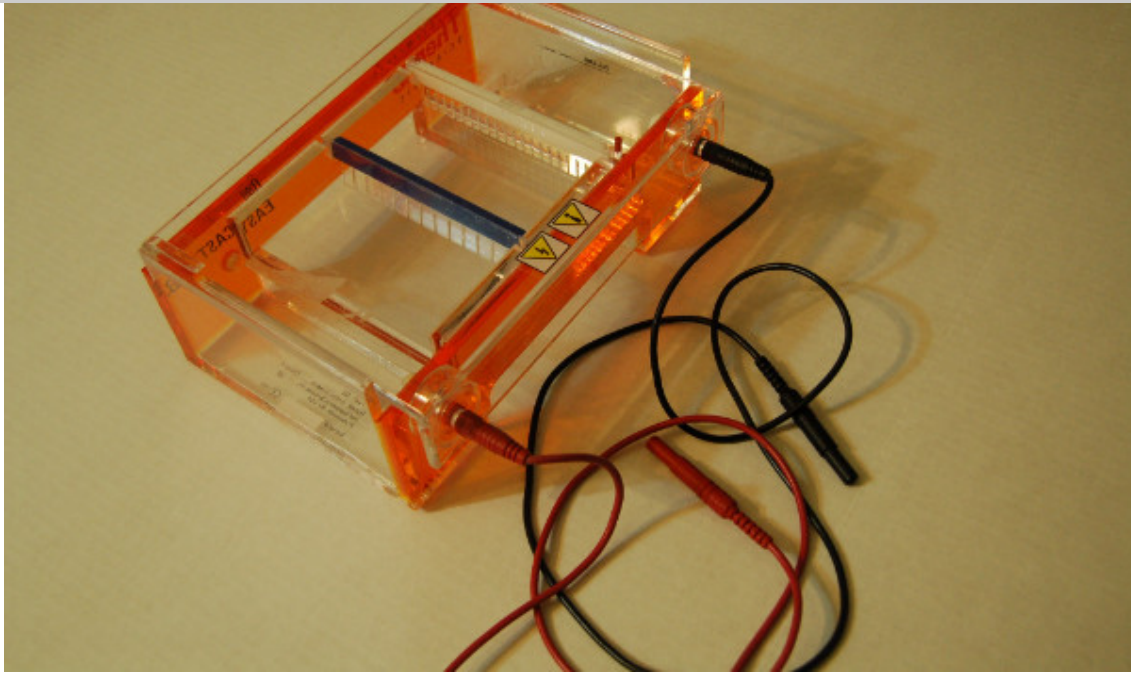


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Makers @ HS/HSL: Do-It-Yourself Gel Electrophoresis Combs

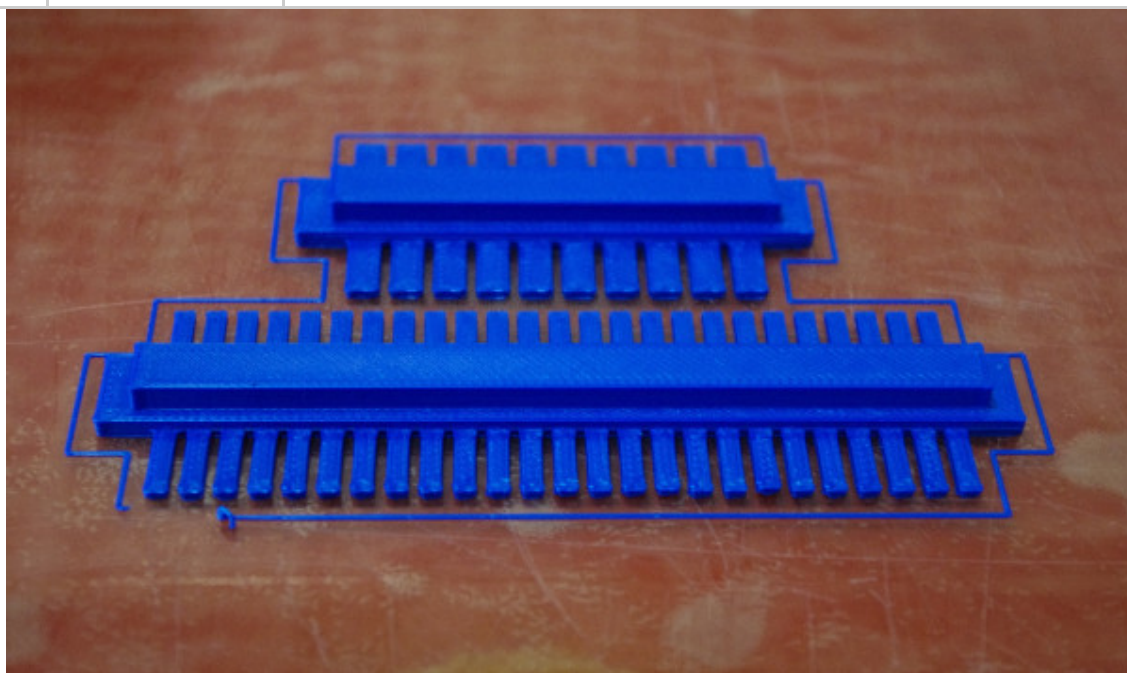
Maker:	Omar Akmal
Affiliation:	Department of Pharmacology, University of Maryland, Baltimore School of Medicine
Project:	Design and 3D print basic instruments commonly used for analyzing macromolecules
Used:	Gel Comb Customizer and Lulzbot Taz 5

