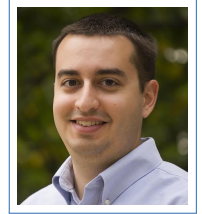


# Michael O. Lam

## Curriculum Vitae

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### Education

- 2007–2014 **Ph.D. Computer Science**, *University of Maryland*, College Park, MD.  
2007–2010 **M.S. Computer Science**, *University of Maryland*, College Park, MD.  
2004–2007 **B.S. Computer Science**, *James Madison University*, Harrisonburg, VA.  
Minor in Mathematics

### Relevant Experience

- 2020–present **Associate Professor**, *James Madison University*, Harrisonburg, VA.  
2014–2020 **Assistant Professor**, *James Madison University*, Harrisonburg, VA.  
Teach courses on systems fundamentals, parallel and distributed systems, compiler systems, and programming languages. Advise undergraduate research projects in system tools, compiler systems, high-performance computing, and software engineering. Serve on a variety of department- and college-level committees and service projects as well as advisor to several student organizations.
- 2011, 2016–present **Research Scholar and Collaborator**, *Lawrence Livermore National Lab*, Livermore, CA.  
Work with multiple teams to develop systems tools for floating-point arithmetic analysis in the context of high-performance computing. Recruit and advise undergraduate student interns.
- 2007–2014 **Graduate Research Assistant and Postdoctoral Researcher**,  
*University of Maryland*, College Park, MD.  
Worked with Dr. Jeff Hollingsworth on a software 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.
- 2006 **Undergraduate Research Assistant**, *DePaul University*, Chicago, IL.  
Worked with Dr. Daniela Raicu on an open-source framework for content-based medical image retrieval.

### Selected Awards and Honors

- Co-PI on awarded grant “PSM based tool to simulate large thread/interceptor events”, Triton Systems, Inc., 2022, \$210,000.
- Outstanding Student Mentor Award, College of Integrated Science and Engineering, James Madison University, 2021.
- Outstanding Junior Faculty Award, College of Integrated Science and Engineering, James Madison University, 2019.
- Invited panelist, “Facilitating the Adoption of Correctness Tools in HPC Applications” at the Second International Workshop on Software Correctness for HPC Applications (co-located with SC’18), 2018.
- Provost’s Research and Development Grant, James Madison University, 2017-2018, \$4,840
- Faculty Development Grant, College of Integrated Science and Engineering, James Madison University, 2017-2018, \$4,000
- Provost Research Award, James Madison University, 2015-2016, \$4,000

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## Teaching Experience

- **CS240 - Data Structures and Algorithms** (Fa14, Fa15)
- **CS261 - Computer Systems I** (Fa16, Fa17, Fa18, Fa19, Fa20, Fa21, Fa22)  
Designed or re-designed all course material in 2016, much of which is now also used by other faculty who teach the course. Augmented this material in 2020 with recorded lectures.
- **CS280 - Competitive Programming** (Fa15, Fa16, Sp18, Sp19)  
This course prepares students to participate in the ACM ICPC programming competition.
- **CS430 - Programming Languages** (Sp15, Sp18, Sp19, Sp20, Sp21, Sp22)
- **CS432 - Compilers** (Fa16, Fa17, Fa18, Fa19, Fa20, Fa21, Fa22)  
Successfully proposed the creation of this new catalog course, designing the course itself and all material using applied backwards design theory. The course is now a permanent advanced elective in our systems curriculum.
- **CS470 - Parallel and Distributed Systems** (Sp16, Sp17, Sp18, Sp19, Sp20, Sp21, Sp22)  
Designed and implemented this course as an advanced elective in our systems curriculum.
- **CS480 - Special Topics: Compilers** (Fa15)
- **CS480 - Special Topics: Large-scale Visualization** (Sp15)  
Co-taught this cross-listed CS/Math course on visualization with a faculty member from the math department; the course was sponsored by the JMU Institute for Visual Studies.
- **CS630 - Compilers (Graduate)** (Sp15, Sp16, Sp17)  
Re-designed this course to include a more rigorous semester-long project.
- **Tutorial on Floating-Point Analysis and Reproducibility Tools for Scientific Software** at Supercomputing'19 conference in Denver, CO. <http://fpanalysistools.org/sc19/>

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## Selected Advising Experience

- Fa22: Ben Huber, "ODE Visualization Tool" (Independent study, advisor)
- Fa20: Steven Taylor, "Video Game Design Concepts and Development" (Independent study, advisor)
- Sp19 – Sp20: Charles Hines, "Less-Java, More Type Safety Project" (Honors thesis, advisor)
- Sp19 – Sp20: William Lovo, "Analyzing Text Classifiers to Support DLP System" (Honors thesis, reader)
- Sp18 – Sp19: Rebecca Wild, "Precision Analysis of a Chaotic System" (Honors thesis, advisor)
- Sp18 – Sp19: Adam Blalock, "A Study of the Effect of Memory System Configuration on the Power Consumption of an FPGA Processor" (Honors thesis, reader)
- Sp17 – Sp18: Zamua Nasrawt, "Less Java, More Learning: Language Design for Introductory Programming" (Honors thesis, advisor)
- 2016 – Sp17: Cory Walker, "Mapping the Bitcoin Network" (Master's thesis, committee member)
- 2015 – Sp16: LaTia Hutchinson, "Live Musical Steganography" (Master's thesis, committee member)

