

NEW FRONTIERS IN 3D PRINTING AT JOHNS HOPKINS UNIVERSITY

JUNE 10, 2016
MOUNTCASTLE AUDITORIUM,
PRE-CLINICAL TEACHING BUILDING (PCTB)
725 NORTH WOLFE STREET



A SPECIAL THANK YOU TO THE FOLLOWING VENDOR FAIR PARTICIPANTS:

Amtek Company: Ron Baddock
Direct Dimensions: Joe Conrad, Michael Raphael
JHU Art as Applied to Medicine: Juan Garcia
Materialise: Bill Peterson, Maureen Schickel
Root 3: Chad Schneider
Stratasys: R. Scott Rader, John Wynne
Vital Images: Mary Daniels, Dave Nuthals
Xometry: Greg Paulsen

*This event was made possible by support from the ICTR
Drugs/Biologics/Vaccines/Devices Translational Research
Community, and the Departments of Neurosurgery and
Biomedical Engineering (BME).*

12:30-1:00pm

Check-in, Refreshments & Vendor Fair

1:00 - 1:10pm

Opening

Welcome Remarks

Daniel Ford, MD, MPH,
*Vice Dean for Clinical Investigation;
Director of the Institute for Clinical and Translational Research (ICTR)*
David M. Levine
Professor of Medicine and Psychiatry

1:10 - 2:10pm

3D Printing Applications

KEYNOTE: 3D Printing in Medicine: History, Applications & Future Thoughts

Andy Christensen,
Founding President of Medical Modeling Inc.

3D Printing Medical Use Cases

John Wynne,
Director of Business Development for Medical Solutions, Stratasys Ltd.

3D Printing for Computer-Assisted Surgery Applications

Mehran Armand, PhD
*Senior Scientist, JHU Applied Physics Laboratory; Merle A. Tuve Associate Research
Professor of Mechanical Engineering; Faculty of Orthopaedic Surgery*

2:10 - 2:15pm

Break

2:15 - 3:15pm

3D Printing Applications

KEYNOTE: 3D Printing Bringing Realism and Relevance to Surgical Education

Katherine Barsness, MD, MS, FACS,
*Associate Director of Clinical and Translational Research; Director of Surgical Simulation;
Associate Professor of Surgery and Medical Education, Northwestern University Feinberg
School of Medicine*

Applications of 3D Printing in Medical Art and Anaplastology

Juan Garcia, MA, CCA,
*Director of the Facial Prosthetics Clinic;
Associate Professor of Art as Applied to Medicine*

**3D-Printing Technologies for Craniofacial Rehabilitation,
Reconstruction, and Regeneration**

Warren Grayson, PhD,
*Director of the Laboratory for Craniofacial and Orthopaedic Tissue Engineering;
Associate Professor of Biomedical Engineering*

3:15 - 3:35pm

Vendor Fair - Room 113

3:35 - 4:20pm

Health Economics for 3D Printing

3D Printed Surgical Models: Indications and Economics

R. Scott Rader, PhD,
General Manager for Medical Solutions Inc.

Automated Segmentation to Speed STL Creation

David Nuthals,
Senior Marketing Manager
Mary Daniels, R.T. (R) (CT),
Clinical Development Specialist at Vital Images Inc.

4:20 - 4:30pm

Concluding Remarks & Dismissal

Clifford Weiss, MD,
*Co-Leader of the ICTR Drugs/Biologics/Vaccines/Devices Translational Research
Community; Medical Director of the JHU Center for Bioengineering, Innovation and
Design (CBID); Associate Professor of Radiology and Radiological Science*

4:30 - 5:00pm

Attendees are invited to revisit the Vendor Fair

SPEAKER BIOS

Mehran Armand, PhD, is a principal investigator at the Johns Hopkins University Applied Physics Laboratory (JHU APL), where he has led projects in computer- and robot-assisted surgery as well as research in novel mobile platforms. He is also Merle A. Tuve Associate Research Professor of the Department of Mechanical Engineering, a core faculty in the Systems Institute, and a faculty member of the Department of Orthopaedic Surgery at the Johns Hopkins Whiting School of Engineering and Medical School. Dr. Armand directs the Biomechanical and Image-Guided Surgical Systems Laboratory within the JHU Center for Computational Sensing and Robotics. Prior to joining APL in 2000, Dr. Armand completed postdoctoral fellowships in the Departments of Orthopaedic Surgery and Otolaryngology at the JHU School of Medicine, where his research involved musculo-skeletal modeling and biomechanical preoperative planning. In 1998 he obtained a Ph.D. in Mechanical Engineering and Kinesiology in the area of bipedal locomotion from the University of Waterloo, Canada. Dr. Armand's research interests include computer and robot-assisted surgical systems with intraoperative biomechanical guidance, as well as novel mobile platforms for non-medical applications. Since 2003 he has been the principal investigator of multiple NIH-funded projects.

