Christopher Lupo

Curriculum Vitae

Contact

Computer Science and Software Engineering Department
California Polytechnic State University
Frank E. Pilling (Building 14), Room 254
San Luis Obispo, CA 93407
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Research Interests

Applied Parallel Computing, Performance Optimization, Computer Architecture

Academic Leadership Training

Academic Leadership Academy, Penn State (Virtual), June 2022

Education

University of California, Davis
Ph.D., Computer Engineering, September 2008
Dissertation: "Precise Register-Allocation Spill-Code Costing and Placement"
Advisor: Prof. Kent Wilken
M.S., Computer Engineering, June 2007

California State University, Fresno
B.S., Electrical Engineering, Magna Cum Laude, May 1997

Academic Experience

2008–Present **California Polytechnic State University, San Luis Obispo**
Department Chair **Sept. 2017–**
Professor **2019–**
Associate Professor **2014–2019**
Assistant Professor **2008–2014**
Computer Science and Software Engineering Department

Mar. 2017–July 2017 **Hochschule München (Munich University of Applied Sciences), Germany**
Visiting Instructor Department of Computer Science and Mathematics

1997–2008 **University of California, Davis**
Associate Instructor positions
Teaching Assistant positions
Teaching Assistant Consultant **2003–2004**

Funding and Support

July 2019–Present **CSU Agricultural Research Institute**
Deep Learning Techniques to Estimate Vigor in Vineyards. PI Maria Pantoja. Co-PIs: Chris Lupo, Jean Dodson Peterson. $12,861.

April 2017 **Silicon Mechanics – Equipment Gift**
Research Cluster Grant for High-Performance Computing Research. PI Graham Doig. Co-PIs: Chris Lupo, Maria Pantoja, Andrew Danowitz, Christopher Pascual, Amelia Greig. $130,000.

2015–2016 **Intel Corporation – Equipment Gift**
Development of Massively Parallel Accelerated Computing (MPAC) Laboratory. PI C. Lupo. Approx. value $300,000.

September 2015 **Sandia National Laboratories, Livermore**
Development of HPC Resilience Testbed and Capstone Course. PI C. Lupo. $25,000.

2014–2015 **US Department of Agriculture, Agriculture and Food Research Initiative (AFRI)**
Enhanced Bioinformatics to Implement Genomic Selection (E-BIGS). PI D. Garrick (Iowa State). Co-Directors: J. Dekkers, J. Reecy, M. Rothschild, R. Fernando (Iowa State), C. Lupo. $89,000.

October 2013 **US Department of Transportation, Research and Innovative Technology Administration (RITA)**
Improved Satellite and Geospatial Tools for Pipeline Operator Decision Support Systems. PI J. Dunning (Cal Poly). Additional investigators: H. Assal, Z. Wood, A. Dekhtyar, C. Lupo, C. Schuldt. 2014-2016. $799,946 (Cal Poly portion $250,000).

October 2013 **Amazon AWS in Education**
Coursework Grant Award. PI C. Lupo. $3,400.

September 2013 **CPConnect**
Supporting Interdisciplinary Distributed Systems Projects and Coursework with Raspberry Pis. PI C. Lupo. co-PI A. Dekhtyar. 2013-2014. $3,290.

June 2013 **NVIDIA – Equipment Gift**
CUDA Research Center Award. PI C. Lupo. $4,000.

June 2013 **NVIDIA – Equipment Gift**
CUDA Teaching Center Renewal Award. PI C. Lupo. $15,000.

Fall 2012 **Extramural Funding Initiative (EFI) Award**
High Performance Ocean Modeling Software Using Massively Parallel GPU Processors. PI C. Lupo. 5 WTU Release Time.

June 2012 **NVIDIA – Equipment Gift**
CUDA Teaching Center Renewal Award. PI C. Lupo. $10,000.

June 2011 **NVIDIA – Equipment Gift**
CUDA Teaching Center Renewal Award. PI C. Lupo. $10,877.

June 2010 **NVIDIA – Unrestricted Gift**
CUDA Teaching Center Award. PI C. Lupo. $9820.

