



## Teaching Portfolio

Submitted to The Center for Teaching and Learning for consideration for the 2023 President's Teaching Excellence Awards for Graduate Teaching Assistants

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# Teaching Philosophy

*“Well, that’s the tough thing about science, isn’t it, being able to effectively communicate your thoughts to other people?”*

In my third year of my undergraduate degree, my organic chemistry professor would ask that question of us every time he finished explaining a concept, or when he was asking us to explain it back to him. At the time, I thought of it as just an odd quirk of his, but looking back I’ve realized just how valuable it was to my educational path. That semester, I reframed what I thought about science and scientific education. I’ve since expanded and better defined those initial thoughts, and have realized I want to ensure my students feel comfortable and confident in my class, and that they leave feeling like they gained something useful from the experience.

My first goal every semester is to create an inclusive environment so every student feels comfortable, regardless of age, race, ethnicity, nationality, sex, gender identity, sexuality, or disability. It is an unfortunate fact that higher education, and chemistry specifically, suffer from the ‘leaky pipeline’, in which people from underrepresented backgrounds are pushed out of the field, be it from discomfort, harassment, isolation, or more harmful policies. Growing up as a queer person of color, and being the first in my family to go to college, studying science didn’t seem possible until a few professors reached out and showed their confidence in me. Now, I want to continue the process for my students every chance I get. There has been plenty of research showing the importance of inclusivity and comfort of students in their academic performance. To achieve this, I have attended workshops and trainings in inclusivity to improve my own understanding of different backgrounds and perspectives. In the classroom, this takes multiple forms; on a “simpler” level, beginning every semester by introducing myself, including my own background and identities and my preferred name and pronouns. In this way, I hope students recognize not only my own intersectionality, but also that I am comfortable talking about these things and that they can be comfortable talking to me about them. Additionally, by surveying students early on, I can determine what they need from me to give them the best chance possible at succeeding in the class, and when providing additional resources (i.e. online readings or videos) I can ensure they come from a diverse group of creators who probe the material in different ways and at different starting levels of understanding. And lastly, asking for feedback regularly, and updating my practices accordingly, to show I recognize that every group of students is unique and I cannot use the same methods and material every semester.

Through improving feelings of inclusivity in the classroom, and with additional practices, I also hope to improve student engagement in lectures and in-class activities. It’s well known how important student involvement is in their own learning and in their comfort on a university campus. To this end, I have and will continue to provide students multiple ways to engage with the me, the material, and each other. While the “ideal” scenario would be for all students to attend every class and actively participate every time, there are many reasons why they might not be able to: outside responsibilities keeping them away, personal health struggles, needing additional time to process material before being comfortable with it, or even just discomfort and anxieties about in-class participation. Because of this,

all lecture notes are made available virtually, before the class starts so students can review it ahead of time and prepare any questions they have. Also streaming and recording every class section, with captions and transcripts available, so any student who cannot physically be in the classroom can still have the same experience, and can send messages in real time if needed. And lastly, office hours are greatly encouraged, and always flexible in days, times, and modalities to reach every student possible.

My final goal in teaching, especially at the university level, is for every student to feel like they gained something useful out of the class. Most of them probably won't need to remember the equations for calculating enthalpy or reaction kinetics after they finish their degrees, and that inevitably leads to questions of why they're learning it now, or why this class is necessary for them to take. Because of this, I believe it's always important to remind students of the bigger picture takeaways. Showing them that by completing the assignments they're also learning skills in problem solving, time management, and the ability to communicate complex concepts in a way that their fellow classmates and us as instructors will understand, among others. Encouraging students to talk about the class to non-chemistry friends and family I believe really helps them grasp this idea, as they have to not only explain the concepts themselves, but relate it to the outside world in order to prove its importance. Additionally, in future classes I lead, I plan to always incorporate at least one project in which they take an issue facing the world today, and relate it back to the concepts we are studying in class.

