Tolulope M. Olugboji

Assistant Professor, University of Rochester
Earth and Environmental Sciences (primary)
Electrical and Computer Engineering (secondary)
Georgen Institute of Data Science (affiliated)
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Online: | GoogleScholar | ORCID | Website

Research Interests

Planetary imaging and Earth hazards with sensing, signals, and intelligent algorithms; the global structure of the lithosphere and mantle; seismo-acoustic signal processing; mathematical geophysics; marine geophysics; parameter estimation; inverse theory; computational imaging; machine learning; and computational statistics.

Education

Ph.D. (2014), Geology and Geophysics, Yale University, USA.

Dissertation: Revealing the Fine Structures of the Lithosphere Asthenosphere Boundary

M.Phil. (2011), Geology and Geophysics, Yale University, USA.

B.Sc. (2008), Computer Science, Obafemi Awolowo University (OAU), Ile-Ife, Nigeria.

Professional Experience

2018 - Present:
Assistant Professor, University of Rochester
Department of Earth and Environmental Sciences (primary)
Department of Electrical and Computer Engineering (secondary)
Georgen Institute of Data Science (affiliated)

2014 - 2018:
Postdoctoral Research Associate, Department of Geology, University of Maryland.

April - October 2014:
Visiting Research Scholar, Earth and Planetary Science, Rutgers University.

2010-2014:
Research & Teaching Fellow, Department of Geology and Geophysics, Yale University.

Honors, Awards, & Fellowships

NSF Faculty Early Career Development (CAREER) Award, 2024.

CIG Distinguished Speaker, Computational Infrastructure for Geodynamics, 2021-2022.

Carnegie Visiting Fellow, Carnegie Earth & Planetary Science Laboratory, 2022.

Furth Award, University of Rochester, 2020.

Next Einstein Fellow, Robert Bosch Foundation, 2017-2019.

IRIS Travel Scholarship, 2014.

Fred Earl Ingerson Fellowship, Yale University, 2010 - 2012.

Grants & Resources

Total ($2.8 million) †Active ($1.1 million) ‡ Pending ($1.1 million) ♯ Finalized ($668,102)

12. † $701,964; 05/24 - 04/29; (PI): *CAREER: Evolution of the Oceanic Plate and Upper Mantle with Deep Probabilistic Seismic Imaging*. NSF Geophysics+MG&G - 2339370

11. † $383,998; 05/25 - 08/28; (Co-PI): *Collaborative Research: Advances in African Crust and Upper Mantle Dynamics from Seismology, Geodesy, and Geodynamics (Co-PIs: D. Sarah Stamps, Aubreya Adams)*. NSF Geophysics EAR-2438437

10. ‡ $779,948; 10/26 - 10/29; (lead PI): *Collaborative Research: CAIG: AI-Powered Earth Imaging: Unraveling Earth Structure with Explainable AI (Co PI: Gonzalo Mateos and Mujdat Cetin)*. NSF GEO CI - GEO Cyberinfrastructre

9. ‡ (N-A); 11/26 - 11/29; (Co PI): *Collaborative Research: Data-driven characterisation of Australia's deep lithosphere to predict new mineralised systems*. Australia Research Council: Discovery Project - Expression of Interest.

8. † $40,000; 03/26 - 12/26; (PI): *Plaentary Imaging with AI*, Empire AI GPU Allocation, 3,000 SUs (Service Units Computing Hours). UofR

7. ‡ $282,501; (declined); (lead PI): *Collaborative Research: GEARS: Enhancing Global Model of the CRUST (Structure & Composition) with Multi-mode Body Waves (Co PI: Chen Yangkang)*. will resubmit to NSF SPSE-Study of Physics of Earth

6. ♯ $357,817; 09/21 - 08/24; (PI): *Developing a Seismic Model for Investigating Layering in Cratonic Lithosphere Beneath Africa*. NSF Geophysics EAR-2102495

5. ♯ $241,791; 09/18 - 08/21; (PI): *Collaborative Research: Understanding the Origin of the Mid-lithosphere Discontinuity Within a Stable Continent From a Combined Geophysics-Mineral Physics Approach (co-PIs Jeffrey Park, Shun-ichiro Karato)*. NSF Geophysics EAR-181865

4. ♯ $20,000; 01/23 - 08/23; (PI): *Computational Earth Imaging with Machine Learning*, One-year Seed Funding Award, (Research Support). UofR GIDS-AI Seed Funding

3. ♯ $5,445; 08/20 - 07/21; (PI): *Collaborative Research: EAGER: Advancing Pedagogy and Inclusivity through Multimodal Upper Level Geophysics Education (co-PIs Margarette Jamadec, Stefany Sit, Derek Schutt, Erasmus Oware)*. NSF Geophysics EAR-2042007

2. ♯ $42,000; 09/22 - 08/23; (PI): *Probabilistic Imaging of Africa's Subsurface*, HPC Resource Allocation, Extreme Science and Engineering Discovery Environment (XSEDE), 2,000,000 SUs (Service Units Computing Hours). NSF TG-EES220030

