

# Deborah Sills

## Professional Address:

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## EDUCATION

**B.S.** (Honors), Civil Engineering, 2001, Montana State University–Bozeman  
Concentration: Bio-resources

**M.S.**, Environmental Engineering, 2005, Cornell University, Ithaca, NY  
Concentration: Environmental Processes  
Thesis: *Search for vinyl chloride degrading organisms at Moody Air Force Base*  
Advisor: James M. Gossett

**Ph.D.**, Environmental Engineering, 2011, Cornell University, Ithaca, NY  
Concentration: Environmental Processes  
Dissertation Topic: *Enzymatic hydrolysis of alkaline pretreated biomasses: Assessment of hemi-cellulase mixtures and the use of FTIR to predict saccharification*  
Advisor: James M. Gossett

**Postdoc**, Cornell Energy Institute, 2012–2013, Cornell University, Ithaca, NY  
Concentration: Life Cycle Assessment (LCA) of Algal Biofuels  
Advisors: Jefferson W. Tester & Charles H. Greene

## RESEARCH INTERESTS

Resource Recovery, Community-Engaged Research, Microbial Source Tracking, Life Cycle Assessment

## PROFESSIONAL EXPERIENCE

**Associate Professor**, Department of Civil and Environmental Engineering, Bucknell University, Lewisburg, PA [8/2020 to present]  
Teacher scholar in environmental engineering. Awarded tenure and promotion to associate professor effective August 2020.

**Visiting Scientist**, Israeli Agricultural Research Organization (ARO) Volcani Institute, Neve Yaar, Israel [10/2021 to 5/2022]  
Conducted research on resource recovery from agricultural waste. Hosted by Dr. Roy Posmanik.

**Assistant Professor**, Department of Civil and Environmental Engineering, Bucknell University, Lewisburg, PA [8/2013 to 7/2020]  
Teacher scholar in environmental engineering.

**Visiting Scientist**, Department of Chemical & Biomolecular Engineering, Cornell University, Ithaca, NY [6/2015 to 2020]  
Conducted research on integration of biological and thermochemical processing of waste biomass.

**Visiting Scientist**, Industrial Processes and Energy Systems Engineering (IPESE), Depart-

ment of Mechanical Engineering, Swiss Institute of Technology (EPFL–Valais), Sion, Switzerland [9/2015 to 5/2016]

Conducted research on LCA and TEA applied to biomass conversion.

**Postdoctoral Researcher and Instructor**, Cornell Energy Institute and Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY [2011 to 2013]

Conducted research on LCA of algae. Taught writing course on climate change and energy.

**Graduate Research Assistant**, Biofuels Research Laboratory, Cornell University, Ithaca, NY [2005 to 2011]

Completed Ph.D research on converting non-edible plant biomass to fermentable sugars.

**Instructor**, School of Civil and Environmental Engineering, Cornell University, Ithaca NY  
Cornell University, Ithaca, NY [2010 to 2011]

Taught two environmental engineering courses.

**Graduate Research Assistant**, School of Civil and Environmental Engineering, Cornell University, Ithaca NY [2002 to 2004]

Completed Master’s research on bioremediation of vinyl chloride. Designed and co-taught (with high school teachers) inquiry-based curriculum for K-12 environmental science classes.

## PEER REVIEWED PUBLICATIONS

\*Indicates current or former Bucknell student and †Indicates corresponding author

R. Darzi, Y. Dubowski, J. L. Goldfarb, M. Karod, **D. L. Sills**, and R. Posmanik, “Hydrothermal Processing of Multilayer Plastic Film for Cascaded Valorization of Nonrecyclable Waste” *ACS Sustainable Chemistry & Engineering*, 2023

D. A. Bowes, A. Darling, E. M. Driver, D. Kaya, R. Maal-Bared, L. M. Lee, K. Goodman, S. Adhikari, S. Aggarwal, A. Bivins, Z. Bohrerova, A. Cohen, C. Duvallat, R. A. Elnimeiry, J. M. Hutchison, V. Kapoor, I. Keenum, F. Ling, **D. Sills**, A. Tiwari, P. Vikesland, R. Ziels, and C. Mansfeldt, “Structured Ethical Review for Wastewater-Based Testing in Support of Public Health” *Environmental Science and Technology*, vol. 57(35), pp.12969–12980, 2023.

A. Bivins, D. Kaya, W. Ahmed, J. Brown, C. Butler, J. Greaves, R. Leal, K. Maas, G. Rao, S. Sherchan, **D. Sills**, & C. Mansfeldt, “Passive sampling to scale wastewater surveillance of infectious disease: Lessons learned from COVID-19” *Science of The Total Environment*, 155347, 2022.

