Tiffany R. Olivera

Ph.D. Candidate in Chemistry
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Education

Rutgers University – Newark **Newark, NJ**
Graduate School – Newark **May 2025**

- Ph.D. Candidate in Chemistry
- Research Advisor: Dr. Fei Zhang

New Jersey Institute of Technology **Newark, NJ**
College of Science and Liberal Arts **May 2020**

- B.S. in Chemistry
- Research Advisor: Dr. Farnaz A. Shakib

New Jersey Institute of Technology **Newark, NJ**
College of Science and Liberal Arts **May 2020**

- B.S. in Biology, Minor in Applied Mathematics
- Research Advisor: Dr. Cristiano L. Dias

Laboratory Skills

- Experimental: Gel Electrophoresis, Atomic Force Microscope (AFM), DNA and RNA Extraction, Purification, Transformation, Distillation, Titration, Spectrophotometer, PCR, Chromatography, 3D Ultimaker 3 Printer
- Computational: Linux, CaDNAno, Tiamat, Python, CP2K, GROMACS, Xmgrace, Spartan, Avogadro, VMD, Gaussview, Vesta, MATLAB, Microsoft Office

Graduate Coursework

- Completed: Classical Mechanics, Statistical Mechanics
- In progress: Biochemistry, Crystal & Molecular Structures I

Undergraduate Coursework

- Biochemistry & Lab, Inorganic Chemistry, Physical Chemistry I, II, & III & Lab, Instrumental Analysis, Organic Chemistry I, II & Lab, Analytical Chemistry & Lab, Material Science and Engineering
- Bioinformatics I & II, Intro to Biomedical Engineering, Microbiology, Molecular Biology, Cell Biology
- Classical Mechanics, Electrodynamics, Calculus I, II, & III, Differential Equations, Linear Algebra, Probability & Statistics, Intro to Partial Differential Equations, Mathematical Biology

Research Experience

Graduate Research Assistant **Newark, NJ**
Rutgers University – Newark Department of Chemistry **Summer 2021 – Present**

- A member of Dr. Fei Zhang's Biomolecular Design research group as a doctoral student researcher.
- Preforming literature reviews on Scaffolded DNA origami, Single-Stranded DNA origami, 2D DNA Tiles, and 3D DNA Bricks.
- Training in techniques using CaDNAno and Tiamat, softwares that aid in designing and creating both DNA and RNA structures.

Graduate Research Assistant **Newark, NJ**
Rutgers University – Newark Department of Physics **Fall 2020 – Spring 2021**

- A member of Dr. Neepa Maitra's theoretical and computational research group as a doctoral student researcher.
- Preformed literature and video reviews on time-dependent density functional theory (TD-DFT), exact factorization approach, non-adiabatic couplings, and mixed quantum – classical methods.

Research Assistant **Newark, NJ**
NJIT Department of Chemistry and Environmental Science **Summer 2020**

- Project: Proton-Coupled Electron Transfer Perspective
- Assisted Dr. Farnaz A. Shakib with literature review for an invited Perspective for the Royal Society of Chemistry's (RSC) Physical Chemistry, Chemistry Physics (PCCP) journal.
- The Perspective focused on the following computational methods: *Mixed Quantum-Classical Liouville* (MQCL), *Ring Polymer Surface Hopping* (RPSH), and *Quasi-Diabatic* (QD) *Scheme*.

Undergraduate Research Assistant **Newark, NJ**
NJIT Department of Chemistry and Environmental Science **Spring 2020**

- Project: Atomistic View of Mercury Cycling over Defected Salt Formations
- Once elemental mercury Hg(II) is photochemically oxidized in the atmosphere, the key chemical form is produced. The inadequate knowledge of the surface chemistry of Hg(II) hinders the evaluation of its deposition into the environment.
- This project aimed to elucidate the rate and mechanism of Hg(II) removal by environmental surfaces. Periodic boundary calculations at the level of density functional theory will be used to study binding of different Hg(II) compounds on the surface of a series of crystalline material.

Undergraduate Research Assistant **Newark, NJ**
NJIT Department of Physics **Summer 2019**

- Project: Designing Amyloid-Inspired β-Sheet Fibrils from Left- and Right-Handed Peptides
- Amphipathic peptides are comprised of alternating polar and nonpolar amino acids that tend to self-assemble into amyloid-like fibril structures. The translation machinery for protein synthesis evolved to utilize the left-handed chiral form of amino acids.
- Designed two simulation systems to compare atomic structures of self-assembling monomers and used high-performance computer applications to perform calculations to simulate amyloid forming peptides with GROMACS. After analyzing the data with Xmgrace and VMD, these peptides coassemble into fibrils alternating in L- and D-peptides that orient in a rippled β-Sheet structure.

Publications and Presentations

- **Invited Presentation**
  1. Olivera, T.R., "Brief Introduction into Proton-Coupled Electron Transfer and Mixed Quantum-Classical Methods" Presented to Maitra Group (2021).
- **Published Abstract**
  2. Olivera, T.R., Dias, C.L., "Designing Amyloid-Inspired β-Sheet Fibrils from L- and D-Handed Peptides." Published on page 119 in NJIT Book of Abstracts (2019).
- **Poster Presentation**
  1. Olivera, T.R., "Designing Amyloid-Inspired β-Sheet Fibrils from L- and D-Handed Peptides." Poster presented at NJIT Twelfth International Undergraduate Summer Research Symposium (2019).

Teaching Experience

Mathematics Instructor **Montclair, NJ**
Mathnasium of Montclair **Fall 2017 – Summer 2020**

- Instructed students K-12, SAT/ACT/Praxis preparation by implementing the Mathnasium Method.
- Proctored assessments to ascertain learning deficiencies and strengths to customize instructional plans and use a variety of teaching techniques to encourage critical thinking and discussion.

EOP Tutor **Newark, NJ**
NJIT EOP Office **Fall 2016 – Spring 2017**

- Instructed Chemistry and English introductory courses for NJIT freshmen students who required additional assistance in transitioning from high school to college.
- Offered mentorship related to academics, resources on campus, and study tips for exams.

Volunteer Experience

- B2D Grad Student Panel Member 2021 for Twelfth Annual GS-LSAMP STEM Research Conference
- Assistant Coordinator for First Annual 2019 NJIT Chemistry Olympics
- Chemistry Demonstrator for 2017, 2018, and 2019 Annual Chem Expo at the Liberty Science Center
- Event Supervisor for 2018 Annual Science Olympiad hosted by NJIT

Awards & Distinctions

- Fall 2019 & Spring 2020 Dean's List Recipient
- Recipient of NJIT Faculty Scholarship
- Recipient of EOP Mobile Engineers Scholarship
- Recipient of the Foster, F. Gordon Scholarship

Certifications

- 2021 Completion of Rutgers Biosafety/Bloodborne Pathogens Training
- 2021 Completion of Rutgers Laboratory Safety Training

Organizations & Affiliations

- Rutgers-Newark Bridge to Doctorate (B2D) Fellow **Fall 2020 – Spring 2022**
- RU-N Graduate Chemistry Club Member **Fall 2021 – Present**
- American Chemical Society (ACS) Member **Spring 2020 – Present**
- NJIT GS-LSAMP Member **Spring 2020**
- American Chemical Society NJIT Chapter Recording Secretary **Fall 2018 – Spring 2020**
- NJIT Student Senate Chemistry Representative **Fall 2018 – Spring 2020**
- NJIT Educational Opportunity Program Member **Summer 2015 – Spring 2020**