

# Jacob P. Troutman

Ph.D. Candidate  
Department of Civil, Architectural, and Environmental Engineering  
The University of Texas at Austin

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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  
Transmission Electron Microscopy  
Ion Chromatography  
X-ray Photoelectron Spectroscopy Analysis  
Inductively Coupled Plasma Optical Emission Spectroscopy

### **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**

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### **Heterogeneous Pd-InNPs for NO<sub>3</sub><sup>-</sup> Reduction**

February 2020–Present

The catalytic reduction of aqueous NO<sub>3</sub><sup>-</sup> 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<sub>3</sub><sup>-</sup> catalysts compared to traditional bimetallic Pd/In catalysts.

### **Alloyed PdAg Nanoparticles for NO<sub>2</sub><sup>-</sup> Removal**

August 2017–May 2020

The catalytic reduction of aqueous NO<sub>3</sub><sup>-</sup> 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  $\text{NO}_3^-$  catalysts compared to traditional bimetallic Pd/In catalysts.

**Department of Chemistry, Wingate University**  
**Undergraduate Researcher**

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**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.

**Department of Chemistry, Wingate University**  
**Laboratory Assistant**

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**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**

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**Functional Cellulose Derivatives via Olefin Cross-Metathesis** 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).

## PEER-REVIEWED PUBLICATIONS

- [4] **Troutman, J. P.**; Humphrey, S. M.; Werth, C. J. Advances in the Synthesis of Bimetallic Hydrogenation Catalysts for Water Treatment. *Chem In Preparation*.
- [3] Werth, C. J.; Yan, C.; **Troutman, J.** Factors Impeding Replacement of Ion Exchange with (Electro)Catalytic Treatment for Nitrate Removal from Drinking Water. *ES&T Engineering*, Submitted 7-10-2020.
- [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 Catalysis* **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. *Polymer Chemistry* **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<sup>th</sup> 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<sup>th</sup> Annual Southeastern Meeting of the ACS in Nashville, TN. October 2014. Poster Presentation.

## MENTORING EXPERIENCE

### *Master's Degree candidates*

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- [1] **Alison Haddix**, The University of Texas at Austin  
May 2019–May 2020

### *Undergraduate students*

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- [3] **Kiet Luan**, The University of Texas at Austin  
McNair Scholars Program, May 2020–Present
- [2] **Benjamin Kienzle**, The University of Texas at Austin  
Independent study credits, September 2018–December 2018
- [1] **Bridget Anger**, The University of Texas  
Environmental Science Institute REU Program, June 2018–August 2018

## LEADERSHIP AND SERVICE

<b>Graduate Student Advisory Board</b> Member (CAEE, UT Austin)	May 2020–Present
<b>EWRE Seminar</b> Member (CAEE, UT Austin)	August 2019–May 2020
<b>ExploreUT</b> Volunteer (UT Austin)	March 2019
<b>First Year Seminar in Environmental Engineering</b> Graduate mentor (EVE 177K, CAEE, UT Austin)	August 2018–December 2018
<b>Student Athlete Advisory Committee</b> Representative (Men's Cross Country, Wingate University)	August 2015–May 2017
<b>Xcel 2 Fitness: The Big Event</b> Volunteer (Indian Trail, Union Co., NC)	November 2015 & 2016
<b>United Way Day of Caring</b> Volunteer (Wingate, Union Co., NC)	August 2015 & 2016

## AWARDS AND HONORS

### Academic

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<b>National Science Foundation INFEWS Scholar Program</b> The University of Texas at Austin	August 2019–Present
<b>Thrust 2000 Graduate Fellowship in Engineering</b> The University of Texas at Austin	August 2017–Present
<b>Senior Chemistry Award</b> Wingate University <i>Awarded to the top graduating Chemistry major every year</i>	April 2017
<b>Senior Mathematics Award</b> Wingate University <i>Awarded to the top graduating Chemistry major every year</i>	April 2017
<b>Phi Eta Sigma National Honor Society</b>	Fall 2014

## **Athletic**

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### **Academic All-America Team**

College Sports Information Directors of America

May 2017

### **Tack 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, 2016, 2015

### **All-Academic Individual Award**

US Track and Field and Cross Country Coaches Association

November 2015

## **PROFESSIONAL AFFILIATIONS**

**American Chemical Society**, Member

September 2016–Present