

Leslie Esther O'Leary

1200 E California Blvd
M/C 127-72
Pasadena, CA 91125

Phone: (626) 395-3964
leoleary@caltech.edu
midnight.caltech.edu/leoleary

Education

California Institute of Technology
Division of Chemistry and Chemical Eng.

2007/10 – present

Ph.D. Candidate, Chemistry

- Advisor: Dr. Nathan S. Lewis
- Research Focus: Silicon and III-V semiconductor interfacial chemistry and electrochemistry for solar energy to fuel conversion.
 - Mixed molecular monolayer synthesis and characterization
 - Band-edge engineering with mixed molecular dipoles
 - Interfacial electron transfer at SC/conductive polymer interfaces
 - Selective III-V surface functionalization

University of Minnesota, Twin Cities
Institute of Technology

2004/09 – 2007/08

B.S. Chemistry, minor Biology, *summa cum laude*

- Research Advisors: Dr. Marc A. Hillmyer and Dr. William B. Tolman
- Research Focus: Synthesis and materials properties of amorphous and semicrystalline biorenewable and biodegradable blockcopolymers

- Biology Research Advisors: Dr. H. Corby Kistler and Dr. Liane R. Gale
- Biology Research Focus: Population genetics of *Fusarium graminearum*

Honors and Awards

1. Link Foundation Energy Fellow, 2011
2. NSF Graduate Research Fellowship – Honorable Mention, NSF, 2008
3. Graduation *summa cum laude* and with high honors, University of Minnesota, 2007
4. David A. and Merece H. Johnson Scholarship in Chemistry, University of Minnesota, 2007
5. Undergraduate Research Opportunities Research Grant, University of Minnesota, 2007
6. Sysco Foodservice Scholarship, Sysco, 2003

Publications

1. O'Leary, L. E.; Rose, M. J.; Ding, T. X.; Johansson, E.; Brunschwig, B. S.; Lewis, N. S. Heck Couplings of Small Molecules to Mixed Methyl/Thienyl Monolayers at Low Defect Density Si(111). *In preparation*.
2. Johansson, E.; Boettcher, S. W.; O'Leary, L. E.; Polatayev, A.; Maldonado, S.; Brunschwig, B. S.; Lewis, N. S. Control of the pH Dependence of the Band Edges of Si(111) Surfaces Using Mixed Methyl/Allyl Monolayers. *J. Phys. Chem. C* **2011**, *115*(17), 8594.
3. O'Leary, L. E.; Johansson, E.; Rose, M. J.; Brunschwig, B. S.; Lewis, N. S., Thiophenylation and Secondary Reactivity at Low Defect Density Si(111) Surfaces. *Prepr. Pap.-Am. Chem. Soc., Div. Fuel Chem.* **2010**, *55*, 23194.
4. O'Leary, L. E.; Johansson, E.; Brunschwig, B. S.; Lewis, N. S., Synthesis and Characterization of Mixed Methyl/Allyl Monolayers on Si(111). *J. Phys. Chem. B* **2010**, *114*(45), 14298-14302. *Part of Michael R. Wasielewski Festschrift issue
5. Wanamaker, C. L.; Bluemle, M. J.; Pitet, L. M.; O'Leary, L. E.; Tolman, W. B.; Hillmyer, M. A., Consequences of Polylactide Stereochemistry on the Properties of Polylactide-Polymenthide-Polylactide Thermoplastic Elastomers *Biomacromolecules* **2009**, *10*, 2904-2911.
6. O'Leary, L. E., Improving Biorenewable Thermoplastic Elastomers Based on Poly(lactide) and Poly(menthide). Honor's Thesis, B. S., University of Minnesota, Twin Cities, 2007.
7. Wanamaker, C. L.; O'Leary, L. E.; Lynd, N. A.; Hillmyer, M. A.; Tolman, W. B., Renewable-Resource Thermoplastic Elastomers Based on Polylactide and Polymenthide. *Biomacromolecules* **2007**, *8*, 3634-3640.