M. Mohammed\* and **D. L. Sills**†, “Coupling a rotating biological contactor with an anaerobic baffled reactor for sustainable energy recovery from domestic wastewater” *Environmental Science: Water Research & Technology*, vol. 8(9), pp. 1822-1835, 2022.

F. Ozis, S. L. Parks, **D. L. Sills**, M. Akca, & C. Kirby, “Teaching sustainability: does style matter?” *International journal of sustainability in higher education*, vol.23(8), pp. 194-210, 2022.

O. Calicioglu, P. V. Femeena, C.L. Mutel, **D.L. Sills**, T.L. Richard, & R.A. Brennan, “Techno-economic analysis and life cycle assessment of an integrated wastewater-derived duckweed biorefinery” *ACS Sustainable Chemistry & Engineering*, vol.9(28), pp. 9395-9408, 2021.

K. Wang, Q. Ma, M. Burns\*, H. Sudibyoy, **D. L. Sills**, J.L. Goldfarb, & J.W. Tester, “Impact of Feed Injection and Batch Processing Methods in Hydrothermal Liquefaction”, *The Journal of Supercritical Fluids*, 2020.

- D. L. Sills**<sup>†</sup>, L.G. Van-Doren, E. Raynor\* & C. Beal, “The effect of functional unit and co-product handling methods on life cycle assessment of an algal biorefinery”, *Algal Research*, 2020.
- N. Kassem, **D. L. Sills**, R. Posmanik, C. Blair & J.W. Tester, “Combining anaerobic digestion and hydrothermal liquefaction in the conversion of dairy waste into energy: A technoeconomic model for New York State”, *Waste Management*, 2020.
- R. Posmanik, C. M. Martinez, B. Cantero-Tubilla, D. Cantero, **D. L. Sills**, M. J. Cocero, & J. W. Tester, “Acid and alkali catalyzed hydrothermal liquefaction of dairy manure digestate and food waste” *ACS Sustainable Chemistry & Engineering*, vol. 6 , pp. 2724-2732, 2018.
- M. N. Poulsen, J. Pollak, **D.L. Sills**, J. A. Casey, K.E. Nachman, S. E. Cosgrove, D. W. Stewart\*, & B. S. Schwartz, “High-density poultry operations and community-acquired pneumonia in Pennsylvania”, *Environmental Epidemiology*, vol.2 , pp. e013, 2018.
- M. N. Poulsen, J. Pollak, J., **D.L. Sills**, J. A. Casey, S. G. Rasmussen, K.E. Nachman, S. E. Cosgrove, D. Stewart\*, & B. S. Schwartz, “Residential proximity to high-density poultry operations associated with campylobacteriosis and infectious diarrhea”, *International journal of hygiene and environmental health*, vol.221, pp. 323-333, 2018.
- L. G. Van Doren, R. Posmanik, F.A. Bicalho\*, J.W. Tester & **D. L. Sills**<sup>†</sup>, “Prospects for energy recovery during hydrothermal and biological processing of waste biomass”, *Bioresource Technology*, vol. 225, pp. 67-74, 2017.
- R. Posmanik, D. A. Cantero, A. Malkani, **D. L. Sills** & J.W. Tester, “Biomass conversion to bio-oil using sub-critical water: Study of model compounds for food processing waste”, *The Journal of Supercritical Fluids*, vol. 119, pp. 26-35, 2017.
- C. H. Greene, M. E. Huntley, I. Archibald, L.N. Gerber, **D.L. Sills**, J. Granados, C. Beal & M. J. Walsh, “Geoengineering, marine microalgae, and climate stabilization in the 21st century”, *Earth’s Future*, vol. 5, pp. 278-284, 2017.
- D. L. Sills**<sup>†</sup>, V. L. Wade\*, T. Distefano, “Comparative life-cycle and technoeconomic assessment for energy recovery from dilute wastewater”, *Environmental Engineering Science*, vol. 33, pp. 861-872, 2016.
- L. N. Gerber, J. W. Tester, C. Beal, M. Huntley, **D. L. Sills**<sup>†</sup>, “Target cultivation and financing parameters for sustainable production of fuel and feed from micro-algae”, *Environmental Science & Technology*, vol.50 pp. 3333-3341, 2016.
- M. J. Walsh, L.G. Van Doren, **D. L. Sills**, I. Archibald, C.M. Beal, X. G. Lei, M. E. Huntley, Z. Johnson, & C. H. Greene, “Algal food and fuel coproduction can mitigate greenhouse gas emissions while improving land and water-use efficiency”, *Environmental Research Letters*, vol.11, pp. 114006, 2016.
- C. H. Greene, M. E. Huntley, I. Archibald, I., L. N. Gerber, **D. L. Sills**, J. Granados, J.W. Tester, C. M. Beal, M. J. Walsh, R. R. Bidigare, R.R., S. L. Brown, et al. “Marine microalgae: climate, energy, and food security from the sea”, *Oceanography*, vol. 29, pp. 10-15, 2016.
- C. M. Beal, L.N. Gerber, **D. L. Sills**, M. E. Huntley, S. C. Machesky, M. J. Walsh, J. W. Tester, I. Archibald, J. Granados, C. H. Greene, “Algal biofuel production for fuels and feed in a 100-ha facility: A comprehensive techno-economic analysis and life cycle assessment ”, *Algal Research*, vol. 10, pp. 266–279, 2015.
- M.E. Huntley, Z. I. Johnson, S. L. Brown, **D. L. Sills**, L. Gerber, I. Archibald, S. C. Machesky, J. Granados, C. Beal, and Greene, C. H. “Demonstrated large-scale production of marine

microalgae for fuels and feed”, *Algal Research*, vol. 10, pp. 249-265, 2015.

**D. L. Sills**<sup>†</sup>, V. Paramita, M. J. Franke, M. C. Johnson, T. M. Akabas, C. H. Greene, and J. W. Tester, “Quantitative uncertainty analysis of life cycle assessment for algal biofuel production”, *Environmental Science & Technology*, vol. 47, pp. 687-694, 2013.

**D. L. Sills**<sup>†</sup> and J. M. Gossett, “Using FTIR spectroscopy to model alkaline pretreatment and enzymatic saccharification of six lignocellulosic biomasses”, *Biotechnology & Bioengineering*, vol. 109, pp. 894-903, 2012.

**D. L. Sills**<sup>†</sup> and J. M. Gossett, “Using FTIR to predict saccharification from enzymatic hydrolysis of alkali-pretreated biomasses”, *Biotechnology & Bioengineering*, vol. 109, pp. 353-362, 2012.

**D. L. Sills**<sup>†</sup> and J. M. Gossett, “Assessment of commercial hemicellulases for saccharification of alkaline pretreated perennial biomass”, *Bioresource Technology*, vol. 102, pp. 1389-1398, 2011.

## REPORTS

Gossett, J. M., T. E. Mattes, **D. L. Sills**, J. C. Spain, S. F. Nishino, and N. V. Coleman, *Characterization of the Aerobic Oxidation of cis-Dichloroethene and Vinyl Chloride in Support of Bioremediation of Chloroethene-Contaminated Sites, Final Technical Report, CU 1168*. Strategic Environmental Research and Development Program, Washington D.C. 143 pp. Nov. 5, 2004.

## INVITED TALKS

“Monitoring wastewater for SARS-CoV-2 at Bucknell University”, Invited talk: *Weekly Seminar, Volcani Institute, Agricultural Research Organization*, Neve Yaar, Israel, March 30, 2022.

“Biological and thermochemical conversion of waste biomass: Experimental and life cycle modeling results”, Invited talk: *Energy Seminar, Cornell Energy Institute*, Cornell University, Ithaca NY, September 27, 2018.

“Life cycle assessment for agricultural biomass”, Invited talk: *Weekly Seminar, Volcani Institute, Agricultural Research Organization*, Neve Yaar, Israel, January 2, 2018.

“Environmental and economic assessments of algal fuel and feed”, Invited talk: *Weekly Seminar, The Zuckerberg Institute for Water Research*, Ben Gurion University, Sdeh Boker, Israel, December 27, 2017.

“Sustainable production of fuel and food from marine microalgae”, Invited talk: *Energy Seminar, Department of Chemical and Biomolecular Engineering*, Cornell University, Ithaca NY, May 2017.

“Climate energy and food security from the sea?”, Invited talk: *Civil and Environmental Engineering Seminar Series*, Clarkson University, Potsdam NY, January, 2017.

“Green Crude? Improvements needed for sustainable production of algal biofuels”, Invited talk: *Mechanical and Environmental Engineering Seminar Series*, Tel Aviv University, December, 2015.

“Introduction to Life Cycle Assessment applied to a lignocellulosic biorefinery”, Invited lecture: *Energy Systems, Ph.D. Course*, Swiss Technical Institute of Technology (EPFL, Valais), December, 2015.

“Target Parameters for sustainable production of algal fuel and feed”, Invited talk: *Life Cycle Assessment Group*, Swiss Technical Institute of Technology (ETH Zurich), November, 2015.

