



Tahiry Andriantsoa Rajaonarison

Postdoctoral Associate

Department of Earth and Environmental Science
New Mexico Institute of Mining and Technology

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CURRICULUM VITAE

CURRENT POSITION

Postdoctoral Associate, New Mexico Institute of Mining and Technology, New Mexico, U.S.

Advisor: John Naliboff

EDUCATION

2015 – 2020 **Ph.D**, Geophysics, Virginia Tech, Blacksburg, Virginia, U.S.

Emphasis: Geodynamic modelling, Geodesy

Advisor: D. Sarah Stamps

2013 – 2014 **Postgraduate Diploma**, Earth System Physics

Abdus Salam International Center of Theoretical Physics, Italy

Emphasis: Seismology, GNSS Geodesy, rock mechanics

Advisor: Abdel Karim Aoudia

2011 - 2013 **M.S**, Geophysics, University of Antananarivo, Madagascar

Emphasis: Geophysics, Geodesy

Advisors: D. Sarah Stamps, Gerard Rambolamana

2007 – 2010 **B.S**, Physics, University of Antananarivo, Madagascar

Emphasis: Physics

PROFESSIONAL APPOINTMENTS

2022 – Present **Postdoctoral Associate**, Department of Earth and Environment Sciences

New Mexico Institute of Mining and Technology, USA

2020 – 2021 **Research Scientist**, Institute and Observatory of Geophysics in Antananarivo

University of Antananarivo, Madagascar

2015 – 2020 **Graduate Research/Teaching Assistant**, Department of Geosciences

Virginia Tech, USA

2014 **Lecturer**, Institute and Observatory of Geophysics in Antananarivo

University of Antananarivo, Madagascar

AREAS OF EXPERTISE

Tectonophysics, Geodynamics, Computational geomechanics, GNSS/GPS geodesy, Rock Mechanics

PRINCIPAL RESEARCH INTERESTS

- Numerical thermo-mechanical modeling of geodynamic processes
- Role of various geological factors (structure inheritance, crustal/lithospheric strength, faults frictions, and extension obliquity) on strain localization and fault network development during rift evolution
- Thermal evolution of continental rifts
- Link between tectonics, surface processes, and climate change
- Rheology of the continental lithosphere
- Mantle dynamic and sources of seismic anisotropy
- Plume-lithosphere interactions
- Real-time GPS monitoring of active volcanoes (Cenozoic volcanisms in Madagascar)

TEACHING EXPERIENCE

Teaching Assistant

- Fall 2020 Potential Field Geophysics (Virginia Tech)
- Fall 2020 Earth's Natural Hazards: Geosciences in the Cinema (Virginia Tech)
- Spring 2019 Earth's Natural Hazards: Geosciences in the Cinema (Virginia Tech)
- Fall 2019 Resources (Virginia Tech)
- Fall 2018 Introduction to Geology (Virginia Tech)
- Fall 2018 Earth's Natural Hazards: Geosciences in the Cinema (Virginia Tech)
- Fall 2017 Physical Geology Lab (Virginia Tech)
- Fall 2017 Earth's Natural Hazards: Geosciences in the Cinema (Virginia Tech)

Lecturer

- Fall 2014. Seismology (Graduate level, University of Antananarivo)

AWARDS

2016 - 2019 AMC SIGHPC/INTEL Computational and Data Science Fellowship, \$45,000
2013 - 2014 Postgraduate Diploma Scholarship in Earth System Physics at the Abdus Salam International Center of Theoretical Physics, Trieste, Italy

FUNDED PROPOSALS

2016 – 2018 Geodetic and Geochemical Constraints on the Hypothesized Lwandle-Somalian Plate in Northern Madagascar
National Geographic Society Waitt Program, PI, \$14,185

PUBLICATIONS

- **T.A. Rajaonarison**, D.S. Stamps, J. Naliboff, A. Nyblade, Emmanuel Njinju, (In Review), A Geodynamic Investigation of Plume-Lithosphere Interactions Beneath the East African Rift, *Journal of Geophysical Research*.
- Njinju A. E., D.S. Stamps, R. Tyron, E. Atekwana, **T. A. Rajaonarison** (In Review) Tomography-based convection beneath the Rungwe Volcanic Province, East Africa: implications for melt generation, *Geophysical Journal International*.
- C. Chisenga, F. Kolawole, **T. A. Rajaonarison**, E. A. Atekwana, J. Yan, E. M. Shemang (2022), Localization of Large Intraplate Earthquakes along Faulted Deep-Reaching Density-Contrast Boundaries: Insights from the 2017 Mw6.5 Botswana Earthquake, *Journal of African Earth Sciences*. doi: [10.1016/j.jafrearsci.2022.104752](https://doi.org/10.1016/j.jafrearsci.2022.104752)
- **T.A. Rajaonarison**, D.S. Stamps, J. Naliboff (2021), Role of Lithospheric Buoyancy Forces in Driving Deformation in East Africa, *Geophysical Research Letters*. doi: [10.1029/2020GL090483](https://doi.org/10.1029/2020GL090483)
- D.S. Stamps, C. Kreemer, R. Fernandes, **T.A. Rajaonarison**, G. Rambolamanana (2020), Redefining East African Rift System Kinematics, *Geology*. doi: [10.1130/G47985.1](https://doi.org/10.1130/G47985.1)
- **T.A. Rajaonarison**, D.S. Stamps, S. Fishwick, S. Brune, A. Glerum, J. Hu (2020a), Numerical Modeling of Mantle Flow Beneath Madagascar to Constrain Upper Mantle Rheology Beneath Continental Regions, *Journal of Geophysical Research*. doi: [10.1029/2019JB018560](https://doi.org/10.1029/2019JB018560).
- **Rajaonarison, T. A.**, Stamps, D. S., Naliboff, J. (2020b). Trajaona/aspect: Rifting model of the East African Rift (version v1.0). Zenodo. <https://doi.org/10.5281/zenodo.4005094>
- Njinju A. E., E. Atekwana, D.S. Stamps, M.G. Abdelsalam, E.A. Atekwana, K.L. Mickus, S. Fishwick, F. Kolawole, **T.A. Rajaonarison**, V.N. Nyalugwe (2019), Lithospheric Structure of the Malawi Rift: Implications for Rifting Processes in Magma Poor Rift Systems, *Tectonics*. doi: [10.1029/2019TC005549](https://doi.org/10.1029/2019TC005549).

