

Kuruvitage Chameera Chathuranga Silva

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RESEARCH STATEMENT

I am a PhD student in computational geodynamics, developing computer models to study how Earth and other planets deform through time. My dissertation research focuses on continental rifting, a fundamental process that shapes continents, creates new ocean basins, and influences Earth's long-term evolution. Using the open-source ASPECT code and high-performance computing, I build numerical models to explore how temporal variations in plate boundary forces and thermal mantle plumes control the initiation, evolution, and ultimate outcome of rifting. Beyond my dissertation, I am broadly interested in improving the accuracy and reliability of geodynamic modeling by advancing numerical methods and best practices for scientific software. My work bridges geophysics, geology, and computational science, with the goal of better capturing the physical processes that govern rock deformation and using these insights to understand both Earth and other planetary bodies.




EDUCATION

- **The University of Memphis** August 2021 - Present
PhD in Geophysics & Earth Science Memphis, TN, USA
- **University of Sri Jayewardenepura** 2018 - 2021
MPhil- Faculty of Graduate Studies Colombo, Sri Lanka
- **University of Sri Jayewardenepura** 2014 - 2017
BSc (Hons) in Physics - Department of Physics, Faculty of Applied Sciences Colombo, Sri Lanka
 - Minor: Mathematics, Computer Sciences

EMPLOYMENT

- **Center for Earthquake Research and Information, The University of Memphis**  August 2021 - Present
Graduate Research Assistant Memphis, TN, USA
- **Department of Physics, University of Sri Jayewardenepura**  Jul 2018 - Jul 2021
Graduate Research Assistant Colombo, Sri Lanka
- **Industrial Technology Institute**  Feb 2018 - May 2018
Assistant Research Technologist-(contract) Colombo, Sri Lanka
- **Petroleum Resources development Secretariat** Jun 2017 - Dec 2017
Intern Colombo, Sri Lanka

RESEARCH EXPERIENCE

- **Doctoral research** Aug 2021 - Present
Center for Earthquake Research and Information, The University of Memphis (advisor: Dr. Eunseo Choi) 
 - Developing numerical models to investigate continental rift initiation, failure and continental breakup considering temporal variations in plate boundary forces.
 - Developing numerical models to evaluate contribution from late arriving mantle plumes' ability to reactivate failed continental rift systems.
 - Investigating effects of temporal variation in ridge push forces on continental rift system development around a craton by mantle plumes.
 - Attended ASPECT Hackathon 2023 -[Allowing multiple traction models for a boundary](#)
- **Masters research** 2018 - 2021
Faculty of Graduate studies, University of Sri Jayewardenepura (advisor: Dr. N.G.S.S Gamage) 
 - Generating crustal thickness map for Mannar basin Sri Lanka by seismic interpretation of offshore reflection seismic profiles and forward and inverse gravity modeling.
- **Undergraduate research** Jan 2017 - Dec 2017
Department of Physics, Faculty of Applied Sciences, University of Sri Jayewardenepura (advisor: Dr. N.G.S.S Gamage) 
 - Estimating sedimentary thickness of Lanka Basin using digitized scanned seismic sections.

TALKS AND PRESENTATIONS

A=ACCEPTED, P=POSTER, T=TALK

- [A.1] Silva, K.C.C, and Choi, E., 2025, December. **Plume-driven rifting around a craton without far-field extensional forces: Initiation and asymmetric development of double rifts.** In *AGU Fall Meeting Abstracts T24A-04 (oral presentation)*, New Orleans Convention Center.
- [T.1] Silva, Kuruvitage Chameera Chathuranga. **Utilizing HPC for Geodynamic Research on Continental Rifting.** In *Research Computing Symposium*, September 4th, 2025, The University of Memphis.
- [P.1] Silva, K.C.C, and Choi, E. **Rift Reactivation and Initiation under Compression Enabled by Evolving Force Balance during Plume-Lithosphere Interactions.** Abstract presented at 2025 CIG Community Workshop, August 4-8, Breckenridge, Colorado.
- [P.2] Silva, K.C.C, and Choi, E. **Continental rift system initiation and reactivation by mantle plumes.** Abstract presented at 37th Annual Student Research Forum, March 24th, 2025, The University of Memphis.
- [P.3] Silva, K.C.C, and Choi, E. **Exploring the Relationship between Time-Dependent Driving Forces and the Fate of Continental Rifts.** Abstract presented at 2024 Ada Lovelace workshop on Modeling Mantle and Lithosphere Dynamics, September 1-6, Sete, France.
- [P.4] Silva, K.C.C, Lee, S., Choi, E. **Modeling Multi-phase Rifting as an Evolving Balance between Internal Structure of Lithosphere and Driving Forces.** Abstract T11B-0172 presented at 2023 AGU Fall Meeting, 11-15 Dec.

PUBLICATIONS

A=ACCEPTED, I= IN PREP, P =PUBLISHED

- [I.1] Silva, K.C.C, and Choi, E., **The Role of Mantle Plumes in Reactivating Rifts under Unfavorable Tectonic Conditions.** *In preparation for Earth and Planetary Science Letters.*
- [A.1] Silva, K.C.C, and Choi, E., 2025 **Continental rifts losing driving forces can still complete breakup .** *Accepted in Scientific Reports.*
- [P.1] Silva, K.C.C., Gamage, N.S. and Weerasinghe, D.A., 2019 **Estimating sedimentary thickness of Lanka Basin using digitised scanned seismic sections.** *Journal of the National Science Foundation of Sri Lanka*, 47(3).
- [P.2] Gamage, N.S., **Silva, K.C.C.**, and Weerasinghe D.A., 2019 **Subsurface structure of the offshore Trincomalee, NE of Sri Lanka.** *Journal of Indian Geophysical Union*, v23(p:214-222)

SERVICE, TEACHING & OUTREACH

- **Volunteer for organizing Earth day** 2023 - 2025
The University of Memphis [🌐]
 - Celebrate the Earth Day and provide hands-on learning experiences for local middle school students about topics in earth and environmental sciences.
- **Volunteer for Project Based Learning** 2025 April
The University of Memphis [🌐]
 - Demonstrating convection in a water tank experiment to The University of Memphis Middle school students.

ADDITIONAL INFORMATION

Computing Experience: C++ (advanced proficiency), Python(advanced proficiency), Aspect (Intermediate)

Interests: Continental Rifting, Mid Oceanic Ridges, Subduction zones and back arc rifting

REFERENCES

1. **Dr. Eunseo Choi**
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2. **Dr. Mitch Withers**
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3. **Dr. Randel Tom Cox**
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4. **Dr. Sungho Lee**
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