

Roseanne Warren, Ph.D., P.E.

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EDUCATION

Institution	Location	Major	Degree, Year
University of California, Berkeley	Berkeley, CA	Mechanical Engineering	Ph.D., 2015
<i>Dissertation:</i> High Energy Density Metal Oxide and Conducting Polymer Supercapacitors <i>Advisor:</i> Liwei Lin, Ph.D.			
Stanford University	Stanford, CA	Mechanical Engineering	M.S., 2009
Stanford University	Stanford, CA	Mechanical Engineering	B.S., 2008

APPOINTMENTS

01/16 – Present Assistant Professor, Dept. of Mechanical Engineering, University of Utah

RESEARCH INTERESTS

My research investigates new nanomaterial structures and advanced nanofabrication techniques for electrochemical energy storage applications. Areas of expertise include: electrochemical capacitors (supercapacitors) (including conducting polymer and metal-oxide based pseudocapacitors), sodium-ion batteries, biodegradable energy storage materials, carbon nanotube synthesis, and atomic layer deposition.

SCIENTIFIC AND PROFESSIONAL SOCIETIES

ECS The Electrochemical Society, Energy Technology Division, Battery Division

PUBLICATIONS

1. Nolan Ingersoll, Zahra Karimi, Dhruv Patel, Robert Underwood, and **Roseanne Warren**, "Metal Organic Framework-Derived Carbon Structures for Sodium-Ion Battery Anodes," *Electrochimica Acta*, Vol. 297, pp. 129-136, 2019. DOI: 10.1016/j.electacta.2018.11.140.
2. Xining Zang, Caiwei Shen, Emmeline Kao, **Roseanne Warren**, Ruopeng Zhang, Kwok Siong Teh, Junwen Zhong, Minsong Wei, Buxuan Li, Yao Chu, Mohan Sanghadasa, Adam Schwartzberg, and Liwei Lin, "Titanium Disulfide Coated Carbon Nanotube Hybrid Electrodes Enable High Energy Density Symmetric Pseudocapacitors," *Advanced Materials*, Vol. 30, pp. 1704754, 2018. DOI: 10.1002/adma.201704754.
3. Casey Glick, Mitchell Srimongkol, Aaron Schwartz, William Zhuang, Joseph Lin, **Roseanne Warren**, Dennis Tekell, Panitan Satamalee, and Liwei Lin, "Rapid Assembly of Multilayer Microfluidic Structures via 3D Printed Transfer Molding and Bonding," *Microsystems & Nanoengineering*, Vol. 2, pp. 16063, 2016. DOI: 10.1038/micronano.2016.63.

4. Emmeline Kao, Chen Yang, **Roseanne Warren**, Alina Kozinda, and Liwei Lin, "ALD Titanium Nitride on Vertically Aligned Carbon Nanotube Forests for Electrochemical Supercapacitors," *Sensors and Actuators A: Physical*, Vol. 240, pp. 160-166, 2016. DOI: 10.1015/j.sna.2016.01.044.
5. Guoqing Chang, Xuefeng Zhu, Aike Li, Weiwei Kan, **Roseanne Warren**, Ruiguo Zhao, Xiaoliang Wang, Gi Xue, Jianyi Shen, and Liwei Lin, "Formation and self-assembly of 3D nano fibrous networks based on oppositely charged jets," *Materials & Design*, Vol. 97, pp. 126-130, 2016. DOI: 10.1016/j.matdes.2016.02.069.
6. **Roseanne Warren**, Firas Sammoura, Fares Tounsi, Mohan Sanghadasa and Liwei Lin, "Highly Active Ruthenium Oxide Coating via ALD and Electrochemical Activation in Supercapacitor Applications," *Journal of Materials Chemistry A*, Vol. 3, pp. 15568-15575, 2015. DOI: 10.1039/C5TA03742E.
7. **Roseanne Warren**, Firas Sammoura, Kwok Siong Teh, Alina Kozinda, Xining Zang, and Liwei Lin "Electrochemically Synthesized and Vertically Aligned Carbon Nanotube-Polypyrrole Nanolayers for High Energy Storage Devices," *Sensors and Actuators - A Physical*, Vol. 231, pp. 65-73, 2015. DOI: 10.1016/j.sna.2014.07.010.
8. Guoqing Chang, Zhen Cheng, **Roseanne Warren**, Guoxia Song, Jianyi Shen, and Liwei Lin, "Highly Efficient Photocatalysts of Surface Hybridization of TiO₂ Nanofibers with Carbon Films," *ChemPlusChem*, Vol. 80, pp. 827-831, 2015. DOI: 10.1002/cplu.201402427.
9. Guoqing Chang, Xuefeng Zhu, **Roseanne Warren**, Xu Wang, Tianzhen He, Liwei Lin, and Jianyi Shen, "Electrospinning of Micro Spiral Fibers," *Materials Research Express*, Vol. 1, 015302, 2014. DOI: 10.1088/2053-1591/1/1/015302.

