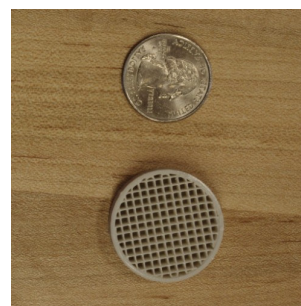


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Makers @ HS/HSL: 3D Printing Scaffolds for Growing Stem Cells

User:	Silviu Diaconu
Affiliation:	Division of Plastic and Reconstructive Surgery, R. Adams Cowley Shock Trauma Center at the University of Maryland
Project:	3D printing scaffolds for growing stem cells
Used:	Afinia H480

Silviu Diaconu, M.D. used the HS/HSL Innovation Space to experiment with 3D printed scaffolds for his bone tissue engineering research under [Michal Zalzman, Ph.D.](#) Using the 3D printers at the HS/HSL Innovation Space, Dr. Diaconu 3D-printed a series of disc-shaped polylactide (PLA) scaffolds, roughly the size of five stacked quarters, with varying porosity. Tonsil cells were then injected into the scaffolds and grown for 50 days. Micro-CT images were taken to determine whether or not cellular growth occurred in the scaffold.



A 3D-printed PLA scaffold like those used by Dr. Diaconu.

A scaffold used in tissue engineering is often made of a biodegradable polymer

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shape of and grows within the scaffold, which can eventually dissolve away. The many benefits of this technique include regenerating difficult-to-repair tissues and significantly decreasing the risk of transplanted tissue being rejected by a recipient's immune system.

As a research fellow in trauma and reconstructive surgery, Dr. Diaconu knows that certain Shock Trauma Center patients suffer from a segmental bone defect which requires a bone graft to repair the large gap between two bone segments. His research aims at helping these patients using their own cells to build a custom bone graft that is more robust than those created by previous methods.



Dr. Silviu Diaconu, M.D.

"The library's 3D printers give us the flexibility and control to create customizable scaffolds at a cheaper cost than what we've found elsewhere," Dr. Diaconu remarked. He was delighted to find that the 3D-printed scaffolds worked as well as those that were not 3D-printed. "The printed scaffold was not toxic to the cells. In fact, the cells grew nicely, and they turned into bone cells," he recounted.

3D Tech in the News

1. [Acoustic Tweezers Manipulate Cells with Sound Waves - Technique Could Enable 3-D Printing of Cellular Structures for Tissue Engineering](#) (mit.edu)
2. [Do 3D Printing Models Improve Anatomical Teaching About Hepatic Segments to Medical Students? A Randomized Controlled Study](#) (nih.gov)
3. [3-D Technologies Help The Blind Experience Art More Fully](#) (fastcompany.com)

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The Innovation Space provides free access to the wide range of learning tutorials (including videos and work files) available on Lynda.com. The Lynda workstation is available during open library hours on a first-come, first-served basis.



Upcoming HS/HSL Innovation Space Workshops

Introduction to 3D Printing

- June 8, 2016
- June 14, 2016
- June 22, 2016
- June 28, 2016

Introduction to 3D Modeling

- June 7, 2016
- June 16, 2016
- June 23, 2016
- June 29, 2016

[Register for our free workshops](#)

New to the HS/HSL Innovation Space?

The Innovation Space is designed for innovative and collaborative hands-on learning experiences. It offers three 3D printers, two 3D scanners, over 3,500 video tutorials from Lynda.com (available on-site only), a large DNA model, two molecule kits, a button maker, and a 3D printing pen. The staff provides orientations as well as workshops on a regular basis for those who are new to 3D printing and 3D scanning.

For more information, visit our webpage at <http://www.hshsl.umaryland.edu/services/inspace/>.



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