Makers @ HS/HSL: New Environmental DNA Research Tools

Users:	Matt Cannon
Affiliation:	Institute for Genome Sciences, University of Maryland, Baltimore School of Medicine
Project:	Prototyping environmental DNA research equipment
Used:	Fusion 360, Slic3r, Lulzbot Taz5

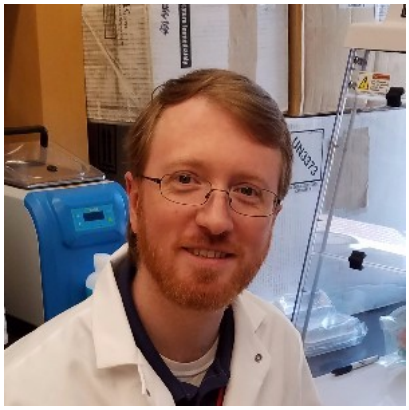
Matthew Cannon, PhD., is a postdoctoral fellow at the Institute for Genome Sciences working with David Serre, PhD. The Serre Lab applies bioinformatics to interesting biological problems with a focus on malaria and environmental DNA. Dr. Cannon used the HS/HSL Innovation Space to 3D print his designs for custom environmental DNA research equipment.

Environmental DNA is DNA collected from environmental samples such as soil and water. Organisms that interact with these environments leave traces of their DNA via hair, shed skin, feces, and more. These samples are then analyzed using DNA sequencing techniques to monitor the environment's biodiversity.

According to Dr. Cannon, most of the existing aquatic environmental DNA research has been limited by low sample volume, or has been confined to the surface of waters, since conventional sampling methods amount to dipping a sterile bottle into a body of water. In contrast, Cannon has designed a device to house a water filter,

upon reaching a specified depth, will pump water through a filter to collect environmental DNA samples. If successful, he will re-manufacture his device using die casting for a metal version capable of withstanding increased water pressure at greater depths to allow the study of environments that are expensive and challenging to study using conventional methods.

Cannon's first 3D printed prototype, shown with pump and filter.



Dr. Matthew Cannon, PhD.

Dr. Cannon earned his PhD. in pathobiology from Auburn University in 2011. Before joining UMB, he worked with Dr. Serre to sequence environmental DNA in the Cuyahoga River near the Cleveland Clinic.

Emerging Tech in the News and Literature

1. 3-D Printing with Cellulose (mit.edu)
2. AI vs. MD: What Happens When the Diagnosis is Automated (newyorker.com)
3. Printable Food: The Technology and its Application in Human Health (nih.gov)

Since July 2016, the HS/HSL has offered a poster printing service that is open to all UMB faculty, students, and staff. To date, over 175 posters have been printed for class assignments and professional conferences by people from all UMB schools.

Posters are submitted via our online form and a member of the library's staff will print the poster as quickly as possible. While we guarantee posters are returned to you within two business days after submission, the turnaround time for getting a poster back is generally quicker than that.

Learn more about our poster service, including tips on creating and designing a poster, on our Poster Printing guide. The HS/HSL also offers a workshop titled "Perfecting Your Poster Presentation" that provides advice for developing poster content and hands-on time to learn design techniques. See our workshop calendar for future dates.

Upcoming HS/HSL Innovation Space Workshops

Introduction to 3D Printing

- April 4, 2017
- April 11, 2017
- April 20, 2017

Introduction to 3D Modeling

- March 31, 2017
- April 19, 2017

From CT to .STL: Create a Printable 3D Model from CT Scan Data

- April 12, 2017

Register for our free workshops

The Innovation Space is designed for innovative and collaborative hands-on learning experiences. It offers three 3D printers, two 3D scanners, a Mac Pro with specialized multimedia software, over 3,500 video tutorials from Lynda.com (available on-site only), a plotter for poster printing, Google Cardboard viewers, 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/ispace/.