CONFERENCE PROCEEDINGS

1. Nolan Ingersoll, Robert Underwood, and **Roseanne Warren**, "MOF-Derived Carbons As Ordered Isoreticular Structures for High-Performance Sodium-Ion Battery Anode," *Proceedings of the 233rd ECS Meeting*, Seattle, Washington, May 2018 (Oral presentation).
2. Virginia Diaz and **Roseanne Warren**, "Dissolvable Conducting Polymers for Electrochemical Energy Storage," *Proceedings of the 231st ECS Meeting*, New Orleans, Louisiana, May 2017 (Oral presentation).
3. Casey C. Glick, Mitchell T. Srimongkol, William Zhuang, Joseph Lin, Aaron Schwartz, **Roseanne Warren**, Dennis Tekell, Panitan Satimalee, Judy Kim, Caroline Su, Kyungna Kim, and Liwei Lin, "Fabrication of Double-sided Microfluidic Structures via 3D Printed Transfer Molding," *Proceedings of the Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop*, June 5-9, Hilton Head Island, SC, 2016.
4. **Roseanne Warren**, and Liwei Lin, "Performance Limitations in Resistive-Capacitive Porous Super capacitor Electrodes," *Proceedings of 29th IEEE Micro Electro Mechanical Systems Conference*, pp. 1208-1211, Shanghai, China, Jan. 2016 (Poster presentation).

5. Emmeline Kao, Chen Yang, **Roseanne Warren**, Alina Kozinda, and Liwei Lin, "ALD Titanium Nitride Coated Carbon Nanotube Electrodes for Electrochemical Supercapacitors," *18th International Conference on Solid-State Sensors, Actuators and Microsystems Transducers 2015*, pp. 498-501, Anchorage Alaska, June 2015 (Oral presentation).
6. **Roseanne Warren**, Firas Sammoura, Alina Kozinda, and Liwei Lin, "ALD Ruthenium Oxide-Carbon Nanotube Electrodes for Supercapacitor Applications," *Proceedings of 27th IEEE Micro Electro Mechanical Systems Conference*, pp. 167-170, San Francisco, Jan. 2014 (Oral presentation).
7. Vishnu Jayaprakash, Ryan D. Sochol, **Roseanne Warren**, Kosuke Iwai and Liwei Lin, "Graphene Electrodes Enhance Performance for Micro-Liter Scale Microbial Fuel Cells," *Proceedings of 27th IEEE Micro Electro Mechanical Systems Conference*, pp. 393-396, San Francisco, Jan. 2014 (Poster presentation).
8. Vishnu Jayaprakash, Ryan D. Sochol, **Roseanne Warren**, Alina Kozinda, Kosuke Iwai and Liwei Lin, "Stackable Cow Dung Based Microfabricated Microbial Fuel Cells," *Proceedings of 26th IEEE Micro Electro Mechanical Systems Conference*, pp. 881-884, Taipei, Taiwan, Jan. 2013 (Poster presentation).
9. **Roseanne Warren**, John Reifenberg, and Kenneth Goodson, "Compact Thermal Model for Phase Change Memory Nanodevices," *Proceedings of the 11th Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, pp. 1018-1045, Orlando, FL, May 2008 (Oral Presentation).

PATENTS

Roseanne Warren, Firas Sammoura, and Liwei Lin, "Fabrication of enhanced supercapacitors using atomic layer deposition of metal oxide on nanostructures," US Patent Application No. 14/602,104 (publication number: US20150303001 A1).

RESEARCH GRANTS

University of Utah Vice President for Research, Research Instrumentation Fund Award, "Electrochemistry package for in-situ TEM", 11/01/18-10/31/19, \$12,613.67. Role: PI.

National Science Foundation, "MRI: Acquisition of a 3-D Nanolithography System", Award #1828480, 10/01/18-09/30/21, \$615,815. Role: Co-PI.

