

EDUCATION

- | | | |
|--|-----------------------|------------------|
| <p>The University of Texas at Austin</p> <ul style="list-style-type: none"> + Ph.D. in Chemical Engineering + Selected Courses: Fluid Flow and Heat Transfer, Advanced Thermodynamics, Energetic Separation, Process Design and Operations. | <p>Austin, TX</p> | <p>May. 2021</p> |
| <p>Carnegie Mellon University</p> <ul style="list-style-type: none"> + M.S. in Chemical Engineering + Overall GPA: 3.97/4, Major GPA: 4/4 + Selected Courses: Analysis and Modeling of Transport Phenomenon, Process Systems Modeling, Mathematical Modeling of Chemical Engineering Processes, Molecular Simulation | <p>Pittsburgh, PA</p> | <p>Dec. 2016</p> |
| <p>Dalian University of Technology</p> <ul style="list-style-type: none"> + B.S. with honor in Chemical Engineering and Technology + Overall GPA: 90.84/100, Major GPA: 91.80/100 | <p>Dalian, China</p> | <p>Jul. 2015</p> |

RESEARCH EXPERIENCE

- | | | |
|--|--|---------------------------------|
| <p>Research Assistant</p> <p>— Plant data driven process modeling for amine scrubbing</p> <ul style="list-style-type: none"> + Rate-based modeling with rigorous thermodynamics and kinetics using Aspen Plus[®] and Fortran for Piperazine Advanced Stripper[™] (PZAS) process. + Developed test plans of pilot plant campaigns at University of Texas Separation Research Program (UT-SRP) and National Carbon Capture Center (NCCC) to facilitate model development using design of experiments (DOE) strategy. + Developed online method for real-time monitoring of solvent composition at UT-SRP and NCCC pilot plant. + Accomplished data reconciliation and model validation, improved the accuracy of model prediction by 40%. + Performed rigorous technical economic analysis for a commercial scale CO₂ capture plant based on pilot plant data and reduced the capture cost by 30% compared to the baseline. | <p>The University of Texas at Austin, TX</p> | <p>Sept. 2017–
Present</p> |
| <p>Master's Thesis</p> <p>— Study of machine learned atomic metal potential energy surface</p> <ul style="list-style-type: none"> + Implemented density functional theory (DFT) and nudged elastic band (NEB) calculations using Vienna <i>Ab initio</i> Simulation Package (VASP). + Applied a neural networks (NN) method to model Pd potential energies surface and performed large time scale molecular dynamics (MD) to estimate diffusion barrier. + Achieved an excellent accuracy of modeling ground and transit state potential energies and energy barriers at a speed several order faster than DFT calculations. | <p>Carnegie Mellon University, PA</p> | <p>Jan. 2016–
Dec. 2016</p> |
| <p>Undergraduate Thesis</p> <p>— Study on coated bimetallic nanocatalyst preparation and application</p> <ul style="list-style-type: none"> + Prepared silica coated CuNi bimetallic nanoparticles from reverse microemulsion by modified co-reduction method and characterized particles composition, size and morphology. + Investigated catalysis activities of various compositions and sizes for <i>p</i>-nitrophenol reduction. + Enhanced catalytic activity and selectivity compared to monometallic particles and studied bimetal synergistic effects. | <p>State Key Laboratory of Fine Chemicals, China</p> | <p>Sept. 2014–
May 2015</p> |

Research Assistant

State Key Laboratory of Fine Chemicals, China

Apr. 2013–

—Highly enhanced photocatalytic activity of Ag/AgCl/TiO₂ by CuO co-catalyst

May 2014

- + Synthesized TiO₂ coated Cu/Ag/AgCl nanoparticles in a reverse microemulsion system.
- + Evaluated photocatalytic activity by degradation of methyl orange and phenol under visible light.
- + Improved photocatalytic efficiency significantly and studied mechanism through band gap theory and surface plasma resonance.

SKILLS

Software: Aspen Plus[®], Aspen Customer Model, GAMS, Microsoft Office/VBA, COMSOL Multiphysics[®], VASP, Simulink, ChemOffice, Origin

Programming Language: Python, Matlab, C, L^AT_EX

Lab techniques: Gas chromatography-mass spectrometry (GC-MS), high performance liquid chromatography (HPLC), ultraviolet-visible spectroscopy (UV-vis), transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD)

PUBLICATIONS & CONFERENCE

- + **Tianyu Gao**, Joseph L. Selinger, Gary T. Rochelle, "Demonstration of 99% CO₂ Removal from Coal Flue Gas by Amine Scrubbing", *International Journal of Greenhouse Gas Control*, 83 (2019): 236-244.
- + Gary T. Rochelle, Yuying Wu, Eric Chen, Korede Akinpelumi, Kent B. Fischer, **Tianyu Gao**, *et al*, "Pilot plant demonstration of piperazine with the advanced flash stripper", *International Journal of Greenhouse Gas Control*, 84 (2019): 72-81.
- + **Tianyu Gao**, John Kitchin, "Modeling Palladium Surfaces with Density Functional Theory, Neural Networks and Molecular dynamics", *Catalysis Today*, 312 (2018): 132-140.
- + Yuzhen Ge, **Tianyu Gao**, *et al*, "Highly Efficient Silica Coated CuNi Bimetallic Nanocatalyst from Reverse Microemulsion", *Journal of Colloid and Interface Science*, 491 (2017): 123-132.
- + **Tianyu Gao**, "Pilot Plant Data Reconciliation and Model Validation", *PSTC 2019*, Poster Presentation, March 2019, Austin, TX.
- + **Tianyu Gao**, Joseph L Selinger, Gary T. Rochelle, "Demonstration of 99% CO₂ Removal from Coal Flue Gas by Amine Scrubbing", *Greenhouse Gas Control Technologies 14th*, Oral Presentation, Oct. 2018, Melbourne, Australia.
- + Yue Zhang, **Tianyu Gao** (Presenter), Gary T. Rochelle, "Absorber Results for the UT-SRP 2017 Campaign", *The Greenhouse Gas Control Technologies 14th*, Poster Presentation, Oct. 2018, Melbourne, Australia.
- + **Tianyu Gao**, "Packing Characterization and absorber design", *UTCSS-4*, Oral Presentation, Feb. 2018, Austin, TX.

AWARDS

Professional Development Award	2018
Dr. Robert Schechter Endowed Fellowship in Chemical Engineering	2017
Dr. Thomas F. Edgar Endowed Graduate Fellowship in Chemical Engineering	2017