# Peiyao Zhao

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## EDUCATION

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| **University of Massachusetts Amherst** | Sept. 2019 - Present |
| *Ph.D. Candidate, Chemical Engineering* | *Current GPA: 3.86/4* |
| **University of Queensland, Brisbane** | Dec. 2018 - Jun. 2019 |
| *B.S. Chemical Engineering and Technology* | |
| **China University of Petroleum, East China** | Sept. 2015 - Dec. 2018 |
| *B.S. Chemical Engineering and Technology* | *GPA: 90/100* |

## RESEARCH EXPERIENCE

**Climate Action Plan** | *Supervisor: Dr. Jimi Oke*  July 2023 - Present

- Tracked and predicted regional greenhouse gas emissions for climate action plan.
- Gathered, organized, and scrutinized data relevant to greenhouse gas estimation and projection.
- Developed mathematical models for forecasting future emissions and utilized them to simulate diverse scenarios based on different assumptions and policy interventions.
- Assessed the efficacy of existing and proposed policies and measures aimed at mitigating greenhouse gas emissions.
- Presented findings to stakeholders, policymakers, and the public to facilitate decision-making and enhance transparency.

**Fabric-based Ammonia Sensor** | *Supervisor: Dr. Trisha Andrew*  Jan. 2021 - July 2023

- Established a procedure utilizing initiated chemical vapor deposition for synthesizing fluorinated polymer.
- Created an image capture system using Raspberry Pi to automate data collection and achieve quantitative results.

**Radiative Heating Fabrics** | *Supervisor: Dr. Trisha Andrew*  Jan. 2022 - Jan 2023

- Formulated a model to investigate the correlation between fabric's optical properties and its effectiveness in radiative heating.

**Point-of-care Diagnostic Tool** | *Supervisor: Dr. Trisha Andrew*  July. 2020 - Jan 2022

- Engineered a peptide-chromophore sensor capable of modifying its optical properties upon detecting the COVID-19 coronavirus disease.
- Devised an image processing pipeline in MATLAB to streamline data analysis quantification.

**Carbon Dioxide Reduction** | *Supervisor: Dr. Mengran Li*  Jan. - Jun. 2019

- Established a protocol for synthesizing catalysts for electroreducing carbon dioxide and optimized the catalysts' Faraday efficiency for monoxide production by studying synthesis parameters such as temperature, pH, and deposition time.
- Acquired proficiency in techniques including Cyclic Voltammetry, X-ray Powder Diffraction, Scanning Electron Microscopy, and X-ray Photoelectron Spectroscopy.

## TEACHING EXPERIENCE

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| **Course: ChemENGIN333 Heat and Mass Transfer** \| *Umass Amherst* | Spring 2023 |
| **Course: ChemENGIN333 Heat and Mass Transfer** \| *Umass Amherst* | Spring 2022 |
| Tillwick and Eldridge Awards for Excellence as a Teaching Assistant | |
| **Course: ChemENGIN290B Experimental Design and Methods** \| *Umass Amherst* | Fall 2021 |
| **Course: ChemENGIN110 Introduction of Chemical Engineering** \| *Umass Amherst* | Fall 2020 |

## Internships

**Sinopec, China Petroleum & Chemical Corporation** | *China* — Jul. 2018
- Interacted with engineers and learned from the concept to production.
- Designed and simulated Jet fuel production process.

**Universiti Teknologi PETRONAS** | *Malaysia* — Aug. 2018
- Helped teachers organize students weekly for Malay study.
- Attended seminars on multicultural and inclusive study.

## Publications

Zhao P, Oke J. Estimating and forecasting regional greenhouse gas emissions inventories: three case studies in Connecticut (Under review).

Zhao P, Patamia ED, Andrew TL. Strategies to combat the fouling and surface texture issues associated with fabric-based colorimetric sensors. Sensors and Actuators B: Chemical. 2023 Feb 15;377:133099.

Viola W, Zhao P, Andrew TL. Solar thermal textiles for on-body radiative energy collection inspired by polar animals. ACS Applied Materials & Interfaces. 2023 Apr 5;15(15):19393-402.

Dutta R, Makhaik S, Zhao P, Cruz KG, Park KW, Liu H, Andrew TL, Hardy JA, Thayumanavan S. Colorimetric cotton swab for viral protease detection. Analytical Chemistry. 2022 Sep 2;94(37):12699-705.

Li M, Tian X, Garg S, Rufford TE, Zhao P, Wu Y, Yago AJ, Ge L, Rudolph V, Wang G. Modulated Sn oxidation states over a Cu2O-derived substrate for selective electrochemical CO2 reduction. ACS applied materials & interfaces. 2020 Apr 27;12(20):22760-70.

Zhao P, Li M, Garg S, Tian X, Wang G, Rufford TE. Chlorine-modulated tin oxide as an efficient catalyst toward carbon dioxide electrochemical reduction. InChemeca 2019 (48th: 2019: Sydney, NSW) 2019 Jan (pp. 450-459). Sydney, NSW: Engineers Australia.

## Conferences

Zhao P, Andrew TL. Facile Fabrication of Stable Enzyme-Based Colorimetric Glucose Biosensor on Cotton Using Polymer Entrapment. InElectrochemical Society Meeting Abstracts 240 2021 Oct 19 (No. 57, pp. 1885-1885). The Electrochemical Society, Inc..

Zhao P, Andrew TL. Chemometrics and Signal Processing-Assisted Design of a Textile-Based Colorimetric Sensing Platform for Real-Time Monitoring of Glucose. InElectrochemical Society Meeting Abstracts 239 2021 May 30 (No. 54, pp. 1319-1319). The Electrochemical Society, Inc..

## Awards

Tillwick and Eldridge Awards for Excellence as a Teaching Assistant | *Chemical Engineering Department at Umass Amherst, 2022*

National Scholarship from Chinese Scholarship Council for studying abroad at the University of Queensland | *Australia, Jan-Jun 2019*

Scholarship for summer cultural exchange program at Universiti Teknologi Petronas | *Malaysia, August 2017*

## Outreach

**Outreach program (ASPIRE) to high school students** | *Umass Amherst* — April. 2023
- Introduced students to the Instron tensile tester and assisted them with their questions.

**Engineering & Society (E&S) Summit program** | *Umass Amherst* — Jun. 2023
- Introduced students to my research on colorimetric sensors and demonstrated experiments on capillary force and capillary action.
- Engaged with students on chemistry experiment.