## Amir Kamil


CONTACT INFORMATION

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RESEARCH INTERESTS

Program analysis, high performance computing, compilers and language design for productive parallel computing, program synthesis, broadening participation in computing, compiler error messages, integrated development environments for education

EDUCATION

**University of California**, Berkeley, California USA

B.S., Electrical Engineering and Computer Science, Minor in Physics, 2004
M.S., Computer Science, 2006
Ph.D., Computer Science, 2012

- Specialization: Languages and compilers for parallel computing
- Advisor: Katherine Yelick

TEACHING EXPERIENCE

**University of Michigan**, Ann Arbor, Michigan, USA

*Instructor* **Winter 2021 (as EECS 398), Winter 2022, Winter 2023**
EECS 390: Programming Paradigms (Junior-level undergraduate course).

*Instructor* **Winter 2020, Fall 2020, Fall 2021, Fall 2022**
EECS 376: Foundations of Computer Science (Junior-level undergraduate course).

*Instructor* **Fall 2016, Fall 2017, Fall 2018, Fall 2019**
EECS 490: Programming Languages (Junior/senior-level undergraduate course).

*Instructor* **Fall 2018, Fall 2019**
EECS 285: Practical Programming in Java (Sophomore/junior-level undergraduate course).

*Instructor* **Winter 2016, Fall 2016, Winter 2017, Fall 2017, Winter 2018, Spring 2018, Winter 2019**
EECS 280: Programming and Introductory Data Structures (Freshman/sophomore-level undergraduate course).

*Instructor* **Fall 2015**
EECS 183: Elementary Programming Concepts (Freshman-level undergraduate course).

**University of California**, Berkeley, California USA

*Instructor* **Spring 2013**
CS61A: The Structure and Interpretation of Computer Programs (Freshman-level undergraduate course).

*Instructor* **Summer 2011**
CS70: Discrete Mathematics and Probability Theory (Sophomore-level undergraduate course).

PUBLICATIONS

*Journal Papers*

1. Didem Unat, Anshu Dubey, Torsten Hoefler, John Shalf, Mark Abraham, Mauro Bianco, Bradford L. Chamberlain, Romain Cledat, H. Carter Edwards, Hal Finkel, Karl Fuerlinger, Frank Hannig, Emmanuel Jeannot, **Amir Kamil**, Jeff Keasler, Paul H J Kelly, Vitus Leung, Hatem Ltaief, Naoya Maruyama, Chris J. Newburn, and Miquel Pericás. *Trends in Data Locality Abstractions for HPC Systems.* IEEE Transactions on Parallel and Distributed Systems, Volume 28, Issue 10, October 1 2017.
2. Katherine Yelick, Dan Bonachea, Wei-Yu Chen, Phillip Colella, Kaushik Datta, Jason Duell, Susan L. Graham, Paul Hargrove, Paul Hilfinger, Parry Husbands, Costin Iancu, **Amir Kamil**, Rajesh Nishtala, Jimmy Su, Michael Welcome, and Tong Wen. *Productivity and Performance Using Partitioned Global Address Space Languages.* Parallel Symbolic Computation 2007, London, Ontario, July 2007.
3. Katherine Yelick, Paul Hilfinger, Susan Graham, Dan Bonachea, Jimmy Su, **Amir Kamil**, Kaushik Datta, Phillip Colella, and Tong Wen. *Parallel Languages and Compilers: Perspective from the Titanium Experience.* The International Journal of High Performance Computing Applications, Volume 21, No. 2, Summer 2007.