When I was in my third year of my undergraduate degree, I was in the same place a lot of the students I now teach are. I was taking the classes the program required to get my degree, without fully understanding what my role in the classroom was, and why these classes I was paying to take would actually benefit my life and career. But having a professor who repeatedly told us that all the scientific research and understanding in the world wasn't useful unless we could share it with others, and who gave all of us the space and patience to get to a point where we could do just that, really changed my perspective on the importance of higher education. While the primary goal of any class is for students to learn the material we spend so much time and effort teaching them, I truly believe that the way to achieve this is to make all students feel accepted and like the class will teach them more than just concepts of chemistry. By emphasizing inclusivity, multi-modal engagement, and transferrable skills in my lectures, I hope to be able to achieve this, and potentially even be that lightbulb teacher for a student.

PhD Candidate using Molecular Dynamics simulations to study the structure, function, and mechanism of membrane transport proteins. Passionate about communication at the teaching, research, and public level, and at improving the accessibility of science and higher education to all communities.

## Education

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- 2018 – Present**      **University of Texas at Dallas**  
*PhD – Chemistry & Biochemistry*  
- Advisor: Dr. Hedieh Torabifard (2021 - present)  
                                 Dr. Steven Nielsen (2018 – 2021)  
- Research Area: Computational study of biological systems
- 2013 – 2018**      **Texas A&M University – Commerce**  
*B.S. – Chemistry, Magna Cum Laude*  
- Advisor: Dr. Bukuo Ni  
- Research Area: Organic synthesis

## Experience

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- 2022 – Present**      **Grants & Communications Director**  
*Science Mentorship Institute*  
- Setting up organizational infrastructure for a nonprofit organization  
- Finding and applying for funding opportunities
- 2022 – Present**      **President**  
*Chemistry Graduate Student Association, University of Texas at Dallas*  
- Planning and organizing events and seminars to help new graduate students acclimate to the program and succeed  
- Working with administration within the department and university campus to improve both the working and personal lives of graduate students
- 2018 – Present**      **Teaching Assistant**  
*Computational, Physical, and General Chemistry, University of Texas at Dallas*  
- Aiding student comprehension of concepts in general chemistry, physical chemistry, and computational chemistry  
- Recognizing common student pitfalls and developing preventative measures

## Awards

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1. Merck Research Award for Underrepresented Chemists of Color (2022)
2. Outstanding Graduate Teaching Assistant (2022)

## Publications

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1. **Mills, K.R.**, and Torabifard, H. “Uncovering the Mechanism of the Proton-Coupled Fluoride Transport in the CLC<sup>F</sup> Antiporter”, *Under Review*
2. **Mills, K.R.**, Baglia, R.A., Mitra, K., Tutol, J.N., Ball, D., Page, K.M., Kallu, J., Gottipolu, S., D’Arcy, S., Nielsen, S.O., and Dodani, S.C.. “An activity-based fluorescent sensor for the detection of the phenol sulfotransferase SULT1A1 in living cells”, *RSC Chem. Biol.*, 2021, 2, 830-834

*\* This article is part of the themed collections: Analytical methods in chemical biology and RSC Chemical Biology Editors' Choice*

## Presentations

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1. Oral Presentation: ACS Southwest Regional Meeting (2022) “Computational Study of a YAP/TAZ-TEAD Inhibitor”
2. Poster Presentation: University of Texas at Dallas Research Day (2022) “Uncovering Mechanism of Fluoride Transport in CLC<sup>F</sup> Protein”
3. Oral Presentation: 263<sup>rd</sup> ACS National Meeting (2022) “Investigation of coupled proton transport in CLC<sup>F</sup> F/H<sup>+</sup> Antiporter”
4. Oral Presentation: ACS DFW Meeting in Miniature (2022) “Molecular Dynamics Study of the Proton-Coupled Fluoride Transport in the CLC<sup>F</sup> F/H<sup>+</sup> Antiporter”  
*\* This presentation won 2<sup>nd</sup> place in the Physical/Computational section for best presentation*
5. Oral Presentation: ACS Southwest Regional Meeting (2021) “Computational Study of CLC<sup>F</sup> F/H<sup>+</sup> Antiporter Protein”
6. Oral Presentation: 255<sup>th</sup> ACS National Meeting (2018) “Diarylpyrrolinol silyl ether as organocatalyst for asymmetric cycloaddition of  $\alpha,\beta$ -unsaturated aldehydes to 3-hydroxyoxindoles to produce spirocyclic  $\delta$ -lactones in aqueous media”
7. Oral Presentation: Texas National McNair Research Conference (2018) “Synthesis of spirocyclic  $\delta$ -lactones by asymmetric organocatalytic reactions”
8. Poster Presentation: 14<sup>th</sup> Annual Pathways Student Research Symposium (2017) “Synthesis of spirocyclic  $\delta$ -lactones...”
9. Poster Presentation: ACS Southwest Regional Meeting (2017) “Synthesis of spirocyclic  $\delta$ -lactones...”
10. Oral Presentation: TRiO McNair Scholars Showcase (2017) “Synthesis of spirocyclic  $\delta$ -lactones...”
11. Oral Presentation: Gulf Coast Student Success Conference (2016) “Teaching Scientific Writing, Even as a Non-STEM Peer Educator”

