

# David R. Wagner, Ph.D.

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## EDUCATION

Ph.D., Chemical Engineering, The University of Utah, 2013

Dissertation: *Coal Conversion Experimental Methods for Validation of Pressurized Entrained-Flow Gasifier Simulation*

M.S., Chemical Engineering, The University of Utah, 2011

Thesis: *Pyrolysis Behavior of Coal and Petroleum Coke at High Temperature and High Pressure*

B.S., Chemical Engineering, The University of Utah, 2009

Thesis: *Circulating Fluidized Beds and Operation*

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## PROFESSIONAL APPOINTMENTS AND EXPERIENCE

2023-Present **Senior Scientist, Instructor**, Department of Chemical Engineering, The University of Utah, Salt Lake City, Utah

Currently investigating entrained-flow gasification of biomass and plastics blends for hydrogen production as well as process intensification of hydrogen production via sorption-enhanced fluidized bed gasification of biomass. Instructor for senior-level Process Design I and II courses and Sustainable Engineering.

2018-2023 **Assistant Professor**, Department of Chemical and Materials Engineering, San José State University, San Jose, California

Research focuses were sustainability, carbon capture, renewable energies, and thermal analysis. Course instruction focuses were pollution control engineering, senior capstone chemical plant design, and sustainable engineering. I am also a co-founder and inaugural Faculty-in-Residence of the HonorsX Program at SJSU. Continued Spring 2023 as a lecturer within the department.

2018 **Research Associate**, Department of Chemical Engineering, The University of Utah, Salt Lake City, Utah

Investigated chemical looping oxygen-uncoupling (CLOU) combustion technology with a 200 kW pilot-scale system at the Industrial Combustion and Gasification Research Facility, focuses were catalysis and establishing operations protocol.

2016-2018 **Faculty Research Assistant**, School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University, Corvallis, Oregon

Investigated internal combustion engine use for chemicals production via oxydehydrogenation catalysis coupled with infrared diagnostics. Novel rotating fluidized bed reactors were developed to allow for process intensification.

2016 **Lecturer**, Dept. of Biomedical, Chemical, & Materials Engineering, San José State University, San Jose, California

Developed and taught three chemical engineering curricula: Senior Chemical Plant Design, Graduate Kinetics, and Graduate Air Pollution Control Engineering. The average end-of-year industry and faculty evaluations increased by ten percent.

- 2015 **Senior Research Engineer**, Thermochemical Energy Conversion Laboratory, Department of Applied Physics and Electronics, Umeå University, Umeå, Sweden Focused on a collaborative project between Umeå University, The University of Utah, and the SP Energy Technology Center in Piteå, Sweden to increase feasibility of continual biomass feed to pressurized fluidized bed reactors.
- 2013 - 2015 **Postdoctoral Fellow**, Thermochemical Energy Conversion Laboratory, Department of Applied Physics and Electronics, Umeå University, Umeå, Sweden Aided in design, fabrication, and operation of a laboratory-scale entrained-flow reactor for use in fuel-ash behavior during pyrolysis, gasification, and combustion processes. Additional work included investigations of rapid heating of solid fuels and computational simulation of combustion and gasification kinetics.
- 2009 - 2013 **Graduate Research Assistant**, Department of Chemical Engineering and The Institute for Clean and Secure Energy, The University of Utah, Salt Lake City, Utah Graduate studies focused on design, fabrication, and operation of sampling systems in a high-pressure entrained-flow gasifier and of a high-pressure wire-mesh reactor. Empirical and theoretical modeling of gasifiers was also performed with high-pressure thermogravimetric analysis and laminar entrained-flow reactor testing. Collaborative research was funded by Eastman Chemical Company.
- 2008 **Intern**, United States Department of Energy, National Energy Technology Laboratory, Morgantown, West Virginia Principal project incorporated the design and fabrication of solids tracer probes to determine residence time distributions for industrial-scale circulating fluidized beds. Additional testing campaigns measured particle velocities and sphericities.
- 2005 - 2009 **Research Assistant**, Department of Chemical Engineering and The Institute for Clean and Secure Energy, The University of Utah, Salt Lake City, Utah Focal work comprised component fabrication and operation of a pilot-scale circulating fluidized bed as well as construction of a pilot-scale cement-preheater cyclone tower. Additional duties included installation and maintenance of instrumentation and mechanical, electrical, and fluid systems.

## OTHER EXPERIENCE

- 2021 **Public Education Specialist**, Department of Chemical and Biomolecular Engineering, University of California, Berkeley, Berkeley, California
- 2021-Present **Advisory Board Member**, Air Pollution Scientific Initiative
- 2020-Present **Advisor**, DAC City, Inc., Santa Clara, California
- 2017-Present **Senior Associate**, EnviroComp, Inc., Reno, Nevada

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## PEER-REVIEWED PUBLICATIONS

Student authors or advisees are italicized

1. (*Submitted*) Zhang, J., Perez, V., Garcia, T., Yoon, D., **Wagner, D.R.**, Schneider, Y., Lee, M., Lee, S., Oh, D., “The effect of salt ratio in the mechanical and electrochemical properties of PEO-LiTFSI/LLZTO electrolytes,” *Electrochimica Acta*.