*Peer-Reviewed Conference and Workshop Papers*

4. Hammad Ahmad, Zachary Karas, Kim Diaz, **Amir Kamil**, Jean-Baptiste Jeannin, Westley Weimer. *How Do We Read Formal Claims? Eye-Tracking and the Cognition of Proofs about Algorithms.* The 45th International Conference on Software Engineering (ICSE 2023), Melbourne, Australia, May 2023.
5. **Amir Kamil** and Dan Bonachea. *Optimization of Asynchronous Communication Operations through Eager Notifications.* The 4th Annual Parallel Applications Workshop, Alternatives To MPI+X (PAW-ATM 2021), St. Louis, Missouri, November 2021.
6. Madeline Endres, Westley Weimer, **Amir Kamil**. *An Analysis of Iterative and Recursive Problem Performance.* The 52nd ACM Technical Symposium on Computer Science Education (SIGCSE 2021), March 2021.
7. Laura K Alford, **Amir Kamil**, Andrew DeOrio. *Student Sense of Community Through an Introductory Computer Programming Course Sequence.* American Society of Engineering Education Annual Conference (ASEE 2020), June 2020.
8. Brett A. Becker, Paul Denny, Raymond Pettit, Durell Bouchard, Dennis J. Bouvier, Brian Harrington, **Amir Kamil**, Amey Karkare, Chris McDonald, Peter-Michael Osera, Janice L. Pearce, James Prather. *Compiler Error Messages Considered Unhelpful: The Landscape of Text-Based Programming Error Message Research.* Proceedings of the Working Group Reports on Innovation and Technology in Computer Science Education (ITiCSE-WGR 2019), Aberdeen, Scotland, July 2019.
9. John Bachan, Scott B. Baden, Steven Hofmeyr, Mathias Jacquelin, **Amir Kamil**, Dan Bonachea, Paul H. Hargrove, and Hadia Ahmed. *UPC++: A High-Performance Communication Framework for Asynchronous Computation.* 33rd IEEE International Parallel and Distributed Processing Symposium (IPDPS 2019), Rio de Janeiro, Brazil, May 2019.
10. **Amir Kamil**, James Juett, Andrew DeOrio. *Gender-balanced TAs from an Unbalanced Student Body.* The 50th ACM Technical Symposium on Computer Science Education (SIGCSE 2019), Minneapolis, Minnesota, February 2019.
11. John Bachan, Dan Bonachea, Paul H. Hargrove, Steve Hofmeyer, Mathias Jacquelin, **Amir Kamil**, Brian van Straalen, Scott B. Baden. *The UPC++ PGAS library for Exascale Computing.* Second Annual PGAS Applications Workshop (PAW 2017), Denver, Colorado, November 2017.
12. David Ozog, **Amir Kamil**, Yili Zheng, Paul Hargrove, Jeff R. Hammond, Allen Malony, Wibe de Jong, Kathy Yelick. *A Hartree-Fock Application using UPC++ and the New DArray Library.* 30th IEEE International Parallel and Distributed Processing Symposium (IPDPS 2016), Chicago, Illinois, May 2016.
13. Hongzhang Shan, Samuel Williams, Yili Zheng, **Amir Kamil**, Katherine Yelick. *Implementing High-Performance Geometric Multigrid Solver With Naturally Grained Messages.* 9th International Con-

ference on Partitioned Global Address Space Programming Models (PGAS 2015), Washington, DC, September 2015.

14. Hongzhang Shan, **Amir Kamil**, Samuel Williams, Yili Zheng, Katherine Yelick. *Evaluation of PGAS Communication Paradigms with Geometric Multigrid.* 8th International Conference on Partitioned Global Address Space Programming Models (PGAS 2014), Eugene, Oregon, October 2014.
15. **Amir Kamil**, Yili Zheng, and Katherine Yelick. *A Local-View Array Library for Partitioned Global Address Space C++ Programs.* ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming (ARRAY 2014), Edinburgh, Scotland, United Kingdom, June 2014.
16. Yili Zheng, **Amir Kamil**, Michael Driscoll, Hongzhang Shan, Katherine Yelick. *UPC++: A PGAS Extension for C++.* 28th IEEE International Parallel and Distributed Processing Symposium (IPDPS 2014), Phoenix, Arizona, May 2014.
17. **Amir Kamil** and Katherine Yelick. *Hierarchical Computation in the SPMD Programming Model.* 26th International Workshop on Languages and Compilers for Parallel Computing, San Jose, California, September 2013.
18. **Amir Kamil** and Katherine Yelick. *Enforcing Textual Alignment of Collectives Using Dynamic Checks.* 22nd International Workshop on Languages and Compilers for Parallel Computing, Newark, Delaware, October 2009.
19. **Amir Kamil** and Katherine Yelick. *Hierarchical Pointer Analysis for Distributed Programs.* The 14th International Static Analysis Symposium (SAS 2007), Kongens Lyngby, Denmark, August 2007.
20. **Amir Kamil**, Jimmy Su, and Katherine Yelick. *Making Sequential Consistency Practical in Titanium.* Supercomputing 2005 (SC|05), Seattle, Washington, November 2005.
21. **Amir Kamil** and Katherine Yelick. *Concurrency Analysis for Parallel Programs with Textually Aligned Barriers.* 18th International Workshop on Languages and Compilers for Parallel Computing, Hawthorne, New York, October 2005.

