Steven Cook

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Summary

I am interested in opportunities to apply my modeling and simulation expertise to impactful, cross-disciplinary problems in computational biology and medicine. My skillset includes mathematical modeling (including multi-scale, high-dimensional density fields), machine learning with emphasis on regression methods, discretizations & numerical methods, parallel & GPGPU algorithm design and implementation, and problem-specific visualization development.

Experience

2018–Now **MTS Software Engineer, Radeon Technologies Group, AMD**
Significantly improved accuracy of a GPU architecture performance prediction model using machine learning techniques including PCAs, MLPs, and regression models. Improved data science methodology by implementing k-fold cross-validation and hyperparameter tuning via grid search. Studied and presented leading-edge research on recurrent convolutional neural networks for image denoising. Identified performance bottlenecks in third party OpenCL GPU computing applications.

2011–2017 **Graduate Student Researcher, Computer Science Department, UC Riverside**
Research Assistant in Computational Biophysics. Research focused on multiscale modeling, simulation, and algorithms for active matter systems consisting of microtubules and motor proteins immersed in fluid. Working on a cross-disciplinary team of mathematicians and computer scientists, I co-developed a novel kinetic theory based hydrodynamic model with coupling between microscopic behavior and macroscopic emergent phenomena, along with a software simulation utilizing CPU and GPU parallelism. Coursework includes computational biology, algorithms, probabilistic graphical models, scientific computing, GPU computing, and operating systems.

2012–2017 **Teaching Assistant, Computer Science Department, UC Riverside**
Teaching Assistant for computer graphics and data structures courses, and a graduate-level scientific computing course.

2014 **iDASH Graduate Intern, Division of Biomedical Informatics, School of Medicine, UCSD**
Investigated scalability and performance of variant-calling pipelines such as GotCloud and GATK for genomic analysis of sensitive patient medical data in HIPAA compliant fashion. Studied accelerating sequence alignment software (Bowtie2) by creating Terabyte-sized hashtables of sequence read matches.

2007–2011 **Software Engineer, Various Projects, Lockheed Martin Integrated Systems and Global Solutions**
Designed and developed simulation of an IP-based mobile wireless RF network deployment. Researched extending VoIP technologies to Airborne Network environments in conjunction with MIT Lincoln Labs and USAF. Planned and executed research into various aspects of VoIP's shortcomings in tactical airborne networks and possible improvement techniques, and co-authored two published research papers based on our findings. Presented one of these papers at the 2010 IEEE Aerospace Conference.

2003–2006	**Summer Undergraduate Intern, Building and Fire Research Lab, National Institute of Standards and Technology** Studied demands of first responder voice and video data traffic via wireless network simulation and co-authored paper on results.

Skills

Data Science	Scikit-Learn, Numpy, Pandas
Languages	C++, CUDA C, Python
HPC	OpenMP, MPI
Visualization	OpenGL, GLSL
Environments	Linux environment, Amazon EC2
Other Tools	Torque, Scons, Gdb, Nvprof / Nvidia Visual Profiler, Valgrind, Git

Education

2011–2017	PhD in Computer Science, UC Riverside, October 2017
Thesis	Modeling, Simulation, and High-Performance Implementation of High-Dimensional Micro-Macro Biophysical Models
2013	MSc in Computer Science, UC Riverside, 3.97 GPA
2003–2007	BSc in Computer Engineering, University of Virginia

Presentations

Apr 2017	11th Southern California Flow Physics Symposium, USCD
Mar 2017	UC Riverside Department of Mathematics Interdisciplinary Seminar, UC Riverside
Sep 2015	Modeling Cellular Processes in Space and Time (course), Ille de Porquerolles
Apr 2014	8th Southern California Flow Physics Symposium, UCLA
Mar 2010	2010 IEEE Aerospace Conference, Big Sky, MT

Publications

2017	Steven C. Cook and Tamar Shinar. Enabling Simulation of High-Dimensional Micro-Macro Biophysical Models through Hybrid CPU and Multi-GPU Parallelism. Submitted August 2017
2017	Steven C Cook, Christel Hohenegger, and Tamar Shinar. A micro-macro framework for analyzing steric and hydrodynamic interactions in gliding assays. *Multiscale Modeling & Simulation*, 15(4):1768–1796, 2017
2014	C. Hohenegger, S. Cook, and T. Shinar. Dimensional Reduction of a Multiscale Continuum Model of Microtubule Gliding Assays. *SIAM Journal of Applied Mathematics*, 2014
2010	Tuong Le, S. Cook, G. Hadynski, D. Kiwior, and D. Parker. Enable VoIP survivability for future tactical Airborne Networks. *Military Communications Conference (MILCOM), 2010*, pages 62–67, October 2010
2010	Tuong Le, S. Cook, G. Kuthethoor, P. Sesha, G. Hadynski, D. Kiwior, and D. Parker. Performance Analysis for SIP Based VoIP Services over Airborne Tactical Networks. *Aerospace Conference, 2010 IEEE*, pages 1–8, March 2010
2007	S. Treado, D. Holmberg, and S. Cook. Simulating the Performance of Building Area Networks as a Communication Bridge to Emergency Responders. *Proceedings of OPNETWORK 2007*, August 2007