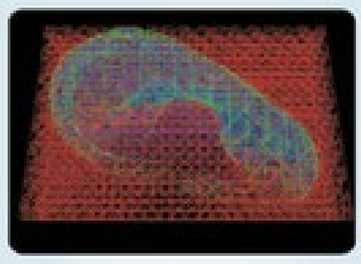
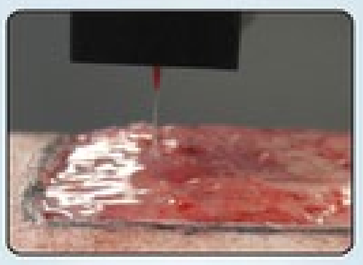
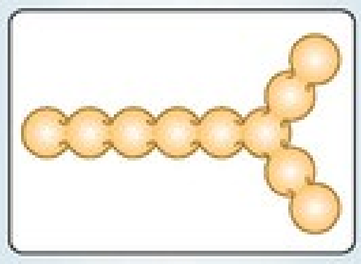
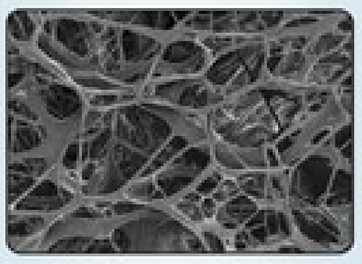
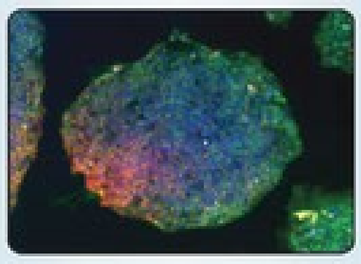
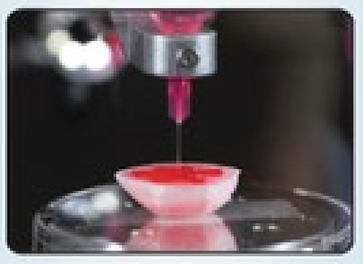
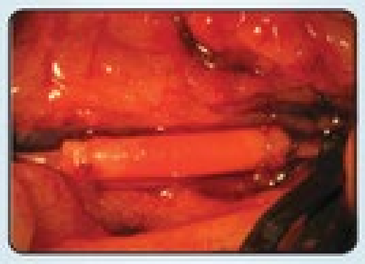