*Technical Reports*

22. Dan Bonachea and **Amir Kamil**. *UPC++ Specification v1.0, Revision 2023.3.0.* LBNL Technical Report No. LBNL-2001516, March 2023.
23. John Bachan, Scott B. Baden, Dan Bonachea, Johnny Corbino, Max Grossman, Paul H. Hargrove, Steven Hofmeyer, Mathias Jacquelin, **Amir Kamil**, Brian van Straalen, and Daniel Waters. *UPC++ Programmer's Guide, Revision 2023.3.0.* LBNL Technical Report No. LBNL-2001517, March 2023.
24. Adrian Tate, **Amir Kamil**, Anshu Dubey, Armin Größlinger, Brad Chamberlain, Brice Goglin, Carter Edwards, Chris J. Newburn, David Padua, Didem Unat, Emmanuel Jeannot, Frank Hannig, Gysi Tobias, Hatem Ltaief, James Sexton, Jesus Labarta, John Shalf, Karl Fuerlinger, Kathryn O'Brien, Leonidas Linardakis, Maciej Besta, Marie-Christine Sawley, Mark Abraham, Mauro Bianco, Miquel Pericàs, Naoya Maruyama, Paul Kelly, Peter Messmer, Robert B. Ross, Romain Cledat, Satoshi Matsuoka, Thomas Schulthess, Torsten Hoefler, Vitus Leung. *Programming Abstractions for Data Locality.* 2014 Workshop on Programming Abstractions for Data Locality. Lugano, Switzerland, April 28-29, 2014.
25. **Amir Kamil.** *A Team Analysis Proposal for Recursive Single Program, Multiple Data Programs.* UCB Technical Report No. EECS-2012-83, August 2012.
26. **Amir Kamil.** *Hierarchical Additions to the SPMD Programming Model.* UCB Technical Report No. EECS-2012-20, February 2012.
27. **Amir Kamil.** *The Hierarchical SPMD Programming Model.* UCB Technical Report No. EECS-2011-28, April 2011.
28. P. N. Hilfinger, Dan Bonachea, Kaushik Datta, David Gay, Susan Graham, **Amir Kamil**, Ben Liblit, Geoff Pike, Jimmy Su, and Katherine Yelick. *Titanium Language Reference Manual, Version 2.20.* UCB Technical Report No. EECS-2005-15.1, August 2006.

29. **Amir Kamil.** *Concurrency Analysis for Parallel Programs with Textually Aligned Barriers.* UCB Technical Report No. EECS-2006-41, April 2006.

*Theses*

30. **Amir Kamil.** *Single Program, Multiple Data Programming for Hierarchical Computations.* Ph.D. Thesis, EECS Department, University of California, Berkeley, August 2012.
31. **Amir Kamil.** *Analysis of Partitioned Global Address Space Programs.* Master's Report, EECS Department, University of California, Berkeley, December 2006.

*Tutorials*

32. Michelle Mills Strout, Damian Rouson, and **Amir Kamil**. *Introduction to High-Performance Parallel Distributed Computing using Chapel, UPC++ and Coarray Fortran.* Oak Ridge Leadership Computing Facility (OLCF), the National Energy Research Scientific Computing Center (NERSC), and the Exascale Computing Project (ECP) Tutorial, July 2023.
33. Katherine A. Yelick, **Amir Kamil**, Damian Rouson, Dan Bonachea, and Paul H. Hargrove. *UPC++: An Asynchronous RMA/RPC Library for Distributed C++ Applications.* The International Conference for High Performance Computing, Networking, Storage and Analysis 2021 (SC21), November 2021.
34. Katherine A. Yelick, **Amir Kamil**, Dan Bonachea, and Paul H. Hargrove. *UPC++: An Asynchronous RMA/RPC Library for Distributed C++ Applications.* The International Conference for High Performance Computing, Networking, Storage and Analysis 2020 (SC20), November 2020.
35. **Amir Kamil**. *UPC++: An Asynchronous RMA/RPC Library for Distributed C++ Applications.* Argonne Leadership Computing Facility and Exascale Computing Project UPC++ Webinar, May 2020.
36. **Amir Kamil**. *UPC++: A PGAS/RPC Library for Asynchronous Exascale Communication in C++.* 2020 Exascale Computing Project Annual Meeting, Houston, TX, February 2020.
37. **Amir Kamil**. *UPC++: A High-Performance Communication Framework for Asynchronous Computation.* National Energy Research Scientific Computing Center and Exascale Computing Project Tutorial on UPC++, Berkeley, CA, December 2019.
38. **Amir Kamil**. *UPC++: A High-Performance Communication Framework for Asynchronous Computation.* National Energy Research Scientific Computing Center and Exascale Computing Project Tutorial on UPC++, Online Tutorial, November 2019.
39. Katherine Yelick and **Amir Kamil**. *UPC and UPC++: Partitioned Global Address Space Languages.* Argonne Training Program on Extreme-Scale Computing (ATPESC 2017), St. Charles, IL, August 2017.
40. Katherine Yelick, Yili Zheng, and **Amir Kamil**. *Developing Parallel C++ Applications with Modern PGAS Features in UPC++.* 9th International Conference on Partitioned Global Address Space Programming Models (PGAS 2015), Washington, DC, September 2015.

