Expected May 2025

Mike Pozulp

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Lawrence Livermore National Laboratory 7000 East Avenue, P.O. Box 808, L-170 Livermore, CA 94550

Berkeley, CA

Personal Information

Citizenship: U.S.

Interests

Numerical Methods, Computer Architecture, Compilers

Education

University of California, Berkeley

PhD in Applied Science & Technology

GPA: 3.89/4.00

The College of William & Mary Williamsburg, VA May 2015

Bachelor of Science, magna cum laude

Major: Computer Science

Minor: Economics GPA: 3.75/4.00

Presentations and Publications

Lead author indicated by *

- "Fast Solvers for the Finite Element Method" (with B. Muldoon). Unpublished. May 2022.
- "Enhancements supporting IC usage of PEM libraries on next-gen platforms" (with D. Richards, B. Ryujin). Technical Report LLNL-TR-823775, Lawrence Livermore National Laboratory, Livermore, California. June 2021.
- "RISC-V Code Generation Comparison" (with Y. Miyasaka). Unpublished. May 2021.*
- "Heterogeneity, Hyperparameters, and GPUs: Towards Useful Transport Calculations Using Neural Networks" (with P. Brantley, T. Palmer, J. Vujic). Presented at *M&C 2021*. Raleigh, North Carolina. October 2021.*
- "Extending 1D Transport Using Neural Nets to GPUs" (with P. Brantley). Accepted for presentation at SNA+MC 2020. Tokyo, Japan. May 2020.*
- "Transitioning the Scientific Software Toolchain to Clang/LLVM" (with S. Dawson, R. Bleile, P. Brantley, M. McKinley, M. O'Brien, D. Richards). Accepted for presentation at *EuroLLVM 2020*. Paris, France. April 2020.*
- "Status of LLNL Monte Carlo Transport Codes on Sierra GPUs" (with M. McKinley, R. Bleile, P. Brantley, S. Dawson, M. O'Brien, D. Richards). In *Proceedings of M&C 2019*, 2160-2165. Portland, Oregon. August 2019.
- "1D Transport Using Neural Nets, SN, and MC." In *Proceedings of M&C 2019*, 876-885. Portland, Oregon. August 2019.*
- "Porting the Opacity Client Library to a CPU-GPU Cluster Using OpenMP4.5" (with J. Kimko, R. Haque, and L. Grinberg). In *Proceedings of SC17*. Denver, Colorado. November 2017.
- "Introduction to Monte Carlo." Presented at LLNL's Computation Intern Seminar Series, June, 2017 and W&M Math Department Colloquium Series, October, 2017.*
- "LLNL Monte Carlo Transport Research Efforts for Advanced Computing Architectures" (with P. Brantley, R. Bleile, S. Dawson, N. Gentile, M. McKinley, M. O'Brien, D. Richards, D. Stevens, J. Walsh, and H. Childs). In *Proceedings of M&C 2017*. Jeju, Korea. April 2017.
- "Optimizing Application I/O by Leveraging the Storage Hierarchy Using the Scalable Checkpoint Restart Library with a Monte Carlo Particle Transport Application on the Trinity Advanced Computing System" (with G. Becker, P. Brantley, S. Dawson, K. Mohror, A. Moody, and M. O'Brien). In *Proceedings of SC16*. Salt Lake City, Utah. November 2016.*

• "Creating a Framework for Systematic Benchmarking of High Performance Computing Systems." In *Proceedings of SC14.* New Orleans, Louisiana. November 2014.*

SNA+MC is the Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo.

EuroLLVM is the European LLVM Developers' Meeting.

M&C is the International Conference on Mathematics and Computational Methods applied to Nuclear Science and Engineering.

SC is the International Conference for High Performance Computing, Networking, Storage, and Analysis.

Work Experience

Lawrence Livermore National Lab

Livermore, CA

July 2015 - Present

Position: Computer Scientist

• Software development for the Monte Carlo Transport Project

W&M High Performance Computing

Williamsburg, VA

February 2012 - May 2015

Position: Undergraduate Assistant to High Performance Computing

- Developed a distributed-memory parallel N-1 and N-N I/O performance benchmark using MPI
- Performed STREAM memory benchmarking, code timing, and cycle counting
- Supported HPC applications with data visualization and performance refactoring
- Assembly/maintenance of diverse CPU + GPU distributed-memory compute clusters, totaling 900+ cores and 21 TFLOP/s theoretical peak performance
- Developed graphical tools for monitoring jobs and node statistics

NASA Langley Research Center

Hampton, VA

January - August 2014

Position: UAV Engineering Intern

- Developed ground control station that controls UAVs with MAVLink transmissions and collects ADS-B, GPS, and other RF data from UAVs to create a live display of UAVs in the local airspace
- Performed Hardware-In-The-Loop Simulation tests of ground control station using autopilot boards and commercial flight simulator
- Prepared hardware/software systems for multi-rotor and fixed-wing aircraft