2. (Submitted) Namsaraeva, O.; Selvaduray, G.; Schneider, Y.; Holder, Z.; **Wagner, D.R.**; Barker, M.; Nichols, L.; Bridgford, K.; MacDonald, J.; Erogbogbo, F.; Simon, M., “The Effects of E-beam Sterilization on Poly-L-lactic acid (PLLA)-- Mechanical, Material and Thermal Properties,” *ACS Applied Polymer Materials*.
3. (Submitted) Gall, D., **Wagner, D.R.**, Dai, J., *Hughey, L.*, Andersson, K., Whitty, K., “Experimental Demonstration of a 200 kW Solid Fuel Chemical Looping System.” *Applied Energy*.
4. **Wagner, D.R.** “Advanced Thermogravimetric Analyses of Stem Wood and Straw Devolatilization: Torrefaction through Combustion.” *Reactions* 5, 350–360 (2024).
5. *Wongmat, Y.*, **Wagner, D.R.**, “Effect of Potassium Salts on Biochar Pyrolysis,” *Energies* 15 (16), 5779 (2022).
6. *Weng P.-E.*, *Gooyandeh, A.*, *Tariq, M.*, *Li, T.*, *Godara, A.*, *Valenzuela, J.*, *Mancini, S.*, *Yeung, S.M.T.*, *Sosa, R.*, **Wagner, D.R.**, *Dhall, R.*, *Adelstein, N.*, *Kao, K.*, *Oh, D.*, “Microbe-Assisted Nanocomposite Anodes for Aqueous Li-Ion Batteries,” *ACS Applied Materials & Interfaces* 13, 39195–39204 (2021).
7. *Lavrich, Z.*, **Wagner, D.R.**, *Taie, Z.*, *Halliday, D.*, *Hagen, C.L.*, “Design Considerations for Small Scale Rotating Fluidized Beds in Static Geometry with Screens for Fine Particles,” *Chemical Engineering Research and Design*, 137, 89-100 (2018). **(Cover Featured)**
8. **Wagner, D.R.**, *Holmgren, P.*, *Skoglund, N.*, *Broström, M.*, “Design and validation of an advanced entrained flow reactor system for studies of rapid solid biomass fuel particle conversion and ash formation reactions,” *Review of Scientific Instruments*, 89, 065101 (2018). **(Featured Article)**
9. *Qu, Z.*, *Holmgren, P.*, *Skoglund, N.*, **Wagner, D.R.**, *Broström, M.*, *Schmidt, F.*, “Distribution of temperature, H<sub>2</sub>O and atomic potassium during entrained flow biomass combustion – Coupling in situ TDLAS with modeling approaches and ash chemistry,” *Combustion and Flame*, 188, 488-497 (2018).
10. *Holmgren, P.*, **Wagner, D.R.**, *Strandberg, A.*, *Molinder, R.*, *Wiinikka, H.*, *Umeki, K.*, *Broström, M.*, “Size, shape, and density changes of biomass particles during rapid devolatilization,” *Fuel*, 206, 342-351 (2017).
11. *Strandberg, A.*, *Holmgren, P.*, **Wagner, D.R.**, *Molinder, R.*, *Wiinikka, H.*, *Umeki, K.*, *Broström, M.*, “Effects of pyrolysis conditions and ash formation on gasification rates of biomass char,” *Energy & Fuels*, 31, 6507-6514 (2017).
12. **Wagner, D.R.**, *Broström, M.*, “Time-dependent variations of activation energy during rapid devolatilization of biomass,” *Journal of Analytical and Applied Pyrolysis*, 118, 98-104 (2016)
13. **Wagner, D.R.**, *Whitty, K.J.*, “Extractive gas-phase sampling of the reaction zone of a pressurized entrained-flow coal gasifier,” *Fuel Proc. Tech.*, 137, 157-163 (2015).
14. *Sur, R.*, *Sun, K.*, *Jeffries, J.B.*, *Hanson, R. K.*, *Pummill, R. J.*, *Waind, T.*, **Wagner, D.R.**, and *Whitty, K. J.* “TDLAS-based sensors for in situ measurement of syngas composition in a pressurized, oxygen-blown, entrained flow coal gasifier,” *Appl. Phys. B.* (2014)
15. **Wagner, D.R.**, *Whitty, K.J.*, “A pulse-width modulation controlled wire-mesh heater apparatus for Investigation of solid fuel pyrolysis,” *Rev. Sci. Inst.* 83 115116 (2012).

