Challenges and Opportunities of using Additive Manufacturing in the Medical Industry

The medical industry is one of the key sectors to take advantage of additive manufacturing (AM) technology. The unique capability of AM to design and fabricate complex geometries using a diverse array of materials has allowed the adoption of this technology in biomedical applications. Despite the tremendous opportunities that AM can offer in creating patient-specific biomedical parts with versatile designs and adoption in orthopedic devices, the application potential of AM in the medical sector is not yet fully explored. Advancement in regenerative medicine, medical device fabrication, and operations management planning ensures a wider adoption of AM in this industry. In addition, a special attention should be given to standardization as well as qualification and certification of these products.

This symposium broadly covers the applications of AM in the medical sector:
- New materials for biomedical applications
- Design and manufacturing of medical models, prosthetics, and implants
- Performance of additive manufactured biomedical parts
- Post processing of AM medical devices
- Lattice design and performance
- Advancements in bioprinting
- Qualification and certification challenges
- Need for standards and regulations

ORGANIZERS
- Matthew Di Prima, FDA, USA
- Dirk Scholvin, Wright Medical, USA
- David Jones, Stryker

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Session 3
Challenges and Opportunities of Using AM in the Medical Industry
Session Chairs TBD

8:00 a.m. Invited Talk: Implementing processing strategies and unique hot isostatic pressing treatments to control microstructure, defect content and mechanical properties of electron beam melted Ti-6Al-4V
Jake Benzing, National Institute of Standards and Technology

8:30 a.m. Invited Talk: Disruptive Innovation in Medical Devices - A 3D Printing Perspective
Jing Lim, Osteopore International Pte Ltd

11:00 a.m. Regular Talk: Dry Electropolishing as a way to improve Post Processing of Additive Manufactured Implants
Patrick Sage, GPA INNOVA America Corp

11:20 a.m. Invited Talk: The effect of additive manufacturing parameters on Ti-6Al-4V alloy microstructure for biomedical applications
Mozart Q. Neto, Rush University Medical Center

11:40 a.m. Invited Talk: Surface texture optimization of metal AM-built components for biomedical applications
Agustin Diaz, REM Surface Engineering

12:10 p.m. Regular Talk: Topology Optimization - Input Parameter Sensitivity Analysis and Validation
Daniel Porter, U.S. Food and Drug Administration

1:50 p.m. Invited Talk: COVID 19 Lessons Learned - From Shifting Priorities, 3D Printing, Supply Chain, and Application to the Next Pandemic
Timothy Gornet, University of Louisville
Misty Jones, Jones Anesthesia

2:20 p.m. Invited Talk: Design for Powder-Bed Fusion Metal Additive Manufacturing: Selected Opportunities and Challenges for Medical Industry
Ebrahim Asadi, The University of Memphis

2:50 p.m. Regular Talk: Assuring chemical and biological cleanliness of porous 3D printed medical devices
Allan W. Kimble, DePuy Synthes / Johnson & Johnson

3:30 p.m. Invited Talk: Additive Manufacturing of Polymers and Polymer-Ceramic Hybrid Materials for Medical Applications
Roger J. Narayan, NC State University

4:00 p.m. Invited Talk: Fused Filament Fabrication of Medical Grade Thermoplastic Polyurethanes: Cyclic Performance, Shape-Memory Behavior, and Clinical Application
David Safranski, MedShape, Inc.

4:30 p.m. Invited Talk: Balancing Osseointegration and Fatigue Resistance of 3D Printed Titanium Scaffolds
Ken Gall, Duke University

9:00 PANEL DISCUSSION PREP | 9:05 PANEL DISCUSSION
10:20 BREAK | 12:30 LUNCH | 3:10 BREAK | 5:00 SESSION ENDS