January 2010 **Lockheed Martin – Unrestricted Gift**
Optimized Code Generation for Reduced Energy Usage. PI C. Lupo. $5,000.

July 2009 **Google – Google Research Awards**
Mobile Application Development Course. Co-PIs D. Janzen, C. Lupo. $20,000.

June 2009 **Sun Microsystems – Academic Excellence Grant**
Compiler Tuning for Power Efficiency. PI C. Lupo. $11,900.

March 2009 **Google – Unrestricted gift**
Equipment gift for Android mobile platform development. Co-PIs D. Janzen, C. Lupo. $9,600.

February 2009 **TemperatureAlert – Unrestricted gift**
Equipment gift for temperature sensing and power measurement. PI C. Lupo. $200.

Publications

Peer-reviewed Conference Papers

Cory Ford*, Elie Saliba*, Maria Pantoja, and **Chris Lupo**. Designing an asynchronous fault detection and recovery for message passing interface (MPI). In *Proceedings of the 19th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE, Rota Spain.* . CME–Wiley, 2020.

Lucy Bowen* and **Chris Lupo**. The performance cost of software-based security mitigations. In *Proceedings of the 2020 ACM/SPEC International Conference on Performance Engineering*, ICPE '20, New York, NY, USA, 2020. ACM.

Andrew Adriance*, Maria Pantoja, and **Chris Lupo**. Acceleration of hydrology simulations using DHSVM for multi-thousand runs and uncertainty assessment. In *Proceedings of the 5th Latin American Conference of High Performance Computing, CARLA 2018, Bucaramanga Colombia*. Springer International Publishing, 2018.

Chris Lupo, Maria Pantoja, and Andrew Adriance*. Estudio de aceleración de simulaciones para la industria agraria (a study in accelerating simulations for the agricultural industry). In *Proceedings of the First Congreso Académico Tecnológico Agropecuario (Academic Agricultural Technology Conference), Osorno Chile*. La Universidad Tecnológica de Chile INACAP, 2018.

Ivan Pachev* and **Chris Lupo**. GPUMap: A transparently GPU-accelerated Python map function. In *Proceedings of the 7th Workshop on Python for High-Performance and Scientific Computing*, PyHPC'17, pages 6:1–6:10, New York, NY, USA, 2017. ACM.

Chris Lupo, Maria Pantoja, and Paul Choboter. Enhancing regional ocean modeling simulation performance with the Xeon Phi architecture. In *OCEANS 2017 - Aberdeen*, pages 1–6, June 2017.

Gavin Baker* and **Chris Lupo**. TARUC: A topology-aware resource usability and contention benchmark. In *Proceedings of the 8th ACM/SPEC International Conference on Performance Engineering*, ICPE '17, pages 305–316, New York, NY, USA, 2017. ACM.

Trevor DeVore*, Scott Winkleblack*, Bruce Golden, and **Chris Lupo**. A heterogeneous compute solution for optimized genomic selection analysis. In *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine*. IEEE, 2014.

Doug Gallatin*, Aaron Keen, **Chris Lupo**, and John Oliver. Twill: A hybrid microcontroller-FPGA framework for parallelizing single-threaded C programs. In *IEEE International Symposium on Parallel and Distributed Processing 2014*. IEEE, May 2014.

Ian Panzer*, Spencer Lines*, Jason Mak, Paul Choboter, and **Christopher Lupo**. High performance regional ocean modeling with GPU acceleration. In *OCEANS 2013, MTS/IEEE San Diego - An Ocean in Common*, September 2013.

Kerry Scharfglass*, Darrin Weng*, Joseph White*, and **Chris Lupo**. Breaking weak 1024-bit RSA keys using CUDA. In *Proceedings of the 13th IEEE International Conference on Parallel and Distributed Computing, Applications and Technologies*. IEEE, 2012.

Aldrin Montana*, Douglas Brandt*, Bob Somers*, Alex Dekhtyar, **Chris Lupo**, Michael Black, Anya Goodman, and Chris Kitts. Pyroprinting sensitivity analysis on the GPU, poster. In *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine*. IEEE, 2012.

