

PRITHVI THAKUR

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KEY SKILLS

- Data scientist with six years of experience in python, julia, and matlab with a focus on multi-threading, distributed high performance computing, finite-element toolboxes, and multigrid solvers for large systems of linear and nonlinear equations. Proficient in building and compiling new softwares on multiple remote and local systems using C, cmake, and bash. Developer, maintainer, and contributor of multiple open source softwares: [GitHub Link](#).
- Five years experience working with numerical models and teleseismic earthquake data. Proficient in earthquake physics and statistics including magnitude-frequency relationships, source spectrum models, and rupture mechanisms.
- Proficient at designing and developing new research ideas by perusing existing literature, identifying key knowledge gaps, and incorporating editorial and reviewer feedback. Involved in multiple original and innovative research projects that led to authorship of 5 publications and various conference presentations.
- Engaging public speaker who helps audience with very diverse academic backgrounds understand and retain information through visually innovative and well-structured presentations using modern tools such as canva, keynote, adobe illustrator, and prez. Has given conference and invited talks both with U.S. and internationally. Actively collaborated with various students and scientists from across the globe: able to communicate ideas, prepare analyses, and work in a team of scientists with various backgrounds.

Softwares/Developer Tools: Python, Matlab, Git and Github, Generic Mapping Tools (GMT), LaTeX, Markdown, vi, Adobe Photoshop and Illustrator, Ableton Live, Davinci Resolve, Visual Studio

Scientific Expertise: General Purpose Programming, Numerical Modeling, High Performance Computing, Bayesian Inference, Machine Learning, Scientific and Technical Writing.

EXPERIENCE

Graduate Research Assistant

September 2017 – Present

University of Michigan

Ann Arbor, MI

- Developed high performance efficient numerical models to study the long-term sequences of seismic and aseismic slip in strike-slip fault zones. Our current implementation in Julia language using efficient multigrid solvers and multithreaded parallelism is faster than the previous implementations by over 60 times.
- Demonstrated the effects of fault zone geometry, compliance, and temporal evolution on dynamic earthquake cycles for the first time: showed that the depth-distribution of earthquakes can be constrained by material heterogeneities and recurrence of earthquakes can be highly irregular in immature fault zones.
- Developer and maintainer of high-performance earthquake cycle simulation code [SPEAR](#) with 6 stars and 4 forks on github. This code has been used for community benchmarking project operated by Southern California Earthquake Center (SCEC).
- Taught several graduate courses (Physical Oceanography, Seismology, Various Minicourses) with over 20 students in each course.

Project Assistant

June 2016 – March 2017

Indian Institute of Science

Bengaluru, India

- Clustered and optimized earthquake focal mechanism data to delineate the spatiotemporal stressing history of the Sumatra-Andaman subduction zone. Worked extensively with Linux shell script (Ubuntu/RHEL), Generic Mapping Tools, and Python to extract, visualize, cluster, and correlate teleseismic data and infer the tectonic history.
- Taught undergraduate and graduate level courses with more than 100 students in each course: designed labs and assignments for each section. Mentored several undergraduate students, some of whom were admitted to prestigious graduate programs in physics, mathematics, and geophysics.

Undergraduate Research Assistant

July 2014 – May 2016

Indian Institute of Technology

Roorkee, India

- Developed the first hybrid clustering-optimization algorithm to invert tectonic stress and simultaneously cluster tectonic fault-slip data ([HGA](#)), written in python. The method uses a unique loss function with genetic algorithm in parallel to group similar stress-states and invert each group for their respective stress-tensor. This code has 12 stars and 5 forks on github.
- Demonstrated the efficacy and increased accuracy of the above method against other existing methods (linearized and quasi-linear direct inversion and grid search algorithms) in complex scenarios such as oblique faulting and noisy fault-slip data.

Summer Internship

Indian Institute of Remote Sensing

Summer 2013

Dehradun, India

- Studied the global gravity anomalies, geoid height variations, and tectonic deformation of the 2011 Tohoku earthquake using data from the satellites GRACE and GOCE.
- Analyzed the seasonal changes in north Indian terrestrial water storage using the earth observation satellites GRACE and TRMM.
- All the numerical analysis was done using MATLAB and plotting and visualization using ArcGIS.

PROFESSIONAL ACTIVITIES AND AWARDS

- Reviewer for Journal of Geophysical Research: Solid Earth and Journal of Structural Geology.
- Member of American Geophysical Union and Southern California Earthquake Center: Involved in community led effort to benchmark earthquake simulation codes. Regularly attend meetings and deliver scientific talks.
- Awarded the prestigious Rackham Pre-Doctoral Fellowship that covers tuition and stipend for the final year of my PhD. Total Amount: USD 36,000.
- Three-time Recipient of Univ. of Michigan's departmental Turner Award for writing outstanding Research Proposal. Cumulative Award Amount: USD 4500.
- Co-wrote two grant proposals (SCEC and NSF-CAREER) with my advisor Prof. Yihe Huang that helped fund a part of my graduate research.
- Recipient of NSF Travel Grant for Numerical Modeling of Earthquake Motions (NMEM) workshop in Smolenice Castle, Slovakia, 2019.
- Recipient of Ministry of Human Resource and Development Scholarship, Qualified Graduate Aptitude Test in Engineering 2015.
- Organized and participated in a community outreach program for high school students EarthCamp, 2021 as a geophysics ambassador.
- Selected as the top three finalist for CAIRN Case study competition at IIT-Roorkee: Analyzed and presented the case study for energy demands and oil and gas pricing in India, compared and contrasted government regulations vs. privatization of oil prices.

EDUCATION

University of Michigan

PhD in Geophysics: specialization in computational seismology

Ann Arbor, MI

September. 2017 – May 2022 (expected)

Indian Institute of Technology

Integrated Masters (BS + MS) in Geology

Roorkee, India

Aug. 2011 – May 2016

PUBLICATIONS AND CONFERENCES

- Authored five publications in high-impact journals, four of which are first-authored. Two of these publications featured novel optimization and clustering techniques and the other three featured new and innovative high-performance numerical models. These publications have garnered 47 citations and h-index of 4 on [google scholar](#).
- Authored twelve conference abstracts and presented them in oral and poster format at various national and international conferences.

ACTIVITIES AND OTHER INTERESTS

- Self-taught multi-instrumentalist and amateur music producer: Guitars, Bass, MIDI-keyboards, Sampling, Production, and Recording. Played live in dozens of venues and recorded several original compositions - [Soundcloud Link](#). Served as the secretary of the music club at IIT-Roorkee and was involved in recruiting new talents and leading shows with over 30 participants at a live venue with hundreds of people in the audience.
- Audio and video editing enthusiast: Recorded seismic station de-installation video and music using iMovie, Davinci Resolve, and Ableton Live for scientific outreach: [Youtube Link](#).
- Creator of [Personal Scientific Blog](#) for scicomm and outreach.
- Event organization and planning: served as the head of cultural events as a part of Hamrock Society at IIT-Roorkee. Involved with recruiting new students and organizing several events with sponsorship and invited speakers. Also served as the treasurer of Geoscience Club at Univ. of Michigan Earth department for two years - involved in tracking finances and co-organizing several field trips and cultural events.
- Graphic designing enthusiast: served as the graphic designer of student-led magazine Geek Gazette at IIT-Roorkee.