Paul Liu

paulliu@stanford.edu

EDUCATION

Ph.D., Computer Science
Stanford University, Stanford, CA, In progress

M.Sc., Computer Science
University of British Columbia, Vancouver, BC, May 2017

B.Sci., Honours Mathematics and Physics
University of British Columbia, Vancouver, BC, May 2015

SKILLS

Languages: C++, Python, Matlab, Java, OpenGL, Mathematica
Operating Systems: Windows, GNU/Linux

EXPERIENCE

Research Assistantship (Fall 2017 - Present)
Computer Science Department, Stanford

Creative Labs Intern (Summer 2018)
Adobe, Seattle

- Worked on the simulation of water bubble sounds for graphics applications.

Research Engineer (Spring 2014 - Fall 2017)
Vital Mechanics Research

- Produced mathematical models of the human body for digital simulations. Work varied widely, from setting up testing and CI infrastructure to building complex physical models and optimizing solvers for specialized large and sparse linear systems. This work was spun off into a Government of Canada funded startup (Vital Mechanics Research).

Research Assistantship (Summer 2015 - Spring 2017)
Computer Science Department, UBC

- Worked on several problems in 2-body coordinated motion. Given two robots on an obstacle-free plane and two destination points, what is the shortest path each robot should take so that the two robots are not within unit distance of each other? We have classified optimal motions for a large variety of cases and have fully solved the problem when the robots are simple geometric shapes.

Software Engineering Intern (Summer 2016)
Facebook, Menlo Park

- Worked on statistical algorithms for detecting anomalies in time-series data. This algorithm was released to all Facebook engineers through a widely used computational backend for logging data. The algorithm was also taken up by internet.org, where it was used to detect abnormal patterns in traffic data.

NSERC Research Assistantship (Summer 2012 - Spring 2013) &
Undergraduate Research Assistantship (Fall 2013 - Spring 2014)
Scientific Computing Lab, UBC

- Created a high-performance C++ software package for performing incomplete factorizations of symmetric indefinite matrices. The complete source code, as well as extensive documentation, can be found at *https://github.com/inutard/matrix-factor*.

Software Engineering Intern (Summer 2013)
Google, Los Angeles

- Created a stochastic model for proposed ads by potential advertisers. Purpose of the model was to predict an ad's performance before the ad is released to the public. Additionally created pipelines to automatically validate accuracy of model.

PUBLICATIONS AND SERVICE

- Christopher Liaw, Paul Liu, Robert Reiss. *Approximation Schemes for Covering and Packing in the Streaming Model.* CCCG 2018.
- Nicholas J. A. Harvey, Christopher Liaw, Paul Liu. *Greedy and Local Ratio Algorithms in the MapReduce Model.* SPAA 2018.
- Ahmad Biniaz, Anil Maheshwari, Michiel H. M. Smid, Paul Liu. *Approximation algorithms for the unit disk cover problem in 2D and 3D.* Comput. Geom. 60: 8-18 (2017).
- Chen Greif, Shiwen He, Paul Liu. *SYM-ILDL: Incomplete LDL^T Factorization of Symmetric Indefinite and Skew-Symmetric Matrices.* ACM Trans. Math. Softw. 44(1): 1:1-1:21 (2017).
- David Kirkpatrick, Paul Liu. *Characterizing minimum-length coordinated motions for two discs.* CCCG 2016.
- Ahmad Biniaz, Anil Maheshwari, Michiel H. M. Smid, Paul Liu. *A Faster 4-Approximation Algorithm for the Unit Disk Cover Problem.* CCCG 2015.
- Paul Liu, Daniel Lu. *A fast 25/6-approximation for the minimum unit disk cover problem.* arXiv:1406.3838 [cs.CG]
- Chen Greif, Sam Karbet, Paul Liu, Fei Xue. *A factorized sparse approximate inverse preconditioner for symmetric indefinite linear systems.* Manuscript in preparation.
- Reviewer for Electronic Transactions on Numerical Analysis (ETNA).

COURSES TAUGHT

Computer Science 490 (2014) - Problem Solving Seminar

- Taught a full 3-credit course to expose UBC students to computing contest problems. Designed curriculum and materials that are still in use 2 years later.

DISTINCTIONS

ACM-ICPC Contest World Finals - UBC Coach (2016 - 2017)
ACM-ICPC Contest (2012 - 2014) - Canada Site Winner
ACM-ICPC Contest World Finals (2013)
U. Chicago Invitational Programming Contest (2013) - Bronze Medal
International University Physics Competition (2012) - Bronze Medal
ACM-ICPC Contest (2012) - Canada Site Winner
Google AI Contest (2011) - 7th in Canada
Dean's Honour List/Science Scholar (2010 - 2014)

AWARDS

Stanford School of Engineering Fellowship (2017)
Mackenzie King Open Scholarship (declined, 2017)
David W. Strangway Fellowship (2016)
Walter C. Koerner Fellowship (2016)
Computer Science Merit Scholar (2015)
NSERC CGS-M Grant (2015 - 2017)
GSS Open Scholar Award (2015)
G.C. Webber Memorial Prize (2015)
Physics and Astronomy Undergraduate Scholarship (2015)
Reginald Palliser-Wilson Scholarship (2014 - 2015)
John Collison Memorial Scholarship (2014)
Dharma Master Chuk Mor Memorial Scholarship (2014)
Dorothy Gladys Studer Memorial Scholarship (2013)
Volkoff Scholarship (2013)
Rick Sample Memorial Scholarship (2013)
W.H. MacInnes Scholarship (2012) - Highest standing in Math/Physics
NSERC USRA Research Award (2012)
Trek Excellence Scholarship (2011 - 2013)
President's Entrance Scholarship (2010)
BC Provincial Examination Scholarship (2010) - Top 20 in Province

EXTRA-CURRICULAR

Computer Science

- UBC ACM Team (2011 - 2018), Coach (2014 - 2018)

Mathematics

- UBC Math Circle Organizer (2012 - 2015)

Sports

- UBC Badminton Team (2016 - 2017)
- Stanford Badminton Team (2017 - Present)