

Theodore L. Jefferson

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Synthetic organic chemist primarily interested in researching and instructing pharmaceutically relevant organic chemistry. This is inclusive of the discovery and design of drugs and the organic syntheses that would produce them. To that end, I am interested in designing asymmetric reactions, and maximizing yields through physical organic evaluation and catalysis, respectively. Broadly interested in the applications of organic chemistry in pharmacy and medicine, and fluorination chemistry.

Education

Ph.D. (DPhil) in Organic Chemistry, University of Oxford (2024–Present)

- Advisor: Professor Véronique Gouverneur, FRS

B.S. Chemistry: Synthesis and Chemical Biology (2020–2023)

- Graduate-Level Coursework: Advanced Organic Chemistry (Synthesis); Physical Organic Chemistry; Organic Spectroscopy; Advanced Organic Chemistry (Supramolecular)
- Relevant Undergraduate Coursework: Organic Chemistry I*, II*; Inorganic Chemistry*; Physical Chemistry*; Quantum Chemistry and Spectroscopy; Analytical Chemistry*; Advanced Analytical Chemistry*; Biochemistry; Cell Biology; Genetics; Engineering Physics I*, II*; Calculus I – III; Differential Equations.
* Course included an independent lab component.
- Obtained additional Certification: Pre-Health Professions for Science Majors
- Active member of the American Chemical Society, the Divisions of Organic and Medicinal Chemistry

Research Experience

Organic Chemistry Research Associate, Dr. Kami Hull, University of Texas at Austin (2022–2024)

- Determined the nucleophilic scope of a copper-catalyzed 1,5-carboamination reaction of vinylcyclopropanes, and developed a rhodium-catalyzed tandem reaction of diallyl ethers to yield α,β -disubstituted amides & esters.
- Mastered essential experimental techniques such as extraction, distillation, solvent recrystallization, as well as column, thin layer (TLC), and flash chromatography.
- Prepared metallic catalysts, and gained substantial practice with Schlenk technique, screening, and synthesis setups within a glove box.
- Practiced characterization techniques learned previously in a graduate-level Organic Spectroscopy course. (^1H -NMR, ^{13}C -NMR, UV/Vis, GCMS, Mass Spectrometry)

Undergraduate Projects and Proposals, University of Texas at Austin (2022–2024)

- Investigating the Influence of $n \rightarrow \pi^*$ Interactions on the Regioselectivity of Diels-Alder Reactions
Proposal drafted for the graduate course Advanced Organic Chemistry (Supramolecular).
- Synthesis and Physical Organic Evaluation of Rivastigmine Derivatives as Dual Enzyme Inhibitors
Proposal drafted for the NSF Graduate Research Fellowship Program (GRFP).
- Assessing the Purity of an Over-the-Counter Benadryl Generic Over Time Using HPLC Analysis
Project carried out for the undergraduate course Advanced Analytical Chemistry.

Academic Experience

Organic Chemistry Laboratory Teaching Assistant, University of Texas at Austin (Jan 2023–May 2023)

- Under the guidance of Dr. Conrad Fjetland, PhD, independently instructed, managed, and graded a group of about a dozen University of Texas at Austin organic chemistry laboratory students.
- Taught and guided students through fourteen organic laboratory experiments through the Spring 2023 semester.
- Graded laboratory reports, provided feedback on experimental techniques and reports, and held office hours.

Organic Chemistry I Teaching Assistant, University of Texas at Austin (Aug 2022–Dec 2022)

- Under Dr. Andrei Straumanis, independently taught a cohort of Organic Chemistry I students twice per week.
- Held weekly office-hour styled work sessions where students were taught in one-on-one and group settings.

Chemistry and Calculus Tutor, Sanger Learning Center, University of Texas at Austin (Aug 2022–Dec 2022)

- Held private, personalized tutoring with UT Austin undergraduate students at a variety of different difficulties.
- Specialized in Organic Chemistry I and II tutoring, but also instructed General Chemistry I and II, Inorganic Chemistry, Physical Chemistry, College Algebra, and Calculus I - III.

Work Experience

MCAT Organic Chemistry Instructor, The Princeton Review (Jan 2024–Present)

- Taught fundamentals of organic chemistry to medical students preparing for the MCAT in a virtual setting.
- Instructed in both classroom settings averaging 20 students, and in one-on-one settings.

Certified Pharmacy Technician, CVS Pharmacy (Feb 2022–May 2023)

- Received, interpreted, and filled prescriptions and refills, and verified that information is complete and accurate.
- Consulted patients, communicated basic pharmaceutical concepts, and created and maintained patient profiles.
- Maintained proper storage and security conditions for drugs, and managed inventory.

Chemistry Author and Content Creator, StudySmarter (May 2022–Oct 2022)

- Authored and prepared SEO-optimized lessons for Organic Chemistry I and II, and General / AP Chemistry.
- A full list of lessons can be found on my website [here](http://www.teddyjefferson.com/ss/). (www.teddyjefferson.com/ss/)

Skills

Analytical Skills: Proficient in interpreting spectroscopic data, analyzing reaction mechanisms, and solving chemical problems. Strong physical organic understanding of fundamental reaction mechanisms, which is applicable to the probing of mechanistic features.

Organic Syntheses: Adept in planning and executing organic synthesis routes using various methodologies such as functional group transformations, protecting group strategies, and multi-step syntheses.

Proper Laboratory Technique: Proficient in handling laboratory equipment, such as glassware and rotary evaporators. Knowledgeable in executing specific techniques such as chromatography (e.g., column chromatography, flash, TLC), spectroscopy (e.g., NMR, IR, LC-MS, Mass), and purification methods (e.g., recrystallization, distillation) while using safe laboratory practices.

Communication and Collaboration: Apt at effectively collaborating with lab colleagues and communicating complex research findings. Able to present technical information to both technical and non-technical audiences, as well as students. Capable of composing research papers using software such as ChemDraw and LaTeX.

Publications

2. Rhodium-Catalyzed Tandem Reaction for the Synthesis of α,β -Disubstituted Amides and Esters
Jefferson, T. L.*; Nguyen, T.*; Hull, K. L. (*Manuscript in Preparation.*)
1. Copper-Catalyzed Three-Component 1,5-Carboamination of Vinylcyclopropanes
Popov, A. G.*; Viviani, V. R. E.*; Skumial, P.; **Jefferson, T. L.**; Hull, K. L. (*Manuscript Submitted.*)

Presentations

3. ACS Fall 2024 in Denver, Poster (Aug 2024)
2. Undergraduate Dissertation, Poster (Dec 2023)
1. Women in Catalysis and Synthetic Chemistry Symposium, Poster (Nov 2023)

Certifications

Certified and Registered Pharmacy Technician (2022)

- Passed the Pharmacy Technician Certification Exam to become a Certified Pharmacy Technician. (#30188808)
- Certified with the Texas State Board of Pharmacy to become a Registered Pharmacy Technician. (#336050)

Sterile Compounding and Aseptic Technique Certified (2022)

- Completed 40 hours of work in an ACPE accredited Sterile Compounding course at Austin Community College to become IV certified, with 20 of which being in a sterilized setting. (NABP ePID #1666702)