Lucas D. Ellis

Assistant Professor, Callahan Faculty Scholar, Oregon State University
Lucas.Ellis@oregonstate.edu Google Scholar | Lucas Ellis

Research Interests

- Heterogeneous Catalysis
- Waste Plastic Upcycling
- Value-Added Products from Biomass
- Adsorptive Separations

Education & Research Experience

2021 - current	**Assistant Professor**, Callahan Faculty Scholar, Oregon State University, Corvallis, OR
2019 - 2021	**Director's Postdoctoral Fellow**, NREL, Golden, CO Advisors: Dr. Gregg T. Beckham (NREL) & Dr. Yuriy Román-Leshkov (MIT)
2018	**Ph.D. Chemical Engineering**, University of Colorado, Boulder, CO G.P.A. 3.94/4.00, Advisors: Dr. Daniel K. Schwartz & Dr. J. Will Medlin
2011	**M.S. Engineering Sciences**, Dartmouth College, Hanover, NH G.P.A. 3.70/4.00, Advisor: Dr. Lee R. Lynd
2007	**B.S. Chemical Engineering Focus (Engineering)**, Cal. Poly. State University, San Luis Obispo, CA G.P.A: 3.90/4.00, Magna Cum Laude Domestic study abroad: West Virginia University, 2006-2007
2011 - 2013	**Research Associate II**, Mascoma Corporation, Lebanon, NH Performed R&D in lignocellulosic pretreatment at the bench and pilot-scales at a cellulosic ethanol start-up company.
2008	**Scientific Research Technician II**, Dept. of Chem. & Bio. Eng., University of Maine Researched strategies to synthesize carbon nanomaterials from lignin.
2007	**Undergraduate Research Assistant**, Chem. Eng. Department, West Virginia University
2006	**NSF-REU: SENSORS! Fellow**, Dept. of Chem. & Bio. Eng., University of Maine Developed a biosensor using self-assembled monolayers to detect red-tide toxins.

Publications

1. **Ellis*, L.D.**, N.A. Rorrer*, K.P. Sullivan*, M. Otto, J.E. McGeehan, Y. Román-Leshkov. N. Wierckx, G.T. Beckham. (2021) "Chemical and biological catalysis for plastics upcycling." *Nature Catalysis*, 4, 539-556. [Link]
2. **Ellis, L.D.,** S.V. Orski, A.G. Norman, G. K.L. Beers, Y. Román-Leshkov, G.T. Beckham. (2021) "Tandem heterogeneous catalysis for polyethylene depolymerization via an olefin intermediate process." *ACS Sustainable Chemistry & Engineering*, 9, 623-628. [Link]
3. **Ellis, L.D.,** S. Parker, J. Hu, H. Funke, J.L. Falconer, J.W. Medlin. (2020) "Tuning gas adsorption selectivity and diffusion rates in zeolite 5A with phosphonic acid monolayers." *Cell Reports Physical Sciences*, 1: 100036. [Link]
4. **Ellis, L.D.** & G.T. Beckham. (2019) "Reaction: Proteins from chemocatalysis; It's what's for dinner." *Chem*, 5, 1353-1354. [Link]
5. Ballesteros-Soberanas, J., **L.D. Ellis**, J.W. Medlin. (2019) "Effects of phosphonic acid monolayers on the dehydration mechanism of aliphatic alcohols on TiO_2." *ACS Catalysis*, 9: 7808-7816. [Link]
6. **Ellis, L.D.**, D.K. Schwartz, J.W. Medlin. (2019) "Effects of metal oxide surface doping with phosphonic acid monolayers on alcohol dehydration activity." *Applied Catalysis A: General*, 571: 102-106. [Link]
7. Coan, P.D., **L.D. Ellis,** D.K. Schwartz, J.W. Medlin. (2018) "Enhancing cooperativity in bifunctional acid-Pd catalysis with carboxylic acid-functionalized organic monolayers." *The Journal of Physical Chemistry Part C*, 12: 6637-6647. [Link]

8. Zhang, J., **L.D. Ellis,** B. Wang, M. Dzara, C. Sievers, S. Pylypenko, E. Nikolla, J.W. Medlin. (2018) "Control of interfacial acid-metal catalysis with organiz monolayers." *Nature Catalysis*, 1: 2520-1158. [Link]
9. **Ellis, L.D.,** R.M. Trottier, C.B. Musgrave, D.K. Schwartz, J.W. Medlin. (2017) "Controlling the surface reactivity of titania via electronic tuning of self assembled monolayers." *ACS Catalysis*, 7: 8351-8357. [Link]
10. **Ellis, L.D.,** S. Pylypenko, S.R. Ayotte, D.K. Schwartz, J.W. Medlin. (2016) "Trimethylsilyl-functionalized alumina exhibits increased activity for 1,2-propanediol dehydration." *Catalysis Science & Technology, 6:* 5721-5728. [Link]
11. Gould, T.D., M.M. Montemore, A.M. Lubers, **L.D. Ellis**, A.W. Weimer, J.L. Falconer, J.W. Medlin. (2015) "Enhanced dry reforming of methane on Ni and Ni-Pt catalysts synthesized by atomic layer deposition." *Applied Catalysis A: General*, 492: 107-116. [Link]
12. Holwerda, E.K., **L.D. Ellis**, L.R. Lynd. (2013) "Development and evaluation of methods to infer biosynthesis and substrate consumption in cultures of cellulolytic microorganisms." *Biotechnology and Bioengineering*, 110: 2380-2388. [Link]
13. Spender, J., A.L. Demers, X. Xie, A.E. Cline, M.A. Earle, **L.D. Ellis**, D.J. Neivandt. (2012) "Method for production of polymer and carbon nanofibers from water-soluble polymers." *Nano Letters*, 12: 3857-3860. [Link]
14. **Ellis, L.D.**, E.K. Holwerda, S.Rogers, D.Hogsett, X.Shao, L.R. Lynd. (2012) "Closing the carbon balance for fermentations by *Clostridium thermocellum* (ATCC 27405)." *Bioresource Technology*, 103: 293-299. [Link]
15. Wark, M., B. Kalanyan, **L.D. Ellis**, J. Fick, L. Connell, D. Neivandt, and J.F. Vetelino. (2007) "A lateral field excited acoustic wave sensor for the detection of saxitoxin in water." *Proc. IEEE Ultrasonics Symposium*, 28:1217–1220. [Link]

Patents

1. Beckham, G.T., **L.D. Ellis**, K.P. Sullivan, A. Werner. (2020) "Upcycling Mixed Waste Plastic Through Chemical Depolymerization and Biological Funneling." U.S. Provisional Patent Application No. 63/126,153.
2. **Ellis, L.D.** & G.T. Beckham. (2020) "Catalysts and methods for depolymerizing plastics." U.S. Provisional Patent Application No. 63/050,209.
3. Falconer, J.L., J.W. Medlin, **L.D. Ellis**, H.H. Funke, S. Parker. (2019) "Functionalization of zeolites." U.S. Patent Application 16/389910. [Link]
4. Neivandt, D.J., J. Spender, X. Xie, and **L.D. Ellis**. (2010) "Carbon nano-structures from preformed polymers." Patent number US 2011/0091711 A1. [Link]

Awards

2020	NREL Key-Contributor Award for Exceptional Performance
2020	NREL Director's Award for Exceptional Achievement
2020	International Congress on Catalysis Travel Award
2017	American Institute of Chemists Graduate Student Faculty Leadership Award
2017	North American Catalysis Society Kokes Travel Award
2016	Best Presentation Award, Student Annual Research Symposium
2016	Best Presentation Award (1st Place), Rocky Mountain Catalysis Society
2015	Best Presentation Award (3rd Place), Rocky Mountain Catalysis Society
2013	Mascoma Corporation Award of Excellence
2011, 2009	Outstanding Graduate Teaching Assistant, Dartmouth Center for the Advancement of Learning, student nomination
2009	Citation for Excellence as a Teaching Assistant, faculty nomination
2009, 2008	National Science Foundation Graduate Research Fellowship Honorable Mention Recipient
2007	Best Paper Award, IEEE Ultrasonics Symposium
2006	Best Presentation Award, NSF-REU: SENSORS! Research Symposium

Fellowships

2019 – 2021	**Director's Postdoctoral Fellowship**, NREL
2017 – 2018	**USDA-NIFA Predoctoral Fellowship**, University of Colorado
2015 – 2016	**Graduate Assistantship in Areas of National Need**, University of Colorado
2014	**Ryland Fellowship**, University of Colorado

Teaching Experience

Advanced Teaching Assistant,

2015 Chemical Engineering Thermodynamics (F.C.Q.* = 5.1/6.0), University of Colorado
Teaching Mentor: Dr. John Falconer

Teaching Assistant

2013 General Chemistry for Engineers (F.C.Q.* = 5.4/6.0), Undergraduate Lab., University of Colorado
Teaching Mentor: Dr. Charles Musgrave

2011, 2009 Introduction to Thermodynamics†, Dartmouth College
Teaching Mentor: Dr. Karl Griswold

2009 Numerical Methods (Graduate Course), Darmouth College
Teaching Mentor: Dr. Simon Shepard

*F.C.Q. = Faculty Course Questionnaire for T.A. performance, reviewed by students
†Citation of Excellence (faculty nomination), Outstanding Graduate Student T.A. (student nomination)

Service Experience

2019-2020 Ad-hoc Reviewer
- Journals: *Catalysis Science & Technology, ACS Central Science, Chemical Science, and ChemSusChem*
- SBIR: USDA-NIFA & DOE

2015-2017 Founder/Executive, Catalysis & Surface Science Super Group, U. of Colorado
- Founded and managed the CSSSG, an organization focussed on increasing collaboration and broadening the educational breadth of graduate students and postdoctoral candidates in the field of catalysis and surface science.
- Organized biweekly seminars, with refreshments, by students, postdocs, faculty and visiting scientists, field trips to local companies/labs (e.g. National Renewable Energy Laboratory), and hardware based educational sessions (e.g. Swagelok – "How to properly tighten Swagelok fittings.")

2010-2011 Founder/Chair, Next Generation Scientists for Biodiesel, National Biodiesel Board
- Selected as co-founding, co-chair, from a national pool of other candidates.
- Organized educational events related to the science and industry of biodiesel production, such as national webinars and events at the annual National Biodiesel Conference (e.g. student poster session).

2006-2007 Founder/President, WVU Biodiesel Project, West Virginia University
- Founded a student organization with the goal of converting waste-vegetable oil produced on campus into biodiesel for university-owned diesel vehicles.
- Organized educational events about biodiesel (e.g. "The Chemistry of Biodiesel.")
- Organization received $1000 prize from Keen Footwear for our efforts in sustainability.

2005-2006 Chemistry Chair, Biodiesel Club, California Polytechnic State University

Interests

Languages: English (native), Spanish (beginner)

Interests: I am an avid rock (and ice) climber, having rock climbed in many locations around the world, and worked search and rescue with Yosemite Search and Rescue (YOSAR) in 2008. I also enjoy bike touring, having ridden from Vancouver, B.C. to San Diego, CA in 2011 with my father and wife.