Mike Pozulp

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

Personal Information

Citizenship: U.S.

Interests

Numerical Methods, Computer Architecture, Compilers

Education

University of California, Berkeley

Berkeley, CA

Expected May 2025

PhD in Applied Science & Technology

The College of William & Mary

Williamsburg, VA May 2015

Bachelor of Science, *magna cum laude* Major: Computer Science

Minor: Economics

Presentations and Publications

Lead author indicated by *

- "Status of Mercury and Imp: Two Monte Carlo Transport Codes Developed Using Shared Infrastructure at Lawrence Livermore National Laboratory" (with B. Beck, R. Bleile, P. Brantley, S. Dawson, N. Gentile, E. Gonzalez, J. Grondalski, M. Lambert, M. McKinley, M. O'Brien, R. Procassini, D. Richards, A. Robinson, S. Sepke, D. Stevens, R. Vega, M. Yang). Published in *EPJ-N* and presented at *SNA+MC 2024*. Paris, France. October 2024.*
- "Achievement of Target Gain Larger than Unity in an Inertial Fusion Experiment" (with O. Hurricane, A. Kritcher, A. Zylstra, D. Callahan, and many others). *Physics Review Letters* 132, 065102. February 2024.
- "Noisy Radiation Diffusion in MFEM" (with T. Haut, P. Brantley, J. Vujic). Presented at MFEM Community Workshop. Internet. October 2023.*
- "An Implicit Monte Carlo Acceleration Scheme" (with T. Haut, P. Brantley, J. Vujic). In *Proceedings of M&C 2023*. Niagara Falls, Canada. August 2023.*
- "Progress Porting LLNL Monte Carlo Transport Codes to Nvidia GPUs" (with R. Bleile, P. Brantley, S. Dawson, M. McKinley, M. O'Brien, A. Robinson, M. Yang). In *Proceedings of M&C 2023*. Niagara Falls, Canada. August 2023.*
- "Lawson Criterion for Ignition Exceeded in an Inertial Fusion Experiment" (with O. Hurricane, A. Kritcher, A. Zylstra, D. Callahan, and many others). *Physics Review Letters* 129, 075001. August 2022.
- "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 Unpublished.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 Unpublished.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). In *Proceedings of M&C 2021*, 1252-1261. 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, 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, 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, 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.*

is the European Physica Journal - Nuclear Sciences & Technologies EPJ-N

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

EuroLLVM is the European LLVM Developers' Meeting.

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

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

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 Computer Science Spot Award	2023 March
 LLNL Computational Physics Monthly Recognition 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

• SNA + MC 2024	Paris, France	2024 October 20-24
MFEM Community Workshop	Internet	2023 October 26
• NECDC 2023	Los Alamos, New Mexico	2023 October 16-20
• M&C 2023	Niagara Falls, Canada	2023 August 13-17
• M&C 2021	Raleigh, North Carolina	2021 October 3-7
 J34 Applied Computer Science Meeting 	Livermore, California	2020 February 24-27
LLVM Developer Meeting	San Jose, California	2019 October 22-23
 NSSC Fall Workshop 	Livermore, California	2019 October 7-9

Technical Coursework		
Supercomputing (SC)	Denver, Colorado	2013 November 17-22
Supercomputing (SC)	New Orleans, Louisiana	2014 November 16-21
• ATPESC	St. Charles, Illinois	2016 July 31 - August 12
 DoE CoE Performance Portability Meeting 	Glendale, Arizona	2016 April 18-22
Supercomputing (SC)	Salt Lake City, Utah	2016 November 13-18
 DoE CoE Performance Portability Meeting 	Denver, Colorado	2017 August 21-24
Supercomputing (SC)	Denver, Colorado	2017 November 12-17
 J34 Applied Computer Science Meeting 	Albuquerque, New Mexico	2018 February 11-16
 LLVM Developer Meeting 	San Jose, California	2018 October 17-18
• M&C 2019	Portland, Oregon	2019 August 25-29

 University of California, Berkeley Finite Elements in Nonlinear Continua (ME 280B) Numerical Linear Algebra (MATH 221) Introduction to the Finite Element Method (ME 280A) Radiation Processes in Astronomy (PHY C207) Graduate Computer Architecture (CS 252A) Numerical Solution of Differential Equations (MATH 228B) Numerical Analysis (MATH 128A) Nuclear Reactor Theory (NE 250) Numerical Simulation in Radiation Transport (NE 255) 	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) Compilers (CS 143) Introduction to Computer Graphics (CS 148) 	2018 Winter 2016 Spring 2015 Fall
 The College of William & Mary Random Walks in Biology (APSC 456) Reliability (CS 668) General Physics II, Honors (PHYS 102H) Analog Electronics (PHYS 252) Ordinary Differential Equations (MATH 302) General Physics I, Honors (PHYS 101H) Digital Electronics (PHYS 351) Finite Automata (CS423) Operating Systems (CS 424) Applied Financial Derivatives (ECON 415) Probability (MATH 401) Numerical Analysis (MATH 413) Programming Languages (CS 312) Systems Programming (CS 415) Econometrics (ECON 308) Multivariable Calculus (MATH 212) Algorithms (CS 303) Computer Organization (CS 304) Intermediate Microeconomics (ECON 303) Software Development (CS 301) 	2015 Spring 2015 Spring 2015 Spring 2015 Spring 2014 Fall 2014 Fall 2014 Fall 2013 Fall 2013 Fall 2013 Fall 2013 Spring 2013 Spring 2013 Spring 2013 Spring 2013 Spring 2013 Spring 2013 Spring 2014 Fall 2015 Fall 2016 Fall 2016 Spring

Database Systems (CS 321)
 Intermediate Macroeconomics (ECON 304)
 Linear Algebra (MATH 211)
 Data Structures (CS 241)
 Discrete Structures (CS 243)
 2012 Spring
 2012 Fall
 2012 Fall