UNIVERSITY OF ALBERTA

DEPARTMENT OF MECHANICAL ENGINEERING

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Research Assistant Position Available – Mesoscale Simulation of Confined Biochemical Processes (Doctoral Student Opportunity)

The Position

Dr. Wylie Stroberg of the Departments of Mechanical Engineering and Biomedical Engineering at the University of Alberta invites applications and queries for a doctoral (PhD) student position in **Mesoscale Simulation of Confined Biochemical Processes**. This position will be open to candidates who possess a Master of Science degree in Biomedical/Mechanical Engineering, Engineering Physics, Biophysics, Physical Chemistry, Applied Math or related fields. Applicants with experience in computational biology or biophysics are highly encouraged to apply. The successful candidate will be required to work independently and must communicate well in English. Some national and international travel may be required. The successful candidate will be financially supported. This position is available to Canadian citizens, permanent residents of Canada, refugees in Canada, and international applicants. It is expected that the successful candidate will take up the position in September or December 2024. Interested candidates may wish to visit **https://stroberg-lab.github.io** to learn more about the Computational BioSystems Lab.

The Project and Training Opportunity

The proposed research project seeks to understand how crowding and confinement within the endoplasmic reticulum affects protein trafficking. The research will develop a new particle-based simulation algorithm to model macromolecule diffusion in confined environments. The project will combine physics-based simulation methods with novel machine learning approaches to extend the time and length scales accessible by current techniques. Simulation results will be analyzed in conjunction with single-molecule molecular tracking data from collaborating research labs to answer specific open questions about protein trafficking that are relevant to a number of diseases. The training of research assistants and fellows is paramount. The selected candidate will receive formal training in the following foundational and practical areas: (i) particle-based simulation algorithms; (ii) development of machine learning-based multiscale methods; (iii) high-performance computing with massively-parallel CPU and GPU codes; (iv) visualization and analysis of large simulation datasets; (v) integration of models with single-particle tracking data; and (xii) presentation and dissemination of research findings.

Preliminary Application Procedure

Candidates are asked to submit: (i) a cover letter; (ii) a detailed curriculum vitae highlighting career achievements, areas of research, publications, awards, and a list of three professional references; (iii) unofficial transcripts from their undergraduate and graduate programs; and (iv) their score sheets from a test of English as a second language, if applicable. Interested candidates should send their completed application packages and direct queries to **Dr. Wylie Stroberg** by email at **stroberg@ualberta.ca**.