KEYNOTE SPEAKER

Katherine A. Barsness, MD, MS, FACS, received her cum laude B.S. degree in Biochemistry and her honors M.D. degree from the University of Tennessee. Dr. Barsness then went on to complete her internship, residency in surgery and a two-year basic science and trauma research program, at the University of Colorado. In 2007, Dr. Barsness completed her pediatric surgery fellowship at the University of Pittsburgh, and then went on to join the faculty at Northwestern University Feinberg School of Medicine, where she currently holds a joint appointment as an Associate Professor in the Departments of Surgery and Medical Education. Dr. Barsness has received numerous teaching awards throughout her career, and is a recognized leader in pediatric surgical education, both in the US and abroad. Dr. Barsness is the Director of Surgical Simulation for Ann & Robert H Lurie Children's Hospital of Chicago, and also serves as Associate Director of Clinical and Translational Research for the Stanley Manne Children's Research Center at Lurie Children's Hospital. She sits on the curriculum committee for graduate medical education (GME) simulation-based education, and serves as the Director of External Relations for Northwestern Simulation in the Department of Medical Education at Northwestern University Feinberg School of Medicine. Dr. Barsness' research interests include objective evaluation of simulation-based educational tools, validated measures of surgical skills, curriculum design, and the delivery of advanced minimally invasive surgical education. Dr. Barsness has broad experience in rapid prototype design processes and the use of additive manufacturing techniques for the design and development of educational devices for surgical education. Dr. Barsness is a strong advocate for the advancement of surgical skills across the continuum of medical education, and remains committed to advancing the science of advanced minimally invasive surgical techniques for infants, children and adults.

KEYNOTE SPEAKER

Andy Christensen has been active in the 3D printing (aka: additive manufacturing) industry since the mid 1990's, the entire time with a focus on medical applications. He is a graduate of the University of Colorado at Denver, with a BS in Business. From 2000 to 2014 he was the Founder and President of Medical Modeling Inc., a world-leading medical device 3D Printing service bureau based in Golden, Colorado. Medical Modeling created entirely new toolsets in the areas of patient-specific anatomical modeling, virtual surgical planning, personalized surgical guides/implants and 3D printed implants. In 2014 Medical Modeling was acquired by 3D Systems and saw Andy lead the creation of a new business vertical for 3D Systems in the Healthcare sector. Andy left 3D Systems in 2015 to pursue other interests.

Mary Daniels, R.T. (R) (CT), is the Customer Advocacy Manager for Vital Images. She had 26 years of experience as a Radiology Technologist prior to her work at Vital Images for the past 16 years.

Daniel E. Ford, MD, MPH, is a general internist who has been active caring for patients and conducting clinical research for over 20 years. He has worked with patients, nurses, social workers and physicians to develop and test new approaches to improving outcomes for patients, mostly those seen in primary care. He has led randomized clinical trials to improve outcomes in depression, smoking cessation and addictions. He published ground breaking studies on the relationship between depression and sleep and understanding how depression is a risk factor for developing heart disease. Since 2005 he has been the Vice Dean for Clinical Investigation at The Johns Hopkins School of Medicine. He is the Founding Director and PI of the Institute for Clinical and Translational Research (ICTR), which is funded by an NIH Clinical and Translational Science Award (CTSA). The CTSA grant supports clinical and translational research throughout Johns Hopkins. It includes support for education and training of new translational investigators, facilities in which clinical research can take place and infrastructure support of patient recruitment, bioinformatics, biostatistics and translational core centers.

