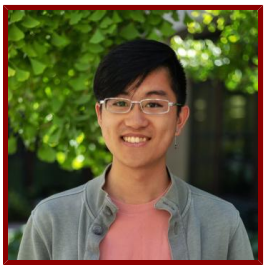
Stanford



Ethan Li

Ph.D. Student in Bioengineering, admitted Autumn 2018

Curriculum Vitae available Online

Bio

BIO

I am a PhD student in Prof. Manu Prakash's lab in the Department of Bioengineering. I design and build hardware and software systems for global health and participatory science.

My thesis focuses on development of open-source medical devices, together with networks of cooperation between people, towards global health equity. The global medical technology industry does not – and will not – make accessible, affordable, and appropriate technologies at the scales needed by the >6 billion people outside wealthy areas of wealthy countries. I am studying strategies for how platforms and international communities might be built to support development of locally-appropriate medical devices. I am also more broadly interested in democratic control of technology innovation and production as a tool for supporting equitable prioritization of the rights and welfare of people and our planet.

HONORS AND AWARDS

- Fellow, National Defense Science and Engineering Graduate (NDSEG) Fellowship (2019-2022)

EDUCATION AND CERTIFICATIONS

- Master of Science, Stanford University , CS-MS (2018)
- Bachelor of Science, Stanford University , BIOE-BS (2016)

STANFORD ADVISORS

- Manu Prakash, Doctoral Dissertation Advisor (AC)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Medical devices are crucial for achievement of equitable access to health care, but the global medical device industry only minimally impacts rural and primary health care for poor people in low- and middle-income countries. Additional obstacles, including in the cost of medical device research & development and in last-mile implementation, make it hard for other entities to rectify the global market’s mismatch between the supply of medical devices and the health needs of poor people. To help challenge these contributing factors of global health inequity, we will synthesize a practical toolkit and intellectual framework for developing medical devices for low-resource settings in a distributed, cooperative, and open-source manner. The proposed framework aims to reduce the barriers for entities in low-resource settings to provide solutions which would be appropriate and affordable in their local contexts. We will use three ongoing Prakash Lab frugal technology projects, which I have been centrally involved in from early-stage development, as case studies of challenges and strategies to inform this framework. These case studies will specifically be used to answer the following questions:

1. How to achieve large-scale exploration & implementation of possible design variations and possible applications?

2. How to help clinicians achieve efficacy using new technologies in low-resource settings?

3. How to ensure medical device safety in globally distributed production of variations upon a reference design?

Each of the three projects (Handyfuge, Octopi, and Pufferfish) will implement and quantitatively assess the outcomes of strategies for distributed invention, development, and implementation of very distinct types of open-source medical devices, spanning in vitro diagnostics, digital pathology, and intensive care medicine, for low-resource settings. Through empirical investigation of the guiding questions as we develop and implement these technologies, we intend to lay the foundations of a new framework for large-scale development and implementation of appropriate open-source medical devices for global health equity.

LAB AFFILIATIONS

- Manu Prakash, Prakash Lab (6/10/2019)

Publications

PUBLICATIONS

- **Scale-free vertical tracking microscopy.** *Nature methods*
  Krishnamurthy, D., Li, H., Benoit du Rey, F., Cambournac, P., Larson, A. G., Li, E., Prakash, M.
  2020

- **Bacterial Evolution in High-Osmolarity Environments.** *mBio*
  Cesar, S., Anjur-Dietrich, M., Yu, B., Li, E., Rojas, E., Neff, N., Cooper, T. F., Huang, K. C.
  2020; 11 (4)