Lau Pak To (Ryan)

CONTACT INFORMATION

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GitHub: https://github.com/SavitarRL
Website: https://savitarrl.github.io/

EDUCATION

University College London (UCL) September 2019 - Present
BSc Natural Sciences (Major: Physics, Minor: Physical Chemistry)

- Year 1&2 Overall: 1st Class Honours
- Recipient of the Brian Duff Summer studentship to conduct Theoretical Condensed Matter Physics research
- Final Year Project (Literature Review): Classifying Topological Phases of Quantum Matter using Tensor Networks
- Associate Member of the Institute of Physics (IOP)
- Founder and Treasurer of Arts for Mental Health (ARTSMH)

Ardingly College (UK) September 2017 - June 2019
Sixth Form

- A-Levels: Mathematics (A*); Physics (A); Chemistry (A)
- Competitions: British Physics Olympiad: Commendation (2019); RSC Chemistry Olympiad: Silver (2019), Bronze (2018) ; Google Science Fair 2018 (Certificate of Recognition); Internal & external sports and music competitions
- Academic Achievements: Distinctions & Academic Awards in Physics and Mathematics; Maureen McDonnell Prize (Scholarship)

RELEVANT RESEARCH EXPERIENCE

Classifying Topological Phases of Quantum Matter using Tensor Networks Sept 2021 - Present
Literature Review on Theoretical Condensed Matter & Computational Physics UCL, UK
Supervisor: Professor Andrew Green
Research and review on using tensor network techniques to classify topological phases of matter .

Topological phase transition in S=$\frac{1}{2}$ spin chains with alternating ferromagnetic (FM) and antiferromagnetic (AFM) couplings and exchange anisotropy June 2021 - August 2021
Theoretical Condensed Matter Physics UCL, CMMP, UK
Supervisor: Dr. Frank Kruger
Conducted theoretical research on topologcial phase transitions of 1D spin chains and constructed a topological phase transition diagram numerically using Python after deriving coupled self-consistent equations.

The 3-Coloured Distributive Consensus Problem June 2021 - July 2021
Wolfram Summer School Fundamental Physics Track Online
Supervisor: Hatem Elshatlawy
Cellular automata is reviewed and used to describe phase transitions. A computational essay has been written in a Mathematica Notebook as a contribution to the Wolfram Physics Project: https://community.wolfram.com/groups/-/m/t/2312007

WORK EXPERIENCE

Research Intern June 2021 - August 2021
Brian Duff Summer Studentship (Theoretical Condensed Matter Physics) UCL, CMMP, UK
Research Topic: Topological phase transition in S=$\frac{1}{2}$ spin chains with alternating ferromagnetic (FM) and antiferromagnetic (AFM) couplings and exchange anisotropy

Undergraduate Research Assistant/Mentee January 2021 - April 2021
UCL Connect.ed Mentorship Project UCL, UK
Research Topic: Machine Learning in Stock Markets

Private Tutoring (HK) Summer 2019, 2020
Self-employed (through recommendations) Hong Kong
One on one tutoring on topics of A-Level Physics and Mathematics

SUMMER SCHOOL

Wolfram Summer School June 2021 - July 2021
Fundamental Physics Track Wolfram Research / Wolfram Physics Project
https://education.wolfram.com/summer-school/programs/physics/
Participated in lectures of Physics and Mathematics, joined Mathematica training workshops and conducted a research project.(Title: The 3-Colored Distributive Consensus Problem)

COMPETITION

The University Physics Competition November 2020
Quadcopter Stability in Wind: Silver Medal http://www.uphysicsc.com/
https://www.ucl.ac.uk/mathematical-physical-sciences/news/2021/jan/ucl-natural-sciences-students-win-silver-medal-2020-university-physics-competition
Supervisor & Team Sponsor: Dr. Frank Kruger
Solving a real-life problem by implementing classical mechanics and computation simulation in a team of 3 representing UCL. A formal paper is written in LaTeXwithin 48 hours. https://drive.google.com/drive/folders/1zf8b-X1uo8PzFvZiwtYG0lvUieJ02r5p?usp=sharing

ADDITIONAL RESEARCH EXPERIENCE

Machine Learning in Stock Markets January 2021 - May 2021
UCL Connect.ed Mentorship Research Assistant/Mentee UCL, UK
Supervisor: Dr. Ava Lee

Birdsong Audio Signal Analysis March 2021
Scientific Programming Module (Python) UCL, UK
Supervisor: Dr. Peter Bratby
Our team aimed to identify different bird species by performing Fourier Transforms (FT) on bird song audios. https://github.com/SavitarRL/NatSci-Computing/tree/master/Group%20Project/NSCI0007_Group_Project

Molecular and Business Modelling June 2020 - September 2020
NatSci Innovation Lab 2020 UCL, UK
My team used LAMMPS to gain knowledge about molecular modelling with an aspect of business modelling with the help of Python. https://mminnovationlab2020.blogspot.com/search/label/Project%20Updates.

Quantum Chemistry with an application on Drug Design Sept 2019-March 2020
Interdisciplinary Research Skills Module UCL, UK
My team reviewed how quantum chemistry and quantum computing techniques can aid the different stages of drug design.

COMMUNICATION AND OUTREACH

Arts for Mental Health (ARTSMH) October 2020 - Present
https://www.artsmentalhealth.org/
I am the Co-chairman , co-founder and treasurer of ARTSMH. ARTSMH is a student-led non-profit organization. We hope to provide students who are interested in both the arts and mental health the opportunity to explore, experience, and learn together, as well as raising awareness of mental health issues.

UCL ChangeMakers X ARTSMH April 2021 - September 2021
UCL ChangeMakers, Project Leader *UCL, UK*
Specific Role: Treasurer and data management

Student-Led Volunteering Programme April 2021 - Present
UCL Student Union, Project Leader *UCL, UK*
Specific Role: Treasurer and data management

RELEVANT CERTIFICATIONS & COURSES

Certificates: Google: IT Automation with Python; LinkedIn: C++ Essential Training; JuliaAcademy: Introduction to Julia; Microsoft: Azure AI Fundementals (AI-900)

Courses: IOP Workshops (C++ & Julia); Wolfram Research Workshops: The Wolfram Language: Programming Fundamentals, Introduction to Machine Learning; Wolfram Summer School: Wolfram Language Training, Theories, Computations & Philosophies in Mathematics & Physics, Wolfram Science models and methods, Machine Learning & Neural Networks, Data Science

TECHNICAL SKILLS

Languages: Intermediate: Python, Wolfram Language, MATLAB; Novice: C, C++, Julia, HTML, CSS, Java

Tools: Visual Studio Code, Jupyter Notebook, Wolfram Notebooks, Wolfram Mathematica, Wolfram Alpha, MATLAB R2021a, Git, GitHub, GitHub Desktop, Bash, Compiler-Explorer, Powershell, LAMMPS, WebMO, Avogadro

Typesetting Documents: LaTeX, Microsoft Office

LANGUAGES

English (Proficient) Cantonese (Native) Mandarin (Fluent)