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**CONFERENCE PROCEEDINGS AND PRESENTATIONS**

Student authors or advisees are italicized

1. **Wagner, D.R.**, Watt, J., Schmucker, D., Butterfield, A., "Broadening Sustainability Education in Engineering Disciplines," 2024 ASEE Annual Conference & Exposition, 23-26 June 2024, Portland, OR (2024). [Peer Reviewed]
2. **Wagner, D.R.**, "Advancing Entrained-Flow Gasification of Waste Materials and Biomass for Hydrogen Production," Fossil Energy and Carbon Management (FECM) Spring Research and Development (R&D) Project Review Meeting, 23-25 April 2024.
3. Hughey, L.R., **Wagner, D.R.**, Whitty, K.J., "Advancing the Entrained Flow Gasification of Waste Materials and Biomass for Hydrogen Production (FE0032175)," Fossil Energy and Carbon Management (FECM) Spring Research and Development (R&D) Project Review Meeting, 23-25 April 2024. [Poster]
4. **Wagner, D.R.**, Hughey, L.R., Whitty, K.J., "Performance of an entrained-flow gasifier using biomass-derived liquid," Western States Sectional Combustion Institute Spring 2024 Technical Meeting, 4-5 March 2024, Salt Lake City, UT, USA (2024).
5. Hughey, L.R., **Wagner, D.R.**, Whitty, K.J., "Demonstrating the feasibility of biomass pyrolysis liquid, coal, plastic oil mixtures for entrained flow gasification," Western States Sectional Combustion Institute Spring 2024 Technical Meeting, 4-5 March 2024, Salt Lake City, UT, USA (2024).
6. **Wagner, D.R.**, "Sustainability in the Chemical Engineering Capstone Course," ASEE Engineering for One Planet Symposium, 25 January 2023, Online (2023) [Poster].
7. **Wagner, D.R.**, "Efficacy and Perceptions of a Specifications Grading Scheme for Chemical Engineering Seniors," 2022 American Institute of Chemical Engineers Annual Meeting, 13-18 November 2022, Phoenix, AZ (2022).
8. *Faylor, J., Ramirez Contreras, E., Tong, K., Wagner, D.R.*, "Bioenergy Production with Carbon Capture: An Optimization of Materials," 2022 American Institute of Chemical Engineers Annual Meeting, 13-18 November 2022, Phoenix, AZ (2022).
9. *Fogelquist, S., Wagner, D.R.*, "Characterization of Brewer's Spent Grain through Thermogravimetric Analysis for Energy Production," 2022 American Institute of Chemical Engineers Annual Meeting, 13-18 November 2022, Phoenix, AZ (2022).
10. **Wagner, D.R.**, "Expanding the Utility of Laboratory Fuels Testing," The 28th International Conference on the Impact of Fuel Quality on Power Production and the Environment, 19-23 September, 2022, Åre, Sweden (2022).
11. Whitty, K.J., Gall D., *Dai J., Wagner, D.R., Hughey, L.* "Operational Experience and Performance of a 200 KW Process Development Unit For CLC And CLOU," 6th International Conference on Chemical Looping, 19-22 September, 2022, Zaragoza, Spain (2022).
12. *Norton, J., Gomes, M., Chan, F., Wagner, D.R.*, "Improving biodiesel production via reactor configuration alternatives: a case study of small-scale industrial operations," American Chemical Society Fall 2022 Meeting and Exposition, 21-25 August, 2022, Chicago, IL, USA - Hybrid (2022) [Poster].

13. **Wagner, D.R.**, “Specifications Grading in a Chemical Engineering Capstone Course,” Teaching Experiment Academy Summit, California Learning Lab, 29 April 2022, Online (2022).
14. *Fogelquist, S.*, **Wagner, D.R.**, “Devolatilization behavior of brewer’s grain for energy production,” Western States Sectional Combustion Institute Spring 2022 Technical Meeting, 21-22 March 2022, Stanford, CA, USA (2022).
15. *Wongmat, Y.*, **Wagner, D.R.**, “Effect of additives in non-isothermal biomass pyrolysis,” Western States Sectional Combustion Institute Spring 2022 Technical Meeting, 21-22 March 2022, Stanford, CA, USA (2022).
16. *Huang, F.*, **Wagner, D.R.**, “Virtual Fluidization Labs to Assist Unit Operations Courses,” 2021 ASEE Annual Conference & Exposition, 26-29 July 2021, Long Beach, CA (2021). [Peer Reviewed]
17. **Wagner, D.R.**, “Dynamic Thermogravimetric Studies of Woody and Herbaceous Biomass” 2020 AIChE Annual Meeting, 16-20 November 2020, San Francisco, CA (2020) [Poster].
18. Whitty, K.J., **Wagner, D.R.**, Dobo, Z., *Merrett, K.M.*, *Dai, J.*, “Experience with Chemical Looping Combustion of Coal in a 200 kW Dual Fluidized Bed Reactor,” 5th International Conference on Chemical Looping, 24 – 27 September 2018, Park City, UT, USA (2018). [Peer Reviewed]
19. *Lane, M.R.*, **Wagner, D.R.**, *Taie, Z.A.*, Hagen, C.L., “Ethane cracker diagnostic development,” Western States Sectional Combustion Institute Spring 2018 Technical Meeting, 25-27 March 2018, Bend, OR, USA (2018).
20. Qu, Z., *Holmgren, P.*, Skoglund, N., **Wagner, D.R.**, Broström, M., Schmidt, F.M., “Investigation of H<sub>2</sub>O, temperature and potassium in entrained flow biomass combustion – coupling in situ TDLAS with modelling,” Nordic Flame Days 2017, 10-11 October, Stockholm, Sweden (2017).
21. *Taie, Z.*, **Wagner, D.**, Hagen, C., “Kinetic study of ethane pyrolysis in an internal combustion engine,” 2017 Western States Sectional Combustion Institute Meeting, 2-3 October 2017, Laramie, WY, USA (2017).
22. *Lavrich, Z.*, *Taie, Z.*, **Wagner, D.**, Hagen, C., “Light extinction based image analysis technique for rotating fluidized beds,” 2017 Western States Sectional Combustion Institute Meeting, 2-3 October 2017, Laramie, WY, USA (2017).
23. **Wagner, D.R.**, *Lavrich, Z.*, *Taie, Z.*, Halliday, D., Hagen, C.L., “Dehydrogenation Catalysis in Rotating Fluidized Beds,” American Chemical Society-Northwest Regional Meeting, 25-28 June 2017, Corvallis, OR, USA (2017).
24. **Wagner, D.R.**, *Lavrich, Z.*, *Taie, Z.*, Halliday, D., Hagen, C.L., “Partial Oxidation of Hydrocarbons in Novel Fluidized Bed Reactors,” [Poster] The Combustion Institute, 10<sup>th</sup> U.S. National Meeting, 23-26 April 2017, College Park, Maryland (2017).
25. Qu, Z., *Holmgren, P.*, Skoglund, N., **Wagner, D.R.**, Broström, M., Schmidt, F.M., “TDLAS-based in situ detection of atomic potassium during combustion of biomass in an entrained flow reactor,” 22<sup>nd</sup> International Impacts of Fuel Quality on Power Production Conference, 19-23 September 2016, Prague, Czech Republic (2016).

26. **Wagner, D.R.**, Broström, M., “The effect of particle size, temperature, and residence time on biomass devolatilization behavior in a wire-mesh reactor,” Impacts of Fuel Quality on Power Production Conference, 26-31 October 2014, Salt Lake City, UT, USA (2014).
27. **Wagner, D.R.**, *Holmgren, P., Strandberg, A.* Wiinikka, H., Molinder, R., Broström, M., “Fate of inorganic species during biomass devolatilization in a drop tube furnace,” Impacts of Fuel Quality on Power Production Conference, 26-31 October 2014, Salt Lake City, UT, USA (2014).
28. **Wagner, D.R.**, Qu, Z., Broström, M., Schmidt, F., “Validation of reacting flow models via tunable diode laser absorption spectroscopy,” [Poster] Impacts of Fuel Quality on Power Production Conference, 26-31 October 2014, Salt Lake City, UT, USA (2014).
29. *Strandberg, A.*, **Wagner, D.R.**, *Holmgren, P.*, Molinder, R., Wiinikka, H., Umeki, K., Broström, M., “Influence of biomass particle properties and pyrolysis conditions on intrinsic char gasification reactivity,” Impacts of Fuel Quality on Power Production Conference, 26-31 October 2014, Salt Lake City, UT, USA (2014).
30. *Holmgren, P.*, Umeki, K., *Strandberg, A.*, **Wagner, D.R.**, Molinder, R., Wiinikka, H., Broström, M., “Size, shape and density changes of biomass particles during devolatilization in a drop tube furnace,” Impacts of Fuel Quality on Power Production Conference, 26-31 October 2014, Salt Lake City, UT, USA (2014).
31. **Wagner, D.R.**, Whitty, K.J., “Gas-phase Measurements of a Bituminous Coal in a Pressurized Entrained-Flow Gasifier,” 8th U.S. National Combustion Meeting, 19-22 May 2013, Park City, UT (2013).
32. Whitty, K.J., *Waind, T.*, **Wagner, D.R.**, “Pressurized Entrained-Flow Gasifier Performance: A Parametric Study,” 28th Annual International Pittsburgh Coal Conference, 12-15 September 2011, Pittsburgh, PA (2011).
33. Whitty, K.J., **Wagner, D.R.**, *Waind, T.*, “Commissioning of a 500 kWth Pressurized Entrained-Flow Coal Gasifier,” 2010 AIChE Annual Meeting, 7-12 November 2010, Salt Lake City, UT (2010).
34. **Wagner, D.R.**, Whitty, K.J., Fanning, P., Shoaf, G., “Pyrolysis and Gasification Reactivity of Coal and Petcoke Under High Pressure Conditions” 2010 AIChE Annual Meeting, 7-12 November 2010, Salt Lake City, UT (2010).
35. Whitty, K., *Pummill, R.*, *Waind, T.*, Wagner, D.A., **Wagner, D.R.**, “Performance of a 500 kWth Pressurized Entrained Flow Coal Gasifier,” 27<sup>th</sup> Annual International Pittsburgh Coal Conference, 11-14 October 2010, Istanbul, Turkey (2010).
36. **Wagner, D.R.**, Whitty, K., Fanning, P., Shoaf, G., “Investigation of Component Release During Pressurized, High Heating Rate Devolatilization of Coal and Petroleum Coke,” 27<sup>th</sup> Annual International Pittsburgh Coal Conference, 11-14 October 2010, Istanbul, Turkey (2010).

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## INVITED PRESENTATIONS AND LECTURES

1. **Wagner, D.R.**, “Approaches to Sustainability in Engineering Disciplines,” The University of Utah, Department of Chemical Engineering, Graduate Seminar, 16 October 2023.
2. **Wagner, D.R.**, “Basics of Process Simulation,” San Jose State University, Chemical Plant Design course (CHE 165A), 15 September 2023, Online.

3. **Wagner, D.R.**, “Research a Career in Research,” Mississippi State University, Swalm School of Chemical Engineering, Graduate Seminar, 10 March 2023, Online.
4. **Wagner, D.R.**, “Environmental and Energy Engineering: Research Activities,” National Science Foundation (NSF) Research Experiences for Teachers (RET) Program, 28 June 2022.
5. **Wagner, D.R.** “Technology Advances in Sustainable Biofuels for Aviation,” Aviation and Climate Change Forum, San Jose State University and Mineta Transportation Institute, 20 January 2022.
6. **Wagner, D.R.** “Energy and Materials in Sustainable Process Design,” San Jose State University, CHE 133: Sustainable Engineering, 5 October 2021.
7. **Wagner, D.R.** “How Air Becomes Polluted and How to Fix It,” Duquesne University, ENVI 451/551: Principles of Environmental Science, 21 April 2021, Online.
8. **Wagner, D.R.** “Environmental and Energy Engineering: Sustainable Pathways,” Duquesne University, Bayer School of Natural and Environmental Sciences Research Seminar, 20 April 2021, Online.
9. **Wagner, D.R.** “Reaction Engineering in Mechanical and Chemical Engineering,” Thermal-Fluids Sciences Seminar Series, 3 March 2017, Corvallis, Oregon.
10. **Wagner, D.R.** “Entrained Flow Gasification in the United States,” Keynote Presentation, Bio4Gasification Meeting, 22 January 2014, Piteå, Sweden.

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## SESSION CHAIR

1. ‘Biomass Combustion and Gasification II’ session, Western States Sectional Combustion Institute Spring 2024 Technical Meeting, 4-5 March 2024, Salt Lake City, UT, USA (2024).
2. ‘Biomass Combustion and Gasification I’ session, Western States Sectional Combustion Institute Spring 2024 Technical Meeting, 4-5 March 2024, Salt Lake City, UT, USA (2024).
3. ‘Diagnostics’ session, The 28th International Conference on the Impact of Fuel Quality on Power Production and the Environment, 19-23 September, 2022, Åre, Sweden (2022).

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## RESEARCH GRANTS AND PROJECTS

### The University of Utah

- 2023 • Sustainability Office, University of Utah, Sustainability Teaching Grant, 1,200 USD  
 • Lemelson Foundation, *Sustainable Engineering Education Development*, 20,000 USD  
 • Dynamis Energy, LLC, Gasification of Refuse-Derived Fuels, 55,000 USD

### San Jose State University

- 2022 • American Society for Engineering Education (ASEE) - Engineering for One Planet-Mini-Grant Program (EOP-MGP), 8,000 USD
- 2021 • National Science Foundation (NSF) Research Experience for Teachers (RET): Multidisciplinary Teacher Research Experience in Engineering (M-TREE). Role: Research Mentor, PI: Liat Rosenfeld, 600,000 USD  
 • SJSU Seed Grant “Bioenergy from agricultural wastes,” 4,940 USD  
 • Guidry Faculty Fellow (engineering education), 5,440 USD
- 2019 • TEAM Grant with SJSU MLK Library for accessible education, 1,500 USD  
 • Davidson Student Scholar Grant (supervising), 1,000 USD

- SJSU Undergraduate Research Grant, “Thermal Decomposition Behavior of Plastics”, 1,000 USD
- 2018 • New Faculty Jump Start Program Grant, 500 USD

### Umeå University

- 2015 • “New fuels and feeding systems suited for the PEBG technology,” Swedish Bio4Gasification (B4G) program, Problem Oriented research Projects (POP) with SP-ETC, BioGreen, University of Utah, and Umeå University, June – October 2015, 600,000 SEK (~75,000 USD).

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## TECHNICAL REPORTS

1. Preciado, I., **Wagner, D.R.**, “Preparation of dual fluidized bed PDU for sorption-enhanced gasification,” Milestone report under DOE Cooperative Agreement No. DE-FE0032174, “Process Intensification of Hydrogen Production through Sorption-Enhanced Gasification of Biomass,” (2024).
2. Hughey, L.R., **Wagner, D.R.**, “Production and Characterization of Waste-Biomass Slurries for Entrained Flow Gasification,” Milestone report under DOE Cooperative Agreement No. DE-FE0032175, “Advancing Entrained-Flow Gasification of Waste Materials and Biomass for Hydrogen Production,” (2023).
3. **Wagner, D. R.**, Taie, Z., Hagen, C.L., “Diagnostic development for reactor engine testing,” Oregon State University – Cascades, Energy Systems Laboratory (2017).
4. **Wagner, D.R.**, Lavrich, Z., Hagen, C.L., “Rotating fluidized bed simulation and modeling,” Oregon State University – Cascades, Energy Systems Laboratory (2017).
5. **Wagner, D.R.**, Molinder, R., and Broström, M., “New fuels and feeding systems suited for the PEBG technology,” Umeå University, Thermochemical Energy Conversion Laboratory (2016).
6. **Wagner, D.R.**, “Development of a High Pressure Extractive Sampling System for Entrained-Flow Gasification,” University of Utah (2013).
7. **Wagner, D.R.**, “Measurement of Char Reactivity in a High Pressure TGA,” Deliverable Report for Eastman Chemical Company under University of Utah project "Gasification Properties of Coal and Petcoke," (2011).
8. **Wagner, D.R.**, “Investigation of Pyrolysis Behavior in a High Pressure Wire Mesh Heater,” Deliverable Report for Eastman Chemical Company under University of Utah project "Gasification Properties of Coal and Petcoke," (2011).
9. **Wagner, D.R.**, “High Temperature, Atmospheric Pressure Entrained-Flow Reactor Studies,” Deliverable Report for Eastman Chemical Company under University of Utah project "Gasification Properties of Coal and Petcoke," (2009).
10. **Wagner, D.R.**, “Basic Fuel Characterization of an Appalachian Coal, a Texas Lignite, and a Petroleum Coke,” Deliverable Report for Eastman Chemical Company under University of Utah project "Gasification Properties of Coal and Petcoke," (2009).
11. **Wagner, D.R.**, “A Literature Review of Gasification Properties and Processes,” Deliverable Report for Eastman Chemical Company under University of Utah project "Gasification Properties of Coal and Petcoke," (2009).

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**STUDENT SUPERVISION****San Jose State University Graduate Students - Masters of Science****Research/Academic Advisor, Chemical Engineering**

