Victoria Valeeva

vicval@math.ubc.ca — *vvsection.com*

Education

The University of British Columbia 2025 – 2029
Doctor of Philosophy – Mathematics *Vancouver, BC*

University of Toronto 2021 – 2025
Honours Bachelor of Science – Mathematics and Statistics *Toronto, ON*

Research Experience

Assistant Scientist May 2026 — August 2026
HTuO Biosciences *Vancouver, BC*

- Classified R&D: mostly work on polarizable force fields, charge models, and machine-learned interaction potentials

Graduate Researcher May 2025 — Present
Under supervision of Dr. Christoph Ortner *Vancouver, BC*

- Theorizing new ways to efficiently model mid- and long-range many-body interactions in atomistic modeling
- Developing fast summation methods for dispersion corrections in Machine-Learned Interatomic Potentials
- Supervising an undergraduate honours thesis project on biomolecular simulation
- Organizing workshops and consulting lab members on the use of compute resources with the Digital Research Alliance of Canada

Summer Research Fellow May 2024 — August 2024
Under supervision of Dr. Sushant Kumar *Toronto, ON*

- Explored various biophysical and genetic features of low-complexity regions in the human proteome
- Exposed prediction biases for proteins with low-complexity regions in AlphaFold and ProstT5 (Foldseek) protein language models
- Traced the differences that alternative splicing induces in predicted protein structures with regards to low-complexity regions

Undergraduate Researcher May 2023 — August 2023
Under supervision of Dr. Duncan Dauvergne *Toronto, ON*

- Study of Multi-Particle Diffusion Limited Aggregation (MDLA) - stochastic model of infection spread
- Proved a bound on the rate of growth of MDLA in $\mathbb{Z} \times [n]$

Undergraduate Researcher May 2021 — May 2023
Under supervision of Dr. Sarah Rauscher *Mississauga, ON*

- Built and analyzed Markov state models of protein crystal simulations
- Performed comparative analysis of capabilities of common biomolecular forcefields (AMBER, CHARMM) to reproduce functional motions of a PDZ domain in thermodynamic equilibrium, under the application of an electric field, and upon ligand binding

Teaching Experience

Teaching Assistant September 2025 — Present
University of British Columbia *Vancouver, BC*

- Teaching Assistant for Introduction to Probability (MATH 302): grading, office hours, invigilation, problem-creation.

Teaching Assistant September 2022 — April 2025
University of Toronto Dept. of Mathematical and Computational Sciences *Mississauga, ON*

- Teaching Assistant for various mathematics and statistics courses on differential calculus, integral calculus and probability theory, including MAT135H5 (3 terms), MAT136H5 (1), MAT232H5 (2), STA107 (1)
- Hosted weekly tutorials and office hours, assisted instructor during active learning lectures, graded assessments, invigilated tests and exams, prepared and conducted final exam review sessions

Awards

Medical Biophysics Summer Fellow 2024

- Award by the Department of Medical Biophysics at the University of Toronto to conduct undergraduate research; Value: 8,500$
- Supervised by Dr. Sushant Kumar

Summer Undergraduate Data Science Research Award 2024

- Award by the Data Science Institute at the University of Toronto to conduct undergraduate research; Value: 7,200$

University of Toronto Excellence Award 2023

- Award by the University of Toronto to support supervised undergraduate research; Value: 7,500$
- Supervised by Dr. Duncan Dauvergne

UTM Undergraduate Research Grant 2022

- Grant by the University of Toronto Mississauga to support undergraduate research; Value: 500$
- Supervised by Dr. Sarah Rauscher

University of Toronto International Scholar 2021

- Entrance scholarship for undergraduate studies; Value: 180,000$

Publications and Preprints

Klyshko E, Kim JS-H, McGough L, **Valeeva V**, Lee E, Ranganathan R, Rauscher S (2024) "Functional protein dynamics in a crystal." Nature Communications 15(1):3244

Posters

Medical Biophysics Poster Day 2024 - Cancer, Entropy, and the Language of Proteins: Exposing pLM bias and analyzing expression of low-complexity regions in cancer

University of Toronto SURF 2022 - Decoding Protein Dynamics with Machine Learning

University of Toronto Smarti Gras 2021 - Searching for Conformational States in the Dynamics of Protein Crystals