“Environomic assessment of algal biofuel”, Invited talk: *Environmental Engineering Seminar Series*, The Pennsylvania State University, February, 2014.

“Is algal biofuel sustainable?”, Invited lecture: *Bioenergy & Bioproducts Education Programs*, Boyce Thompson Institute, Ithaca, NY, July 2013 & July 2012.

“Sustainable bioenergy production”, Invited lecture: Climate Change Senior Seminar, Cornell University, Ithaca, NY, April 2012.

“Using FTIR to model pretreatment and enzymatic hydrolysis of lignocellulosic biomass”, Invited talk: Environmental Engineering Seminar Series, Cornell University, Ithaca, NY, March 2012.

“Life cycle assessment of algal biofuels,” Invited lecture: Biofuels Module class, Cornell University, Ithaca, NY, February 2012.

## CONFERENCE PRESENTATIONS & POSTERS

**D.L. Sills**, C. Gwin, and D. Staebler, “Use of microbial source tracking to identify the sources of fecal bacteria in the Buffalo Creek watershed of Union County, Pennsylvania”, Oral Presentation, Plenary Session, *2023 Pennsylvania State wide Watershed Conference*, Altoona, PA, October 29, 2023.

M. Gamboa\*, C. Gwin, and **D.L. Sills**, “Community engaged research and teaching: Are Union County’s waterways safe for recreation?”, Oral Presentation, *Association of Environmental Engineering and Science Professors*, Northeastern University, Boston, MA, June, 2023.

M. Mohammed\* and **D.L. Sills**, “Coupling an anaerobic baffled reactor with a rotating biological contactor for sustainable resource recovery”, Poster Presentation, *Association of Environmental Engineering and Science Professors*, Arizona State University, Tempe, Arizona, May 15, 2019.

K Burns\* and **D.L. Sills**, “Aqueous and oil products from hydrothermal liquefaction of manure digestate”, Poster Presentation, *Association of Environmental Engineering and Science Professors*, Arizona State University, Tempe, Arizona, May 16, 2019.

**D. L. Sills** and M. Mohammed\*, “Social hotspots for aerobic and anaerobic wastewater treatment”, Oral Presentation, *Engineering Sustainability*, Pittsburgh, Pennsylvania, April 8, 2019.

**D. L. Sills**, M. Walsh, L.G. Van-Doren “Integrated assessment applied to large scale production of algal fuel and feed”, Poster Presentation, *Gordon Research Conference—Industrial Ecology*, Les Diablerets, Switzerland, May, 2018.

**D. L. Sills**, “Aqueous products from hydrothermal liquefaction of manure digestate”, Poster Presentation, *Gordon Research Conference—Water & Environmental Science*, Holderness, New Hampshire, June, 2018.

**D. L. Sills** and L. Gerber, “What is the correct functional unit? Life cycle assessment of an algal biorefinery”, Oral Presentation, *Algae Biomass Summit*, Salt Lake City, Utah, October 31, 2017.

**D. L. Sills**, “Can marine algae enhance climate, energy, and food security?”, Oral Presentation, *Association for Environmental Engineering & Science Professors*, Michigan State University, Ann Arbor MI, June, 2017.

**D. L. Sills**, R. Posmanik, L. G. Van Doren, and J. W. Tester, “Prospects for energy recovery during hydrothermal and biological processing of waste biomass”, Oral Presentation, *NY-SAWWA/NYWEA Joint Energy Specialty Conference*, Albany NY, November, 2016.

**D. L. Sills**, R. Posmanik, J. G. Usack, M. C. Moore, L. T. Angenent, T. R. Overton, and J. W. Tester, “Energy recovery from dairy waste”, Oral Presentation, *NYSAWWA/NYWEA Joint Energy Specialty Conference*, Albany NY, November, 2016.

**D. L. Sills**, V. L. Wade, and D. Cowell, “Soluble methane in effluent of an anaerobic baffled reactor”, Poster presentation, *Gordon Research Conference—Water & Environmental Science*, Holderness NH, June, 2016.

**D. L. Sills**, “Climate energy and food security from the sea”, Oral Presentation, *Computer Assisted Process Engineering (CAPE) Forum*, Swiss Technical Institute of Technology (EPFL, Valais), Sion, Switzerland, March, 2016.

**D. L. Sills** and V. L. Wade, “Life cycle impacts of low-energy anaerobic and aerobic wastewater treatment”, Oral Presentation, *Association for Environmental Engineering & Science Professors*, Yale University, New Haven, CT, June 2015.

**D. L. Sills**, L. Gerber, C. H. Greene, and J. W. Tester, “Uncertainty of foreground and background processes parameters for algal fuel and feed production—100 ha Case Study”, Poster Presentation, *Algae Biomass Organization*, San Diego, CA, September 2014.

**D. L. Sills**, L. Gerber, C. H. Greene, and J. W. Tester, “Uncertainty of economics and environmental impacts for algal biofuel production”, Poster Presentation, *DOE — Biomass 2013*, Washington, DC, August 2013.

**D. L. Sills**, V. Paramita, M. J. Franke, M. C. Johnson, T. M. Akabas, C. H. Greene, and J. W. Tester, “Uncertainty of life cycle assessment for algal biofuel”, *The Third International Conference on Biomass, Biofuel and Bioproducts*, Toronto, Canada, June 2013.

**D. L. Sills** and J. M. Gossett, “Assessment of commercial hemicellulases for saccharification of alkaline pretreated perennial biomass”, Poster Presentation *Northeast Sungrant Regional Conference*, Syracuse, NY, June, 2010.

**D. L. Sills** and J. M. Gossett, “Effect of hemicellulase addition during hydrolysis of pretreated switchgrass and mixed prairie biomass”, Invited talk: *Sungrant Renewable Energy Conference*, Washington, DC, 2009.

## FUNDED RESEARCH GRANTS

*Community Engagement Grant: Microbial Source Tracking of Coliform Contamination in Waters Impaired for Recreation in Union County, Part II*

**Status:** Funded

**Role:** Co-Investigator

**Sponsor:** Office of Civic Engagement, Bucknell University

**Collaborators:** Carley Gwin, Jessica Newlin, Members of the Buffalo Creek Watershed Alliance: Gerald Heckler, David Staebler, Shanon Stamm

**Period:** September 2023 –June 2025

**Amount:** \$10,000.

*Community Engagement Grant: Microbial Source Tracking of Coliform Contamination in Waters Impaired for Recreation in Union County, Part I*

**Status:** Funded

**Role:** Co-Investigator

**Sponsor:** Office of Civic Engagement, Bucknell University

**Collaborators:** Carley Gwin, Jessica Newlin, Members of the Buffalo Creek Watershed Alliance; Gerald Heckler, David Staebler, Shanon Stamm

**Period:** January 2022 –August 2023

**Amount:** \$10,000.

***ADVANCE Fellow***

**Status:** Funded

**Sponsor:** ADVANCE Grant, Bucknell University

**Period:** 2022–2023

**Amount:** \$5,000.

***BARD Senior Research Fellow: Resource recovery from agricultural waste.***

**Status:** Funded

**Role:** Investigator

**Sponsor:** US Israel Binational Agricultural Research and Development Fund (BARD)

**Hosted by:** Dr. Roy Posmanik, Agricultural Research Organization, Israel

**Period:** September 2021-May 2022

**Amount:** \$26,000.

***Costa Equipment Grant: Wastewater based epidemiology: Monitoring Bucknell's sewage for SARS-CoV-2***

**Status:** Funded

**Role:** Principal Investigator

**Sponsor:** Costa Fund, Bucknell University

**Period:** June 2021-May 2022

**Amount:** \$18,000.

***Thermochemical Processing of Agricultural Plastic Waste for Selective Resource Recovery and Sustainable Development***

**Status:** Funded

**Role:** Co-Principal Investigator

**Sponsor:** US Israel Binational Agricultural Research and Development Fund (BARD)

**Collaborators:** Roy Posmanik, ARO, Israel, Jillian Goldfarb, Cornell University

**Period:** September 2020-May 2024

**Amount:** Bucknell: \$18,000; total: \$310,000.

***Carbon utilization efficiency in marine algae biofuel production systems through loss minimization and carbonate chemistry modification***

**Status:** Funded

**Role:** Co-Principal Investigator

**Sponsor:** US Department of Energy, BETO DE-FOA-0001908 Topic 1

**Collaborators:** Zackary Johnson, Duke University (lead PI); Greg Rau, University of California–Santa Cruz; Colin Beal, B&D Consulting

**Period:** September 2019–June 2024

**Amount:** Bucknell: \$96,232; Total: \$1.5 million.

***Targeted algal biofuels and bioproducts***

**Status:** Funded

**Role:** Co-Principal Investigator

**Sponsor:** US Department of Energy, BETO DE-FOA-001162

**Collaborators:** Marine AlGae Industrialization Consortium (MAGIC): Zackary Johnson, Duke University (lead PI); Mark Huntley, University of Hawaii; Léda Van Doren, University of Hawaii; Colin Beal, University of Hawaii, and others

**Period:** March 2016–December 2019

**Amount:** Bucknell: \$47,933; Total: \$5.2 million.

***High-density poultry operations and associated infectious disease risks***

**Status:** Funded

**Role:** Co-Principal Investigator

**Sponsor:** The Fisher Center for Environmental Infectious Disease

**Collaborators:** Melissa Poulsen and Brian Schwartz, Johns Hopkins Bloomberg School of Public Health

**Period:** June 2016–May 2017

**Amount:** Bucknell: \$5,000; Total: \$50,000.

**RESEARCH ADVISING AT BUCKNELL**

***Undergraduate Research Students***

Summer 2023

**Melanie Gamboa'24, Filareti Karamitros '25, Demi Gonzales'26, Omuhle Ndholvu '26**–Using microbial source tracking to determine the source of fecal pollution in Buffalo Creek, the Chilorro Fund, the department of Civil & Environmental Engineering, and the College of Engineering, Bucknell University. *Co-advised with Dr. Carley Gwin*

Summer 2022

**Melanie Gamboa'24**–Are Union County's waterway safe for recreation? funded by the Chilorro Fund, Department of Civil & Environmental Engineering, Bucknell University. *Co-advised with Dr. Carley Gwin*

**Demi Gonzales'26**–Nutrient Pollution in Buffalo Creek, funded by The Stem Scholars Program, Bucknell University. *Co-advised with Dr. Carley Gwin*

Summer 2021

**Asteri Aliaj'22**–Correlating typical wastewater parameters to virus concentrations in wastewater, funded by the Emerging Scholars Program, Bucknell University.

**John Piorkowski'24**–Comparing concentration methods for wastewater based epidemiology, funded by the Costa Program, Bucknell University.

Summer 2020

**Riley Doyle'22**–Modeling carbonate chemistry in an algal cultivation systems, funded by Department of Energy Grant.



Summer 2019

**Kenzie Burns'20**–Effect of retention time on formation of dissolved organic nitrogen compounds in hydrothermal liquefaction wastewater, funded by Clare Booth Luce, Bucknell University.

**Elizabeth Raynor'21**–LCA modeling of nutritional products produced from marine microalgae, funded by The US Department of Energy.

**Leah Henk'21**–Effect of inorganic carbon type on growth of marine microalgae, funded by the McKenna Foundation, Bucknell University.

**Lucille Keterrer'23**–Effect of landfill leachate on nitrogen removal at the Gregg Township Wastewater Treatment Plant, funded by The Stem Scholars Program, Bucknell University.

Summer 2018

**Kenzie Burns'20**–Aqueous and oil phase products from hydrothermal liquefaction of waste biomasses, funded by Clare Booth Luce, Bucknell University.

**Elizabeth Raynor'21**–Uncertain LCA parameters for algal biofuel, funded by The US Department of Energy.

**Siwon Sung'21**–Pretreatment and enzymatic hydrolysis of lignocellulosic biomass, funded by The STEM Scholar Program, Bucknell University.

**Emma Saloky'21**–Low cost air pollution sensors and thinking about citizen science, funded by The STEM Scholar Program, Bucknell University.

Summer 2017

**Kenzie Burns'20**–Aqueous and oil phase products from hydrothermal liquefaction of waste biomasses, funded by the McKenna Foundation, Bucknell University.

**Muxi You'20**–Pretreatment and enzymatic hydrolysis of lignocellulosic biomass, funded by The Program of Undergraduate Research (PUR), Bucknell University.

**Alyssa Dedrickson'19**–Uncertain LCA parameters for algal biofuel and coproducts, funded by the US Department of Energy.

Summer 2016

**Dalton Stewart'19, Shai Gerstle '18 & Matthew Geiger '19**–Concentrated poultry operations in Central PA, funded by The Fisher Center for Environmental Infectious Disease; and PUR, Bucknell University.

Summer 2015

**Mona Mohammed'16 & Ray Abbiatici'17**–Nutrient management for animal feeding operations in Pennsylvania, funded by the McKenna Foundation and the Chiloro Fund, Bucknell University.

Summer 2014

**Sarah Emrich'16**–Assessment of using manure-based biochar to reduce nutrient loads in sensitive watersheds, funded by PUR, Bucknell University.

Spring 2014

**Victoria Caudullo'15**—Biomethane potential of defatted marine algae, CENG 481—  
Undergraduate Research.

***Graduate Students—Primary Advisor***

**Rajasri Alaparthi**, *Using FTIR to predict saccharification of ball milled lignocellulosic biomass*, 2018–2020, Masters Thesis Advisor.