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## Selected Service Contributions

- Fa22 – Fa23: Students@SC Student Networking and Mentoring chair (Supercomputing, field)  
Manage all student networking and mentoring events (four reporting roles).
- Fa22 – present: madiSTEM Co-Director for Volunteers and Evaluation (JMU, community)  
Manage yearly STEM outreach conference for girls in grades 6-8.
- Sp22 – present: Students@SC Student Programming committee member (Supercomputing, field)
- Fa20 – present: CS department Scholarship and Awards committee member (JMU, dept.)

- Fa19 – present: CS department representative on the CISE Curriculum and Instruction committee (JMU, college, chair Fa20-Sp22)
- Fa17 – present: Advisor for Upsilon Pi Epsilon honor society (JMU, dept.)
- Fa17 – present: Co-advisor for Unix Users Group club (JMU, university)
- Fa17 – present: Advisor for PlayMU gaming club (JMU, university)
- Fa14 – present: CS department lab systems committee member (JMU, dept.)
- Sp20 – Fa21: Students@SC Mentor-Protege chair (Supercomputing, field)  
Ran Mentor-Protege program two years in a row.
- Fa16 – Sp20: Volunteer mentor for Mentor-Protege program (Supercomputing, field)  
Mentor students attending Supercomputing, answering questions about research, teaching, and career options in HPC.
- Fa20 – Sp21: CS department faculty search committee chair (JMU, dept.)
- Fa15 – Fa19: Co-advisor for ACM Competitive Programming club (JMU, dept.)
- Fa19: Site director for the International Collegiate Programming Contest (ICPC) Mid-Atlantic Regional Contest (ICPC, field)  
Organized a site for the regional programming contest for 20 teams from surrounding states.
- Sp19: Volunteer Chair for ACM Capital Region Celebration of Women in Computing (CAP-WIC'19) conference at JMU (ACM-W, field)
- Sp18 – Sp19: Web Chair for Principles and Practice of Parallel Programming 2019 (PPoPP'19) conference in Washington, DC (ACM SIGPLAN, field)
- Sp15 – Sp17: Systems acquisition (JMU, dept./college)  
Coordinated the purchase, installation, and maintenance of a 16-node high-performance computing cluster that is used for both research and teaching.
- Fa14 – Fa15: Systems track curriculum re-design committee (JMU, dept.)  
Helped significantly with the development of a new senior-level parallel and distributed systems class with an emphasis on high-performance computing, as well as a new senior-level compilers class with an emphasis on systems and software engineering.
- Fa10 – Sp13: Representative, Graduate Student Government (UMD)  
Represented Computer Science graduate students in assembly meetings. Served one year on the Student Affairs committee and one year on the Budget and Finance committee.

## Software Releases

- **FloatSmith** Automated source-level precision tuning (released December 2019)  
URL: <https://github.com/crafthpc/floatsmith>
- **ADAPT** - Automatic differentiation tool for precision tuning (released January 2019)  
URL: [github.com/11n1/adapt-fp](https://github.com/11n1/adapt-fp)
- **CRAFT** - Floating-point runtime analysis library  
(v1.0 released 2014, v1.1 released 2016, and v1.2 released 2018)  
URL: [github.com/crafthpc/craft](https://github.com/crafthpc/craft)
- **C Test Framework** for academic courses (released July 2018)  
URL: [github.com/JMU-CS/c-test-framework](https://github.com/JMU-CS/c-test-framework)
- **SHVAL** - Floating-point shadow value analysis library (released April 2017)  
URL: [github.com/lam2mo/shval](https://github.com/lam2mo/shval)