1. Evan Patel, 2023  
Project: *Characterizing the Carbon Dioxide Separation Performance of MOF-177*
2. Edgar Ramirez Contreras, 2023  
Project: *Preparation of Biosolid-Based Activated Carbon for CO<sub>2</sub> Capture*
3. Roberto Montenegro, 2023  
Project: *Oxidation Behavior of Ni-Based Superalloy, IN718 from Recycled Material Produced by Additive Manufacturing*
4. Jackson Faylor, 2023  
Project: *Analysis of the Energy Capabilities of a Bio-Energy and Carbon Capture Sequestration Process*
5. Joshua Sumabat, 2022  
Project: *Catalytic Oxidation of Polycyclic Aromatic Hydrocarbons from the Pyrolytic Decomposition of Methane*
6. Spencer Fogelquist, 2022  
Project: *Characterizing Brewers Spent Grain Devolatilization Through Thermogravimetric Analysis*
7. Lovish Nayyer, 2022  
Project: *Characterizing Operating Conditions for Carbon Capture Adsorbents*
8. Faan Chan, 2022  
Project: *Improvement of Biodiesel Production at Blue Lake Rancheria Tribe and Casino*
9. Mellanie Gomes, 2022  
Project: *Improvement of Biodiesel Production at Blue Lake Rancheria Tribe and Casino*
10. Jack Norton, 2022  
Project: *Improving the Blue Lake Rancheria Biodiesel Operation*
11. Yuthapong Wongmat, 2021  
Project: *Effect of Additives in Non-isothermal Biomass Pyrolysis*
12. Calvin Chen, 2021  
Project: *Synthesis and Characterization of Gold-Copper Metal Organic Decomposition Inks*
13. Fanny Huang, 2021  
Project: *Development and Implementation of Virtual Unit Operations Laboratories*
14. Kean Wai Lee, 2021  
Project: *Biomass Feedstock Energy Assessment in the United States*
15. Maria Do, 2021  
Project: *Kinetic Analyses of Carbon Capture Adsorbents*
16. Alex Chieh, 2020  
Project: *Kinetics of Non-isothermal Pine Stem Wood and Wheat Straw Pyrolysis*
17. Shabnam Arianta, 2019

Project: *Kinetic Analysis for Pyrolysis and Combustion of Pine and Wheat Using Comparative Thermogravimetric Analysis Methods*

18. Janine Young, Current
19. Long Nguyen, Current
20. Marcos (Niko) Rosales, Current

#### **Research/Academic Co-Advisor, Chemical Engineering**

1. Kathy Tong, 2024 (PI: Dr. Liat Rosenfeld, SJSU)  
Project: Mineralization of Carbon Dioxide in Aqueous Environments within Basalt Rocks
2. Valeria Perez, 2023 (PI: John Lee, Mech. Eng.)  
Thesis: *Interdependence of Salt Concentration and Filler Particles on Crystallinity and Mechanical Behavior of PEO-LITFSI Electrolytes for Lithium-Ion Batteries*
3. Zhaoyang (Alex) Huang, 2023 (PI: Dr. Yanika Schneider, SJSU/EAG)  
Project: *The Synergistic Effect of Curcumin and Glycerol Additives on Properties of Chitosan Film*
4. Jinann Alzaghari, 2023 (PI: Dr. Liat Rosenfeld, SJSU)  
Project: *CO<sub>2</sub> Capture and Absorption by Basalt Rock-Water Mixture*
5. Truman Jefferson, 2023 (PI: Dr. Claire Komives, SJSU)  
Project: *Commercial Production of Lethal Toxin Neutralizing Factor (LTNF) peptide conjugated to a Camelid Nanobody*
6. Lauren Seto, 2023 (PI: Dr. Ali Tohidi, SJSU, Mech. Eng.)  
Project: *A novel multi-phase approach in modeling heat transfer from the assemblage of firebrands*
7. Mariela Aguilar, 2021 (joint project) (PI: Dr. Melanie McNeil, SJSU)  
Project: *Biodiesel Synthesis from Canola Oil Using Non-Hazardous Alkaline Catalysts*
8. Geeta More, 2021 (joint project) (PI: Dr. Melanie McNeil, SJSU)  
Project: *Biodiesel Synthesis from Canola Oil Using Non-Hazardous Alkaline Catalysts*
9. Salim Soubra, 2021 (PI: Dr. Madalyn Radlauer, SJSU Dept. of Chemistry)  
Project: *The Development of Antimicrobial Polymers to Combat the Rising Resistance from Bacteria*
10. Aaron Lualhati, 2020 (PI: Dr. Melanie McNeil, SJSU)  
Project: *Reduction of Saponification for Biofuel Synthesis*
11. Philip Zinsli, 2019 (PI: Dr. Claire Komives, SJSU)  
Project: *Design of a Bulk Sodium Hydroxide Loop with Variable Concentration Delivery in an Existing Biopharmaceutical Facility*
12. Juan Moreno, 2019 (PI: Dr. Madalyn Radlauer, SJSU)  
Project: *Towards a Polymer-Supported Ruthenium Catalyst for Olefin Metathesis*
13. Daniel Coxon, Current (PI: Dr. Melanie McNeil, SJSU)
14. Alexia Portillo Rivera, Current (PI: Dr. Melanie McNeil, SJSU)
15. Emile Tayag, Current (PI: Dr. Liat Rosenfeld, SJSU)
16. Harman Grewel, Current (PI: Dr. Katy Kao, SJSU)
17. Tom Nobal, Current (PI: Ali Tohidi, Mech. Eng.)

#### **San Jose State University Undergraduate Students, Research Advisor Role**

1. Nameer Sadik, 2022

2. William Albert, 2022 (via CSU Long Beach)
3. Kalp Shah, 2022, Project Engineering Success Program
4. Rishika Joshi, 2022, Project Engineering Success Program
5. Edgar Ramirez Contreras, 2020-2022
6. Kathy Tong, 2021-2022
7. Jacob Rodriguez, 2021-2022
8. Jackson Faylor, 2021-2022
9. Noah Wind, 2019-2021

Awarded Undergraduate Research Grant and as a Davidson Student Scholar, Col. of Eng.

