Pak Lam (Philip) **Lee**

M.Sc. Physics (*McMaster*)
B.Sc. Math and Physics hons. (*Toronto*)

✉ PhilipPL.Lee@gmail.com
http://individual.utoronto.ca/philipUoT/

Objectives

To work in a collaborative environment investigating physical/computational processes. Models will be developed and numerically simulated for problems with inhomogeneous inputs, where a closed form solution does not exist. In cases where model for exact results become intractable, mean-field, perturbative methods, or annealing techniques are applied or simulated. Investigate whether a useful model of biological/physical computation (*i.e.* representation of information, emergent invariants/quantities) exists or to analyse the computational bounds of physical systems. My goal in the applied is to find good numerical results to "intractable" problems related to physical computation. The scientific goal is the quantitative study of complex systems (*in silico*, or by natural computations (experiments)).

Research/Work experience

2010-2012
McMaster University

M.Sc. project - supervised by *Prof. Paul G. Higgs*
We investigated the pattern of codon usage based on bioinformatics studies and developed a model to test its effect on protein translation. We used a queueing model with stochastic update rules on real gene sequences in simulations. The model is based on a paradigmatic model of statistical physics, the totally asymmetric exlusion process. Interacting particles on a lattice driven and held in non-equilibrium models ribosomes on mRNA. The flow modeled responds in a non-linear manner, remains dynamic, and rich in phenomenology (e.g. shocks, phase transition). The simulation was programmed in C++.

2010-2012
McMaster University

Physics TA, and lab demonstrator
As a graduate student at McMaster, I had the opportunity to hold tutorial sessions, and facilitate undergraduate labs. I implemented active learning strategies in tutorials. I tried to hold learner centered lessons that were driven by peer discussion and student participation.

Winter, 2007
University of Toronto

Physics project - supervised by *Prof. Stephen W. Morris*, and *Dr. Lucas Goehring*
We investigated the fracturing of dried colloidal soution in a dynamical setting. The experiment was intended to be the 2-dimensional analog of columnar jointing (work of *Goehring et al.*). Steady/persistent patterns emerge as interaction with the environment dynamically drives a system that has instabilities. We tested for the bifurcation of fracture widths, and hysteresis. I co-designed, drafted, setup, and calibrated the main experimental apparatus, communicated and collaborated with the machine shop, and performed data analysis. Excellent first exposure in applying sophisticated theory to experimental investigations.

2006-present
Toronto area

Tutor for mathematics, chemistry
I tutor students in elementary, secondary, and postsecondary level mathematics. Ranging from polygons, operations, basic algorithms, sequence and series, equations (integer, and real), polynomials, pre-calculus, vector calculus, proof logic, complex numbers, to point-set topology. Chemistry includes spectrum of elements, Bohr model, Rutherford experiment, molecular worldview, valence model of chemical bonds, reaction equations (detailed balance), redox balance, basic van der Waals, hydrocarbons, and polymers. We build and challenge our own knowledge and conception in the subjects.

Extracurricular

2011 — *McMaster University*

Instructional Skills Workshop certificate
The workshop aimed to develop skills to facilitate learning, teaching based on learner participation. We focused on active learning techniques, and in aligning assessment, activity, and outcomes.

2011 — *McMaster University, Centre for Leadership in Learning*

Principles and practices for university teaching
We explored various teaching strategies, assessment development, curriculum design, and research in education. Specific highlights are peer evaluation for mini-lesson presentations, building a course portfolio, and informed discussion and application of research in learning.

November, 2011 — *McMaster University*

Labour studies course in the Green Economy
We participated in discussions on eco-privilege, social and economic inclusiveness, and policy making in energy. I learned from distinguished peers of the community the local industrial history and environmental change in Hamilton. I learned more than I was able to contribute from members of the community.

Summer, 2011 — *Sharcnet consortium, Sheridan*

Sharcnet summer school
Students were introduced to high performance computing. Courses included: Linux shell, MPI parallelization for numerical methods, and visualization using ParaView. Programming, and hands on use of a high performance multi-processor hydrodynamic code.

2005 — *Physics and Astronomy Student Union, University of Toronto*

VP communications
I was elected VP communications for the undergraduate physics community. I was responsible for using various media, such as website, and posters to update students on current events.

Languges

Chinese	Mother tongue
English	**Fluent**
German	Conversation: beginner, reading and writing: fair
Spanish	Beginner

Programming

- Java
- C++
- Python
- LaTeX
- gnuplot
- CAD

Interests

- Enviroment, cultures, traveling
- Casual reading of philosophy
- Bass and guitar, Jazz and Blues
- Dodgeball, softball