Manufacturing USA®

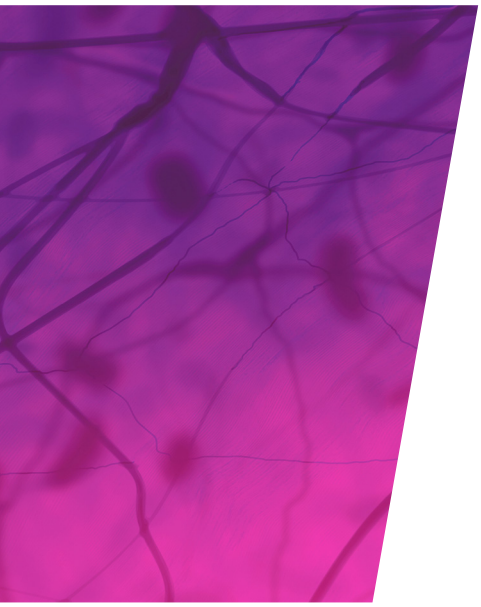
a program of armi

biofabusa
Manufacturing the Future of Biofabrication

MANUFACTURING THE FUTURE OF BIOFABRICATION

ARMI (Advanced Regenerative Manufacturing Institute), a Manufacturing USA® institute, created the BioFabUSA program. ARMI is a member-driven, non-profit organization, whose mission is to make practical the large-scale manufacturing of engineered tissues and tissue-related technologies. BioFabUSA was established to lead the charge in large-scale manufacturing of engineered tissues and regenerative medicine research, turning foundational breakthroughs in the manufacture of engineered tissues and tissue-related technologies into life-changing possibilities for everyone.

Manufacturing USA, a public-private partnership with 14 manufacturing institutes across the nation, connects companies, academic institutes, non-profits, and local, state, and federal entities to solve industry-relevant advanced manufacturing challenges in new technology areas with the goals of enhancing industrial competitiveness and economic growth and strengthening national security.



Technology Focus Area

Biofabrication is the industrial production of biological tissues which can be used for infinite therapeutic applications, including for burn injuries or damaged vasculature, in toxicology screening to test the safety of drugs under development, and to develop therapies to cure diseases including renal failure and diabetes. To reach its goals, BioFabUSA is removing hurdles to manufacture biological tissues more reliably, produce scalable processes and integrated technologies for the field, and develop disruptive cell and tissue-based technologies that will accelerate the discovery and characterization of new small molecules and biologics.

Approach to Innovation and Collaboration

BioFabUSA brings together partners in government, industry, and academia to collectively overcome manufacturing challenges in commercializing tissue engineering technology through:

- Participating in the Standards Coordinating Body for Regenerative Medicine to accelerate development of tissue products and creating needed standards in cell therapy, gene therapy, regenerative medicine, and cell-based drug discovery
- Developing an ecosystem of large and small institutions, start-ups, and established firms working together to accelerate this new market opportunity
- **Projects** that focus on developing technologies that are broadly applicable and supportive of manufacturing multiple tissues to create more standardized practices across the industry; and
- Accelerating development of an advanced biofabrication workforce by establishing a new series of skills in advanced regenerative manufacturing and related curricula for learning institutions

LEARN MORE + CONNECT WITH BIOFABUSA

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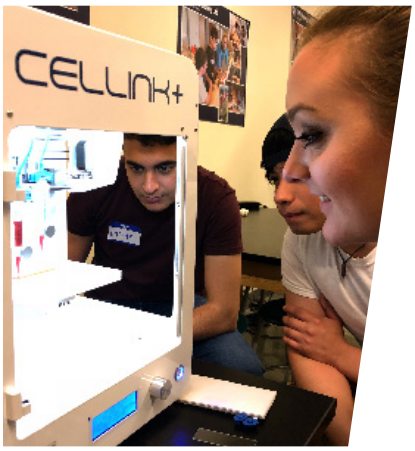
COLLABORATIVE PROJECT EXAMPLES

"When science meets Manufacturing, we save lives. As part of a public-private partnership, Rockwell Automation will bring together advances in manufacturing, biotech, medicine and life sciences and automate those new bio manufacturing processes to add a new chapter to medicine—a story that, as it unfolds, will integrate biomanufacturing science with production techniques that increase capacity, speed, modularity and quality. We've committed $10 million to ARMI to develop ways to scale up production of new technologies to produce tissues, such as growing artificial skin for grafts, which have been under development in labs around the country."

– David Vasko, Director, Advanced Technology, Rockwell Automation



WORKFORCE SKILLS IN 3D BIO PRINTING: In partnership with the University of Minnesota, and its 3D Bio printing Facility, BioFabUSA will develop educational programs to support the 3D bio printing skills required to train future workers. 3D bioprinting represents a disruptive technology with the potential to transform health care as part of the revolution in the personalized medicine industry.

The benefits of 3D bio printing include the ability to build functional tissues, organs, supports and guiding scaffolds, tailored to the patient's size, specification and histocompatibility. In addition to the creation of transplantable/implantable tissues, the ability to build small and reproducible human tissue models brings unprecedented capability to predict drug interactions and toxicities, as well as to study disease in a context approximating the natural 3 dimensional complexity.

These programs will ultimately include exposing young students (K-12) to 3D printing (STEM, Anatomical Models, & Robotics), specially focused bio printing courses for 2- and 4-year degree programs and graduate school, Veterans education, and intense 1-week workshop courses for Industry professionals.

"I am astounded by the 21st century science fiction done by scientists in the field of regenerative medicine. I am equally astounded by the science fiction in their labs, where the manual labor conducted by technicians is reminiscent of Louis Pasteur's laboratory. It is amazing that these miracles can be performed without modern process controls, robotics, and sensors, but this field will need 21st century engineering and manufacturing to mature into an industry capable of manufacturing FDA-approved tissues at the scale they are needed. BioFabUSA will build the coalition of industry, academia, and government that I hope will make that happen and enable the next big advance out there."

– Dean Kamen, Executive Director, BioFabUSA