# Description of Courses Taught

## University of Texas at Dallas

### ***CHEM 1111/1112: General Chemistry I & II Labs***

**Semesters:** Fall 2018 (3 sections), Spring 2019 (3 sections), Fall 2019 (3 sections)

**Enrollment:** Each section had 25-30 undergraduate students

**Course Description:** These lab courses aid in student understanding of the concepts taught in the General Chemistry lectures through the use of simple chemistry experiments. The experiments teach basic chemistry lab skills, and provide a visualization and hands-on understanding of the lecture material.

#### **Teaching Responsibilities:**

My primary role in this course was to supervise and assist students as they performed weekly chemistry experiments. This included preparing for the lab each week in the form of ensuring necessary supplies were provided, and aiding the Instructor of Record in the preceding workshop where we guided the students through the concepts that would be covered during the experiment and had them complete relevant sample calculations. I was responsible for grading each student's workshop calculations and lab reports each week, and hosted office hours to assist them as needed. Additionally, after noticing students were struggling with portions of the lab reports that required Excel, I began to offer an additional evening or weekend workshop to cover the basic functions and ensure all students were comfortable with the program.

### ***CHEM 1311: General Chemistry I***

**Semesters:** Summer 2019

**Enrollment:** 51 undergraduate students

**Course Description:** This course provides an introduction to the basic concepts of chemistry, and the necessary background for advanced chemistry courses. Students learn topics such as atomic and molecular structure, bonding and reactions.

#### **Teaching Responsibilities:**

My role in this course was to assist the Instructor as needed with preparing exams or other course materials. I additionally set up a weekly open review session, where students could drop by and ask for help as they studied or worked through the homework. For these sessions I would prepare worksheets with sample problems that I could work through with them, and I'd provide a brief review lecture if needed.

## ***CHEM 3321/3322: Physical Chemistry I & II***

**Semesters:** Spring 2020, Fall 2020, Spring 2021, Fall 2021, Spring 2022, Fall 2022

**Enrollment:** Each section had 60-120 undergraduate students

**Course Description:** These advanced chemistry courses give students a deeper understanding of macroscopic (3321) and microscopic (3322) properties of matter. In the first semester, they learn about the thermodynamics and kinetics of large systems of matter, and in the second semester they learn about structure on the atomic and molecular scale, and concepts of quantum chemistry.

### **Teaching Responsibilities:**

As the graduate teaching assistant, I hosted once weekly review sessions, with the primary goal of assisting the students with their homework assignments. However, as the concepts covered in these courses can be quite dense, I incorporated a brief (30-40 minute) lecture covering any relevant topics, before going through the homework problems and assisting them with the math involved in solving each. Additionally, I graded all homework assignments, assisted in grading the midterm exams, and hosted weekly office hours.

## ***CHEM 4311/5311: Classical Simulations for Biological and Condensed Systems***

**Semesters:** Spring 2023

**Enrollment:** 3 undergraduate and 7 graduate students

**Course Description:** In this course, students learn the basic concepts of computational chemistry, and how to apply classical simulations to study biologically relevant systems. They learn concepts of molecular dynamics and quantum mechanics simulations, force field development, and methods to determine free energy.