Omar Akmal used the HS/HSL Innovation Space to make "gel combs". These combs are commonly found in genomic research labs the world over. They are used for gel electrophoresis, the process of separating fragments of DNA, RNA, and proteins, using electricity and gel. Gel is poured into a casting tray, and a comb is inserted at one end to make wells for the sample to be poured into. An electric current is passed across the tray so that one end of the gel has a positive charge and the other end has a negative charge. Negatively charged molecules migrate toward the positively charged electrode. Because larger molecules migrate slower than smaller molecules, scientists are able to separate and analyze the molecular fragments.

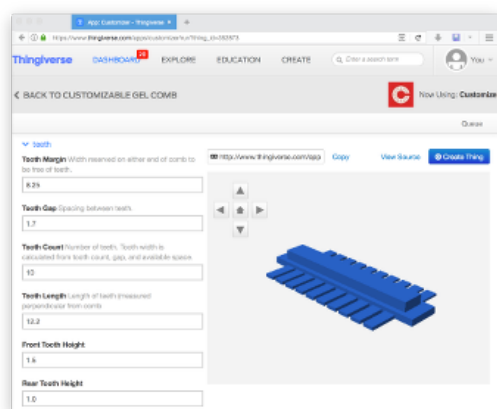


A typical gel electrophoresis tray, with positive and negative electrodes, and gel combs inserted comb-down into the gel.

Omar is a research assistant with [Dr. Alexandros Pouloupoulos' Lab](#), a developmental neurology lab studying neural circuit formation to repair neurological diseases. Upon learning about the HS/HSL Innovation Space, Omar thought to save the lab money by 3D printing gel comb models he'd either find online or design himself. When browsing [Thingiverse.com](#), a popular website for sharing 3D models, he found the [Gel Comb Customizer app](#) (requires a Thingiverse account to use) that lets users easily create comb models of varying dimensions. Gel combs tend to cost the lab between \$50 - \$80 a piece. His first two combs printed at the HS/HSL Innovation Space cost a total of \$4.

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The first two gel combs printed by Omair, the models for which were generated using the Gel Comb Customizer app.



Screenshot of the Gel Comb Customizer app on Thingiverse.com



Omair Akmal recently received his [BS in neuroscience at Johns Hopkins](#). He is interested in starting a collaborative spreadsheet for the UMB community to share the dimensions of as many different gel combs as possible.

Emerging Tech in the News and Literature

1. [3D Bioprinting: The Future of Regenerative Medicine](#) (wypr.org)
2. [How the Maker Movement Is Speeding Up Innovation in Health Care](#) (washingtonian.com)

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Did You Know?

The HS/HSL recently launched a KIC Click scanner, a standalone, high speed, touch screen scanner for quickly scanning physical documents to a USB drive or cloud storage account.

Find the KIC Click scanner on the library's first floor, across from the Innovation Space.



Upcoming HS/HSL Innovation Space Workshops

Introduction to 3D Printing

- July 7, 2017
- July 12, 2017
- July 20, 2017
- July 24, 2017

Introduction to 3D Modeling

- July 6, 2017
- July 17, 2017

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

- July 11, 2017
- July 26, 2017

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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, a plotter for [poster printing](#), a [zSpace](#) virtual reality station, [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/inspace/>.



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