Harsha Lokavarapu

5221 Ferrera Ct
Pleasanton, California 94588
lokavarapuh@gmail.com
https://github.com/hlokavarapu

Education

University of California, Davis	MS	Computational Geodynamics (4.0 GPA) Thesis Adviser: Professor Louise H. Kellogg Secondary Adviser: Professor Eldridge G. Puckett	2017–
University of California, Davis	BS	Computer Science	2015
	Minor	Applied Mathematics	2015

Appointments

2014-2017	Computational Infrastructure for Geodynamics (CIG)	Junior Assistant Programmer
2012	Certify Data Systems (Humana)	Internship as Code Developer

Programming Languages, Computing Skills, and Work Experience

Open Source Code Development

- Advanced Solver for Problems in Earth's ConvecTion (ASPECT) - A parallel, extensible finite element code to simulate convection in both 2D and 3D models written in C++. There is more. Parameter parsing?
- State of-the-art model of the Earth's Geodynamo, Calypso - FORTRAN and CUDA Is the correct language for the GPU code? That's right, CUDA is a C++ library designed for Nvidia GPUs
- Generalized Reservoir Modeling (MS Thesis Project) - Python

Parallel Processing and High Performance Computing

Tools

- SLURM HPC scheduler
- Distributed memory parallelism - MPI for C++ and FORTRAN
- Shared memory parallelism - openMP
- CUDA - C++
- Profilers: gdb and cuda-gdb

Machines

- National Science Foundation (NSF) Texas Advanced Computing Center
  - Stampede and Stampede 2
  - Maverick
- UCD Math and Physical Sciences (MPS) HPC Cluster
  - Ymir - 38 Dual socket, quad core (Intel E5620 2.4 GHz CPUs) with 24 GB RAM.

- Peloton - 55 nodes with 64GB ram, 16 cores / 32 threads (Intel Xeon E5-2630v3 Processors).

Computations

- ASPECT
  - Design and implement parallel particle generation algorithms
  - Design and implement parallel particle interpolation algorithms including harmonic averaging and bilinear least squares
  - Design 2D benchmarks to test the accuracy of particle algorithms in a finite element code
  - Implement Schmeling subducting slab benchmark from Schmeling et al., Physics of the Earth and Planetary Interiors 171 (2008) 198–223
  - Execute strong and weak scaling tests for original draft of publication [3] (see below), which was not included in the final publication
- Calypso
  - Optimization of Legendre Polynomial transform in spherical geometry using CUDA for Nvidia GPUs
  - Designed different implementations using CUDA Fast Fourier Transform (cuFFT) library, CUDA Basic Linear Algebra Subprograms (cuBLAS), and CUB library Take out the links to (cuFFT) library, CUDA Basic Linear Algebra Subprograms (cuBLAS), and CUB. You can leave the words in, but they want to see the code you wrote. WHERE IS THE CODE YOU WROTE????
  - Profile and test optimizations using strong and weak scaling tests
  - Published results as poster [4], [6] (see below) at the 2014, 2015 Annual Fall AGU Meetings

Data Analysis and Visualization

- R
- Python Libraries - matplotlib, numpy, scipy, and pandas
- Gnuplot
- Paraview
- Visit

Extracurricular Interests

- Virtual Reality - (A-frame) - JavaScript
- 3-D Design/Printing - (Tinkercad)
- Machine Learning - (Keras, Tensorflow) - Python
- Neural style

Professional Affiliations and Activities

2017–	Member	Deep Carbon Observatory
May 6– May 17, 2017	Participant	2017 ASPECT Hackathon
2014 – 2016	Member	American Geophysical Union (AGU)
June 24 – July 2, 2016	Participant	2016 ASPECT Hackathon
June 17 – June 24, 2016	Staff	CIG All Hands Meeting
May 19– May 30, 2015	Participant	2015 ASPECT Hackathon

Publications

Refereed Journal Publications

Submitted

[1] L. H. Kellogg, D. L. Turcotte, M. Weisfeiler, H. Lokavarapu[@], S. Mukhopadhyay, (2018) "Implications of a Reservoir Model for the Evolution of Deep Carbon", *Earth and Planetary Science Letters*, Ms. Ref. No.: EPSL-D-17-01055