National Science Foundation, CMMI, Nanomanufacturing, "Collaborative Research: Liquid Phase Atomic Layer of Thin Films on Nanoparticles Using Three-Dimensionally Printed Microfluidics," Award #1761273, 07/18-06/21, \$168,737. Role: PI

University of Utah Vice President for Research, Research Incentive Seed Grant Program, "Metal Organic Framework-Derived Carbons for Sodium-Ion Battery Anodes," 07/17-06/18, \$33,245. Role: PI

ADVISING

PhD Students

Zahra Karimi, 01/2018 – present
Fariha Khan, 05/2018 – present
Talha Razauulla, 08/2018 – present

Master's Thesis Students

Virginia Diaz, 05/2016 – 08/2017 (Graduated Fall 2017)
Nolan Ingersoll, 05/2016 – 05/2018 (Graduate Spring 2018)

Undergraduate Research Students

Sean Lund, 08/2016 – 12/2016
Takara Truong, 08/2016 – present (UROP-funded)
Robert Underwood, 01/2017 – 05/2018 (UROP-funded)
Brian Carlson, 05/2017- 08/2017
Katherine Vega, 02/2018 – present
Misha Bekeris, 08/2018 – present
Muhammad Mahadzir, 12/2018 – present

Senior Design Projects

2016-2017: “Cradle-to-Cradle Coffee Maker” by Rumal Kaluarachchi, Sierra Krippner, Katie Talda, and Marie VanderVliet.

INSTRUCTION

Engineering Design I First course in the two-semester senior-level capstone design sequence. Lectures on and team assignments leading to the completion of the detailed design phase including: concept generation and selection, detailed engineering design, application of machine elements, prototype testing, engineering analysis, DFX, parameter design, and preliminary economic analyses. Culminates in design review based on formal presentations of fully documented, detailed engineering drawings and prototype demonstration. *ME 4000 at the University of Utah: 42 students Spring 2016, 68 students Spring 2017, 106 students Fall 2017.*

Fundamentals of Micromachining Introduction to the principles of micromachining technologies. Topics include photolithography, silicon etching, thin film deposition and etching, electroplating, polymer micromachining, and bonding techniques. A weekly lab and a review of micromachining applications is included. Undergraduate students only. *ME 5050/6050, ECE 6221, BIOEN 6421, MSE 6421 at the University of Utah: 42 students Spring 2018.*

Nanofabrication: Graduate course exploring fundamental processes involved in the fabrication of nanoscale materials, structures, and devices, as well as nanofabrication process scale-up (robustness, throughput, yield, and economic considerations). A lab component provides students with hands-on exposure to several nanofabrication techniques available at the University of Utah Nanofab. *Semesters taught: Spring 2019 (12 students).*

PROFESSIONAL SERVICE

Conference Symposia

Co-Organizer, 235th ECS Meeting, Symposium A05 “Battery Characterization”, Dallas, TX, May 26-31, 2019.

Lead Organizer, 233rd ECS Meeting, Symposium L06 “Nanoporous Materials”, Seattle, WA, May 13-17, 2018.

Co-Organizer, 68th Annual Meeting of the International Society of Electrochemistry, Symposium 7 “Supercapacitors from Materials and Processes to Applications”, Providence, RI, August 27-September 1, 2017.

Reviews

Journal article reviews: Sensors and Actuators A: Physical, Journal of The Electrochemical Society, RSC Advances, Micromachines, New Journal of Chemistry, Electrochimica Acta, Langmuir.

Grant proposal reviews: National Science Foundation (2)

Workshops

Invited attendee, National Science Foundation-sponsored “Design of Engineering Materials Workshop”, Texas A&M University, July 18-19, 2016.

Additional Professional Service

Student Poster Session Judge, The Electrochemical Society Meetings (Spring 2016, Fall 2017, Spring 2018).

Research Award Committee, Energy Technology Division, The Electrochemical Society (2016, 2017)

SERVICE AWARDS

Outstanding Reviewer for the *New Journal of Chemistry*, 2017

UNIVERSITY SERVICE

Department of Mechanical Engineering, University of Utah

Seminar Committee (2016-2018)

Capstone Design Committee (2016-2019)

OUTREACH AND MENTORING ACTIVITIES

University of Utah

Undergraduate Research Mentoring Program, Spring 2017

“Engineering Day” Volunteer (2016, 2017).

Salt Lake City, UT

Salt Lake Valley Science & Engineering Fair, Secondary Division Judge (2016, 2017)