

Ming Tse Paul Laiu

CONTACT INFORMATION 1 Bethal Valley Rd. Bldg. 5600, Rm. J312
Oak Ridge, Tennessee, USA laiump@ornl.gov

RESEARCH POSITIONS

Research Staff Mathematician – Oak Ridge National Laboratory Sep 2019 to –

Postdoctoral Researcher – Oak Ridge National Laboratory Mar 2017 to Aug 2019
Topic: Numerical Methods for Solving Kinetic Equations
Mentor: Dr. Cory Hauck

Postdoctoral Researcher – U. of Tennessee, Knoxville Sep 2016 to Mar 2017
Topic: Positivity Preserving Schemes for Linear Kinetic Equations
Mentor: Dr. Cory Hauck

DOE–SCGSR Fellow – Oak Ridge National Laboratory Jan 2015 to Aug 2016
Topic: Moment Methods for Linear Kinetic Transport Equations
Supervisor: Dr. Cory Hauck

Student Intern – Oak Ridge National Laboratory Jun 2014 to Aug 2014
Topic: Extended Quadrature Method of Moments for Linear Transport Equations
Supervisor: Dr. Cory Hauck

Research Assistant – U. of Maryland, College Park Jan 2012 to Jan 2015
Topic: Positive Filtered P_N Closures and Associated Optimization Algorithms
Supervisor: Dr. André Tits

RESEARCH INTERESTS Numerical Optimization, Numerical PDE, Surrogate Modeling

EDUCATION **University of Maryland, College Park**

Ph.D., Electrical and Computer Engineering, Aug 2016

- Thesis: *Positive Filtered P_N Method for Linear Transport Equations and the Associated Optimization Algorithm*
- Coadvisors: Dr. André Tits, Dr. Cory Hauck

M.S., Electrical and Computer Engineering, Dec 2014

- Coadvisors: Dr. André Tits, Dr. Cory Hauck

National Chiao Tung University, Taiwan

B.S., Electrical Engineering & Computer Science Honors Program, Jun 2010

JOURNAL
PUBLICATIONS

1. M. P. Laiu, C. D. Hauck, R. G. McClarren, D. P. O’Leary, and A. L. Tits, “*Positive Filtered P_N Moment Closures for Linear Kinetic Transport Equations,*” SIAM Journal on Numerical Analysis, 54 (2016), pp.3214–3238, <http://dx.doi.org/10.1137/15M1052871>.
2. M. P. Laiu and C. D. Hauck, “*Positivity Limiters for Filtered Spectral Approximations of Linear Kinetic Transport Equations,*” Journal of Scientific Computing, 78 (2019), p.918–950, <https://doi.org/10.1007/s10915-018-0790-y>.
3. M. P. Laiu and A. L. Tits, “*A Constraint-Reduced MPC Algorithm for Convex Quadratic Programming, with a Modified Active Set Identification Scheme,*” Computational Optimization and Applications, 72 (2019), 3, pp 727–768 <https://doi.org/10.1007/s10589-019-00058-0>.
4. M. P. Laiu, M. Frank, and C. D. Hauck, “*A Positive Asymptotic Preserving Scheme for Linear Kinetic Transport Equations,*” SIAM Journal on Scientific Computing, 41(2019), 3, A1500–A1526, <https://doi.org/10.1137/18M1196297>.
5. J. M. Scott, M. P. Laiu, and C. D. Hauck, “*Analysis of the Zero Relaxation Limit of Systems of Hyperbolic Conservation Laws with Random Initial Data,*” SIAM/ASA Journal on Uncertainty Quantification, 7 (3), p.806–837, <https://doi.org/10.1137/18M1226683>.
6. M. P. Laiu, Z. Chen, and C. D. Hauck, “*Fast Iterative Solvers for Semiconductor Models in One Space Dimension,*” Journal of Computational Physics, 417, 15 (2020), <https://doi.org/10.1016/j.jcp.2020.109567>.
7. S. Madireddy, J. Park, P. Balaprakash, S. Yoo, C. D. Hauck, M. P. Laiu, R. Archibald, “*In Situ Compression Artifact Removal in Scientific Data Using Deep Transfer Learning,*” Machine Learning: Science and Technology, 2, 2, (2021), <https://doi.org/10.1088/2632-2153/abc326>.
8. M. P. Laiu and A. L. Tits, “*A Framework for Accommodating Infeasible Starts in Convex Quadratic Optimization, with Application to Constraint-Reduced Interior Point,*” submitted, p.1-25, <https://arxiv.org/abs/1912.04335>
9. V. P. DeCaria, C. D. Hauck, and M. P. Laiu, “*Analysis of a new implicit solver for a semiconductor model,*” accepted by SIAM Journal on Scientific Computing, <https://arxiv.org/abs/2009.05626>
10. M. P. Laiu, E. Endeve, R. Chu, J. A. Harris, and O.E. B. Messer, “*A DG-IMEX method for two-moment neutrino transport: Nonlinear solvers for neutrino-matter coupling,*” accepted by The Astrophysical Journal Supplement Series

CONFERENCE
PUBLICATIONS

1. M. P. Laiu, J. A. Harris, R. Chu, E. Endeve, “*thornado-transport: Anderson- and GPU-accelerated nonlinear solvers for neutrino-matter coupling,*”, Journal of Physics: Conference Series, 2020. <https://doi.org/10.1088/1742-6596/1623/1/012013>
2. V. Sobes, B. Hiscox, E. Popov, M. Delchini, R. Archibald, C. D. Hauck, M. P. Laiu, B. Betzler, K. Terrani, “*Artificial Intelligence Design of Nuclear Systems Empowered by Advanced Manufacturing,*” Proceedings of PHYSOR 2020.

AWARDS	SIAM Travel Award – ICIAM	Jul 2019	
	SIAM Travel Award – SIAM CSE	Mar 2015	
	DOE Office of Science Graduate Student Research Award	Jan 2015	
	Undergraduate Research Scholarship – NSC, Taiwan	Sep 2009	
PROFESSIONAL SERVICE	Conference Organizing Committee		
	SIAM Southeastern Atlantic Sectional Conference, Knoxville, TN	2019	
	Technical Reviewer		
	SIAM Multiscale Modeling and Simulation (MMS)		
	Journal of Computational Physics		
	ESAIM: Mathematical Modelling and Numerical Analysis		
	Editorial Assistant		
	Automatica	Jan 2012 to Apr 2016	
	CONFERENCE PRESENTATIONS	• SIAM Computational Science and Engineering, Virtual	Mar 2021
		• SIAM Central States Section Annual Meeting, Ames, IA	Oct 2019
• Kinetic Theory Workshop for Junior Researchers, Madison, WI		Apr 2019	
• SIAM Computational Science and Engineering, Spokane, WA		Feb 2019	
• AIMS Conference on Differential Equations, Taipei, Taiwan		Jul 2018	
• SIAM Central States Section Annual Meeting, Fort Collins, CO		Oct 2017	
• SIAM Computational Science and Engineering, Atlanta, GA		Feb 2017	
• AMS Fall Southeastern Sectional Meeting, Raleigh, NC		Nov 2016	
• SIAM Southeastern Atlantic Sectional Conference, Athens, GA		Mar 2016	
• Scalable Methods for Kinetic Equations Workshop, Oak Ridge, TN		Oct 2015	
• SIAM Computational Science and Engineering, Salt Lake City, UT		May 2015	
• SIAM Annual Meeting, Chicago, IL		Jul 2014	
• AMS Spring Eastern Sectional Meeting, Baltimore, MD		Mar 2014	