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## Selected Publications

### Journal Articles

- [1] Michael O. Lam and Dee A. B. Weikle. A successful online systems class using scaffolded active learning and formative assessment. *Journal of Computing Sciences in Colleges*, 37(3):132–142, October 2021.
- [2] Zamua O. Nasrawt and Michael O. Lam. Less-Java, More Learning: Language Design for Introductory Programming. *Journal of Computing Sciences in Colleges*, 34(3):64–72, 2019.
- [3] Michael O. Lam, Noah S. McClelland, Matthew R. Petty, and John J B Webb. Computing bases of modular forms using the graded algebra structure. *Monatshefte für Mathematik*, March 2018.
- [4] Joseph K. Arbogast, Isaac B. Sumner, and Michael O. Lam. Parallelizing Shamir's Secret Sharing Algorithm. *Journal of Computing Sciences in Colleges*, 33(3):12–18, 2018. Publisher: Consortium for Computing Sciences in Colleges.
- [5] Quincy E. Mast, Zamua O. Nasrawt, Garrett L. Folks, and Michael O. Lam. Traveling Salesman: A Heuristic Scaling Analysis. *Journal of Computing Sciences in Colleges*, 33(3):19–25, 2018. Publisher: Consortium for Computing Sciences in Colleges.
- [6] Patricia D. Soriano, Kevin H. Amrein, Sam P. Carswell, and Michael O. Lam. Analysis of Parallel Implementations of Centrality Algorithms. *Journal of Computing Sciences in Colleges*, 33(3):31–38, 2018. Publisher: Consortium for Computing Sciences in Colleges.
- [7] R. Medhat, M.O. Lam, B.L. Rountree, B. Bonakdarpour, and S. Fischmeister. Managing the performance/error tradeoff of floating-point intensive applications. *ACM Transactions on Embedded Computing Systems*, 16(5s), 2017.
- [8] Michael O. Lam and J. K. Hollingsworth. Fine-Grained Floating-Point Precision Analysis. *International Journal of High Performance Computing Applications*, page 1094342016652462, June 2016. Publisher: SAGE Publications.
- [9] Michael O. Lam, Jeffrey K. Hollingsworth, and G.W. Stewart. Dynamic Floating-Point Cancellation Detection. *Parallel Computing*, 39(3):146–155, March 2013. Publisher: Elsevier Science Publishers B. V.

### Conference or Peer-Reviewed Workshop Papers

- [10] Konstantinos Parasyris, Ignacio Laguna, Harshitha Menon, Markus Schordan, Daniel Osei-Kuffuor, Giorgis Georgakoudis, Michael O. Lam, and Tristan Vanderbruggen. HPC-MixPBench: An HPC Benchmark Suite for Mixed-Precision Analysis. In *2020 IEEE International Symposium on Workload Characterization (IISWC)*, pages 25–36, October 2020.
- [11] Michael O. Lam, Tristan Vanderbruggen, Harshitha Menon, and Markus Schordan. Tool Integration for Source-Level Mixed Precision. In *Proceedings of the Third International Workshop on Software Correctness for HPC Applications held in conjunction with SC19: The International Conference for High Performance Computing, Networking, Storage and Analysis*, Denver, CO, 2019.
- [12] Dee A. B. Weikle, Michael O. Lam, and Michael S. Kirkpatrick. Automating Systems Course Unit and Integration Testing. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education (SIGCSE'19)*, pages 565–570, Minneapolis, MN, 2019. ACM.
- [13] Harshitha Menon, Michael O Lam, Daniel Osei-kuffuor, Markus Schordan, Scott Lloyd, Kathryn Mohror, and Jeffrey Hittinger. ADAPT : Algorithmic Differentiation Applied to Floating-Point

- Precision Tuning. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'18)*, pages 48:1–48:13, Dallas, Texas, 2018. IEEE Press.
- [14] Ramy Medhat, Michael O. Lam, Barry L. Rountree, Borzoo Bonakdarpour, and Sebastian Fischmeister. Managing the Performance/Error Tradeoff of Floating-point Intensive Applications. In *Proceedings of the International Conference on Embedded Software (EMSOFT'17)*. ACM, 2017. arXiv: 1603.09436 ISSN: 16130073.
- [15] Shane Fogerty, Siddhartha Bishnu, Yuliana Zamora, Laura Monroe, Steve Poole, Michael Lam, Joe Schoonover, and Robert Robey. Thoughtful Precision in Mini-Apps. In *2017 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 858–865, Honolulu, HI, September 2017. IEEE.
- [16] Michael O. Lam and Barry L. Rountree. Floating-Point Shadow Value Analysis. In *Proceedings of the 5th Workshop on Extreme-Scale Programming Tools*, pages 18–25, Piscataway, NJ, USA, 2016. IEEE Press. Series Title: ESPT '16.
- [17] Michael O. Lam, 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)*, page 369, New York, New York, USA, June 2013. ACM Press.
- [18] Michael O. Lam, Jeffrey K. Hollingsworth, and G.W. Stewart. Dynamic Floating-Point Cancellation Detection. In *WHIST '11*, 2011.

#### Technical Reports

- [19] J. A. Hittinger, P. G. Lindstrom, H. Bhatia, P. T. Bremer, D. M. Copeland, K. K. Chand, A. L. Fox, G. S. Lloyd, H. Menon, G. D. Morrison, D. Osei-Kuffuor, N. T. Pinnow, D. J. Quinlan, G. D. Sanders, M. Schordan, T. Vanderbruggen, D. Hoang, P. Klacansky, V. Pascucci, W. Usher, M. Lam, L. G. Moody, J. D. Diffenderfer, A. Metere, and L. M. Yang. Variable Precision Computing. Technical report, Lawrence Livermore National Laboratory, 2019.
- [20] Michael O Lam. Summer Report: Tool Integration for Variable-Precision Computing. Technical report, Lawrence Livermore National Laboratory, 2018.
- [21] Michael O Lam. Summer Report: Software Tools for Variable-Precision Computing. Technical report, Lawrence Livermore National Laboratory, 2017.

#### Invited Articles

- [22] Michael O. Lam. Video games. *AccessScience*, 2016. Publisher: McGraw-Hill Education.