Research Fellow (Physical Sciences/STEM)
Nanyang Technological University

Job Title	Research Fellow (Physical Sciences/STEM)
Department	School of Physical and Mathematical Sciences
Institution	Nanyang Technological University Singapore, , Singapore
Date Posted	Jul. 29, 2024
Application Deadline	Open until filled
Position Start Date	Available Immediately
Job Categories	Professional Staff
Academic Field(s)	Physics - General Sciences - General
Job Website	https://ntu.wd3.myworkdayjobs.com/en-US/Careers/details/Research-Fellow--Physical-Sciences-STEM-_R00017959
Apply By Email	

Job Description

The School of Physical and Mathematical Sciences (SPMS) of NTU is an exciting environment for research. The Yong research group works on novel problems in biological and complex systems and has published many high impact papers in top scientific journals such as Science, PNAS, Phys. Rev. Lett., etc.

Our approach is highly interdisciplinary, using emerging state-of-the-art methods from mathematics, physics, artificial intelligence, machine learning, topological data analysis, and statistics. We are interested in analyzing big data of complex systems such as DNA, RNA, biological networks, social

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networks, financial markets, etc., in order to understand their behavior, pattern and interaction.

Understanding the structure-function relationships of biomolecules is an active area of research due to its fundamental importance in biology, physics, and engineering. The emerging field of Mathematical AI for Molecular Sciences is proposed for molecular representation, featurization, and learning. We are interested in developing physical models using graphs, simplicial complexes for molecular representation, featurization, and learning, particularly in the context of nucleic acids such as DNA, G-quadruplex. The results from the research will provide key insights to understanding the structure-function relationships of biomolecules.

The Yong research group is looking for a highly motivated and qualified Research Fellow with the ambition of producing high quality research that can be published in high impact journals. The Research Fellow will be involved in research design, data analysis, model development, numerical simulations, and report/paper writing.

The Research Fellow is expected to perform state of the art numerical simulations using computing resources from National Supercomputing Centre (NSCC) Singapore. The incumbent has freedom to design the nature and type of deep learning simulations.

Key Responsibilities:

- Utilize recently developed mathematical tools from algebraic topology, combinatorial topology, computational topology, and differential geometry (e.g., Betti numbers, Hodge-Laplacian, discrete Ricci curvature) to characterize and model biopolymers such as DNA and RNA.
- Develop simplicial models for molecular representation, featurization, and learning, particularly in the context of nucleic acids such as DNA, G-quadruple, to better understand form-function relationship in biology.
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Use molecular modeling and AI (using e.g., the SMILES protocol) to quickly and accurately assess compounds with Essential Physicochemical Properties for drug design and development.

- Translate research findings into practical applications in pharmacology.
- Perform numerical simulations on National Supercomputing Centre (NSCC) Singapore.

Job Requirements:

- PhD from a reputable university, preferably in physical sciences or STEM related field.
- Good publication track record.
- Strong background in artificial intelligence and biochemistry with prior experience in numerical simulations.
- Expertise in numerical simulations, and the ability to code and run simulations on deep learning workstation/supercomputers clusters.
- Able to think and work independently and have the aspiration to perform high quality research that can be published in high impact journals

We regret to inform that only shortlisted candidates will be notified.

Contact Information

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Contact

School of Physical and Mathematical Sciences
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Singapore