

# Michael O Lam

## Curriculum Vitae

October 2013

Affiliation: Department of Computer Science  
University of Maryland, College Park

Address: A.V. Williams Building  
College Park, MD 20742

Phone: 301.405.8162 (shared office)

Email: lam@cs.umd.edu

Web: <http://blog.freearrow.com/about>

### Education

- 2014 (expected) Ph.D Computer Science, University of Maryland  
Thesis title: "Automated Floating-Point Precision Analysis"
- 2010 M.S. Computer Science, University of Maryland  
GPA: 4.0
- 2007 B.S. Computer Science, James Madison University  
Minor in Mathematics and 15 credit hours in Technical Communication  
GPA: 4.0

### Research Interests

- High-Performance Computing
- Program Analysis
- Software Engineering

### Technical Skills

- Areas: Binary instrumentation, runtime analysis, floating-point arithmetic
- Operating Systems: Linux (RHEL, Ubuntu), Mac OS X, Microsoft Windows
- Languages: C, C++, C#, Java, Ruby, OCaml, x86/x86\_64 Assembly
- Systems: GNU Make, LaTeX/BibTeX, .NET, Swing

### Organizations

- Association for Computing Machinery
- Upsilon Pi Epsilon
- Pi Mu Epsilon
- Phi Kappa Phi

### Research Experience

I have performed postgraduate research in floating-point program analysis in the context of high-performance computing, as well as undergraduate research in software engineering and medical imaging. I have authored peer-reviewed papers on these topics and presented research results in a wide variety of settings.

- Spring '08-present: Graduate Research Assistant at the University of Maryland, College Park. Worked with Dr. Jeff Hollingsworth on a system for automated floating-point precision level

recommendations using binary instrumentation and runtime analysis. Also developed a tool for detecting and reporting floating-point cancellation. Website: <http://blog.freearrow.com/software/craft>

- Summer '11: Research Internship at Lawrence Livermore National Lab in Livermore, CA. Worked with Dr. Bronis de Supinski and others to develop tools for floating-point arithmetic analysis in the context of high-performance computing.
- Fall '06 - Spring '07: Worked as student research assistant with Dr. David Bernstein on an open source object-oriented framework for OpenGL programming in C++, with a focus on robust design patterns and support for large-scale multiple-monitor visualization. Website: <http://code.google.com/p/xor/>
- Summer '06: Worked as a student research assistant on an open source framework for medical image retrieval in C# with Dr. Daniela Raicu (DePaul). Topics included content-based image retrieval, co-occurrence image features, and Gabor image filters. Website: <http://brisc.sourceforge.net/>

## Teaching Experience

- Summer '08 and Summer '12: Instructor for CMSC330 - Survey of Programming Languages. Taught three 75-minute lectures per week for eight weeks on various topics related to programming paradigms, language theory, and type systems. Supervised five programming assignments. Wrote and graded midterm and final exams. Class consisted of around 30 sophomore- and junior-level college students.
- Fall '07: Teaching Assistant for CMSC330 - Survey of Programming Languages. Led four hours of discussion sections biweekly for around 80 students total and helped with homework/exam grading.
- January '13 - present: Home group study leader, Wallace Presbyterian Church. Prepared and taught weekly lessons based on materials provided by church leadership.

## Service Experience

- Fall '10 - Spring '13: Representative, Graduate Student Government, University of Maryland. Attended regular campus-wide assembly meetings and voted on matters related to graduate student life. Served one year on the Student Affairs committee and one year on the Budget and Finance committee.
- Spring '13: Member, Graduate Admissions Committee, Department of Computer Science, University of Maryland. Reviewed over thirty applications and submitted written evaluations.
- Spring '12: Member, Departmental Review Committee, Department of Computer Science, James Madison University. Reviewed numerous aspects of the department and co-authored a report for the university administration.
- January '12-present: Deacon, Wallace Presbyterian Church. Served as secretary for the diaconal board. Handled various day-to-day IT and networking issues for the church office. Coordinated the implementation of a new recycling initiative. Helped in various humanitarian and relief efforts.

## Publications

### Journal articles

1. Lam, Michael O., Jeffrey K. Hollingsworth, and G. W. Stewart. Dynamic floating-point cancellation detection. *Parallel Computing* **39**(3) (Mar. 2013), 146–155.
2. Lam, Michael O, Tim Disney, Daniela S Raicu, Jacob Furst, and David S Channin. BRISC - An Open Source Pulmonary Nodule Image Retrieval Framework. *Journal of Digital Imaging* **20**(Suppl 1) (2007), 63–71.

### Conference papers

1. Lam, Michael O., Jeffrey K. Hollingsworth, Bronis R. de Supinski, and Matthew P. Legendre. Automatically adapting programs for mixed-precision floating-point computation. In: *Proceedings of the 27th International ACM Conference on Supercomputing - ICS '13*. New York, New York, USA: ACM Press, June 2013, pp.369.
2. Lam, Michael O, Jeffrey K Hollingsworth, and G W Stewart. Dynamic Floating-Point Cancellation Detection. In: *Proceedings of the First International Workshop on High-performance Infrastructure for Scalable Tools (WHIST'11)*. 2011.
3. Disney, Tim, Michael O Lam, Daniela S Raicu, Jacob Furst, and David S Channin. A Lookup and Reference Tool for Pulmonary Computed Tomography Nodules. In: *Proceedings of the 2007 Annual Meeting of the Society for Imaging Informatics in Medicine (SIIM'07)*. Providence, Rhode Island, 2007.
4. Lam, Michael, Tim Disney, Mailan Pham, Daniela Raicu, Jacob Furst, and Ruchaneewan Susomboon. Content-Based Image Retrieval for Pulmonary Computed Tomography Nodule Images. In: *Proceedings of the 2007 SPIE Medical Imaging Conference (SPIE'07)*. Vol. 6516. San Diego, CA: Spie, 2007.

### Conference posters

1. Lam, Michael O, Jeffrey K Hollingsworth, Bronis R de Supinski, and Matthew P Legendre. Automatically Adapting Programs for Mixed-Precision Floating-Point Computation (Poster). In: *Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis (SC'12)*. 2012.

### Unpublished technical reports

1. Lam, Michael O. *Automatic Floating-Point Precision Analysis (Ph.D Proposal)*. Tech. rep. Department of Computer Science, University of Maryland, Oct. 2011.
2. — *Dynamic Floating-Point Cancellation Detection (Master's Degree Scholarly Paper)*. Tech. rep. Department of Computer Science, University of Maryland, 2010.

### Selected presentations

- “Automatically Adapting Programs for Mixed-Precision Floating-Point Computation.” ICS'13. Eugene, OR. 14 June 2013.
- “Automated Mixed-Precision Floating Point Analysis.” Invited talk. Workshop on Algorithmic and Application Error Resilience 2013. Eugene, OR. 11 June 2013.
- “Office Space and Salami: Analyzing Rounding Error in Computer Programs.” Presentation. 1st Place in “Smart Computers and Computer Science” category. UMD Graduate Research Interaction Day. 23 April 2013.
- “Optimization of Floating-point Precision using Binary Modification.” Presentation. Center for Scalable Application Development Software (CScADS). Performance Tools for Extreme-scale Computing Workshop 2012. Snowbird, UT. July 2012.
- “Binary-Level Tools for Floating-Point Correctness Analysis.” Internship final report. Lawrence Livermore National Lab. 29 July 2011.
- “Dynamic Floating-Point Cancellation Detection.” WHIST '11. Tucson, AZ. 4 June 2011.