Zuriel Erikson Joven, MSE

PhD Student, Harvard-MIT Health Sciences & Technology
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Education

- **Massachusetts Institute of Technology** — Cambridge, MA
  Doctor of Philosophy, Medical Engineering and Medical Physics — *Sep 2025 - Present*
  - Harvard-MIT Health Sciences and Technology: Mechanical Engineering Concentration
- **Johns Hopkins University** — Baltimore, MD
  Master's of Science in Engineering, Mechanical Engineering — *Jan 2024 - May 2025*
  - Thesis: Label-Free Optical Biosensing for Malaria and Osteoarthritis
- **Johns Hopkins University** — Baltimore, MD
  Bachelor's of Science, Mechanical Engineering — *Aug 2021 - May 2025*
  - Minors: Applied Mathematics and Statistics & Robotics

Journal Publications, Refereed

- Joven, Z.E., Raj, P., Barman, I. (2024, Oct 8). ***Material-Agnostic Characterization of Spatially Offset Raman Spectroscopy in Turbid Media via Monte Carlo Simulations.*** *Analyst,* 149, 5463-5475. [150th Anniversary Colelction: Raman Spectroscopy and SERS]

Conference Posters

- Joven, Z.E., Wu, L., Thanakornsombut, T., Tripathi, A., Barman, I. ***Label-Free Quantitative Phase Imaging for Malaria Vector Surveillance: Towards a Noninvasive Approach to Detect* Plasmodium*-Infected Mosquitoes.*** Johns Hopkins Bloomberg School of Public Health World Malaria Day, Baltimore, MD, United States.
- Joven, Z.E., Raj, P., Barman, I. (2024, October 20-26). ***Material-Agnostic Characterization of Spatially Offset Raman Spectroscopy in Turbid Media via Monte Carlo Simulations.*** SciX 2024, Raleigh, NC, United States. [First Place FACSS Student Poster Award]
- Brown, D., Joven, Z.E., Dillman, N., Yang, E., Johnson, C., Nakuchima, S., Tressler, C., Glunde, K. (2024, May 4-9). ***MALDI-MRS-SHY: Statistical Heterospectroscopy of MALDI Imaging and Magnetic Resonance Spectroscopy.*** International Society for Magnetic Resonance in Medicine & International Society for MR Radiographers and Technologists 2024 Annual Meeting & Exhibition, Singapore.
- Brown, D., Joven, Z.E., Dillman, N., Yang, E., Johnson, C., Nackuchima, S, Glunde, K., Tressler, C. (2023, Nov 14). ***Statistical Heterospectroscopy of MALDI Imaging and NMR Spectroscopy Data for Evaluation of Breast Tumor Models.*** Johns Hopkins Medicine: 2023 Radiology Research Day, Baltimore, MD, United States. [Pre-Clinical Poster Award Winner]
- Brown, D., Joven, Z.E., Dillman, N., Yang, E., Johnson, C., Nackuchima, S., Glunde, K., Tressler, C. (2023, Oct 23-25). ***Statistical Heterospectroscopy of MALDI Imaging and NMR Spectroscopy Data for Evaluation of Breast Tumor Models.*** 1st International Mass Spectrometry Imaging Society Conference, Montreal, Quebec, Canada.
- Brown, D., Tressler, C., Joven, Z.E., Johnson, C., Nakuchima, S., Yang, E., Glunde, K. (2023, June 4-8). ***Statistical Heterospectroscopy of MALDI Imaging and NMR Spectroscopy Data for Evaluation of Breast Tumor Models***. American Society for Mass Spectrometry 71st Conference on Mass Spectrometry and Allied Topics, Houston, TX, United States.

