

Phoebe Douglas

Assistant Adjunct Professor, Chemistry and Biochemistry

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STRENGTHS

- 🔬 **Research validation**
A habit of repeat runs and benchmark comparisons made computational conclusions easier for faculty mentors to trust and review.
- 🎓 **Graduate instruction**
Problem sessions linked equations with physical meaning, and students often brought difficult quantum mechanics questions back for discussion.
- 🔗 **Python teaching**
Computer experiments turned abstract statistical mechanics ideas into visible results that students could test, question, and explain.
- ✅ **Assessment support**
Careful rubrics and recurring misconception notes helped faculty refine review materials and gave students clearer feedback.
- 👥 **Academic service**
Peer mentoring, outreach, and seminar organization created welcoming points of connection beyond scheduled class meetings.

SKILLS

Quantum mechanics

Statistical mechanics Python

Research design

Molecular simulation

Computational chemistry

University teaching

General chemistry

Organic chemistry

Biochemistry fundamentals

Computer experiments

SUMMARY

Recent chemistry Ph.D. and **teacher scholar** with four years of graduate teaching and research experience in theoretical and physical chemistry. Research centers on computational **statistical mechanics**, molecular simulation, quantum chemistry, Python programming, and reproducible **computer experiments**. Teaching includes general chemistry, organic chemistry, physical chemistry, **quantum mechanics**, and statistical mechanics through lectures, discussion sections, laboratory support, office hours, assessment development, grading, and teaching assistant supervision. Research work connects mathematical models with chemically meaningful interpretation, supported by careful validation, clear documentation, presentations, and manuscript preparation. Mentoring graduate researchers and supporting students with varied preparation has strengthened communication across technical levels. Community outreach, peer mentoring, and seminar organization reflect sustained academic service. Prepared for a teacher scholar appointment combining rigorous instruction, independent scholarship, faculty collaboration, and meaningful departmental contribution.

EXPERIENCE

Postdoctoral Chemistry Research Project

University Research Lab 📅 June 2026 - Present 📍 Madison, WI

Conduct computational physical chemistry research under faculty mentorship, supporting **molecular simulation** studies, quantum mechanical models, statistical mechanical analysis, advanced instructional demonstrations, and graduate researcher mentoring.

- Developed Python studies of molecular energy landscapes under faculty mentorship for **benchmark comparisons**.
- Designed reproducible computer experiments connecting quantum models with **thermodynamic observables** for advanced instruction.
- Evaluated simulation convergence and uncertainty, clarifying assumptions for group research review.
- Prepared figures, methods documentation, and **manuscript sections** for **physical chemistry** seminars.
- Mentored graduate students through Python notebooks, numerical validation, and reproducible analysis practices.
- Translated **research** methods into quantum mechanics and statistical mechanics classroom demonstrations.

Doctoral Researcher, Physical Chemistry

University Research Lab 📅 September 2022 - May 2026 📍 Madison, WI

Conducted doctoral research in computational **physical chemistry**, building reproducible molecular simulation workflows, evaluating quantum chemical models, preparing scholarly communication, and mentoring newer researchers.

- Conducted computational research on **molecular simulation**, **statistical mechanics**, and quantum chemical models.
- Built Python pipelines for simulation trajectories and **numerical experiments** across molecular systems.
- Tested computational results through sensitivity studies, **benchmark comparisons**, and repeat runs.
- Prepared manuscript drafts, conference posters, and presentations linking mathematics with chemical interpretation.
- Maintained versioned code, **research** records, and literature summaries for dissertation review.
- Guided newer graduate researchers through code walkthroughs and computational problem solving.

Graduate Teaching Fellow, Quantum and Statistical Mechanics

University Project 📅 August 2024 - May 2026 📍 Madison, WI

Scientific writing Office hours

Exam development

Community outreach

LANGUAGES

English Native

Spanish Intermediate

MY CAREER



● Postdoctoral Chemistry Research Project at University Research Lab (4 Months)

● Doctoral Researcher, Physical Chemistry at University Research Lab (3.7 Years)

● Graduate Teaching Fellow, Quantum and Statistical Mechanics at University Project (1.8 Years)

● General and Organic Chemistry Teaching Assignment at Course Project (1.8 Years)

Supported **graduate instruction** in quantum mechanics and statistical mechanics through problem sessions, Python computer experiments, office hours, **assessment development**, grading, and teaching assistant coordination.