*Other*

41. Madeline Endres, Westley Weimer, and **Amir Kamil**. *Making a Gamble: Recruiting SE Participants on a Budget.* The 1st International Workshop on Recruiting Participants for Empirical Software Engineering (ROPES'22), May 2022.
42. Michael Driscoll, **Amir Kamil**, Shoaib Kamil, Yili Zheng, and Katherine Yelick. *PyGAS: A Partitioned Global Address Space Extension for Python.* The Sixth Conference on Partitioned Global Address Space Programming Models (PGAS 2012), Santa Barbara, California, October 2012.
43. **Amir Kamil**, Jimmy Su, and Katherine Yelick. *Towards a Sequentially Consistent Memory Model for PGAS Languages.* The Second Conference on Partitioned Global Address Space Programming Models (PGAS 2006), Washington, D.C., October 2006.

## Panels and Invited Talks

*A TA-selection Process that Increases Representation of Women.* Showcase of NCWIT Academic Alliance Members: Promising Practices Regarding Admission, Curriculum, Pedagogy, TA Selection, and Undergraduate Research at the 52nd ACM Technical Symposium on Computer Science Education (SIGCSE 2021), March 2021.

*Towards a Portable Model for Mapping Locality to Hierarchical Machines.* Workshop on Programming Abstractions for Data Locality (PADAL), 2015.

*Managing Hierarchy with Teams in the SPMD Programming Model.* Workshop on Programming Abstractions for Data Locality (PADAL), 2014.

*Three Challenges and Three Solutions for Exascale Computing.* NSF Workshop on Research Directions in the Principles of Parallel Computation, 2012.

## Professional Experience

**University of Michigan**, Ann Arbor, Michigan, USA

*Lecturer IV* **September 2019 - present**
*Lecturer III* **September 2015 - August 2019**
Teaching and development of undergraduate Computer Science courses. Advising undergraduate students.

**Lawrence Berkeley National Laboratory**, Berkeley, California, USA

*Visiting Faculty* **June 2022 - present**
*Computer Systems Engineer (Limited)* **September 2015 - September 2020, November 2020 - May 2022**
*Postdoctoral Fellow* **July 2013 - August 2015**
Design and implementation of a C++ library for high-performance partitioned global address space programs.

**University of California, Berkeley**, Berkeley, California, USA

*Postdoctoral Scholar* **August 2012 - June 2013**
Implementation and evaluation of programming language features for hierarchical computation.

**University of California, Berkeley**, Berkeley, California, USA

*Lecturer* **January 2013 - May 2013**
Primary instructor for introductory Computer Science class with approximately 650 students.

**Sun Microsystems, Inc.**, Menlo Park, California USA

*Graduate Intern* **June 2007 - June 2009**
Circuit simulation, architecture design, and language design and implementation for a concurrent architecture.

## Awards

College of Engineering Jon R. and Beverly S. Holt Award for Excellence in Teaching for 2019-20, University of Michigan, 2020.

NCWIT Academic Alliance Seed Fund Award - Surging Enrollments Track. Valeria Bertacco, Laura Alford, William Arthur, and **Amir Kamil**, University of Michigan, 2019.

NCWIT Extension Services Transformation (NEXT) Awards - Second Place. William Arthur, Mary Lou Dorf, Valeria Bertacco, **Amir Kamil**, and Laura Alford, University of Michigan, Division of Computer Science and Engineering, 2017.

Outstanding Graduate Student Instructor Award - Honorable Mention, Department of Electrical Engineering and Computer Sciences, Computer Science Division, UC Berkeley, 2011.

Outstanding Graduate Student Instructor Award, University of California, Berkeley, 2011.