Research Experience

- **Massachusetts General Hospital, Wellman Center for Photomedicine** — Boston, MA
  Research Assistant in the Bio-Optics Lab–PI: Dr. Seok-Hyun Andy Yun — *Sep 2025 - Present*
- **Johns Hopkins University, Mechanical Engineering** — Baltimore, MD
  Research Assistant in the Barman Lab–PI: Dr. Ishan Barman — *Sep 2023 - May 2025*
  - Photonics in biology and medicine. Developed systematic Monte Carlo simulations and nondimensionalization framework to characterize spatially offset Raman spectroscopy (SORS) in samples of varying turbidity and geometry. Applied SORS and diffusion-based modeling for the depth-resolved quantitative interrogation of elastic moduli degradation in osteoarthritic cartilage. Developed simulation and signal processing framework for the application of SORS to the noninvasive, through-skin bloodborne diagnosis of malaria. Enabled label-free imaging of oocysts in *Plasmodium*-infected mosquito midguts via quantitative phase imaging (QPI). Collaborated with funding managers and researchers at the Bill and Melinda Gates Foundation and Johns Hopkins Bloomberg School of Public Health.
- **Johns Hopkins School of Medicine, Koch Cancer Research Building** — Baltimore, MD
  Research Assistant in the Applied Imaging Mass Spectrometry Lab–PI: Dr. Cay Tressler — *Mar 2023 - Sep 2023*
  - Molecular imaging of cancer. Implemented statistical heterospectroscopy (SHY) to identify potentially correlated metabolites and lipids in tumor cell cultures by analyzing Pearson's correlation matrices between matrix-assisted laser desorption/ionization (MALDI) mass spectra and nuclear magnetic resonance (NMR) spectra on cohorts of MDA-MB-231 and SUM-159 cell line samples.
- **Benchmark Research** — Sacramento, CA
  Assistant Clinical Research Coordinator–PI: Dr. Masaru Oshita — *Jun 2020 - Sep 2020*
  - Conducting investigational studies for the development of new vaccines and medicines. Spearheaded transfer of paper records to electronic databases for 300 subjects in Moderna's mRNA COVID-19 vaccine Phase III trial and 100 subjects in Regeneron's monoclonal antibody COVID-19 treatment Phase I trial. Developed automated workflows for iMedidata and MyClinicalCoordinator platoforms using Selenium and Python to reduce manual data entry workload.

Teaching Experience

- **Johns Hopkins University, Applied Mathematics and Statistics (Graduate)** — Baltimore, MD
  Teaching Assistant for EN.553.693: Mathematical Image Analysis — *Spring 2025*
- **Johns Hopkins University, Mechanical Engineering (Graduate)** — Baltimore, MD
  Head Teaching Assistant for EN.530.646: Robot Devices, Kinematics, Dynamics and Control — *Fall 2024 - Spring 2025*
  Teaching Assistant for EN.530.646: Robot Devices, Kinematics, Dynamics and Control — *Fall 2023 - Spring 2024*
- **Johns Hopkins University, Applied Mathematics and Statistics (Undergraduate)** — Baltimore, MD
  Head Teaching Assistant for EN.553.291: Linear Algebra and Differential Equations — *Spring 2023 - Fall 2024*
  Teaching Assistant for EN.553.291: Linear Algebra and Differential Equations — *Spring 2022 - Spring 2023*
- **Johns Hopkins University, Mechanical Engineering (Undergraduate)** — Baltimore, MD
  Teaching Assistant for EN.530.241/243: Electronics and Instrumentation & Lab — *Spring 2023*

Selected Honors

- **NSF Graduate Research Fellowship Program** — National Science Foundation
  5-year PhD fellowship, 3 years of funding — *Apr 8, 2025*
- **Charles A. Miller Award** — Johns Hopkins University
  MechE faculty-selected award (2 Students) — *May 22, 2024*
- **JHU MechE Senior Design Day: 2nd Place Award** — American Society of Mechanical Engineers
  For "Smart Driver for Orthopedic Screw Extraction" — *Apr 30, 2025*
- **JHU WSE Design Day: Tangible Ingenuity Award** — Johns Hopkins, Whiting School of Engineering
  For "Smart Driver for Orthopedic Screw Extraction" — *Apr 29, 2025*
- **1st Place Student Poster Award** — SciX 2024 Conference - Raleigh, NC
  Awarded by Federation of Analytical Chemistry and Spectroscopy Societies — *Oct 20-25, 2024*

- **Robert George Gerstmyer Award** — Johns Hopkins University
  MechE faculty-selected award (7 Students) — *May 23, 2024*
- **Pre-Clinical Poster Award** — Johns Hopkins School of Medicine
  JHSOM Radiology Research Day — *Nov 14, 2023*
- **Tau Beta Pi** — Maryland Alpha Chapter
  Engineering honor society (top 1/8th of class) — *Inducted Nov 2023*
- **Pi Tau Sigma** — Tau Alpha Chapter
  Mechanical engineering honor society (top 17% of class) — *Inducted Nov 2023*
- **A. James Clark Scholars Program** — Johns Hopkins University
  Engineering & leadership scholarship '25 cohort (7 students from 30k+ pool) — *Admitted Mar 2021*