10. Julie Gower, 2020
11. Hazim Dibian, 2020
12. Itzel Garcia-Ocampo, 2020
13. Spencer Fogelquist, 2020
14. Marcos (Niko) Rosales, 2020
15. Domenic Lestochi, 2019
16. Mohammad AlSabah, 2019
17. Mohammad Abdin, 2019
18. Ashley Moreno, 2019
19. Kevin Chang, 2019
20. Gabriel Aviles, 2019

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## TEACHING EXPERIENCE

### The University of Utah

| Semester    | Course   | Students |
|-------------|--|----------|
| Fall 2024   | CH EN 4253: Process Design I (Senior-level)          | 55       |
| Summer 2024 | CH EN 5960: Special Topics – Sustainable Engineering | 3        |
| Spring 2024 | CH EN 5253: Process Design II (Senior-level)         | 48       |
| Fall 2023   | CH EN 4253: Process Design I (Senior-level)          | 63       |

### San José State University – Assistant Professor

| Semester                     | Course   | Students | Effectiveness<br>(out of 5.0) |
|------------------------------|--|----------|-------------------------------|
| Spring<br>2023<br>(Lecturer) | CHE 165B: Plant Design II Lab (Senior-level)               | 29       | 4.4                           |
| Fall<br>2022                 | CHE 165A: Plant Design I Lecture and Lab (Senior level)    | 29       | 4.6, 4.6                      |
| Summer<br>2022               | UNVS 120: Complex Problems (HonorsX Program)               | 23       | 4.9                           |
| Spring<br>2022               | CHE 165B: Plant Design II Lecture and Lab (Senior-level)   | 35       | 4.9, 5.0                      |
|                              | CHE 160A: Unit Operations I Lab, 2 sections (Junior-level) | 37       | 4.5, 4.8                      |

| Semester       | Course  | Students | Effectiveness<br>(out of 5.0) |
|----------------|---|----------|-------------------------------|
|                | CHE 180(R): Undergraduate Research and Projects                   | 5        | -                             |
| Fall<br>2021   | CHE 165A: Plant Design I Lecture and Lab (Senior level)           | 35       | 4.4                           |
|                | CHE 180(R): Undergraduate Research and Projects                   | 4        | -                             |
| Spring<br>2021 | CHE 218: Advanced Chemical Engineering Kinetics (Graduate)        | 20       | 4.7                           |
|                | CHE 165B: Plant Design II Lecture and Lab (Senior-level)          | 46       | 4.7, 4.7                      |
|                | CHE 180(R): Undergraduate Research and Projects                   | 2        | -                             |
| Fall<br>2020   | CHE 165A: Plant Design I Lecture and Lab (Senior level)           | 46       | 4.6, 4.5                      |
|                | CHE 160B: Unit Operations II                                      | 25       | 4.5                           |
|                | CHE 137: Pollution Control Engineering (Elective)                 | 26       | 4.7                           |
|                | <b>I developed this course as a permanent course offering</b>     |          |                               |
|                | CHE 180(R): Undergraduate Research and Projects                   | 1        | -                             |
| Spring<br>2020 | CHE 218: Advanced Chemical Engineering Kinetics (Graduate)        | 28       | N/A                           |
|                | CHE 165B: Plant Design II Lecture and Lab (Senior-level)          | 48       | 4.6, 4.5                      |
|                | CHE 180(R): Undergraduate Research and Projects                   | 6        | -                             |
| Fall<br>2019   | CHE 165A: Plant Design I (Senior level)                           | 50       | 4.6                           |
|                | CHE 160B: Unit Operations II                                      | 27       | 4.6                           |
|                | CHE 199: Special Topics: Sustainability in Process Design (Elect) | 8        | 4.8                           |
|                | <b>I developed this course as a permanent offering, CHE 133</b>   |          |                               |
|                | CHE 180(R): Undergraduate Research and Projects                   | 1        | -                             |
| Spring<br>2019 | CHE 218: Advanced Chemical Engineering Kinetics (Graduate)        | 12       | 4.8                           |
|                | CHE 165B: Plant Design II Lecture and Lab (Senior-level)          | 66       | 4.5, 4.7                      |
|                | CHE 180(R): Undergraduate Research and Projects                   | 5        | -                             |
| Fall<br>2018   | CHE 165A: Plant Design I (Senior level)                           | 68       | 4.1                           |
|                | CHE/METR 131: Air Pollution Meteorology (Elective)                | 22       | 4.5                           |
| Spring<br>2016 | CHE 165: Plant Design (Senior-level)                              | 55       | 4.7                           |
| (Lecturer)     | CHE 218: Advanced Chemical Engineering Kinetics (Graduate)        | 16       | 4.5                           |
|                | CHE 297: Air Pollution Control Engineering (Graduate)             | 21       | 4.8                           |

### The University of Utah – Teaching Assistant Positions

- 2015 CH EN 5253: Senior Design II (Senior-level)
- 2013 CH EN 4905: Senior Projects Laboratory II (Senior-level)
- 2011 CH EN 4253: Senior Design I (Senior-level)
- 2010 CH EN 3433: Heat Transfer (Junior-level)
- 2009 CH EN 3433: Heat Transfer (Junior-level)

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## SERVICE

### Professional Service

- Reviewer for peer-reviewed journals
  - Applied Sciences

- ChemEngineering
- Energies
- Energy & Fuels
- Fuel
- Fuel Processing Technology
- Proceedings of IMechE: Journal of Automobile Engineering
- Resources
- Sustainability
- Reviewer for ASEE Conference and Exposition, 2021, 2022, 2023, 2024
- Reviewer for Cambridge University Press textbooks (subject: pollution control engineering)
- Reviewer for American Chemical Society (ACS) funding programs, 2021
- National Science Foundation Review Panels, 2021, 2022
- Engineering for One Planet (EOP) Network, Member, 2024-Present
- EOP Network Competition Committee, Member, 2024-Present

#### **Service to the University, The University of Utah**

- Sustainability Education Advisory Committee, Sustainability Office, 2023-Present

#### **Service to the University, San Jose State**

- Faculty-in-Residence for Inaugural HonorsX Program, Office of the Provost, 2022
- SJSU Honors Initiative, Member of Steering Committee and Task Force, 2020-2022
- Faculty Learning Community – Authentic Assessment, Member, 2020-2021
- Faculty-Student Engagement Working Group, Member, 2020-2021