1. ♯ $1,049; 09/22 - 08/23; (PI): *Probabilistic Imaging of Africa's Subsurface*, HPC Resource Allocation, Extreme Science and Engineering Discovery Environment (XSEDE), 500,000 SUs (Service Units Computing Hours). NSF TG-EES220006

Student Supervision

♯ *Postdocs (1) † PhD/Masters (3**, 11*) ‡ Undergraduate(2**,19*) **Current *Former*

36. ♯** Baowei Liu (2019 - Present). *Research Computing Support*

35. †** Sayan Swar (expected 2029). *Ocean Exploration with Interpretable AI*

34. †** Molly Maener (expected 2030). *Environmental Seismology*

33. †* Steve Carr (19-2026, now at Chevron Energy). *Global Observations of Mantle Stratification*

32. †* Jean-joel Legre (21-2026, now at Penn State/Cornell). *African Seismicity and Tectonics*

31. †* Canberk Eckmeckci (19-2026, now at Argonne Labs). *Computational Earth Imaging*

30. †* Ziqi Zhang (19-24, now at UMD). *Lithospheric Imaging in Reverberant Settings*

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29. †** Balamurugan Kanimozhi, Tejaswini ('25-27). *WaveMNIST: An Imagenet for Planetary Signals*
28. †* Siyu Xue (2021-25). *Global Dispersion Model of the Ambient Noise Wave-field*
27. †* Meng Wang (2024-25). *Denoising Seismic Signals with Algorithmic Unfolding*
26. †* Stephen Akinremi (Visiting, 2024). *The Structure of Netherhlands's Crust*
25. †* Thapasya Murelli (2023-24). *Machine Learning on Solid Earth Signals*
24. †* Walter Hennings (2021-23). *Stochastic Imaging of Africa's Lithosphere*
23. †* Xinxuan Lu (2021-23). *Big Data Mining of Scattered Waves with Radon Filters*
22. †* Yingping Lu (2018-2019). *Research Assistant, now at American Express*
21. ‡** Christopher Angel Pena Gonzalez (2025-29). *Planetary Signals and AI*
20. ‡** Tianhao Zhang (2025-26). *Planetary Interiors with Stochastic Vibrations*
19. ‡* Qike Jiang (2024-25). *Graph Analysis on Large-N Datasets*
18. ‡* Sylvia Liu (2024-25). *Graph Scheduling on Heterogeneous Computers*
17. ‡* Mai Pham (2024-25). *Deblurring of S-waves in Global Oceans*
16. ‡* Aaron Shneydman (2024-25). *Graph Neural Networks for Equake Detection*
15. ‡* Helen Jackson (Summer, 2024). *Senior at the UofR*
14. ‡* Emma Dickerson (Fall, 2023). *Senior at the UofR*
13. ‡* Jiayue (Joyce) Meng (Summer, 2023). *GIDS Intern, now at Georgia Tech*
12. ‡* Kaetu Wleh (Summer, 2023). *URISE intern, currently at Princeton*
11. ‡* Enting Zhou (BSc. 2023). *Africa's Crustal Architecture from Sequencing Noise Maps*
10. ‡* Yuri Tamama (Summer, 2021). *IRIS intern, currently at Princeton*
9. ‡* Ayla Martinelli (BSc. 2021). *Project Support for URSeismo Africa Network (URAFNet)*
8. ‡* Faner Lin (BSc. 2019). *Independent research, now at Carnegie Mellon University*
7. ‡* Brian Filipiak (BSc. 2020). *Independent study, now Ph.D. at University of Albany*
6. ‡* Derrick Murekezi (BSc. 2019). *Senior thesis; now Ph.D at Georgia Tech*
5. ‡* Liam Moser (Summer, 2019). *IRIS intern, now Ph.D. at MIT*
4. ‡* Trey Brink (Summer, 2019). *IRIS intern, now MSc. at UCDavis*
3. ‡* James Pippin (summer, 2019). *IRIS intern, now a senior at Penn State University*
2. ‡* Julie Schnurr (Summer, 2015). *Now at the University of Hawaii*
1. ‡* Liam Shaughnessy (Summer, 2016). *Senior at the University of Maryland*

Research Publications

Publications (♯ peer-reviewed, @ not peer-reviewed)

*♯ published (n=24) † in review or revision (n=4) ‡ in prep (n=7) *undergraduate advisee **graduate advisee*

In progress

34. ‡ Lauren Waszek and **Tolulope Olugboji (Invited)**, *Deep Earth structure: Transition zone and Mantle Discontinuities.*, Treatise on Geophysics: Third Edition.

33. ‡ Jean-Joel Legre** and **Tolulope Olugboji**, *Africa's Whole Mantle Discontinuity Structure: Oceans, Cratons, and Rifts*, TBD.

32. ‡ Steve Carr**, **Tolulope Olugboji**, