# Jacob Troutman

The University of Texas at Austin
Department of Civil, Architectural, and Environmental Engineering
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## Education

**University of Texas at Austin**, Austin, Texas
Ph.D. Civil Engineering, Anticipated December 2022
M.S.E. Civil Engineering, May 2019

**Wingate University**, Wingate, North Carolina
B.S. Chemistry, *summa cum laude*, May 2017
B.S. Mathematics, *summa cum laude*, May 2017

## Skills and Abilities

***Technical, Laboratory, & Instrumental***
Powder X-ray Diffraction Prep, Analysis
Transmission Electron Microscopy Prep, Analysis
Ion Chromatography Prep, Analysis
Inductively Coupled Plasma Prep, Analysis
X-ray Photoelectron Spectroscopy Analysis

***Programming Languages & Applications***
Matlab
Python
Microsoft Excel
LaTex

## Research and Professional Experience

***Environmental and Water Resources Engineering, University of Texas at Austin***

**Graduate Research Assistant – Heterogeneous Pd-InNPs for $NO_3^-$ Reduction**
**February 2020 – Present**
The catalytic reduction of aqueous $NO_3^-$ by palladium (Pd) catalysts requires a secondary promoter metal. I am synthesizing shape-controlled indium nanoparticles (InNPs), with various surface facets as seed particles. I then grow Pd crystals grow on these InNP seeds, and seek to understand how the exposed crystal facets impact Pd growth and shape. I am then investigating how these Pd-InNPs behave as $NO_3^-$ catalysts compared to traditional bimetallic Pd/In catalysts.

**Graduate Research Assistant – Alloyed PdAg Nanoparticles for $NO_2^-$ Removal**
**August 2017 – May 2020**
I investigated the use of novel nanomaterials for water treatment. I synthesized bimetallic alloyed nanoparticles consisting of palladium, Pd, and silver, Ag, which were then tested as catalysts to reduce the aqueous pollutant nitrite ($NO_2^-$) for drinking water treatment. I investigated the use of microwave heating as a quick, efficient method for nanoparticle growth in order to study the effects of nanoparticle composition and size on reaction kinetics within the treatment process. Additionally, I conducted preliminary studies on how support effects combine with alloy effects to improve $NO_2^-$ reduction.

***Department of Chemistry, University of Texas at Austin***

**Teaching Assistant – General Chemistry (CH 204)**
**January 2019 – May 2019**
As a teaching assistant (TA), I was charged with leading two sections of Introduction to Chemical Practice (CH 204), the general chemistry laboratory for undergraduate students. As a lab instructor, I explained each week's experiment to the students, demonstrating proper use of different glassware, how to work

instruments, and generally how to work and maintain a lab. Additionally, I graded student performances, quizzes, and lab reports.

***Department of Chemistry, Wingate University***

**Undergraduate Researcher – An Inexpensive Emission Spectrometer**
**August 2014 – May 2017**
An inexpensive emission spectrometer was developed and built by faculty in the Chemistry Department at Wingate University. I performed preliminary studies of the capabilities of the instrument in atomic emission spectroscopy, as well as phosphorescence and chemiluminescence. After preliminary experiments, more in-depth analysis of the device's limits was performed using chemiluminescent kinetic studies.

**Laboratory Assistant – General Chemistry (CHEM 101 & 102)**
**August 2015 – May 2017**
As a laboratory assistant, I worked under Ms. Stacy Hutchison, the Coordinator of Chemistry Labs at Wingate University. I helped to prepare experiments for the freshman level, general chemistry labs. I assisted in keeping the lab clean and functional on a week-to-week basis. Additionally, I helped in making sure the stock supplies were always present and available for the instructors of the general chemistry labs.

***Macromolecules and Interfaces Institute, Virginia Tech University***

**Undergraduate Research Assistant – Functional Derivatives of Cellulose**
**May 2015 – August 2015**
As part of a summer research experience for undergraduates (REU), I worked with Yifan Dong and Dr. Kevin Edgar to investigate the use of olefin cross-metathesis as a means of creating functional derivatives of hydroxypropyl cellulose. I participated in the laboratory, performing synthesis reactions and characterizing products. These polymers were then tested as potential drug delivery material for a method known as amorphous solid dispersion (ASD).

## Professional Affiliations

American Chemical Society 2016 – Present

## Publications

***Peer-reviewed Articles***

3. Werth, C. J.; Yan, C.; **Troutman, J.** Factors Impeding Replacement of Ion Exchange with (Electro)Catalytic Treatment for Nitrate Removal from Drinking Water. *Environ. Sci. Technol. Eng.*, *Submitted 10-7-2020.*

2. **Troutman, J. P.**; Li, H.; Haddix, A. M.; Kienzle, B. A.; Henkelman, G.; Humphrey, S. M.; Werth, C. J. PdAg Alloy Nanocatalysts: Toward Economically Viable Nitrite Reduction in Drinking Water. *ACS Catal.* **2020**, *10*, 7979–7989.

1. Dong, Y.; Mosquera-Giraldo, L. I.; **Troutman, J. P.**; Skogstad, B.; Taylor, L. S.; Edgar, K. J. Amphiphilic hydroxyalkyl cellulose derivatives for amorphous solid dispersion prepared by olefin cross-metathesis. *Polym. Chem.*, **2016**, *7*(30), 4953–4963.

***Major Research Grants***

1. NSF-CBET, SusChEM: Non-precious metal substitution into hydrogenation metal alloy catalysts deposited onto redox active supports for facile nitrate destruction in drinking water, 2019–2022 (PI: Werth, Co-PI: Humphrey, Co-PI: Henkelman), $343K. *Assisted in literature review for various research aspects of proposal, and in expanding/editing different sections.*

## Presentations

5. Cooper, C.; **Troutman, J. P.**; Klopfenstein, L. A.; Werth, C. J. "INFEWS Scholar Program: A National Science Foundation Research Traineeship Program." 2019 NSF Research Traineeship (NRT) Annual Meeting in Evanston, IL. September 2019. Poster Presentation.

4. **Troutman, J. P.**; Humphrey, S. M.; Werth, C. J. "Bimetallic PdAg nanoparticles for sustainable nitrite reduction in drinking water." ACS Fall 2019 National Meeting and Exposition in San Diego, CA. August 2019. Oral Presentation.

3. Free, D.; **Troutman, J. P.**; Dahm, C. "Development of an inexpensive emission spectrometer for the detection of easily ionizable elements." 68$^{th}$ Annual Southeastern Meeting of the ACS in Columbia, SC. October 2016. Poster Presentation.

2. **Troutman, J. P.**; Dong, Y.; Edgar, K. J. "Creating functional variety in hydroxypropyl cellulose using olefin cross-metathesis." 2015 Polymers in Medicine and Biology Workshop in Santa Rosa, CA. September 2015. Poster Presentation.

1. **Troutman, J. P.**; Griffin, M.; Thompson, G. D.; Dahm, C. E. "Inexpensive emission spectroscopy." 66$^{th}$ Annual Southeastern Meeting of the ACS in Nashville, TN. October 2014. Poster Presentation.

## Awards and Honors

***Academic***

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| **National Science Foundation INFEWS Scholar Program**, The University of Texas at Austin | August 2019 – Present |
| **Thrust 2000 Graduate Fellowships in Engineering**, The University of Texas at Austin | August 2017 – Present |
| **Senior Chemistry Award**, Wingate University | April 2017 |
| **Senior Mathematics Award**, Wingate University | April 2017 |
| **Phi Eta Sigma National Honor Society**, Wingate University | Inducted Fall 2014 |

***Athletic***

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|---|---|
| **Academic All-America Team**, College Sports Information Directors of America | May 2017 |
| **Track and Field Elite 18 Award**, South Atlantic Conference of the NCAA Division II | May 2017 |
| **Men's Track and Field Scholar Athlete of the Year**, South Atlantic Conference of the NCAA Division II | May 2017 |
| **Academic All-District III**, College Sports Information Directors of America | May 2017, May 2016, May 2015 |
| **All-Academic Individual Award**, US Track and Field and Cross Country Coaches Association | November 2015 |

## Mentor Experience

4. ***Kiet Luan*, undergrad study**
University of Texas at Austin, May 2020–Present
talk about the project that i am having kiet do

3. ***Alison Haddix*, Master's degree work**
University of Texas at Austin, May 2019–May 2020
Talk about ali here.

2. ***Benjamin Kienzle*, under**
   University of Texas at Austin, September 2018–December 2018
   more information that I need to fill in

1. ***Bridget Anger*, Environmental Science Institute Research Experience for Undergraduates**
   University of Texas at Austin, June 2018–August 2018
   fill this in blah blah blah

## Volunteer and Leadership Experience

**Graduate Student Advisory Board, Department of Civil, Architectural, and Environmental Engineering, University of Texas at Austin**
GSA Board Member, May 2020 – Present
The CAEE Graduate Student Advisory Board was created in May 2020 in order to address challenges faced by graduate students in the CAEE Department. As a student member, I helped bring faculty attention to issues that students were having. I worked alongside other student representatives from programs within the department to gather and disseminate information pertinent for graduate students and to conduct activities that promoted graduate student welfare. By acting as a bridge between the faculty and the students, myself and the other members sought to enhance the entire graduate school experience for students within our department, so that they could better focus on their classes and research.

**Environmental and Water Resources Engineering Seminar, Department of Civil, Architectural, and Environmental Engineering, University of Texas at Austin**
Seminar Committee Member, August 2019 – May 2020
As a member of the Environmental and Water Resources Engineering (EWRE) Seminar Committee, I helped to plan and host the department's weekly seminar series where students could listen to peers and guest speakers present relevant research. At the start of the semester, we (as a committee) were tasked with organizing a small newsletter detailing recent milestones within the department. We also had to create a schedule for the semester, which included reaching out to potential guest speakers and students, to ensure that there was a presenter each week. During the semester, we had to make flyers for each presentation, send reminder emails to presenters and the department, and otherwise ensure that the seminar ran smoothly each week.

**Explore UT, University of Texas at Austin**
Volunteer, March 2019
I volunteered at Explore UT, running a station explaining different physical processes used in treating both drinking and wastewater. With two fellow members of my research group, we operated bench scale reactor showing how flocculation, sedimentation, and filtration can be used to remove particulate contaminants. We also demonstrated how dissolved contaminants are removed using activated carbon columns.

**Department of Civil, Architectural, and Environmental Engineering, University of Texas at Austin**
First Year Seminar in Environmental Engineering (EVE 177K) Mentor, August 2018 – December 2018
As a mentor, I helped facilitate in-class conversations within a small group of students. Every week I would meet with the students, who listened to a brief lecture from the professor before breaking into groups for discussion. The topics varied widely, covering everything from how to handle the stresses of college to locating internships to controversial topics related to environmental engineering.

**Student-Athlete Advisory Committee, Wingate University**
Men's Cross Country Student-Athlete Advisory Committee Representative, August 2015 – May 2017
As a member of the student-athlete advisory committee (SAAC), I represented the Men's Cross Country team. I brought attention to issues that team members encountered throughout the school. Additionally, I worked with administration and other SAAC representatives to resolve these and other problems that student-athletes experienced around campus. As an organization, the SAAC also fund raised for the Make

A Wish Foundation.

**Xcel 2 Fitness: The Big Event, Indian Trail, Union County, NC**
Volunteer, November 2016, November 2015
I helped Xcel 2 Fitness, a program for boys in elementary school focusing on developing character through fitness habits and sports, organize The Big Event. The Big Event is a day where boys from various participating area schools and groups come together for team competitions, such as obstacle course races. I assisted in directing parking traffic, running games, and selling refreshments to the boys and their families.

**United Way Day of Caring, Wingate, Union County, NC**
Volunteer, August 2016, August 2015
As a volunteer with the United Way Day of Caring, I participated in various experiences around the community for different people and groups in need. Events varied from helping to complete landscaping work for a Habitat for Humanity house to assisting with minor maintenance jobs for a church serving a low-income area.