

Genesis Mariana Higueros

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Profile

- **Mechanical Engineering & Materials Science** doctoral candidate researching energy storage technology with a focus on porous materials and interfacial transport
- Investigated vascularization of battery electrodes for low-temperature space exploration and fast charging electric vehicles
- Experienced in microfabrication technology including photolithography and reactive ion etching (RIE) and have synthesized 2D microstructures for 3D electrodes.
- Hosted several diversity initiatives and outreach events including Light, Infrared, and Thermal Energy workshop for high school students of underrepresented backgrounds

Education

2019-Present

Expected graduation: May 2024

Cumulative GPA: 3.47

Advisor: Prof. Po-Chun Hsu

Duke University

Ph.D. in Mechanical Engineering & Materials Science

2015-2019

Cumulative GPA: 3.89

University of California, Merced

Bachelor of Science in Environmental Engineering

Awards and Fellowships

2019-Present

Alfred P. Sloan Foundation Scholarship, Duke University

2019

Outstanding Student Award for Environmental Engineering, University of California, Merced

2017-19

Summer Undergraduate Research Fellowship, University of California, Merced

2015

Project Recognition Award, The American Association of University Women

Technical Experience

Jul 2022 – Present **Hsu Group/Phase Change Investigations in LiCoO₂ for Battery Reuse**

- Analysis of performance degradation and irreversible lithium loss in LiCoO₂ after high-temperature sintering for recyclability of spent batteries

Jun 2019 – Present **Hsu Group/Vascular ENabled Advanced (VENA) Batteries**

- Fabricating dual-porous graphite anodes for fast-charging, high-energy density batteries by increased materials utilization and lowered ionic tortuosity
- A cleanroom fabrication process could produce sacrificial 2D micro-sized templates. Magnetic alignment for orientation purposes and CAD designs permits a myriad of possible 2D structures
- Our approach for vascularized channels in electrodes may be applied to various energy systems

Jul 2020 – Jun 2021 **Hsu Group/X-ray CT Battery Thermal Measurement**

- Assembled several Li-ion battery coin (CR2032) and cylindrical (18650) cells with resistant temperature detectors to predict battery thermal gradients using x-ray computed tomography in collaboration with Dr. Cristian Badea and group

Jun 2018 – Aug 2018 **Summer Undergraduate Research Fellowship/Supercapacitors**

- Drop casted PEDOT:PSS and N2200 polymers onto electrodes for Type IV supercapacitors with Dr. Tse Nga Ng and characterized system utilizing three-electrode electrochemical cells and EC-Lab software

Jun 2017 – Aug 2017 Summer Undergraduate Research Fellowship/Plasma Gasification

- Researched effects of biochar steam activation and its resultant surface properties with Dr. Gerardo Diaz
- Operated gas chromatograph and PeakSimple software to analyze producer gas of activated peach pits

Publications

(*corresponding author, †equal contribution)

C. Sui†, Y.-Y. Li†, X. Li, G. Higueros, K. Wang, W. Xie, P.-C. Hsu* “Bio-inspired computational design of vascularized electrodes for high-performance fast-charging batteries optimized by deep learning” *Advanced Energy Materials* (2022) DOI: 10.1002/aenm.202103044

University Service

- Lead organizer for **Light, Infrared, and Thermal Energy (LITE) Workshop**, a one-day outreach event for highschool students from underrepresented backgrounds in STEM. Managed volunteers, created lectures, and designed/implemented virtual-reality thermal-imaging headsets, 2022
- Moderated MRS@Duke **Implicit Bias Workshop** in collaboration with the University Program in Materials Science and Engineering and the Duke Office for Institutional Equity to promote discussion of racial biases and microaggressions in classrooms to prevent intolerance and foster community, 2020
- **Graduate student mentor** for first-year graduate students in the Mentorship Network Program at Duke University, 2020
- Member of the Search Committee for the position of Director of Diversity & Inclusion at the Pratt School of Engineering at Duke University, 2019
- **Hosted STEM-based workshops** in collaboration with the Society of Women Engineers for Expand Your Horizons conference which aims to empower young female students, 2016, 2018, 2019

Extracurricular Activities

Jun 2020 – Jul 2022 Materials Research Society at Duke University

- Acted as the 2021-2022 President responsible for overseeing club activities, events, and Executive Board
- Outreach Coordinator from 2020-2021 responsible for undergraduate and graduate outreach events, local community engagement, and membership retainment
- Managed advertisement of events and designed all flyers
- Assisted President with his duties on managing executive board and regularly provided advice as a past student organization President

Aug 2017 – Apr 2019 Solar Energy Association at UC Merced

- President from 2018-2019 and responsible for overseeing executive board, general meetings and events
- Vice President from 2017-2018 and assisted President with her duties
- Managed the Solar Charging Station Project from January to May 2018
- Provided key lectures on solar panels and power calculations

Membership Activities & Conferences Attended

August 2020 – Present	Materials Research Society
August 2018 – Present	Society of Hispanic Professional Engineers
August 2017 – Present	Society for Advancement of Chicanos/Hispanics and Native Americans in Science
August 2020 – July 2022	Materials Research Society at Duke
August 2018 – April 2019	American Solar Energy Society
August 2017 – April 2019	Solar Energy Association at UC Merced

Conferences

- SHPE 2018 National Convention, Cleveland, OH, November 7-11, 2018
- 2018 UC Solar Research Symposium, San Francisco, CA, October 19, 2018
- California Solar Power Expo, San Diego, CA, March 27-28, 2018
- 2017 SACNAS International Conference, Salt Lake City, UT, October 19-21, 2017

Verbal & Poster Presentations

- Virtual Presentation “*Vascular ENabled Advanced (VENA) Electrodes for Fast Charging LIBs*” NC Space Symposium, NC, April 8, 2022
- Virtual Presentation “*Vascular ENabled Advanced (VENA) Electrodes for Fast Charging LIBs*” 9th Annual Triangle Student Research Competition, Raleigh, NC, October 7, 2021
- Presentation “*Dual-porosity Electrodes for Fast-Charging Li-ion Batteries*” Energy Materials Seminar, Durham, NC, January 10, 2020
- Poster “*Fabrication and Characterization of Polymers for Type IV Supercapacitors*” SHPE 2018 National Convention, Cleveland, OH, November 9, 2018
- Presentation “*Fabrication and Characterization of Polymers for Type IV Supercapacitors*” Summer Research Conference at UC San Diego, San Diego, CA, August 16, 2018
- Poster “*High Temperature Steam Activation of Peach Pit Biochar*” 2017 SACNAS International Conference, Salt Lake City, UT, October 20, 2017
- Presentation and Poster “*High Temperature Steam Activation of Peach Pit Biochar*” 2017 Annual Summer Undergraduate Research Symposium at UC Merced, Merced, CA, August 4, 2017