

ISBF Board of Directors Nomination for:

**Jordan S. Miller, Ph.D.**

Assistant Professor  
Department of Bioengineering  
Rice University

**Narrative:**

The lack of sufficient numbers of donor organs for human transplantation therapies results in the loss of tens of thousands of lives and costs hundreds of billions of dollars each year in the US alone. However, the ability to create, *de novo*, functional organ replacements for treating human pathologies is fundamentally limited by the lack of a comprehensive vascularization strategy for engineered three-dimensional (3D) tissues. We have developed 3D printing materials and sacrificial casting strategies to enable the rapid fabrication of engineered tissues containing perfusable vascular architectures. Patterned vasculature facilitated capillary sprouting and supported the function of primary hepatocytes in centimeter-sized constructs. Together these technologies provide a flexible platform for a wide array of specific applications, and may enable the scaling of densely populated tissue constructs to arbitrary size.

My research interests have been rooted in the biofabrication toolchain for the past 15 years — we design, development, characterization, and deployment of fabrication systems; we develop and synthesize novel biomaterials and bioinks that can support unprecedented fabrication and 3D cell culture advances; and we identify and elaborate new volumetric tissue quantification strategies that we believe will empower the next decade of personalized medicine therapies and significantly extend human lifespan and improve quality of life dramatically.

My fundamental belief and interest in biofabrication is that the key to alleviating the suffering of millions of patients worldwide is advanced biofabrication technologies to model native and pathologic tissues, acquire statistically significant datasets and interpret them with an open mind, and then develop functional therapies and disease models for addressing a myriad of needs for the human condition. We are confident these advances require worldwide collaboration and open sharing of ideas and knowledge and fostering the next generation of biofabrication researchers; these principles perfectly summarize the work to-date of the International Society of Biofabrication and make me so excited for the potential to join the board of directors to continue facilitating this worldwide biofabrication strategy.

**Bio:**

Jordan Miller received his bachelor's degree in Biology from MIT in 2003, and PhD in Bioengineering from Rice University in 2008. Miller has served as Assistant Professor of Bioengineering at Rice University since 2013. His primary research interests combine synthetic chemistry, 3D printing, microfabrication, and molecular imaging to direct cultured human cells to form more complex organizations of living vessels and tissues for research in regenerative medicine. Precisely engineered *in vitro* systems at the molecular, micro- and meso-scale are well suited to decouple the relationship between tissue architecture and cell function. These systems are now permitting comprehensive closed-loop design and optimization of large-scale engineered tissues through refinement with computer models of mass transport and assessment of their therapeutic potential *in vivo*.

**Conflict of Interest Statement:**

Jordan S. Miller is a co-founder and holds an equity stake in Volumetric, Inc., which is a biofabrication startup company located in Houston, Texas, USA.