### **Teaching Responsibilities:**

My role in this course is to assist students with the practical knowledge needed to carry out computational chemistry calculations, as most of them are inexperienced in this field. Once weekly, I meet with the students and review the material covered in the main lecture before leading them through the softwares and techniques necessary for their homework assignments and final project. As the semester progresses and they begin working on the larger research project, I will also assist in the proposal, experimental design, data collection, and final presentation, as needed.



## **Texas A&M University – Commerce**

### ***UNCO 101: First Year Mentoring***

**Semesters:** Fall 2017

**Enrollment:** 25 undergraduate students

**Course Description:** This mentorship course assigned freshman students to a “mentor house” led by older undergraduate students, during which time they would learn skills to navigate college life and the campus.

#### **Teaching Responsibilities:**

My role in this course was to teach the once weekly class of “First Time Full Time” freshman students over a campus-wide curriculum. We covered topics useful to new university students, including student success, mental health, time management, etc. Additionally, I served as a liaison between the students and the campus at large, helping them to find resources, and connecting them with different on-campus offices and departments.

### ***UNCO 1301: Signature Course – The Quest for Happiness***

**Semesters:** Spring 2018

**Enrollment:** 50 undergraduate students

**Course Description:** A Signature Course at Texas A&M University- Commerce offers first-year students the opportunity to explore unique topics in engaging learning environments. Students develop college-level skills in communication, critical thinking, and social responsibility through a rigorous intellectual experience.

#### **Teaching Responsibilities:**

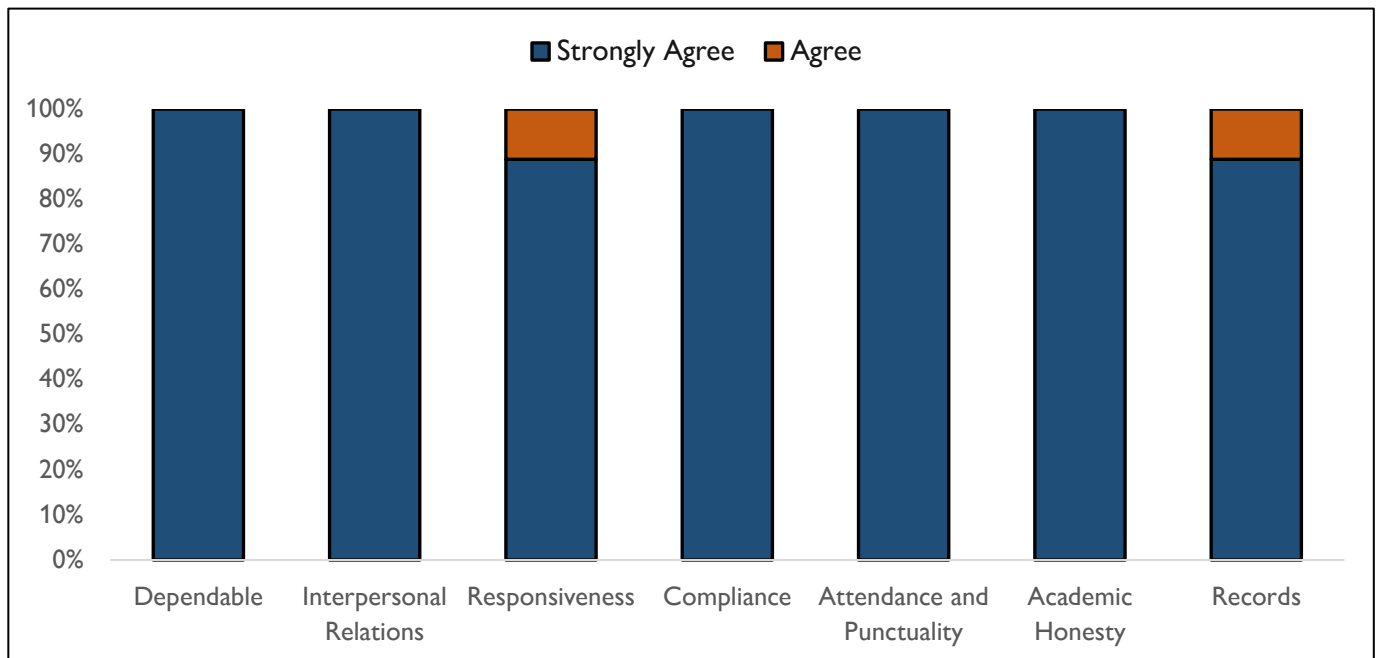
As an undergraduate teaching assistant, in this course I primarily helped with evaluating students’ assignments and in-class participation as they read and analyzed Aristotle’s Nicomachean Ethics. At the end of the semester, the students also had to give a presentation to the entire freshman student body on a real-world example of the concepts covered. I assisted the students in preparing their presentations, providing feedback as they went, and scored each student’s presentation at the end.