Christopher Lupo, Zoë Wood, and Christine Victorino. Cross teaching parallelism and ray tracing: A project-based approach to teaching applied parallel computing. In *Proceedings of the 43rd ACM SIGCSE Technical Symposium on Computer Science Education*, SIGCSE '12, New York, NY, USA, 2012. ACM.

Jason Mak*, Paul Choboter, and **Christopher Lupo**. Numerical ocean modeling and simulation with CUDA. In *OCEANS 2011, MTS/IEEE KONA - Oceans of Opportunity: International cooperation and partnership across the Pacific*, September 2011.

Christopher Lupo and Kent Wilken. Post register allocation spill code optimization. In *CGO '06: Proceedings of the International Symposium on Code Generation and Optimization*, pages 245–255, Washington, DC, USA, 2006. IEEE Computer Society.

Invited Talks

Chris Lupo. The use of high-performance computing in agricultural applications. In *Keynote Presentation for the First Congreso Académico Tecnológico Agropecuario (Academic Agricultural Technology Conference)*, Osorno, Chile, July 2018.

Gavin Baker*, Sean Sheen*, John Oliver, and **Chris Lupo**. Astro: A low-cost, low-power computing cluster, poster. In *NVIDIA GPU Technology Conference*, San Jose, CA, USA, April 2016.

Bruce L. Golden, **Chris Lupo**, and Dorian J. Garrick. High performance gibbs sampler for mixed density generaly linear systems, poster. In *NVIDIA GPU Technology Conference*, San Jose, CA, USA, March 2015.

Scott Winkleblack*, Trevor DeVore*, and **Chris Lupo**. GPMoo: Genomic selection related analysis, poster. In *NVIDIA GPU Technology Conference*, San Jose, CA, USA, March 2014.

Chris Lupo. Numerical ocean modeling and simulation with CUDA. In *NVIDIA GPU Technology Conference*, San Jose, CA, USA, March 2013. http://registration.gputechconf.com/quicklink/baYkLbl.

Kerry Scharfglass*, Darrin Weng*, Joseph White*, and **Chris Lupo**. Breaking weak 1024-bit RSA keys using CUDA. In *NVIDIA GPU Technology Conference*, San Jose, CA, USA, March 2013.

Chris Lupo. Teaching applied parallel computing with GPUs. In *NVIDIA GPU Technology Conference*, San Jose, CA, USA, May 2012. http://nvidia.fullviewmedia.com/gtc2012/0516-C-S0311.html.

Brian Greenwood, Jennifer Becker, and **Christopher Lupo**. College "Kids These Days!" Student and faculty perceptions of the millennial generation. In *12th CSU Regional Symposium on University Teaching*, San Luis Obispo, CA, USA, May 2009.

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Advising

Masters Students

James Asbury. Millipyde: A cross-platform Python framework for transparent GPU acceleration. Master's thesis, California Polytechnic State University, December 2021.

Lucy Bowen. The performance cost of security. Master's thesis, California Polytechnic State University, June 2019.

Ivan Pachev. GPUMap: A transparently GPU-accelerated map function. Master's thesis, California Polytechnic State University, March 2017.

Chris Hunt. CORGI: Compute oriented recumbent generation infrastructure. Master's thesis, California Polytechnic State University, March 2017.

Vanessa Forney. Encouraging development of mobile applications as a service to the community. Master's thesis, California Polytechnic State University, November 2016.

Gavin Baker. An emperical study of contention and NUMA effects on heterogeneous computing systems. Master's thesis, California Polytechnic State University, June 2016.

Jeffrey Forrester. Platforms for teaching distributed computing concepts to undergraduate students. Master's thesis, California Polytechnic State University, March 2015.

Corey Ford. Lazy fault detection for redundant MPI. Master's thesis, California Polytechnic State University, June 2016.

Sean Sheen. Astro - a low-cost, low-power cluster for CPU-GPU hybrid computing using the Jetson TK1. Master's thesis, California Polytechnic State University, June 2016.

Bryan Ching. Optimizing Lempel-Ziv factorization for the GPU architecture. Master's thesis, California Polytechnic State University, June 2014.

