

Roy Liu

One Miramar Street
Apartment #929023
La Jolla, CA 92092-9023

Home: 650-793-3017
E-mail: royliu@cs.ucsd.edu
Web Home: <http://cs.ucsd.edu/~r4liu/>

Research Interests

I specialize in computational methods that support high-throughput initiatives in Mass Spectrometry and Structural Genomics. My research is inherently multidisciplinary; it requires me to incorporate novel machine learning and distributed computing techniques to solve problems. As a result, I have interests ranging from high-dimensional data analysis to signal processing for feature extraction to large-scale cloud computing infrastructure.

Education

PhD in Computer Science, University of California at San Diego San Diego, CA
In progress, August 2006 – .

MS in Computer Science, Carnegie Mellon University Pittsburgh, PA
August 2005 – May 2006.

BS in Computer Science, Carnegie Mellon University Pittsburgh, PA
With additional degree in Mathematics, August 2002 – May 2005.

Research Experience

Computer Science Department *Bioinformatician*
La Jolla, CA **August 2006 –**
I primarily work on analytical tools for Computational Mass Spectrometry, a major research direction of the UCSD bioinformatics group. On the side, in collaboration with the Joint Center for Structural Genomics, I develop algorithms for the analysis of crystallization trial images.

IGMA Project *Software Architect*
La Jolla, CA **June 2007 – September 2007**
Defined core API's and provided foundation libraries for the world's first music search engine that incorporates machine learning from multiple sources of data. Achieved a harmony of optimization algorithms, database integration, and the high reliability afforded by Java.

Google, Inc. *Engineering Intern*
Mountain View, CA **August 2005 – September 2005**
Requirements analysis, design, and initial implementation for what later became the Google Image Labeler.

Carnegie Mellon University *Aladdin Center Intern Researcher*
Pittsburgh, PA **May 2005 – August 2005**
Under the guidance of Luis von Ahn, finished implementation of the Peekaboom project, which I started the preceding school year. Mentored fellow undergraduates on the design and implementation of their research projects, which were also web-based games.

Carnegie Mellon University
Pittsburgh, PA

Under the guidance of Alan Frieze, defined and analyzed a web graph model with orientation and deletion.

Aladdin Center Intern Researcher
May 2004 – August 2004

Teaching and Work Experience

Panasas, Inc.
Pittsburgh, PA

Proposed and implemented improved resource matching algorithms for in-house automated testing system.

Software Engineering Intern
June 2006 – August 2006

Carnegie Mellon University
Pittsburgh, PA

Graded assignments, proposed test questions, and helped professional masters students get a better feel for the programming craft.

Java Programming TA (15-500)
September 2005 – December 2005

Carnegie Mellon University
Pittsburgh, PA

Graded assignments, proposed test questions, and managed Assignment 2, “Texture Synthesis”.

Computer Graphics TA (15-462)
January 2005 – May 2005

Papers

Roy Liu, Yoav Freund, and Glen Spraggon. Image-based crystal detection: a machine-learning approach. *Acta Crystallographica Section D*, 64(12):1187–1195, Dec 2008

Douglas Turnbull, Roy Liu, Luke Barrington, and Gert Lanckriet. A game-based approach for collecting semantic annotations of music. In *ISMIR '07*, 2007

Luis von Ahn, Roy Liu, and Manuel Blum. Peekaboom: A game for locating objects in images. In *CHI '06: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, New York, NY, USA, 2006. ACM Press

Luis von Ahn, Shiry Ginosar, Mihir Kedia, Roy Liu, and Manuel Blum. Improving accessibility of the web with a computer game. In *CHI '06: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, New York, NY, USA, 2006. ACM Press

Talks

Roy Liu. Peekaboom: A game for general image segmentation. Lamps of Aladdin 2005

Posters

Roy Liu, Yoav Freund, and Glen Spraggon. Automated scoring of crystallization trials. In *Workshop on Bio-Image Informatics*, 2008

Patents

Douglas Turnbull, Luke Barrington, Roy Liu, and Gert Lanckriet. Generating audio annotations for search and retrieval. Filed March 2008, currently collecting royalties

Luis von Ahn, Roy Liu, Manuel Blum, Alexei Efros, Takeo Kanade, and Manuela Veloso. Method for locating objects in images using a computer game. Filed July 2005

Selected Peekaboom News Articles

Hide and peek. **PC Magazine**, October 2005

Guessing game gives machines clearer vision. **New Scientist**, August 2005

Teaching computers to see with games. **Slashdot**, August 2005

CMU online game will be used to teach computers to see. **Pittsburgh Post Gazette**, August 2005

Activities and Hobbies

Open Source Involvement – I maintain two open source projects, the Shared Scientific Toolbox in Java (<http://shared.sourceforge.net/>) and Dapper (<http://dapper.sourceforge.net/>), which I actively develop for my own research and at the same time share with the rest of the world.

Investing – With a focus on beaten down stocks and precious metals companies. I regularly read the WSJ and Barron's for ideas. I manage retirement funds as a service to my family. I am conversant in universal portfolios, as well as futures and options pricing.

Dean's List – Fall 2004, Spring 2004, Fall 2003, Spring 2003.

Graduated **Phi Beta Kappa** with **University Honors**.

Instructor, **Introduction to Chinese Cinema**, a student-run class – Spring 2005.

President, **Origami Club** – Fall 2004, Spring 2005.

Toolbox

Java – I consider myself a master of the language and its foundation classes.

Hibernate – My research requires me to organize large amounts of data, and Hibernate seems like the logical choice for database manipulation.

Matlab – I use Matlab for quick calculations and initial analyses.

Utility Languages – I am proficient in Perl, C++, Scheme, and SML.

Development Environment – I use the Eclipse IDE and its associated plugins to deploy my Java applications.