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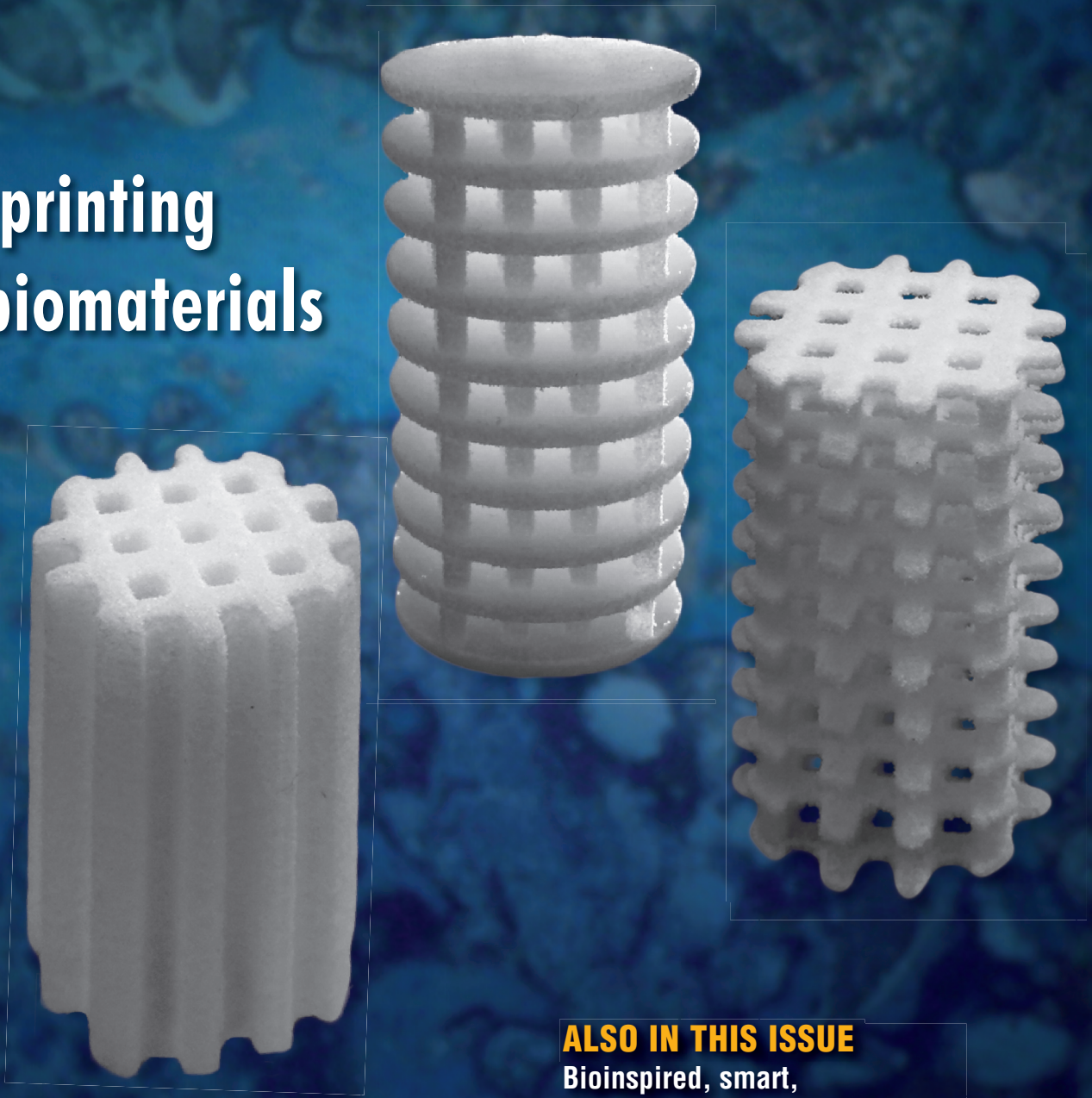
3D printing of biomaterials



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3D Printing of Biomaterials

Wednesday, February 25 | 12:00 pm - 1:30 pm (ET)

Three-dimensional (3D) printing represents the direct fabrication of parts layer-by-layer, guided by digital information from a computer-aided design file without any part-specific tooling. Over the past three decades, a variety of 3D printing technologies have evolved that have transformed the idea of direct printing of parts for numerous applications. Three-dimensional printing technology offers significant advantages for biomedical devices and tissue engineering due to its ability to manufacture low-volume or one-of-a-kind parts on-demand based on patient-specific needs. However, many concerns remain for widespread applications of 3D-printed biomaterials, including regulatory issues, a sterile environment for part fabrication, and the achievement of target material properties with the desired architecture. The presentations in this webinar will cover some of the important aspects of 3D printing of biomaterials.

HOST **Amit Bandyopadhyay,** Washington State University

This webinar expands on research that is featured in the February 2015 Issue of *MRS Bulletin*.

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CONTENTS

3D PRINTING OF BIOMATERIALS

TECHNICAL FEATURE

DEPARTMENTS

NEWS & ANALYSIS

https://doi.org/10.1557/mrs.2015.27 Published online by Cambridge University Press

166 SOCIETY NEWS

FEATURES

186 CAREER CENTRAL

ON THE COVER

3D printing of biomaterials. Three-dimensional printing technology offers significant advantages for biomedical devices and tissue engineering due to its ability to manufacture low-volume or one-of-a-kind parts on-demand. The cover shows tensile and compressive mechanical test specimens endowed with 1D, 2D, and 3D designed porous architectures fabricated via selective laser sintering of polycaprolactone powder. The specimens were used to evaluate the effective tensile and compressive mechanical properties of the 3D printed scaffolds with orthogonally oriented pore architectures, as compared to bulk mechanical properties. An understanding of the interrelationships between computationally designed pore architectures and effective mechanical properties is especially important for the rational design of scaffolds with multifunctional requirements, such as load-bearing capability simultaneous with permeability for ingrowth and integration of bone tissue, and transport of nutrients and metabolic wastes. Images reprinted with permission from Elsevier. See the technical theme that begins on page **108**.

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The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973 and headquartered in Warrendale, Pennsylvania, USA, promotes interdisciplinary materials research. Today, MRS is a growing, vibrant, member-driven organization of over 16,000 materials researchers spanning over 80 countries, from academia, industry, and government, and a recognized leader in the advancement of interdisciplinary materials research.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across many scientific and technical fields touching materials development. MRS conducts three major international annual meetings and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction through University Chapters. In the international arena, MRS implements bilateral projects with partner organizations to benefit the worldwide materials community. The Materials Research Society Foundation helps the Society advance its mission by supporting various projects and initiatives.

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