

# David Dooley

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## EDUCATION

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### University of Tennessee 2019–Present

Knoxville, TN

**Degree:** Ph.D. Chemical Engineering

**GPA:** 3.94

### University of Tennessee 2019–2022

Knoxville, TN

**Degree:** M.S. Chemical Engineering

**GPA:** 3.94

### Tennessee Technological University 2015–2019

Cookeville, TN

**Degree:** B.S. Chemical Engineering (Biomolecular conc.)

**GPA:** 3.87

## EXPERIENCE

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### Graduate Research Assistant

University of Tennessee

Aug. 2018–Present

- Developing safe and effective CRISPR-Cas antimicrobials against virulent pathogens.
- Engineering stable and specific microbial production platforms for CRISPR-carrying phage-like particles.
- Understanding transcriptomic and proteomic response of target pathogens to treatment with CRISPR-Cas antimicrobials.

### Teaching Assistant

University of Tennessee

Aug. 2020–Dec. 2023

- Served as TA for the following courses:
  - Fall 2020: CBE 350 - Chemical and Bioengineering Reactor Fundamentals
  - Spring 2021: CBE 340 - Mass Transfer and Separation Processes
  - Spring 2022: CBE 551 - Advanced Chemical and Biomolecular Engineering Kinetics and Reactor Design
  - Fall 2023: CBE 350 - Chemical and Bioengineering Reactor Fundamentals
- Graded homeworks and exams and proctored tests.
- Held office hours to provide instruction and feedback on assignments and grading.

## REU Research Assistant

National Science Foundation

May 2018–Aug. 2018

- Investigated effect of feedstock pretreatment on kinetics of cellulosic pyrolysis.
- Designed, performed, and presented various experiments involving thermogravimetric, rheological, and X-ray diffraction-based analyses.

## PUBLICATIONS

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- Mendoza, B.\*\* , Fry, T.\*\* , Dooley, D.\*\* , Herman, J., & Trinh, C. T. (2022). CASPER: An Integrated Software Platform for Rapid Development of CRISPR Tools. *The CRISPR Journal*, 5(4), 609-617. \*\* **equal contribution**
- Walker, C., Ryu, S., Garcia, S., Dooley, D., Mendoza, B., & Trinh, C. T. (2022). Gene Coexpression Connectivity Predicts Gene Targets Underlying High Ionic-Liquid Tolerance in *Yarrowia lipolytica*. *Msystems*, 7(4), e00348-22.
- Dooley, D., Trinh, C.T. Simultaneous Co-Targeting of Essential and Defensive Gene Targets in *Staphylococcus aureus* Increases Potency and Mitigates Resistance to CRISPR Antimicrobials. (*in preparation*)
- Dooley, D., Trinh, C.T. Improving the Specificity and Host Range of a Phage-Based Delivery System in *Staphylococcus aureus*. (*in preparation*)
- Dooley, D., Giannone, R., Trinh, C.T. Multi-OMICS Analysis of CRISPR Antimicrobial Treatment Reveals Resistance Mechanisms and Genetic Targets in *Staphylococcus aureus*. (*in preparation*)
- Dooley, D., Edwards, J., Ryu, S., Dien, B.S., Trinh, C.T. Characterizing Proteome Reallocation of an Undomesticated Robust *Bacillus coagulans* Growing on Fermentable C5 and C6 Sugars. (*in preparation*)

## PRESENTATIONS

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- Dooley, D., Trinh, C. T. "Casper: An Integrated Software Platform for CRISPR Gene Editing of Non-Model Organisms and Microbiomes." 2023 AIChE Annual Meeting. Orlando, FL. 11/8/23.
- Dooley, D., Ryu, S., Edwards, J., Ha, K., Giannone, R., Dien, B., Trinh, C. T. "Harnessing Robustness of Thermophilic Bacillus Coagulans for Conversion of Switchgrass Hydrolysates to Designer Bioesters at Elevated Temperatures." 2023 AIChE Annual Meeting. Orlando, FL. 11/6/23. (Poster)

## AWARDS AND HONORS

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| • Outstanding Achievement CBE Graduate Student Award             | April 2024         |
| • Tickle College of Engineering Fellowship                       | July 2023          |
| • Outstanding Promise CBE Graduate Student Award                 | April 2023         |
| • SARIF Summer Research Graduate Assistantship                   | June 2021          |
| • Tennessee Tech Eminence Award for Outstanding Innovation       | May 2019           |
| • Dr. John C. McGee and Family Scholarship                       | May 2016–May 2019  |
| • University Academic Scholarship from Tennessee Tech University | Aug. 2015–May 2019 |
| • Dean's List at Tennessee Tech University                       | May 2016–May 2019  |

## OUTREACH ACTIVITIES

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- Mentor for UTK CBE Undergraduate Researchers 2021–Present
  - Coordinate research efforts of undergraduate researchers in the Trinh Lab.
  - Train students in critical thinking and formulation of creative research projects.
  - Provide technical advice and troubleshooting for undergraduate researchers' projects.
- Mentor for Student Mentoring and Research Training program (SMaRT) 2022
  - Provided mentorship and guidance to undergraduate SMaRT program participants on graduate-level studies.
  - Instructed participants on ethical research practices involving collection, storage, and communication of scientific data.
  - Taught participants molecular cloning techniques and assisted them in assembling a fluorescence-producing plasmid.
- Mentor for High School Introduction to Engineering Systems for Twelfth Graders (HITES<sup>12</sup>) 2020–2021
  - Gave oral presentations to high school students on Trinh Lab research.
  - Conceived and led educational workshops to introduce participants to Trinh Lab research concepts and methodologies.

## LAB CITIZENSHIP

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- Purchasing Officer 2020–Present
  - Serve as point of contact for all incoming and outgoing goods in the Trinh Lab.
  - Monitor and organize Trinh Lab inventory, purchasing replacements when necessary.
- Instrument Manager 2019–Present
  - Manage Opentrons Flex and OT-2 robots, Guava flow cytometer, MinION sequencer, Nanodrop, and gel imager.
  - Perform routine maintenance, calibration, and repair for assigned instruments.
  - Develop standard operating procedures and protocols for assigned instruments.