# Evaluations of Teaching

## Faculty Evaluations

Each semester, the instructor of record for the course(s) I was assisting for would provide a performance review. They were asked to rate (on a scale from strongly disagree to strongly agree) how I performed in the following areas:

1. **Dependable:** The TA works closely with his/her supervisor to carry out assigned tasks.
2. **Interpersonal Relations:** The TA behaves in a professional manner that is respectful of others' ideas and opinions.
3. **Responsiveness:** The TA provides students with feedback that is constructive and effective.
4. **Compliance:** The TA consistently follows program/department, school, and university regulations.
5. **Attendance & Punctuality:** The TA is present and on time for work, meetings, and scheduled events, with any absences scheduled and reported well in advance.
6. **Academic Honesty:** The TA maintains and enforces standards of academic honesty and integrity.
7. **Records:** The TA maintains all records pertinent to his or her assignments.



## ***Additional Comments and Feedback***

In addition to the scoring shown above, faculty were able to leave additional comments, and I've selected a few to highlight below:

*"Kira was great and organizing and presenting workshops and returning graded work to students in a timely fashion. She kept excellent records, especially during the challenging times of the shut down."*

*"Kira did a great job. She provided very organized and useful notes/videos to help students with the class materials and homework assignments. She was very organized, and on-time. The grades were posted in timely manner."*

I have also received the following student feedback:

*"I would like to give Kira my warmest gratitude for all that she has done for us this semester – her reviews have allowed me to understand P. Chem in a way I would have never imagined myself being able to, and the effort she puts into being TA for this class is unlike anything I have seen in my college experience"*

*"Kira was one of the reasons I am choosing to go for my Ph.D. She was my TA for both Gen Chem II lab and P. chem I and hearing her talk about her experiences helped motivate me to take the plunge."*

*"This was my first semester at UTD and she really set the expectations high for future TA's."*

*"Her reviews are always supremely helpful... thanks for being a really good TA for this class. Good TAs are not super common in my experience."*

*"Thank you so much for the TA sessions, they are really so helpful in understanding the concepts and how to apply them!"*