**Mona Mohammed**, *Environmental performance of a rotating biological contactor treating anaerobic effluent*, 2016–2019, Masters Thesis Advisor.

**Valerie Wade**, *Life cycle environmental impacts for anaerobic treatment of domestic wastewater*, 2013–2015, Masters Thesis Advisor.

**TEACHING EXPERIENCE**

**Department of Civil and Environmental Engineering, Bucknell University, August 2013 to present**

*FOUND 098.57—Being Human in a Warming World*

Foundation seminar that focuses learning basic writing skills while students explore inequitable human experiences of climate change. After reflecting on their relationship with nature and place in the climate change story, students review and critique potential solutions to the climate crisis: from technological fixes, to personal behavioral changes, societal shifts, and large systemic changes driven by policy.

*ENGR 226—Introduction to Probability and Statistics*

A half credit course with the following learning goals: (1) Present data effectively by computing summary statistics measures, describing probability distributions, and displaying information graphically for discrete and continuous data. (2) Formulate and test hypotheses using inferential statistical analysis. (3) Draw conclusions or make decisions based on statistical analyses and application of probability concepts. (4) Use statistics and probability concepts to describe how civil and environmental engineering designs affect people.

*ENGR 100—Introduction to Engineering, Three week mini-course on Environmental Engineering*

Short course that uses algae cultivation as a topic to introduce students to concepts in environmental engineering. The course includes 9 lecture periods, 2 two-hour lab sessions, and a two-hour design session. Laboratory data is incorporated into a conceptual design of an algal bio refinery that produces fuel and feed.

*ENGR 290—Engineering in a Global and Societal Context—Costa Rica, 2019*

The primary theme for this course was Sustainable Energy in Costa Rica. During this three-week trip students visited solar, wind, biomass, geothermal and hydroelectric power generation sites, as well as other locations that showcase Costa Rica's commitment to sustainability. They proposed engineering designs to improve the environmental sustainability of a sites we visited.

*CEEG 242—Sustainability Principles for Engineers*

This course introduces students to the application of sustainability principles in the field of engineering. Topics include sustainability concepts and definitions, climate science, biogeochemical cycles, embedded resources (e.g., carbon and water footprints), material flows, indicators of social sustainability, and systems thinking.

*CEEG 445L—Environmental Engineering Chemistry Laboratory*

This upper-level course consists of hands-on laboratory exercises designed to reinforce material learned in lecture. Labs include gas transfer, acid-base reactions, chemical kinetics, and metal speciation. Students conduct an open-ended project that requires them to be proficient with environmental engineering laboratory analyses.

*CEEG 443—Sustainable Design*

This upper-level course focuses on quantitative sustainable design. Students apply economic and environmental assessment models, and link these tools to engineering design decisions under uncertainty. Students also complete a semester-long, service-learning design project.

*ENGR 222L—Fluid Mechanics Laboratory*

This course consists of hands-on laboratory exercises that reinforce material learned in lecture. Labs include visualizations of fluid mechanics phenomena and measurement methods in fluid mechanics. Students acquire skills needed for effective teamwork and practice writing engineering reports.

*CEEG 340—Introduction to Environmental Engineering*

This course introduces fundamentals of environmental engineering, such as chemistry, microbiology, mass balance, and reactor theory. Applications include air quality, water quality, and water and wastewater treatment. This course includes hands-on laboratory exercises that reinforce materials learned in lecture and a community-engaged learning module on bacterial pollution in waterways.

## **SERVICE AT BUCKNELL**

- Posse Mentor (DC-18) 2022-present.
- Co-chair: Committee on Academic Freedom & Tenure (CAFT), 2022–2024.
- Co-instructor: Workshop—incorporating sustainability in the curriculum, Summer 2023.
- Member: Department Change Team—Strategic planning for incorporating justice, equity, diversity, and inclusion, 2022–2023.
- Co-facilitator: Learning Community on STEM (In)Justice, 2022–2023.
- Co-facilitator with Bucknell’s Office of Multicultural Student Services: Student-centered conversation on “Centering the Margins: Exploring the exclusionary social and pedagogical environment in our classrooms.” Spring 2023.
- Member: Search Committee for Postdoc to Tenure Track Fellow in Environmental Engineering, 2022–2023.
- Project mentor: EXCELerator: Worked with four incoming first-year engineering students on testing DIY air filters, Summers 202, 2023, and 2024.
- Member: Department ABET Summer Committee, 2018–2019, 2022.
- Co-facilitator: Reading Group on Engineering Justice, 2019.
- Member: University Committee for Campus and Student Life, (CCSL) 2019–2020.