Oral Presentations

1. O'Leary, L. E. *Semiconductor Surface Functionalization for Solar Energy Conversion*, Inorganic-Organometallics Seminar, California Institute of Technology, Pasadena, CA, 2011 February 18.
2. O'Leary, L. E.; Rose, M. J.; Lewis, N. S. *The Heck Reaction at Functionalized Silicon Surfaces*. 1st Annual Caltech Molecular Inorganic Chemistry Conference, representing the Lewis Group, Pasadena, CA, 2010 July 13.
3. O'Leary, L. E.; Rose, M. J.; Johansson, E.; Brunschwig, B. S.; Lewis, N. S. *Thiophenylation and Secondary Reactivity at Low Defect Density Si(111) Surfaces*. ACS - Chemistry for a Sustainable World, Fuels division, San Francisco, CA, 2010 March 24.
4. O'Leary, L. E. *Expanding Synthetic Versatility at Functionalized Si Surfaces with Low Defect Densities for Solar Energy Conversion Applications*, Inorganic-Organometallics Seminar, California Institute of Technology, Pasadena, CA, 2010 February 5.

5. O'Leary, L. E. *Mixed Allyl/Methyl Monolayers on Si(111)*, Inorganic-Organometallics Seminar, California Institute of Technology, Pasadena, CA, 2009 April 4.
6. O'Leary, L. E.; Johansson, E.; Brunschwig, B. S.; Lewis, N. S. *Formation and Characterization of a Mixed Alkyl Monolayer on Si(111)*, Renewable Energy: Solar Fuels Gordon Research Conference Open Session, Ventura, CA, 2009 February 5.
7. O'Leary, L. E. *Improving Biorenewable Thermoplastic Elastomers Based on Poly(lactide) and Poly(menthide)*, Thesis Defense, University of Minnesota, Twin Cities, 2007 August.

Poster Presentations

1. Ding, T. X.; O'Leary, L. E.; Keller, G.; Brunschwig, B. S.; Lewis, N. S. *Stability Improvement via Solution-Based GaP Surface Functionalization*. ACS - Anaheim, CA 2011 Mar 27. (Poster presented by undergraduate TXD)
2. O'Leary, L. E.; Rose, M. J.; Dempsey, J. L.; Brunschwig, B. S.; Gray, H. B.; Lewis, N. S. *Coupling H₂ Evolution Catalysts to Si(111) Surfaces with Low Electronic Trap State Densities*. Renewable Energy: Solar Fuels Gordon Research Conference, Ventura, CA, 2011 January 16-21. (Poster presented by LEO)
3. O'Leary, L. E.; Rose, M. J.; Dempsey, J. L.; Brunschwig, B. S.; Gray, H. B.; Lewis, N. S. *Coupling H₂ Evolution Catalysts to Si(111) Surfaces with Low Electronic Trap State Densities*. Renewable Energy: Solar Fuels Gordon Research Seminar, Ventura, CA, 2011 January 15-16. (Poster presented by LEO)
4. O'Leary, L. E.; Rose, M. J.; Dempsey, J. L.; Brunschwig, B. S.; Gray, H. B.; Lewis, N. S. *Pd Catalyzed Coupling Reactions at Low Defect Density Si(111) Surfaces*. CCE Student Seminar Day, Pasadena, CA, 2010 October 15. (poster presented by LEO)
5. Johansson, E.; O'Leary, L. E.; Brunschwig, B. S.; Lewis, N. S. *Mixed Allyl/Methyl Monolayers on Si(111)* Renewable Energy: Solar Fuels Gordon Research Conference, Ventura, CA, 2009 February 1-6. (poster presented by EJ and LEO)
6. O'Leary, L. E.; Johansson, E.; Brunschwig, B. S.; Lewis, N. S. *Mixed Allyl/Methyl Monolayers on Si(111)* Renewable Energy: Solar Fuels Gordon-Kenan Research Seminar, Ventura, CA, 2009 January 31 - February 1. (poster presented by LEO and EJ)
7. Boettcher, S. W.; O'Leary, L. E.; Warren, E. L.; Atwater, H. A.; Lewis, N. S. *Design and Surface Functionalization of Structured Semiconductor Photoelectrodes* Global Climate & Energy Project (GCEP) Research Symposium, Palo Alto, CA, 2008 October 2-3. (poster presented by SWB, LEO, and ELW)
8. Gale, L. R.; O'Leary, L. E.; Bryant, J. D.; Ochocki, G. E.; Ward, T. J.; and Kistler, H. C. *Population shifts in Fusarium graminearum sensu stricto in the Upper Midwest* American Phytopathological Society (APS) Annual Meeting, Québec City, Québec, Canada, 2006 July 29 - August 2. (poster presented by LRG)
9. Gale, L. R.; O'Leary, L. E.; Bryant, J. D.; Ochocki, G. E.; Ward, T. J.; and Kistler, H. C. *Displacement of the native population of Fusarium graminearum in North Dakota and parts*

of Minnesota by a genetically divergent and more toxigenic population. National Fusarium Head Blight Forum, Milwaukee, WI, 2005 December 11-13. (poster presented by LRG)

Teaching Experience

1. Research mentor to undergraduate student, Suyeon Pyo 2011/03 - present
2. Summer research co-mentor to high school student 2010/06 - 2010/08
3. Ch147: Polymer Chemistry (Prof. Bob Grubbs, Caltech) 2010/01 - 2010/03
4. Ch1a: General Chemistry (Prof. Nathan S. Lewis, Caltech) 2009/10 - 2009/12
5. Ch2: Introduction to Energy Sciences (Prof. Nathan S. Lewis, Caltech) 2009/03 - 2009/06
6. Research mentor to undergraduate student, Tina Ding 2008/01 - 2010/12
7. Ch4ab: Synthesis and Analysis of Organic and Inorganic Compounds (Dr. Jane Raymond, Caltech) 2008/01 - 2008/06
8. Ch3b: Experimental Procedures of Synthetic Chemistry (Dr. Jane Raymond, Caltech) 2007/10 - 2008/06
9. Chem2311: Organic Chemistry Lab (Dr. Jane Wissinger, University of Minnesota) 2006/09 - 2007/05

Outreach/Volunteer Activities

1. 'Juice from Juice' at John Muir HS, Pasadena, 2010/06 - present
Co-led a Dye Sensitized Solar Cells (DSSC) lab for two public high school chemistry classes. Students assembled the cells and tested them under the southern California sun! Website design and assisted in teacher workshops.
2. 'SHArK Project' Mentor John Muir HS, Pasadena, CA 2009/07 - present
The mission of the Solar Hydrogen Activity research Kit (SHArK) Project is to discover inexpensive and stable oxide semiconductors that can efficiently photoelectrolyze water using sunlight. The project allows High school students to take an active role in solving the global energy problem while participating in real time research.
3. Big Brothers Big Sisters Mentor, Minneapolis, MN 2004/07 - 2007/06
The main goal of my work with BBBS was to support and encourage one inner city teenager to pursue post-secondary education. I occasionally performed science demos for my little's classes.
4. Compassionate Action for Animals, UMN, Minneapolis, MN 2005/03 - 2007/03
The mission of CAA is to advocate for conscientious eating habits. Group officer on education of the environmental impacts of animal agriculture.
5. Minnesota Literacy Council ESL teacher, Minneapolis, MN 2004/07 - 2006/12
"The Minnesota Literacy Council (MLC) is a nonprofit organization dedicated to sharing the power of learning throughout Minnesota. They offer services for adults, children and families seeking to improve their literacy skills as well as support literacy programs across Minnesota." I led a group of ~10 adult learners through lecture and activities and the northeast Minneapolis location.