# Additional Training and Related Experiences

## *Professional Development & Teaching Training*

- The 4<sup>th</sup> Annual Excellence in Teaching Lecture, “Creating the Path to Success in the Classroom” (2/8/2019)
- CTL Seminar, “The Scope and Limits of Educational Fair Use” (6/27/2019)
- CTL Seminar, “Teaching as a Transferable Skill” (10/7/2019)
- CTL Seminar, “Engaging and Motivating Students by Reducing Their Resistance to Learning” (10/31/2019)
- Graduate Teaching Seminar, Dr. Jonas Bunte, Spring 2020
  - Designing a Course
  - Improving Lecturing
  - Leading Discussions
  - Engaging Students
  - Helping Students to Prepare for Class
  - Managing Classrooms
  - Technology in the Classroom
  - Designing Exams
  - Grading Exams
  - Cheating
- The 6<sup>th</sup> Annual CTL All-Campus Workshop, “Innovations in Teaching Large and Introductory Courses” (3/6/2020)
- CTL Seminar, “Guiding the Mentoring Relationship Between Faculty and Graduate TAs” (3/9/2020)
- CTL Seminar, “Options and Recommendations for Online Administration of Exams” (4/22/2020)
- CTL Seminar, “Essential First Choices in Planning an Online Course” (5/12/2020)
- CTL Seminar, “Connected and Compassionate Teaching Online” (5/18/2020)
- CTL Seminar, “Group Work in Online Teaching” (5/19/2020)
- CTL Seminar, “Constructing Assignments & Discussions for Online Teaching” (5/22/2020)
- CTL Seminar, “TAs and Student Interaction” (6/2/2020)
- American Chemical Society (ACS) Webinar, “Leading and Learning Inclusively” (8/12/2020)
- CTL Seminar, “Joy and Curiosity in Learning: Short Lessons from a Bright and Curious Little Dog” (9/24/2021)
- CTL Seminar, “Understanding Implicit Bias in the Classroom – How Implicit Bias Impacts Teaching, Student Learning, and the Sense of Belonging” (9/30/2021)
- ACS High Impact Educational Practices in the Chemistry Classroom (8/23/2022)
  - An approach to increase students’ self-confidence to improve retention in general chemistry
  - Chemistry modeling instruction in career and technical education
  - Flipped organic chemistry as a conduit for students to embrace critical thinking and multi-step syntheses

- Building a sense of community for chemistry and biochemistry majors in general chemistry
- Implementation and student perceptions of a collaborative learning-based chemistry course
- Increasing the Diversity, Equity and Inclusion in chemistry education through culturally responsive recruitment
- SciX: Scalable and sustainable authentic research experiences for high-school students
- Teaching computational chemistry as a formal course at the pre-college level
- Insights from intervention to support first generation college student success in general chemistry
- Upgrading CURE for organic synthesis optimization

## ***Additional Leadership Roles & Outreach Efforts***

### **Chemistry Graduate Student Association**

#### **2018-2019: First Year Liaison**

- Brought attention to issues the first-year PhD students were facing and worked to plan a “Qualifying Exam Q&A Session” and “Wellness Focus Group”

#### **2021-2022: Vice President**

- Helped to restart the organization after it had shut down during the pandemic
- Organized a series of flash talks by graduate students and faculty members to introduce first year PhD students to the different research labs and on-campus resources
- Aided in the campus-wide mercury thermometer exchange to remove unnecessary hazardous materials from research and teaching labs
- Helped organize and moderate the ACS DFW Meeting in Miniature, a local meeting where chemistry students from around north Texas can present their research and meet students from other universities
- Performed and organized several outreach talks and events:
  - National Chemistry Week with ACS DFW: performed chemistry demonstrations for hundreds of school-age children
  - GSA Diversity Lunch Series: School of Natural Sciences & Mathematics panelist
  - Westwood Junior High “Ed-Talks”: gave a 45 minute presentation to students about my research and career
  - Boy Scouts of America, Chemistry Merit Badge, gave a 15 minute presentation about my research

### **2022-2023: President**

- Expanded the orientation events aimed at the incoming PhD students by incorporating additional social events, talks with current graduate students and faculty, and campus tours
- Developed and organized a monthly series of Professional Development events for graduate students
- Performed and organized several outreach talks and events:
  - National Chemistry Week with ACS DFW: performed chemistry demonstrations for hundreds of school-age children
  - Young Women's Preparatory Network, STEAM Explorers Camp, gave 30 minute talk to young girls about my career and how they can get involved in science

### **sci-MI (Science Mentorship Institute)**

sci-MI is a 501(c)3 nonprofit organization with the aim of bridging the opportunity gap in scientific research by providing a free, fully online, summer research course available to high school students worldwide.

### **2022-2023: Grants & Communications Director**

- Developed and organized the back end operations, creating methods to easily share and communicate with volunteers and board members nationwide
- Created Standard Operation Procedure for finding, accurately describing, and applying for funding opportunities
- Assisted in the creation and dissemination of curriculum information for the summer programs
- Aided in efforts to improve the diversity in staff and students, and highlighted this information for recruitment efforts
- Designed and implemented marketing and branding strategies to aid in recruitment and fundraising efforts