- Member: Engineering International Education Committee, 2014–2015, 2016–2020.
- Member: Faculty Council, 2017–2019.
- Member: Search Committees: Tenure Track, Geology; Tenure Track, ECE, VAP Environmental Engineering (multiple), VAP Geology, 2017–2020.
- Member: Writing Across the Curriculum Council (one semester replacement), 2019.
- Presenter: Admitted Students Day – Sample Class, 2018.
- Instructor: Engineering Camp— Created and led sessions on water treatment for middle and high school students, 2017 and 2019.
- Member: University Committee of Off Campus Study, 2014–2015.

### **PROFESSIONAL SERVICE and MEMBERSHIPS**

- Association of Environmental Engineering and Science Professors (AEESP), Membership & Demographics Committee, member, 2023-present.
- Association of Environmental Engineering and Science Professors (AEESP), Mentor to new faculty, Dr. Elaine Wong, Biola University, 2023-present.
- Assistant Mentor, American Society of Civil Engineering (ASCE) Excellence in Civil Engineering Education (ExCEEEd), Florida Gulf Coast University, 2018 & 2019, 2023 & 2024 (remote).
- Associate Editor, Special Issue on Life Cycle Assessment, *Environmental Engineering & Science*, 2022.
- Journal reviewer: Environmental Science & Technology, Environmental Engineering & Science, Science of the Total Environment, Bioresource Technology, Fuel, Environmental Science: Water Research & Technology, Algal Research
- Journal reviewer: Environmental Science & Technology, Environmental Science & Technology Letters, Science of the Total Environment, Bioresource Technology, Industrial Biotechnology, Algal Research, Journal of Chemical Technology & Biotechnology, Sustainable Chemistry & Engineering, Environmental Development & Sustainability
- Reviewer, National Science Foundation, INFEWS–China Award Panel, April, 2019.
- Reviewer, Department of Energy (DOE), BETO-SBIR Program, March, 2019.
- Reviewer, National Science Foundation, Career Award Panel, October 2016.
- Reviewer of Conference Abstracts, Algae Biomass Summit, 2018 and 2019.
- Session Chair, Bioprocesses, AEESP, Arizona State University, Tempe, Arizona, May 15, 2019.
- Member of Ph.D. Dissertation Committee for Ozgul Caliciogul, Dept. of Civil and Environmental Engineering, Pennsylvania State University, August 2015–December 2018.
- Member: Association of Environmental Engineering & Science Professors, American Society of Civil Engineers, American Society of Engineering Education.

### **PROFESSIONAL DEVELOPMENT**

- Teaching of Writing Workshop, Bucknell University, led by the Writing Center, 2022
- KEEN Workshop, Incorporating Sustainability in Engineering Design, 2022
- Bucknell Fabrication Workshop (BFAB), 2019 & 2017
- Institute in Drinking Water Treatment, Northhampton MA, August 2018

- Faculty Development Workshop on Service-Learning and Community-Based Research, Bucknell University, May 2017
- Fellow, American Society of Civil Engineering (ASCE) Excellence in Civil Engineering Education (ExCEED), United States Military Academy, West Point, NY, 2014
- National Effective Teaching Institute (NETI) workshop, Washington, DC, 2014
- Sustainability Studio Workshop, Bucknell University, led by Peter Wilshusen, 2014
- KEEN Interdisciplinary Senior Design Workshop, Bucknell University, led by Charles Kim, 2014
- Teaching of Writing Workshop, Bucknell University, led by the Writing Center, 2013
- Engineering an Education, Bucknell University, led by Michael Prince, 2013

### **HONORS AND AWARDS**

- Claire W. Carlson Chair in Environmental Engineering, 2023–present.
- ADVANCE Fellow, Bucknell University, 2022–2023.
- Senior Fellow, US Israel Bi-national Agricultural Research and Development Fund (BARD) (2021 to 2022).
- Swanson Fellowship in Science and Engineering, Bucknell University (2013 to 2016).
- Second Place, Oral Presentation Competition, Cornell University, School of Civil and Environmental Engineering, 3rd Graduate Research Symposium (January 28, 2011, Ithaca, NY).
- Graduate Teaching Fellowship—National Science Foundation (2003 to 2004)
- GAANN Fellowship, focused on computational aspects of in-situ bioremediation for the detoxification of groundwater (2001 to 2003)
- Highest Grade Point Average, Bio-resources Concentration, Civil Engineering, Montana State University (2001)
- Best Student All-Around, Bio-resources Concentration, Civil Engineering, Montana State University (2001)