

## Harsha Lokavarapu

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<https://github.com/hlokavarapu>

### Professional Preparation

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

### Appointments

2014-2017	<a href="#">Computational Infrastructure for Geodynamics (CIG)</a>	Junior Assistant Programmer
2012	<a href="#">Certify Data Systems (Humana)</a>	Internship as Code Developer

### Programming Languages, Computing Skills, and Experience

#### Open Source Code Development

- Advanced Solver for Problems in Earth's ConvecTion ([ASPECT](#)) - C++ **There is more. Parameter parsing?**
- State of-the-art model of the Earth's Geodynamo [Calypso](#) - Fortran **Where is the GPU?**
- Generalized Reservoir Modeling (MS Thesis Project) - Python **This is a Carbon Reservoir in the Earth's Deep Interior, and perhaps elsewhere is it not?**

#### Parallel Processing / High Performance Computing (HPC) Experience

##### 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 **Details, briefly ...**
- Peloton **Details, briefly ...**

## Computations

- [ASPECT](#)
  - Executed strong and weak scaling tests for original draft of publication [1] (see below), which was not included in the final publication
- [Calypso](#)
  - Wrote GPU code to speed up Legendre Polynomial computations in spherical geometry
  - Published as poster at 2014 Annual Fall AGU Meeting

## Continuous Integration Tools

- Jenkins - Java
- Travis

## Outside Interests

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

## Professional Affiliations and Activities

2017–	Member	<a href="#">Deep Carbon Observatory</a>
2014-2016	Member	<a href="#">American Geophysical Union</a>
2016 <b>dates!!!</b>	Participant	<a href="#">ASPECT Hackathon</a>
2016	Participant	<a href="#">CIG - All Hands Meeting</a>
2015	Participant	<a href="#">ASPECT Hackathon</a>

## PUBLICATIONS

### REFEREED JOURNAL PUBLICATIONS

#### Submitted

L. H. Kellogg, D. L. Turcotte, M. Weisfeiler, H. Lokavarapu<sup>®</sup>, 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

R. Gassmoeller, H. Lokavarapu<sup>®</sup>, 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

E. G. Puckett, D. L. Turcotte, L. H. Kellogg, Y. He<sup>†</sup>, J. M. Robey<sup>\*</sup>, and H. Lokavarapu<sup>@</sup> (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**

L. H. Kellogg, H. Lokavarapu<sup>@</sup>, 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](#)

J. Jiang, A. P. Kaloti, H. R. Levinson, N. Nguyen, E. G. Puckett, and H. Lokavarapu<sup>@</sup> (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](#)

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

H. Lokavarapu<sup>@</sup>, 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](#)

J. A. Russo, E. H. Studley, H. Lokavarapu<sup>@</sup>, 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](#)

H. Lokavarapu<sup>@</sup>, H. Matsui, and E. M. Heien (2014) “Parallelization of the Legendre Transform for a Geodynamics Code”, *Annual Geophysical Union Fall Meeting 2014* [View Abstract](#)

<sup>@</sup>Undergraduate Student

<sup>\*</sup>Graduate Student

<sup>†</sup>Postdoctoral Scholar

## **EDUCATION**

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### **Computer Science Courses**

- 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**

- 21B - Differential Calculus
- 21C - Integral Calculus
- 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