

Harrison Khoo

hkhoo2@jhu.edu | linkedin.com/in/hkhoo | Baltimore, Maryland

Education

Johns Hopkins University

Ph.D. Student, Mechanical Engineering
Masters of Science in Engineering, Mechanical Engineering

August 2019 - Present
August 2019 - December 2021

University of California, Berkeley

Bachelor of Science, Bioengineering

August 2015 - December 2018

Work Experience

Johns Hopkins University - Ph.D. Student

August 2019 - Present

- Developing devices with Professor Soojung Claire Hur for hydrodynamic sample manipulation at wide length scales

Low-Cost, Sequential, Automated Delivery of Reagents for Point-of-Care Diagnostics

- Created a <\$15 rapid fabrication method for multi-height thermoplastic devices from SLA 3D printed templates
- Designed a capillary circuit device to perform simple automated bead-based immunoassay for facile protein detection

Label-Free Microfluidic Separation of Monocytes from Peripheral Blood Mononuclear Cells (PBMCs)

- Achieved label-free, high purity separation of monocytes from heterogeneous PBMCs using hydrodynamic forces
- Performed fluid dynamic simulations for device parallelization while maintaining uniform flow conditions

Hydrodynamic Separation of Hydrogel Droplets

- Developing a millifluidic device for separation of hydrogel droplets with different biophysical properties
- Generated monodisperse hydrogel droplets at different sizes and stiffnesses for microfluidic sorting optimization

Correlia Biosystems - Engineering Intern

January 2019 - May 2019

- Spearheaded automation of experiments on a liquid handling robot to rapidly detect and quantify protein samples
- Wrote Python scripts to reduce data analysis time from hours to seconds and aggregate final images

University of California, San Francisco - Undergraduate Researcher

March 2016 - May 2019

- Independently investigated DNA Holliday junctions under Dr. Sy Redding to visualize this structure in real time
- Optimized photolithography process of DNA Curtain microfluidic chips to extend device lifetime

ETH Zurich - ThinkSwiss Scholar

May 2018 - August 2018

- Focused on isothermal amplification method for ultrasensitive miRNA detection under Professor Andrew deMello
- Experimented with a PDMS microfluidic assay for digital readouts to accurately quantify miRNA concentration

Publications

Khoo, H., Allen, W.A., Arroyo-Curras, N., & Hur, S.C. (2024). Rapid Prototyping of Thermoplastic Microfluidic Devices via SLA 3D Printing. *Scientific Reports*, 14(1), 17646. <https://doi.org/10.1038/s41598-024-68761-5>

Choi, S.E.*, **Khoo, H.***, & Hur, S.C. (2022). Recent Advances in Microscale Electroporation. *Chemical Reviews*, 122(13), 11247–11286. <https://doi.org/10.1021/acs.chemrev.1c00677>

Keenen, M.M., Brown, D., Brennan, L.D., Renger, R., **Khoo, H.**, Carlson, C.R., Huang, B., Grill, S.W., Narlikar, G.J., & Redding, S. (2021). HP1 proteins compact DNA into mechanically and positionally stable phase separated domains. *ELife*, 10, e64563. <https://doi.org/10.7554/eLife.64563>

Kalyan, S. *, Torabi, C. *, **Khoo, H.***, Sung, H.W., Choi, S.E., Wang, W., Treutler, B., Kim, D., & Hur, S.C. (2021). Inertial Microfluidics Enabling Clinical Research. *Micromachines*, 12(3), 257. <https://doi.org/10.3390/mi12030257>

* Denotes equal contribution

Selected Conferences

Khoo, H. & Hur, S.C. (Oct. 2024) Label-Free Monocyte Purification from Peripheral Blood Mononuclear Cells. Biomedical Engineering Society 2024 Annual Meeting., Baltimore, MD (**Oral Presentation**)

Khoo, H., Allen, W. A., Arroyo-Curras, N., & Hur, S.C. (Sept. 2023) Rapid Prototyping of Thermoplastic Microfluidic Devices with Multi-Height Features for Scalable Mass Production. SLAS Microscale Innovations in Life Sciences, San Diego, CA (**Poster**)

Skills

Experimental: Microfluidics, Photolithography, Soft Lithography, Cell Culture, Immunofluorescence Staining, Bacterial Transformation, Fluorescence/Confocal/Scanning Electron Microscopy, 3D Printing, Hot Embossing, Laser Cutting

Software: Python, MATLAB, AutoCAD, Solidworks, FIJI, COMSOL, Adobe Illustrator, Figma, Microsoft Office