier for materials science (Whitesides and Wong, 2006; Friedman, 2001; Murr, 2006). The BMS Symposium is unique compared to other related symposia in emphasizing the primacy of the study of *biological materials* to the development of biomaterials and biomimetic materials, as well as the application of materials science and engineering principles to the study of biological materials (Meyers et al., 2008).

Programming over three and one-half days included nearly seventy papers in seven oral sessions and a student poster contest. Presenters represented at least fourteen different countries from five continents. Session topics included the Mechanical Behavior of Biological Materials, Implant Biomaterials, Bioinspired Design and Processing, Scaffold Biomaterials, and Functional Biomaterials. Keynote and invited speakers comprised internationally recognized investigators, and they were afforded ample time to highlight seminal contributions, recent advances, and gaps in the field. Keynote lectures were given by a materials scientist – Robert Ritchie (University of California, Berkeley) “How Really Tough is Human Cortical Bone?” – and a molecular biologist – Malcolm Snead (University of Southern California) “Designing Hard Tissue by Genetic Knock-In Approaches”. Two papers in this special issue, co-authored by James Mason (Zimmer Corporation) and Xiaodu Wang (University of Texas at San Antonio), are representative of a dozen outstanding invited speakers. All other papers in this special issue are reflective of the dozens of enthusiastic students who presented their work in the Symposium. Moreover, a student poster contest was launched to further increase student participation and interaction with senior investigators. First place in the graduate (Ryan Ross, University of Notre Dame) and undergraduate (Kirsten Kepple, Georgia Institute of Technology) division

received cash awards. A grant from the National Science Foundation (DMR 0757787) provided generous travel assistance to ten student presenters.

As Chair and on behalf of the entire organizing committee (Eduard Arzt, Max Planck Institute; Chwee Teck Lim, National University of Singapore; Marc A. Meyers, University of California, San Diego; Robert O. Ritchie, University of California, Berkeley; Mehmet Sarikaya, University of Washington), I invite you to browse the quality and diversity of BMS Symposium programming. The eight papers featured in this special issue span the three main classes of materials, especially including biological and synthetic composites. Mechanical behavior is explored by both experiment and model, from nanoscale investigations of nanotubes and macromolecules, to micromechanical investigations of dental multilayers and abalone nacre, to continuum level investigations of hydrogel cartilage substitutes, bone tissue, and scaffolds.

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