NASA Ames Research Center

Moffett Field, CA

May - August 2013

Position: Supercomputing Research Intern

- Investigated performance scaling in four generations of Intel Xeon processors running the NASA Parallel Benchmarks on top-20 supercomputer Pleiades
- Researched effects of MPI communication traffic across Pleiades interconnect

Computer Skills

- C/C++, Python, Java, R. Bash, MPI, OpenMP, CUDA, Git/Github, LLVM, Latex, PyTorch
- Linux, OS X, Windows, Solaris, Android, Web

Fellowships, Research Grants, and Contracts

• LLNL LEARN Research Funding (\$115,434)	2020 January
W&M Small Hall Makerspace Grant Recipient (\$700)	2014 May
 ACM Student Research Competition Travel Award (\$500) 	2014 September
 Virginia Space Grant Consortium Grant Recipient (\$6,750) 	2013 June

Honors, Prizes, and Awards

 LLNL Computational Physics Monthly Recognition Award 	2021 July
• LENE Computational Physics Monthly Necognition Award	2021 July
 LLNL Computational Physics Monthly Recognition Award 	2020 July
 LLNL Code Development Bronze Star Award 	2019 August
 LLNL Computational Physics Monthly Recognition Award 	2018 November
 Stanford CS148 Raytracing Project, 2nd Place 	2015 December
 NASA Ames Poster Contest, 1st Place 	2013 August

Professional Development

 M&C 2021 J34 Applied Computer Science Meeting LLVM Developer Meeting NSSC Fall Workshop M&C 2019 LLVM Developer Meeting J34 Applied Computer Science Meeting Supercomputing (SC) DoE CoE Performance Portability Meeting Supercomputing (SC) DoE CoE Performance Portability Meeting ATPESC Supercomputing (SC) Supercomputing (SC) Supercomputing (SC) Supercomputing (SC) 	Raleigh, North Carolina Livermore, California San Jose, California Livermore, California Portland, Oregon San Jose, California Albuquerque, New Mexico Denver, Colorado Denver, Colorado Salt Lake City, Utah Glendale, Arizona St. Charles, Illinois New Orleans, Louisiana Denver, Colorado	2021 October 3-7 2020 February 24-27 2019 October 22-23 2019 October 7-9 2019 August 25-29 2018 October 17-18 2018 February 11-16 2017 November 12-17 2017 August 21-24 2016 November 13-18 2016 April 18-22 2016 July 31 - August 12 2014 November 16-21 2013 November 17-22
Technical Coursework		
 University of California, Berkeley Finite Elements in Nonlinear Continua (ME) Numerical Linear Algebra (MATH 221) Introduction to the Finite Element Method (M) Radiation Processes in Astronomy (PHY C2) Graduate Computer Architecture (CS 252A) Numerical Solution of Differential Equations Numerical Analysis (MATH 128A) Nuclear Reactor Theory (NE 250) Numerical Simulation in Radiation Transport 	ME 280A) 207) (MATH 228B)	2022 Spring 2022 Spring 2021 Fall 2021 Fall 2021 Spring 2021 Spring 2020 Fall 2020 Fall 2018 Fall
 University of California, Davis Network Architecture & Resource Management (EEC 273/ECS 258) Quantum Mechanics (PHY 115A) Analytical Mechanics II (PHY 105B) Analytical Mechanics I (PHY 105A) 		2018 Fall 2017 Spring 2017 Winter 2016 Fall
University of California, San Diego ◆ High Energy Density Physics (MAE 207)		2017 Fall
Stanford University • Partial Differential Equations in Engineering	(CME 204)	2018 Winter

 Partial Differential Equations in Engineering (CME 204) 	2018 Winter
Compilers (CS 143)	2016 Spring
 Introduction to Computer Graphics (CS 148) 	2015 Fall

The College of William & Mary

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Random Walks in Biology (APSC 456)	2015 Spring
Reliability (CS 668)	2015 Spring
General Physics II, Honors (PHYS 102H)	2015 Spring
Analog Electronics (PHYS 252)	2015 Spring
 Ordinary Differential Equations (MATH 302) 	2014 Fall
General Physics I, Honors (PHYS 101H)	2014 Fall
Digital Electronics (PHYS 351)	2014 Fall
Finite Automata (CS423)	2013 Fall
Operating Systems (CS 424)	2013 Fall
 Applied Financial Derivatives (ECON 415) 	2013 Fall
Probability (MATH 401)	2013 Fall
Numerical Analysis (MATH 413)	2013 Fall
 Programming Languages (CS 312) 	2013 Spring
Systems Programming (CS 415)	2013 Spring
• Econometrics (ECON 308)	2013 Spring
Multivariable Calculus (MATH 212)	2013 Spring

Algorithms (CS 303)	2012 Fall
 Computer Organization (CS 304) 	2012 Fall
 Intermediate Microeconomics (ECON 303) 	2012 Fall
 Software Development (CS 301) 	2012 Spring
 Database Systems (CS 321) 	2012 Spring
 Intermediate Macroeconomics (ECON 304) 	2012 Spring
Linear Algebra (MATH 211)	2012 Spring
Data Structures (CS 241)	2012 Fall
 Discrete Structures (CS 243) 	2012 Fall