Trevor DeVore. A multi-GPU compute solution for optimized genomic selection analysis. Master's thesis, California Polytechnic State University, June 2014.

*Student authors

Mike Lady. Towards an automated weight lifting coach: introducing LIFT. Master's thesis, California Polytechnic State University, June 2014.

Halli Meth. DecaFS: A modular distributed file system to facilitate student learning. Master's thesis, California Polytechnic State University, June 2014.

Scott Winkleblack. ReGen: Optimizing genetic selelection algorithms for the heterogeneous computing environment. Master's thesis, California Polytechnic State University, June 2014.

Isaac Asay. Compacting loads and stores for code size reduction. Master's thesis, California Polytechnic State University, March 2014.

Douglas Gallatin. Twill: A hybrid microcontroller-FPGA framework for parallelizing single-threaded C programs. Master's thesis, California Polytechnic State University, March 2014.

Xiaoxi Luo. The accessible user interaction framework for Android applications. Master's thesis, California Polytechnic State University, June 2013.

Darrin Weng. Accurate hardware RAID simulator. Master's thesis, California Polytechnic State University, June 2013.

Joseph White. PARIS: A PArallel RSA-prime InSpection tool. Master's thesis, California Polytechnic State University, June 2013.

Austin Dworaczyk Wiltshire. CUDA enhanced filtering in a pipelined video processing framework. Master's thesis, California Polytechnic State University, June 2013.

Massimo Becker. CUDA web API remote execution of CUDA kernels using web services. Master's thesis, California Polytechnic State University, June 2012.

Adam Miller. Hard drive command capture and sequential stream detection. Master's thesis, California Polytechnic State University, June 2012.

Andrew Hughes. Active pen input and the Android input framework. Master's thesis, California Polytechnic State University, June 2011.

Robert L. Webb. Asynchronous MIPS processors: Educational simulations. Master's thesis, California Polytechnic State University, July 2010.

Service

University Service

Fall 2017–Present Computer Science and Software Engineering Department Chair

Winter 2022–Present Member of the Center for Innovation and Entrepreneurship (CIE) Advisory Board

Winter 2022–Spring 2022 Member of the CENG Strategic Planning Committee

Fall 2021 Member of the Search Committee for CENG's Senior Personnel Manager

Fall 2019–Spring 2020 Member of the Search Advisory Committee for Cal Poly's Provost/Executive Vice President

Winter 2019–Spring 2020 Member of the Cal Poly Year-Round Operations Task Force Committee

2018–2019 Member of the Cal Poly Computer Engineering Task Force

2012–2017 Computer Science Faculty Liaison to Computer Science Laboratory Staff

2012–2017 Member of the CENG Faculty Computing Committee

2011–2017 Member of CPConnect college-wide committee dedicated to connecting industry partners with Cal Poly faculty for interdisciplinary projects.

2011–2017 Member Cal Poly Computer Science Curriculum Committee

2011–2017 Member Cal Poly Computer Engineering Curriculum Committee

2008–Present Member of the Cal Poly Computer Engineering Program Council

2009–2014 Advisor for Cal Poly's Eta Kappa Nu ($\eta\kappa\nu$) Honors Society

2009–2019 Advisor for Cal Poly's Linux Users' Group (CPLUG)

Fall 2010–June 2011 Chair of the Cal Poly Computer Engineering Curriculum Committee

Professional Affiliation Service

Jan. 2012–Dec. 2013 Program Committee member for the IEEE international conference on *Parallel and Distributed Computing, Applications and Technology*

Winter 2013–Present Reviewer for ACM's *Computing Reviews*

Winter 2013 Reviewer for Multidisciplinary Digital Publishing Institute's (MDPI) Journal of *High Performance Computing in Remote Sensing*

December 2012 Session Chair for the IEEE international conference on *Parallel and Distributed Computing, Applications and Technology*

Spring 2010 Reviewer for ACM's Transactions on Architecture and Code Optimization (TACO)

Professional Memberships

2012–Present Institute of Electrical and Electronics Engineers (IEEE)

2007–Present Association for Computing Machinery (ACM)