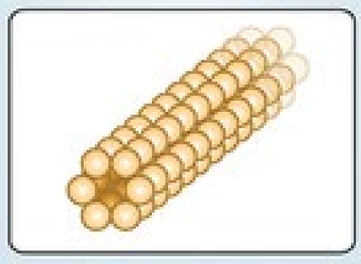
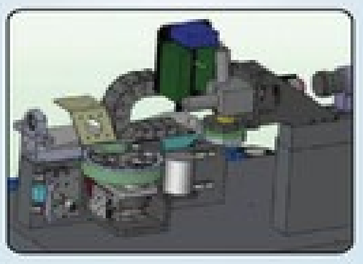
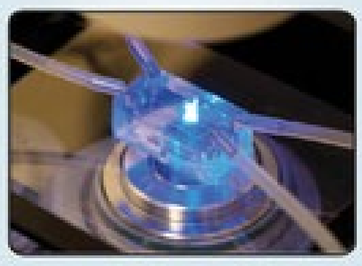
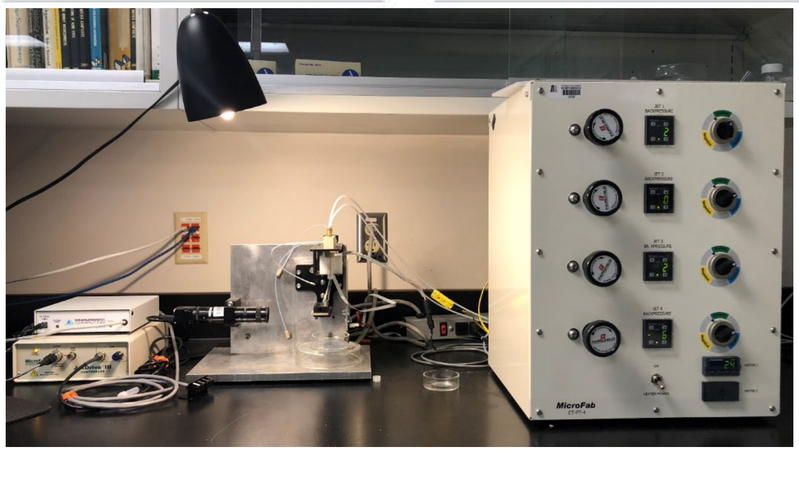
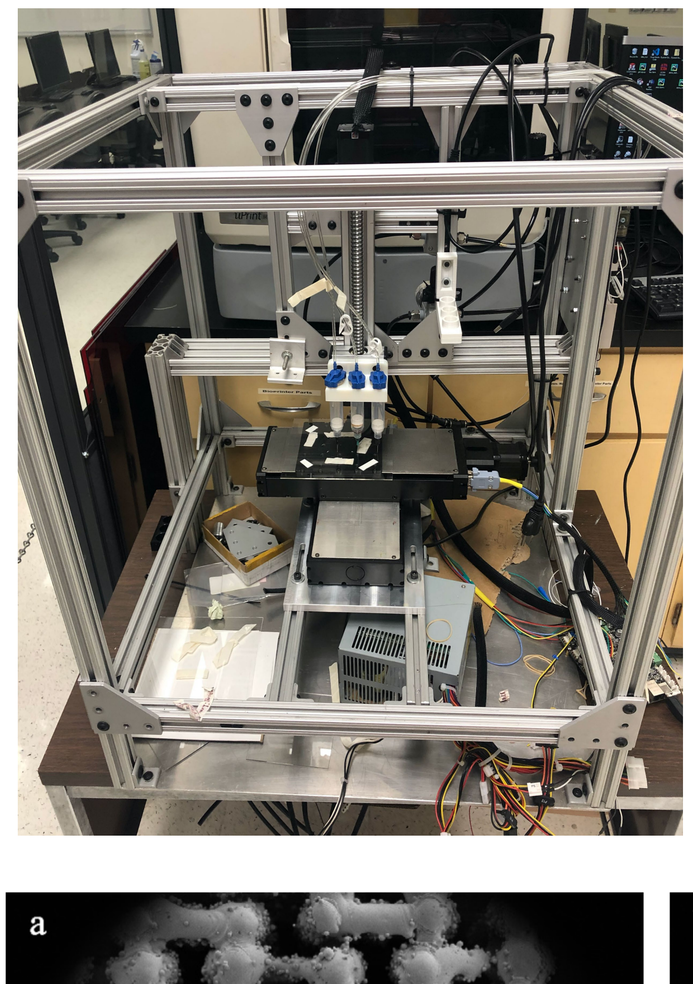
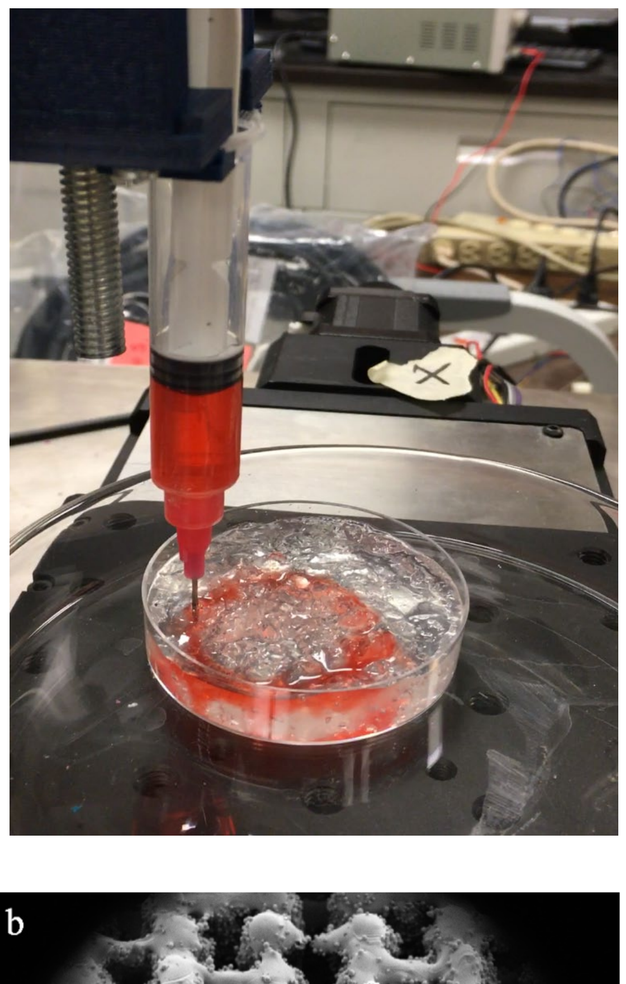
ADDITIVELY MANUFACTURED SCAFFOLDS FOR TISSUE ENGINEERING

