

Joe Hittinger, Ph.D., Senior Associate

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Senior Associate*, March 2024 – Present.

- Manages projects and proposals focused on resource planning issues, electricity markets, energy efficiency, clean energy technologies, legacy fossil fuel power plants, and industrial decarbonization
- Conducts electricity system modeling activities using industry-standard production cost and capacity expansion software
- Creates and utilizes spreadsheet-based tools and other analytical platforms to analyze energy technologies, programs, and portfolios
- Assesses utility company modeling approaches, scenario definitions, input assumptions and related parameterization

Sublime Systems Inc., Somerville, MA. *Research Scientist*, October 2022 – March 2024.

- Contributed to commercialization of a breakthrough electrochemical process for producing decarbonized cement from renewable electricity, with the goal of addressing 8% of the world's carbon emissions
- Designed and built novel chemical reactor prototypes for upcycling industrial waste by-products into sustainable cement
- Oversaw research and development efforts on a large federal research grant including experimental design, data collection & analysis, budget oversight, and quarterly presentations to federal representatives
- Developed techno-economic models in support of scaling the process from lab- and pilot-scale to a commercially-sized cement plant
- Automated data analyses by creating Python workflows in Jupyter Notebooks utilized by the Research & Development team
- Collaborated on technical writing of IP documents and multi-million dollar grants from the U.S. Dept. of Energy
- Interviewed, hired, onboarded, and mentored junior scientists on the Research & Development team

Tulane University – Shantz Energy Materials Laboratory, New Orleans, LA. *Graduate Research Fellow*, August 2017 – September 2022; *Laboratory Manager & Technician*, May 2020 – September 2022.

Graduate Research Fellow:

- Designed and implemented experiments relating to recycling of waste plastics into sustainable fuels and chemicals

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- Developed low-temperature process for converting polyethylene waste into hydrocarbon fuels
 - Designed, synthesized, and characterized zeolite catalysts with precision-tuned morphological features for various catalytic applications
 - Performed life cycle assessments of next-generation photovoltaic systems with emphasis on carbon footprints
 - Studied nucleation and growth kinetics of perovskite nanocrystals for thin-film solar panels
 - Developed MATLAB code for modeling crystal structure data and analyzing x-ray diffraction data

Laboratory Manager & Technician:

- Trained graduate students and visiting scientists in advanced materials synthesis and characterization techniques
- Maintained and repaired analytical instruments with emphasis on gas chromatography and x-ray diffraction
- Managed laboratory safety including hazardous chemical regulation and disposal

Tulane University – Chemical Engineering Department, New Orleans, LA. *Teaching Assistant*, August 2017 – May 2018.

- Assisted professors of chemical engineering in teaching the following undergraduate courses: Advanced Thermodynamics, Fluid Mechanics, and Chemical Reactor Design
- Held weekly office hours and led recitation study periods for junior and senior undergraduate chemical engineering students
- Awarded “Teaching Assistant of the Year” in 2018 by combined vote of students, peers, and professors

Vanderbilt University – Bardhan Nanophotonics Laboratory, Nashville, TN. *Research Assistant*, January 2014 – May 2017.

- Developed synthesis and characterization methods for gold nanoparticles with immunotherapy applications

University of Washington – Molecular Engineering & Sciences Institute, Seattle, WA. *Research Intern*, June 2015 – August 2015.

- Interned with the National Science Foundation’s Nanotechnology Network and developed lab skills for nanoparticle synthesis

EDUCATION

Tulane University, New Orleans, LA

Doctor of Philosophy in Chemical & Biomolecular Engineering, 2022

Vanderbilt University, Nashville, TN

Bachelor of Engineering in Chemical & Biomolecular Engineering with minors in Chemistry and Nanotechnology, 2017

PUBLICATIONS

Hittinger, J., D. Shantz. 2022. *Systematic Study of Low Temperature Cracking of Low-Density Polyethylene with ZSM-5*. Microporous and Mesoporous Materials, Volume 343. ISSN 1387-1811.

Webb, J., Y. Ou, S. Faley, E. Paul, J. Hittinger, C. Cutright, E. Lin, L. Bellan, R. Bardhan. 2017. *Theranostic Gold Nanoantennas for Simultaneous Multiplexed Raman Imaging of Immunomarkers and Photothermal Therapy*. American Chemical Society Omega, 2, 7, 3583-3594.

Resume updated April 2024