Juan R. Garcia, MA, CCA, is a Certified Clinical Anaplastologist (CCA) serving as the Director of the Johns Hopkins University Facial Prosthetics Clinic. He is also an Associate Professor in the Department of Art as Applied to Medicine in the Johns Hopkins University School of Medicine. He leads the program in Supervised Training in Clinical Anaplastology as well as teaches in the medical illustration graduate degree program. Juan graduated with an MA degree in Medical & Biological Illustration from Johns Hopkins. His clinical anaplastology training experience included several technical exchanges at Columbia University/Bronx VA, Toronto-Sunnybrook Cancer Center, Sahlgrenska Univ. Hospital, Kings College London (in Pune India) as well as with respected colleagues Gillian Duncan, Fred Harwin, and Barbara Spohn-Lillo. Mr. Garcia currently serves as the Vice President of the Board for Certification in Clinical Anaplastology (BCCA), having led the Job Task Analysis leading to the development of the credential. He is a past president of the International Anaplastology Association (2002-3). This oral presentation will touch upon many of his research interests which include the use of advanced technologies such as surface scanning, DICOM reconstructions, 3D sculpting, and 3D printing.

Warren Grayson, PhD, is an Associate Professor of Biomedical Engineering and Material Sciences & Engineering at Johns Hopkins University and is a founding member of the Translational Tissue Engineering Center. His research interests focus on engineering musculoskeletal grafts for craniofacial and orthopaedic tissue regeneration. Dr. Grayson's previous work on bioreactor design and engineering anatomically shaped bone grafts has received national and international coverage in various news agencies including the New York Times, BBC, and Science Translational Medicine. He has been recognized by the Maryland Science Center as the Outstanding Young Engineer (2010), awards from the Orthopaedic Research Society (2007), the American Society for Bone and Mineral Research (2013), TERMIS Young Investigator Award, and has received the prestigious Early Faculty CAREER Award from the National Science Foundation (2014). He has authored over 40 original and review articles and book chapters and holds several patents for bioreactor and biomaterial designs. Currently, his lab focuses on spatial and temporal regulation of stem cell differentiation in 3D constructs to generate clinically useful engineered grafts.

David Nuthals is the Senior Manager for Diagnostic Solutions at Vital Images. For over ten years, Mr. Nuthals has been in the medical device industry developing innovative products for physicians. He holds a Bachelors of Civil Engineering and Masters in Business Administration from the University of Minnesota.

R. Scott Rader, PhD, General Manager for Medical Solutions. With more than 20 years in the medical product industry, he brings the experience and expertise of matching clinical needs to technology solutions from the conceptual stage to the challenges of commercialization. Recently, he was selected as an Associate Editor for a new medical journal, 3D Printing in Medicine. Dr. Rader was an Assistant Professor of both Ophthalmology and Engineering at Johns Hopkins University. He holds a Ph.D., M.S.E. and B.S.E. in Mechanical Engineering and Materials Science from Duke University.

Clifford Weiss, MD, has extensive experience in the design, development, and clinical evaluation of new technologies, devices and therapeutics. Dr. Weiss' clinical focus lies in vascular and interventional radiology. He specializes in MRI-guided interventions for the treatment of peripheral and renal arterial and vascular disease, total occlusions, claudication, varicocele, vascular malformations and venous thromboembolism, as well as lower extremity and visceral angioplasty and stenting. His daily practice involves the use of cutting edge technologies and therapeutics to treat a diverse set of diseases including cancers, peripheral vascular disease, uterine fibroids and vascular malformations. Many of the tools and therapies Dr. Weiss has worked to develop are either in clinical trials, or have been recently FDA approved. As the Clinical Director of CBID, Dr. Weiss works closely with undergraduate, masters and PhD students in assessing clinical needs that can be solved using engineering/biomedical engineering solutions, and then in designing and implementing these solutions. Dr. Weiss has extensive knowledge and experience in the device design and evaluation/iteration processes, in intellectual property assessment, and in regulatory affairs. As such, Dr. Weiss is well suited to his role as a Co-Leader of the ICTR Drugs/Biologics/Vaccines/Devices Translational Research Community (TRC). The goals of the ICTR TRC(s) are to improve the quality, innovation, and impact of the translational products created by JHU researchers. The TRC(s) are forums where researchers may obtain emerging knowledge in their field; identify new bioscience and data science methodologies; and identify substantial barriers to research and propose new approaches to addressing these issues.

John Wynne, Director of Business Development for Medical Solutions, brings over a decade of medical expertise to Stratasy. Prior to Stratasy, he worked at Boston Scientific, a leading medical device manufacturer, where he spent nine years in various strategy and business development roles. Earlier in his career, he worked for Bristol-Myers Squibb, a global leader in the pharmaceutical space. John has a degree in Chemical Engineering from the University of New Hampshire and an MBA from Boston University.