#### **Service to the College of Engineering, San Jose State**

- College of Engineering Teaching Mentor Program – Mentor to six instructors, 2022
- SJSU EXCEED: Excellence in Your Engineering Education Program, Summer 2022
- American Institute of Chemical Engineers (AIChE) Student Club Faculty Advisor, 2018-2022
  - Best Submission Award, AIChE 4 Good Challenge, 2018 and 2019
  - Second Place, AIChE 4 Good Challenge, 2018
- Surface Mount Technology Association (SMTA) Student Club Faculty Advisor, 2020-2022
- Research Mentor for US Dept. of Education Project Engineering Success Program, 2022
- Fundamentals of Engineering Exam (FE/EIT) Review Sessions – Spring, 2019-2022
- Graduate Studies/Curriculum Committee, Member, 2019-2021
- Undergraduate Curriculum Committee, Member, 2019-2020
- Assessment Committee, Member, 2018-2019

#### **Service to the Department of Chemical and Materials Engineering, San Jose State**

- CME Undergrad Curriculum Committee, Member, 2018-2022
- CME ad hoc Committee, Chair, 2018-2022
- ABET/Program Committee, Member, 2018-2022
- CME Faculty Search Committee – Chemical Engineering, Member, 2018-2019
- Graduate Research, Alumni, and Senior Projects (GRaSP) Event Committee, Member (2018-2019), Chair (2020, 2021, 2022)

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## HONORS AND AWARDS

- 2012 John Zink Company Scholarship  
2008 Fundamentals of Engineering Exam, EIT – Chemical, Passed

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## PROFESSIONAL DEVELOPMENT AND CERTIFICATES

- 2024 • AI Tools for Teaching and Learning, California State Univ., Office of the Chancellor  
2022 • *Flexibility for Equitable Learning and Teaching*, California State Univ. Summer Institute  
• *AspenTech Process Modeling using Aspen Plus*, Course EAP101 (Three-day, Online)  
• *Master Class on Effective Teaching*, American Society for Engineering Education  
• *Microcredential in Inclusive Teaching for Equitable Learning*, Association of College and University Educators (ACUE)  
• *Purposeful Pivoting for Academic Continuity*, Center for Faculty Development, SJSU  
• *Adding Interactivity to Your Online Course*, Center for Faculty Development, SJSU  
• *Academic Affairs Leadership Discovery Group*, SJSU  
• *CS 50: Introduction to Computer Science*, edX Harvard course  
2021 • *Essentials of Effective Proposal Writing Workshop*, American Society for Engineering Education  
• *University Grants Academy*, SJSU  
• *Resilient Course Design Institute*, Center for Faculty Development, SJSU  
• *Teaching Experiment Academy: STEM Course Redesign Program*, UC Irvine/SJSU  
2020 • *Teach Online Summer Certificate Program*, Center for Faculty Development, SJSU  
• *Active Learning Certificate Program*, Center for Faculty Development, SJSU  
• *Writing Across the Curriculum (WAC) Workshop Series*, SJSU  
• SJSU Professional Development Grant, AIChE Annual Conference Presentation  
2019 • Center for Chemical Process Safety (CCPS) AIChE Faculty Workshop, Richmond, CA  
2018 • Oregon State University Advantage Accelerator Iterate Seminar Series for Entrepreneurs  
2017 • OSHA 10-hour Training for Industry

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## WORKSHOPS AND PANEL DISCUSSIONS

1. “Gasification Technology Status and Pathways for Net-Zero Carbon Economy Workshop,” Fossil Energy and Carbon Management/National Energy Technology Laboratory, U.S. Department of Energy, 24 April 2024.
2. NSF Engineering (ENG) CAREER Workshop and Mock Panel, 11-13 May 2022.
3. Panelist, Society of Women Engineers, “SJSU WOW! Parent Track Panel Workshop,” 30 March 2019.
4. Panelist, SJSU AIChE Professional Panel and Networking Event, 26 October 2018.

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## MEDIA EXPOSURE

1. Chopra, R., Del Casino, V., Dougan, M., Middaugh, E., Mulvaney, D., Pruthi, S., **Wagner, D.R.**, “College honors programs should be inclusive, grassroots and hands-on,” EdSource. 30 November 2022. <https://edsource.org/2022/college-honors-programs-should-be-inclusive-grassroots-and-hands-on/681879>

2. “Experts Weigh In On Current Job Market Trends,” Zippia. 28 February 2021.  
<https://www.zippia.com/chemical-engineering-internship-jobs/trends/>

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## PROFESSIONAL MEMBERSHIPS

American Institute of Chemical Engineers (AIChE), Senior Member – Current  
American Society for Engineering Education (ASEE, multiple sections) – Current  
The Combustion Institute (CI) – Current  
American Chemical Society (ACS) – Energy & Fuels Division – Current  
Surface Mount Technology Association (SMTA) – 2020-2022

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## SKILLS

Proficient or familiar in the following skillsets

**Analytical:** Thermogravimetric analysis (TGA), Differential Scanning Calorimetry (DSC), BET and pore size analyses, Gas Chromatography (GC), Infrared spectroscopy (FT-IR),

**Hardware:** Electrical, pipefitting, arc welding and torching, metal- and woodworking

**Software:** SolidWorks, AutoCAD, Process simulation (AspenPlus, SuperPro, SimSci PRO/II, ChemCAD, Promax), COMSOL, MatLab, SAS JMP, OPTO 22 process control, ANSYS ChemKin and Fluent, MS Office, Adobe Creative Cloud