PUBLICATIONS IN PREPARATION

- R. Andrianasolo, **T. A. Rajaonarison** (In Preparation), Magma Plumbing System Beneath the Intraplate Cenozoic Ankaratra and Itasy Volcanoes, Revealed by Vp, Vp/Vs 3D Tomography, (to be submitted to) *Geophysical Research Letters*.

SOFTWARE

- Rajaonarison, T. and D.S. Stamps, 2016, Adiabatic Boundary, NSF Computational Infrastructure for Geodynamics ASPECT plug-in

- Rajaonarison, 2016, Cartesian to WGS84 transformation utility, NSF Computational Infrastructure for Geodynamics ASPECT plug-in

TRAINING

June 2020	Advanced Solver for Problems in the Earth's ConvecTion Hackathon California, USA	
June 2016	Advanced Solver for Problems in the Earth's ConvecTion Hackathon California, USA	
Aug 2013	University of Antananarivo <i>ArcGIS and Geostatistics</i>	Madagascar
Jul 2013	UNAVCO, Boulder Colorado <i>GAMIT/GLOBK GPS Processing Short Course</i>	USA
Jun 2013	University of Antananarivo <i>GNSS/GPS campaign and GNSS/GPS Geodesy Short Course</i>	Madagascar

PRESENTATIONS

Sep 2022	Weekly Seminar New Mexico Tech Oral: <i>Geodynamics of the East African Rift: Insight from 3D Numerical Modeling</i>	
June 2022	Rift and Rifted Margin Seminar (Invited talk) Oral: <i>3D Numerical Modelling of Plume-Lithosphere Interactions beneath the East African Rift</i>	
Dec 2020	American Geophysical Union Fall Meeting Poster: <i>Assessing the Role of Lithospheric Buoyancy Forces and Mantle Flow in Driving Deformation across the East Africa Rift through 3D Geodynamic Modeling</i>	
Dec 2020	2020 CIG Community Workshop- Advancing Our Understanding of Earth Dynamics in CIG IV Poster: <i>Geodynamics Investigation of Plume-Lithosphere Interactions beneath the East African Rift</i>	
Dec 2018	American Geophysical Union Fall Meeting Poster: <i>Small Scale Flow Induced Azimuthal Seismic Anisotropy beneath Madagascar: implications for rheology</i>	
Dec 2017	American Geophysical Union Fall Meeting Poster: <i>Geodynamic Constrain on Source of Seismic Anisotropy Beneath Madagascar</i>	
Dec 2016	American Geophysical Union Fall Meeting Poster: <i>Testing the Role of Upper Mantle Flow on Lithospheric Deformation in Madagascar</i>	

- Mar 2016 UNAVCO Science Workshop
Poster: *Testing the Role of Upper Mantle Flow on Lithosphere Deformation in Madagascar*
- Jan 2013 University of Witwatersrand, Africa Array Annual Meeting
Oral: *Determining Correction Parameters for Millimeter Precision GPS Positioning in Madagascar*

COLLABORATORS

International: Stewart Fishwick (University of Leicester, University of Bristol), Sascha Brune (GFZ), Anne Glerum (GFZ)

Domestic: John Naliboff (University of California, Davis), D. Sarah Stamps (Virginia Tech), Folarin Kolawole (Columbia University), Jiashun Hu (California Tech), Andrew Nyblade (Pennsylvania State University),

PROFESSIONAL SOCIETY MEMBERSHIP

- American Geophysical Union
- Seismological Society of America

COMPUTATIONAL SKILLS

- 3D Visualization with Visit and Paraview
- Python
- ArcGIS
- SQL
- Generic Mapping Tools (GMT)
- GitHub
- Matlab
- LaTeX
- SHELLS, AWK, vi
- Dealii
- Coulomb 3.4
- C++
- GAMIT-GLOBK GNSS/GPS processing software maintained at MIT (requires knowledge of RINEX and BINEX geoscience data standards for GNSS/GPS data)