Accepted

[2] R. Gassmoeller, H. Lokavarapu[@], E. Heien, E. G. Puckett, and W. Bangerth, (2018) "Flexible and scalable particle-in-cell methods with adaptive mesh refinement for geodynamic computations", *Geochemistry, Geophysics, Geosystems* manuscript 2018GC007508R View Accepted Manuscript

Appeared

[3] E. G. Puckett, D. L. Turcotte, L. H. Kellogg, Y. He[†], J. M. Robey[*], and H. Lokavarapu[@] (2018) "New numerical approaches for modeling thermochemical convection in a compositionally stratified fluid", Special issue of . *Physics of the Earth and Planetary Interiors* associated with the 15th Studies of the Earth's Deep Interior (SEDI) Symposium (*Phys. Earth. Planet. In.)* **276**:10–35, 10.1016/j.pepi.2017.10.004 View Article

Poster Presentations

[1] L. H. Kellogg, H. Lokavarapu[@], D. L. Turcotte, and S. Mukhopadhyay (2017) "A reservoir model study of the flux of carbon from the atmosphere, to the continental crust, to the mantle", *Annual Geophysical Union Fall Meeting 2017* View Abstract

[2] J. Jiang, A. P. Kaloti, H. R. Levinson, N. Nguyen, E. G. Puckett, and H. Lokavarapu[@] (2016) "Benchmark Results Of Active Tracer Particles In The Open Souce Code ASPECT For Modelling Convection In The Earth's Mantle", *Annual Geophysical Union Fall Meeting 2016* View Abstract

[3] E. G. Puckett, D. L. Turcotte, L. H. Kellogg, H. Lokavarapu[@], Y. He[†], and J. M. Robey[*] (2016) "New Numerical Approaches To thermal Convection In A Compositionally Stratified Fluid", *Annual Geophysical Union Fall Meeting 2016* View Abstract

[4] H. Lokavarapu[@], and H. Matsui (2015) "Optimization of Parallel Legendre Transform using Graphics Processing Unit (GPU) for a Geodynamo Code", *Annual Geophysical Union Fall Meeting 2015* View Abstract

[5] J. A. Russo, E. H. Studley, H. Lokavarapu[@], I. Cherkashin, and E. G. Puckett (2014) "A New Monotonicity-Preserving Numerical Method for Approximating Solutions to the Rayleigh-Benard Equations", *Annual Geophysical Union Fall Meeting 2014* View Abstract

[6] H. Lokavarapu[@], H. Matsui, and E. M. Heien (2014) "Parallelization of the Legendre Transform for a Geodynamics Code", *Annual Geophysical Union Fall Meeting 2014* View Abstract

[@]Undergraduate Student
[*]Graduate Student
[†]Postdoctoral Scholar

CLASSES

Computer Science

- 10 - Concepts of Computing
- 20 - Discrete Mathematics for Computer Science
- 30 - Introduction to Programming and Problem Solving
- 40 - Software and Object-Oriented Programming
- 50 - Machine Dependent Programming
- 60 - Data Structures and Programming
- 120 - Theory of Computation
- 122A - Algorithm Design
- 140A - Programming Languages
- 150 - Operating Systems
- 152A - Computer Networks
- 153 - Computer Security
- 154A - Computer Architecture
- 158 - Parallel Architectures
- 170 - Artificial Intelligence
- 188 - Ethics in an Age of Technology

Mathematics

- 21A - Differential Calculus
- 21B - Integral Calculus
- 21C - Expansions, Series, etc.
- 21D - Vector Analysis
- 22A - Linear Algebra
- 22B - Ordinary Differential Equations
- 118A - Partial Differential Equations (first quarter)
- 118B - Partial Differential Equations (second quarter)
- 125A - Real Analysis (Foundations of Calculus)
- 125B - Real Analysis (second quarter)
- 135A - Probability
- 150A - Modern Algebra (first quarter)
- 150B - Modern Algebra (second quarter)
- 167 - Advanced Linear Algebra: Machine Learning
- 228A - Computational methods for Partial Differential Equations

READ THESE NOTES

- Harsha you need a lot more links to your own code; e.g., your code in R, Python, Jupyter notebooks, etc.
- If you don't have time to make a pile of links just put it all in your GitHub repo and let them hunt around.
- Having a link to someone else's GitHub repo won't be effective unless it is for your extracurricular activities ***only*** such as Neural style.
- Can you point them to a place in your or another GitHub repo that has the Cuda code? Anyone can say they wrote in Cuda, they want to see your code!.