- Facilitated graduate problem sessions covering derivations, approximations, and physical interpretation.
- Developed Python experiments illustrating eigenvalues, probability distributions, partition functions, and Monte Carlo concepts.
- Held **office hours** that helped students address conceptual gaps and mathematical reasoning.
- Drafted assessment questions and rubrics with faculty instructors for consistent **grading**.
- Supervised small teaching assistant groups during coordinated discussion activities.
- Used assessment patterns to refine review materials and computational demonstrations.

General and Organic Chemistry Teaching Assignment

Course Project 📅 August 2022 - May 2024 📍 Madison, WI

Supported general and organic chemistry teaching through discussion sections, laboratory assistance, office hours, assessment grading, instructional demonstrations, and coordination with faculty and **teaching assistants**.

- Led **general chemistry** discussions using worked examples and guided problem solving.
- Supported **organic chemistry** laboratories while reinforcing lecture concepts and safe procedures.
- Held **office hours** covering stoichiometry, equilibrium, thermochemistry, structure, mechanisms, and spectroscopy.
- Graded **examinations**, laboratory reports, and **problem sets** using faculty rubrics.
- Prepared practice problems aligned with weekly objectives for students with varied preparation.
- Coordinated section pacing, assessment logistics, academic integrity procedures, and student referrals.

PROJECTS

Reproducible Molecular Simulation Study 📅 2026

Built Python workflows connecting quantum mechanical models with statistical mechanical observables. Validation checks, uncertainty analysis, and documented assumptions supported clear research communication and future classroom use.

Computational Mechanics Teaching Demonstrations 📅 2026

Created computer experiments for eigenvalue problems, probability distributions, partition functions, and Monte Carlo sampling. Examples helped graduate students connect equations with molecular interpretation.

LEADERSHIP & AWARDS

- Graduate Research Presentation Award, 2025
- Departmental Teaching Recognition, 2024
- Doctoral Research Fellowship, 2023
- Physical Chemistry Seminar Organizer, 2025 to 2026

EDUCATION

Ph.D. in Chemistry

University of Wisconsin Madison 🎓 GPA: 4.0 📅 2026 📍 Madison, WI

Coursework: *Quantum mechanics, statistical mechanics, computational chemistry, molecular simulation, physical chemistry*

Bachelor of Science in Chemistry

University of Minnesota Twin Cities 🎓 GPA: 4.0 📅 2022 📍 Minneapolis, MN

Coursework: *General chemistry, organic chemistry, biochemistry, thermodynamics, spectroscopy*

CERTIFICATIONS

- University Teaching and Learning Certificate 📅 2025

- Python for Scientific Computing 📅 2024

TECHNICAL SKILLS

- **Computational Chemistry:** Quantum chemistry, molecular simulation, physical chemistry
- **Python Programming:** Python, Jupyter notebooks, numerical experiments
- **Statistical Mechanics:** Monte Carlo sampling, partition functions, thermodynamic observables
- **Quantum Mechanics:** Eigenvalue problems, quantum models, mathematical derivations
- **Research Analysis:** Convergence checks, uncertainty analysis, sensitivity studies
- **Scientific Communication:** Manuscript preparation, research presentations, conference posters
- **University Teaching:** Lectures, discussion sections, laboratory support
- **Assessment Development:** Examinations, problem sets, grading rubrics
- **Student Support:** Office hours, feedback, misconception review
- **Teaching Leadership:** Teaching assistant supervision, peer mentoring, faculty coordination
- **Chemistry Instruction:** General chemistry, organic chemistry, biochemistry
- **Research Documentation:** Versioned code, methods documentation, literature summaries

PROFESSIONAL AFFILIATIONS

- Graduate Chemistry Peer Mentor, 2024 to 2026
- Chemistry Outreach Volunteer, 2023 to 2026
- Physical Chemistry Seminar Organizer, 2025 to 2026

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST