TSIM™ & BioAssemblyBot™

Tissue Structure Information Modeling Software and 3D Bioprinter

Accelerating Biomedical Discovery & Innovation

TSIM — TISSUE STRUCTURE INFORMATION MODELING

BioAssemblyBot

- Medical Images
- Tissue Designs
- Experimental Models
- Cell Systems

→ 3D Modeling & Analysis → Tissue Assembly

An Integrated Solution

Tissue Structure Information Modeling (TSIM) and BioAssemblyBot comprise an integrated workstation that empowers physicians, researchers, engineers, and scientists to design, visualize, and print 3D virtual models of complex tissue structures. The patent pending innovation advances the current capability of 3D printing to enable biological tissue assembly, a key step in realizing functional biological structures for human purposes.

Tissue Structure Information Modeling (TSIM)

3D Modeling & Analysis

**TSIM** — TISSUE STRUCTURE INFORMATION MODELING

TSIM is an intuitive software tool that empowers doctors and scientists to design, visualize, simulate and analyze 3D computer models of complex tissue structures. TSIM software utilizes a digital prototyping workflow that enables scientists to work with 3D computer models of complex tissue structures before they are created. This capability allows scientists to enhance the precision and functional specifications of any tissue structure design.

Capabilities

- **Image Import and Manipulation** – Patient specific image sets, such as ultrasound, MRI or CT scans, are converted to 3D representations. These representations are then used to guide the printing.

- **3D Structure Design and Modeling** – The user creates a 3D model in TSIM using the medical image sets as a guide.

- **Materials Inventory Management** – TSIM supports a comprehensive material data management system that provides the ability to define, create, query, update, administer, and attach data attributes (e.g. cell type, viscosity, etc.) to objects within the model.
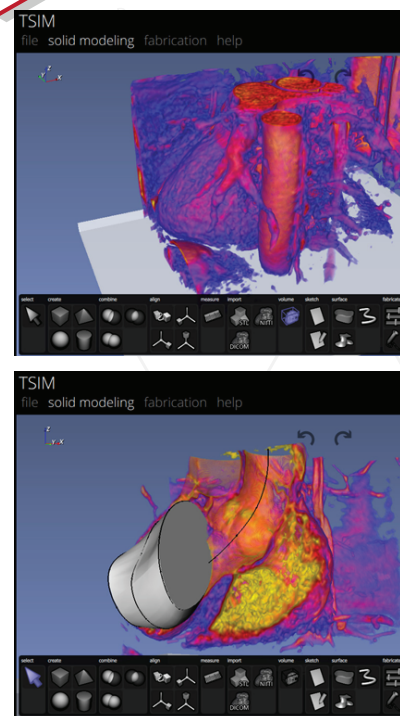
BioAssemblyBot

Once the 3D model is complete in TSIM, the data is sent to the BioAssemblyBot workstation for printing. Utilizing a six-axis robotic arm, the BioAssemblyBot precisely builds 3D tissue structures and models.


- LED Lights
- Robot Arm
- Video Camera
- Robot End Effector
- RJ45 / 120V / Air
- Syringe Storage
- Integrated HMI
- Work Stage

Capabilities

- **Six-axis robotic arm** – Enables multi-directional printing functionality

- **Modular end effector design** – Multiple unique printing cartridges and "bioinks" can be utilized during a single print run, enhancing the range and scope of task functionality and tissue assembly.

- **Automated print operations** – Automatically calibrates the position of the robot arm using laser sensors. The arm then moves to the storage rack, selects the proper syringe, and dispenses the specified amount of material to construct the biological model.

- **Intuitive touch screen interface** – Integrated human-machine interface gives the user control of print operations

- **Video camera** – Displays live feed of printing activity from inside the BioAssemblyBot

- **Flexible printing environment with bench-top footprint** – Sized to provide a flexible printing area and to fit medical laboratory environments

Direct print to well plates
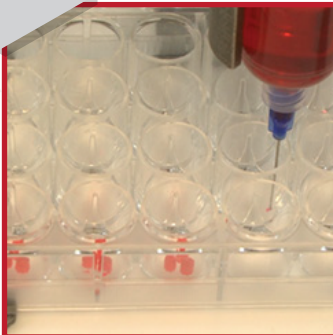
Print complex geometries
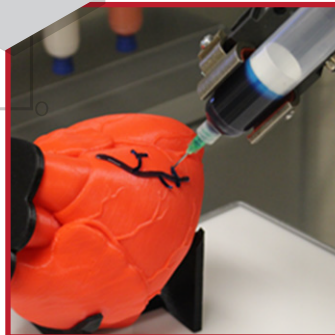
Store up to 10 bioinks

Sample Applications

- Vascular tree – cell system and assay

- Heart with vein – organ model

- Nose – surgical model

- Aortic valve – experimental tissue system

- Tissue models – cell system and assay

- Bone replacement tissue molding – implant system

"This is a game changer. The BioAssemblyBot and TSIM solution is enabling us to rapidly advance and expand our biological capability for tissue repair, improved drug therapy and organ replacement. "

Dr. Jay Hoying
Division Chief, Cardiovascular Therapeutics
Cardiovascular Innovation Institute

Advanced SOLUTIONS™
LIFE SCIENCES

TSIM™
TISSUE STRUCTURE
INFORMATION MODELING

BioAssemblyBot®

Advanced Solutions Life Sciences is dedicated to the discovery, design, development and commercialization of integrated software and hardware solutions for the fields of science that involve living organisms, molecular biology, and biotechnology. We seek to improve the quality and standard of life through innovative solutions in health, agriculture, medicine, medical device manufacturing, pharmaceutical industry, and food