

JACQUELINE ELWOOD

1701 Woolsey St ◊ Berkeley, CA 94703
(+1) 972-742-7033 ◊ jacqueline_elwood@berkeley.edu

EDUCATION

University of California, Berkeley

Doctorate of Philosophy in Mechanical Engineering

Department of Mechanical Engineering

Expected Completion: May 2021

Berkeley, CA

August 2016 - Present

University of California, Berkeley

Master of Science

Department of Mechanical Engineering

Berkeley, CA

August 2016 - May 2018

State University of New York (SUNY), University at Albany

Bachelor of Science, Nanoscale Engineering.

Minors in Chemistry & Mathematics

Albany, NY

August 2012 - May 2016

RESEARCH EXPERIENCE

University of California, Berkeley

Department of Mechanical Engineering

Aug 2016-May 2021

Advisor: Liwei Lin

- Thesis Title: Conductive Materials for Additive Manufacturing: Towards Multi-functional, Multi-Material 3D Printed Systems
 - Developed a polymer nanocomposite material capable of being 3D printed using a desktop stereolithography (SLA) 3D printer
 - Developed a protocol to print this conductive material with pure, inert resin to perform multi-material 3D printing
 - Invented method to crosslink commercially available PEDOT:PSS to a variety of 3D printing materials
 - Demonstrated ability to use 3D printed structures coated in PEDOT:PSS as an electrochemical sensor that is stable in aqueous environments

Lawrence Livermore National Laboratory

Physical and Life Sciences Directorate

August 2020-May 2021

Mentor: Eric Meshot

- Project Title: Electrochemical Behavior of Ionic Liquid Electrolytes Under Nanoconfinement
 - Developed a continuum model via MATLAB to describe the diffusion of gas into an ionic liquid filled carbon nanotube (CNT) and its effect on electrical double layer (EDL) capacitance
 - Invented method to measure response of IL-filled CNT devices in real time with changing gas environments

State University of New York (SUNY) Polytechnic Institute

College of Nanoscale Science and Engineering

Jun 2014-May 2016

Advisor: Michael Carpenter

- Project Title: AuNPs Encapsulated in Soda-Lime Glass for Plasmonic Temperature Sensing

- • Developed and characterized gold nanoparticles encapsulated in soda-lime glass for optical temperature sensing
- Discovered optical response was independent of surrounding environmental conditions, gaseous or aqueous
- Discovered linear relationship between optical response and temperature for use as a temperature sensor

National Energy Technology Laboratory, Department of Energy
Office of Fossil Energy

Jun 2015-Aug 2015
Mentor: Paul Ohodnicki

- Project Title: Effect of Ionic Species on pH Dependent Response of Silica Coated Optical Fibers
- • Fabricated TEOS/AuNP coated optical fibers for development of an optical fiber pH sensor
- Discovered that transmission response of optical fiber not only dependent on pH of the system, but also depended on the nature of the cation based on relative cation polarizability, absorption, and ion-ion interactions

AWARDS

US Department of Energy (DOE) Office of Science Graduate Student Research (SCGSR) Fellowship, 2020

- *Electrochemical Behavior of Ionic Liquid Electrolytes Under Nanoconfinement*

Host DOE Laboratory: Lawrence Livermore National Laboratory (LLNL)

Collaborating DOE Laboratory Scientist: Eric Meshot

Appointment Dates: Aug 2020-May 2021

US Department of Energy (DOE) Office of Fossil Energy, Mickey Leland Energy Fellowship, 2015

- *Effect of Ionic Species on pH Dependent Response of Silica Coated Optical Fibers*

Host DOE Laboratory: National Energy Technology Laboratory (NETL)

Collaborating DOE Laboratory Scientist: Paul Ohodnicki

Appointment Dates: Jun-Aug 2015

PEER-REVIEWED PUBLICATIONS AND PROCEEDINGS

Journal Publications and Peer-Reviewed Conference Proceedings

- **J. Elwood**; L. Lin. "A 3D Printed Ethanol Sensor Using Conformally-coated Conductive Polymer Electrodes." In *2019 20th International Conference on Solid-State Sensors, Actuators and Microsystems / Eurosensors XXXIII (TRANSDUCERS EUROSENSORS XXXIII)*, pp. 1230-1233, IEEE
- I. Karakurt; **J. Elwood**; X. Li; L. Beker; E. Sweet; W. Cai; L. Lin. "Membraneless Microfluidic Redox Battery for Wearable Electronics Applications." In *2017 19th International Conference on Solid-State Sensors, Actuators and Microsystems (TRANSDUCERS)*, pp. 1820-1823, IEEE.

- **J. Elwood**; Z. Zhao; L.M. Saupe; T.D. Strayer; R.N. Odell; M.A. Carpenter. “Gold nanoparticles encapsulated in a soda-lime glass substrate for plasmonic temperature sensing.” *Sensing and Bio-Sensing Research*, **2016**, 11, 37-4.
- **J. Elwood**; P.R. Ohodnicki. “The effect of ionic species on pH dependent response of silica coated optical fibers ”, In *Proc. SPIE 9836, Micro- and Nanotechnology Sensors, Systems, and Applications VIII, 98360I* (May 17, 2016); doi:10.1117/12.2224959.
- M.P. Buric; P. Ohodnicki; Z. Poole; C. Wang; **J. Elwood**; “Angular interrogation of evanescent wave absorption spectroscopy-based sensors for harsh environment sensing applications”, In *Proc. SPIE 9586, Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications IX, 95860Q* (August 26, 2015); doi:10.1117/12.2188941.
- Z. Zhao; **J. Elwood**; M.A. Carpenter. “Phonon Anharmonicity of PdO Studied by Raman Spectrometry.” *J. Phys. Chem. C*, **2015**, 119 (40), pp 23094-23102.

Presentations

- “3D Printed Microsensors”, *Berkeley Sensors and Actuators Center(BSAC) Industrial Advisory Board (IAB)*, UC Berkeley (Fall 2019-Fall 2020)
- “Applications of 3D Printed Microfluidics: Circuitry, Finger-Powered Pumps and Mixers”, *Berkeley Sensors and Actuators Center(BSAC) Industrial Advisory Board (IAB)*, UC Berkeley (Spring 2016-Fall 2018)
- “A Study in Optical Fiber pH Sensors”, *Mickey Leland Energy Fellowship Program*, Pittsburgh, PA, 08/2015

TECHNICAL SKILLS AND INTERESTS

Modeling and Analysis

SolidWorks, MATLAB

Fabrication

Chemical Vapor Deposition (CVD), Electropolymerization, Nanoparticle Synthesis

3D Printing: *Stratasys* Objet260 Connex3 (PolyJet), *3D Systems* ProJet HD 3000 (MultiJet), *Carbon3D* M1 (Continuous Liquid Interface Printing), *Photon* AnyCubic (Stereolithography)

Material Characterization

SEM, UV-Vis Spectroscopy, Raman Spectroscopy

Software & Tools

MS Office, LaTeX, Illustrator

SELECTED COURSEWORK

Surface Properties of Materials, Polymer Surfaces and Interfaces, Theory of Electron Microscopy and X-Ray Diffraction, Introduction to MEMS/NEMS, Micro and Nano Materials Processing Technology, Fundamentals of Nanoelectronics, Industrial Nanomanufacturing, Introduction to MEMS Design

TEACHING EXPERIENCE

University of California, Berkeley

ME102B: Mechatronics Design

Berkeley, CA

Instructor: *Liwei Lin*