Tim W. Reid

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https://treid5.github.io/

Education

Ph.D., Applied Mathematics, North Carolina State University, GPA 3.95/4.00 — May 2022 (Expected)
Advisor: Ilse C. F. Ipsen

M.S., Applied Mathematics, North Carolina State University, GPA 3.91/4.00 — May 2019

B.S., Mathematics, George Mason University, Magna Cum Laude, GPA 3.74/4.00 — May 2017

Skills

Research: Scientific Computing, Probabilistic Numerics, Machine Learning, Numerical Linear Algebra, Bayesian Inference, Surrogate Modeling, Tensor Decompositions, Uncertainty Quantification

Computational: Python (incl. TensorFlow and PyTorch), Julia, Matlab, Mathematica, LaTeX, Git, Shell Scripting

Professional Experience

North Carolina State University, Raleigh, NC — 2018 – Present
Graduate Student Researcher

- Investigates probabilistic numerical methods that enable errors to be quantified in computational pipelines
- Develops efficient implementations of probabilistic numerical methods using Python

MIT Lincoln Laboratory, Lexington, MA — 2021
Summer Research Program Intern

- Conducted research in Bayesian methods to improve calibration of neural networks used in classification problems
- Implemented Bayesian neural networks with TensorFlow, deployed Bayesian neural networks on GPU cluster

Sandia National Laboratories, Livermore, CA — 2019
Computer Science Research Institute Summer Intern

- Investigated different methods of incorporating physical model parameters in functional tensor train models
- Examined how choice of optimization algorithm affected training speed of functional tensor train models

George Mason University, Fairfax, VA — 2015 – 2017
Undergraduate Student Researcher

- Developed numerical solution in Matlab to PDE model of contact lens motion in blinking eye
- Investigated group theory conjectures by generating and analyzing large set of test problems with Mathematica

Papers

1. T. W. Reid, I. C. F. Ipsen, J. Cockayne, and C. J. Oates, *BayesCG as an uncertainty aware version of CG*, 2021, https://arxiv.org/abs/2008.03225
   Related software: https://github.com/treid5/ProbNumCG_Supp
2. J. Cockayne, I. C. Ipsen, C. J. Oates, and T. W. Reid, *Probabilistic iterative methods for linear systems*, Journal of Machine Learning Research, 22 (2021), pp. 1–34, http://jmlr.org/papers/v22/21-0031.html
3. D. M. Anderson, M. Corsaro, J. Horton, T. Reid, and P. Seshaiyer, *Tear film dynamics with blinking and contact lens motion*, Mathematical Medicine and Biology: A Journal of the IMA, 38 (2021), pp. 355–395, https://doi.org/10.1093/imammb/dqab010
4. T. Reid, C. Safta, A. Gorodetsky, J. Jakeman, and K. Sargsyan, *Implementing physical dependence in the functional tensor train*, in Computer Science Research Institute Summer Proceedings 2019, M. Powell and M. J. Parks, eds., Technical Report SAND2020-9969R, Sandia National Laboratories, 2020, pp. 55–65

Conference Presentations

Talks

1. SIAM Conference on Uncertainty Quantification, Munich, Germany — March 2020
   Prior Distributions and Test Statistics for the Bayesian Conjugate Gradient Method
   Online due to pandemic: http://probabilistic-numerics.org/meetings/SIAMUQ2020/
2. American Physical Society Division of Fluid Dynamics Meeting, Portland, OR — November 2016
   Contact Lens and Tear Film Dynamics During Blinking
3. Shenandoah Undergraduate Mathematics Conference, Harrisonburg, VA — September 2016
   Solving a Tear Film Model with a Spectral Method

Posters

1. SIAM Conference on Computational Science & Engineering, Fort Worth, TX — March 2021
   Estimating Error with the Bayesian Conjugate Gradient Method
2. Sandia National Laboratories Posters on the Patio, Livermore, CA — July 2019
   Approximating Data With Stochastic and Physical Dependence Using Functional Tensor Train Models
3. SIAM Conference on Computational Science & Engineering, Spokane, WA — February 2019
   Computational Developments for the Bayesian Conjugate Gradient Method
4. National Conference on Undergraduate Research, Memphis, TN — May 2017
   Special Words in Free Groups
5. Joint Mathematics Meetings, Atlanta, GA — January 2017
   Solving a Tear Film Model with a Spectral Method
6. Geometry Labs United Conference, Urbana, IL — August 2015
   Special Words in Free Groups

Awards

- NSF RTG Fellowship — 2018 – Present
- SIAM Student Travel Award — 2020
- George Mason University OSCAR Student Excellence Award — 2017
- APS-DFD Travel Grant — 2016
- Mason Excellence Scholarship — 2014 – 2017

Graduate Coursework

- Numerical Analysis
- Matrix Methods in Data Science
- Uncertainty Quantification
- Nonlinear Eqs. & Unconstrained Optimization
- Theory & Applications of Machine Learning
- Data Driven Modeling of Dynamical Systems

Service

- Peer reviewer for *Statistics and Computing*
- NCSU Undergraduates Union Graduates mentor — 2020 – Present
- NCSU SIAM student chapter webmaster — 2018 – Present
- NCSU SIAM student chapter representative to SIAM Student Days — 2019
- SIAM booth volunteer at USA Science and Engineering Festival — 2018

Professional Memberships

- Society for Industrial and Applied Mathematics (SIAM)
- American Mathematical Society (AMS)