

Julia M. Montgomery

NSF Graduate Fellow & Computational Chemist

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EDUCATION

Virginia Tech in Blacksburg, Virginia

Est. May 2024

Ph.D. Candidate in Biochemistry

St. Joseph's University in Patchogue, New York

May 2019

Bachelor of Science in Chemistry (thesis-based); Biochemistry Sequence, Biology Minor

WORK EXPERIENCE

Graduate Research Fellow, National Science Foundation

2021 – Present

- Created documentation and tutorial work for molecular dynamics simulations, GitHub, text-editors, and Unix used to train 18 undergraduate and graduate students
- Secured HPC resources equaling over \$10,000 in equivalent value through NSF programs
- Mentored one visiting graduate student, two rotation students, and one undergraduate student directly
- Presented research at 4 national conferences, 3 industry meetings, and 5 university-level events

Graduate Research Assistant, Virginia Tech

2019 – Present

- Established computational protocols for polarizable molecular dynamic simulations of membranes and membrane proteins for both production and analysis
- Simulated peptides (amyloid beta, WALP model peptide), proteins (NaV Sodium Channel, GPCRs), and biological membranes using OpenMM with a polarizable force field
- Parameterized a GPCR small molecule agonist, epinephrine, for a polarizable force field
- Four years of experience in applying high-performance, GPU-accelerated, and parallelized computing

Graduate Teaching Assistant, Virginia Tech, Department of Biochemistry

2020 – 2023

- Assisted in teaching one graduate and two undergraduate courses ranging from 40 to 130 students
- Provided feedback on assignments and projects, generated review sessions, and held weekly office hours
- Developed and presented a lecture centered around hidden curriculum in computational sciences

Head Laboratory Assistant, St. Joseph's University, Department of Physical Science

2017 – 2019

- Maintained laboratory equipment, including glassware, rotary evaporators, benchtop NMR Spectrometer, IR spectrometer, and varied probes, assisting students when necessary
- Handled, organized, and kept inventory of the department's stock of chemicals, reordering when needed, and making solutions for specific undergraduate lab and senior thesis needs

Tutor, St. Joseph's University, Office for Tutoring and Academic Development

2017 – 2019

- Taught both voluntary and probationary students in specific course content and soft skill development
- Created small group content-focused sessions to increase tutoring opportunities within a part-time schedule

SELECTED HONORS & AWARDS

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| • Catalyzing Gender Equity at Schrödinger Symposium selected participant | • 4 travel grants equaling \$2,500 in support |
| • Bayer CS University Mentoring Program selected participant | • Virginia Tech Department of Biochemistry Dean's Scholar awardee |
| • National Science Foundation GRFP awardee | • Rosemary O'Halloran Women in Chemistry Scholarship awardee |

PUBLICATIONS

Davidson, D. S., Kraus, J. A., **Montgomery, J. M.** Lemkul, J. A. 2022. *Effects of Familial Alzheimer's Disease Mutations on the Folding Free Energy and Dipole–Dipole Interactions of the Amyloid β -Peptide*. J. Phys. Chem. B 2022, 126, 39, 7552–7566

LEADERSHIP & SERVICE

Virginia Tech Biochemistry Graduate Student Association (BcGSA)

2019 – Present

Pilot Mentorship Program Chair 2023 - Current | Communications 2022-2023 | Event Coordinator 2019-2020

- Developed a peer mentoring program to assist first-year student's transition to graduate school
- Served on a departmental committee as a graduate student representative to streamline website and social media messaging to encourage buy-in from graduate students, undergraduate students, and alumni
- Assembled welcome/informational packages for incoming graduate students during COVID-19 shutdowns

SJU Chemistry Club

2015 – 2019

President 2018 – 2019

- Established a STEM curriculum for a local preschool and aided in elementary school science fairs
- Acted as a community role-model through organizing biannual blood drives and seasonal river clean-ups

TECHNICAL SKILLS

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| • Physics-based simulation softwares (CHARMM, OpenMM, LOOS, MDAnalysis, NAMD, Psi4, PLUMED, GROMACS) | • Structure Prediction tools (MODELLER, AlphaFold, Phyre ² , SWISS-MODEL) |
| • Enhanced sampling techniques (Umbrella Sampling, Metadynamics) | • Virtual environments/Containers (Conda, Docker) |
| • Visualization (PyMOL, VMD, Blender) | • High-performance computing (SLURM) |
| • Scripting languages (Python, Bash, LaTeX) | • Linux/Unix |
| • Version control (Git, GitHub) | • Data visualization tools (Grace, Matplotlib, R) |
| | • Large-scale data analysis |
| | • Documentation of code and workflows |