AUTONOMY RESEARCH CENTER FOR **STEAHM**

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Imaging	Design approach	Material selection	Cell selection	Bioprinting	Application
					
X-ray	Biomimicry	Synthetic polymers	Differentiated cells	Inkjet	Maturation
					
CT	Self-assembly	Natural polymers	Plurpotent stem cells	Microextrusion	Implantation
					
MRI	Mini-tissues	ECM	Multipotent stem cells	Laser-assisted	*In vitro* testing







Research Objective

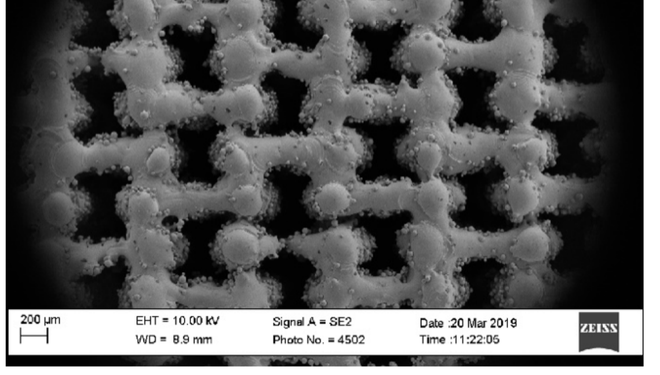
3D bioprinting can also be applied to regenerative medicine to address the need for tissues and organs suitable for transplantation. These fabricated tissues and organs can lead to an alternative to replace the damaged human tissues and organs, which is emerging as a promising solution to solve the organ donor shortage problem being faced all over the world.

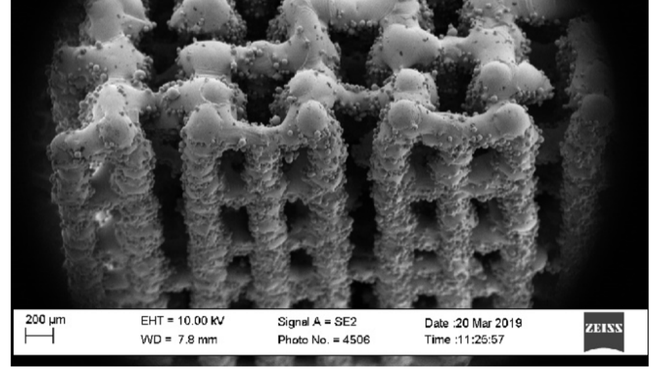
The aim of this project is to explore the relationship between pore size, shape, and mechanical property of different additively manufactured porous scaffolds while examining their viability for cell ingrowth.

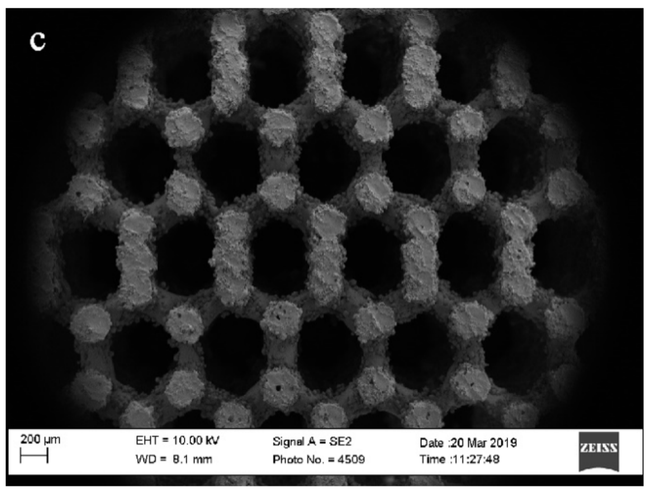
Research Approach

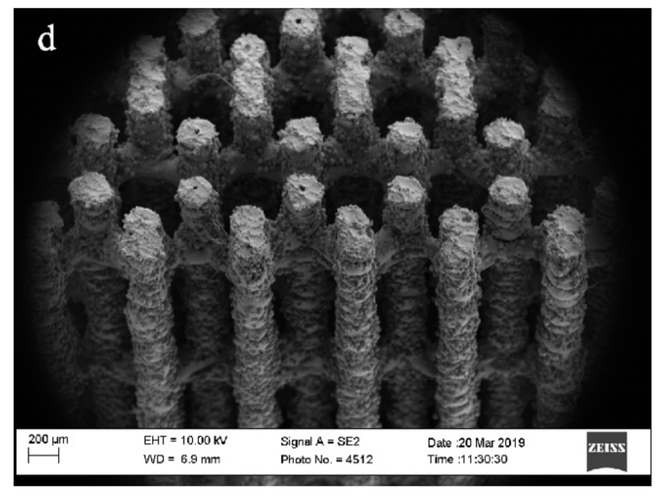
Researchers are generating strategies for fabricating engineered tissue constructs full of vasculature, diversity of cells, and the extracellular matrix (ECM) [21, 22]. These strategies can be grouped into three main catalogs: inkjet bioprinting, microextrusion bioprinting, and laser assisted bioprinting.

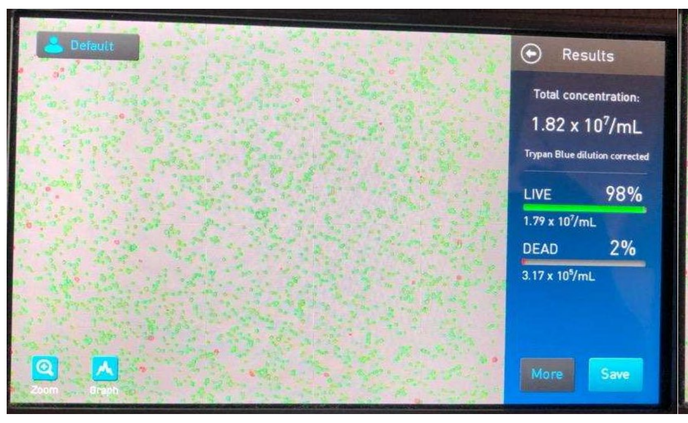
- *Rhinoceros*- 3Dimensional modeling software
- *Grasshopper*- visual programming and algorithmic modeling plugin
- *IntraLattice*- open source plugin for *Grasshopper* that is used for creating solid lattice structures inside a 3D modeling program.
- The software allows us to find the optimum balance between porosity, mechanical behaviors of scaffolds and their correlations with their cell viability.
- We used *Concept Laser M2*, a metal 3D printer to print the scaffolds in Ti64.

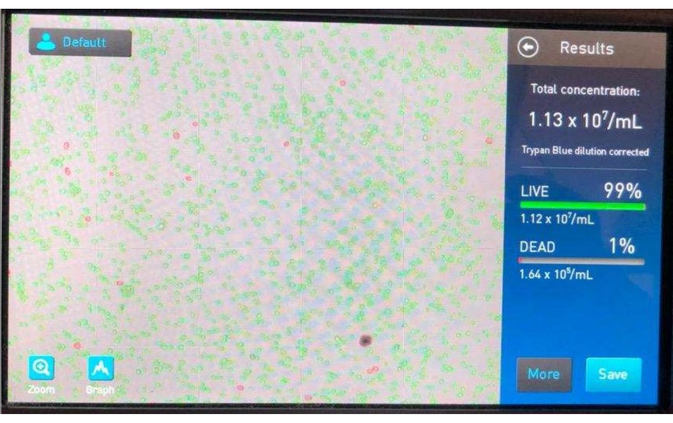












Research Team

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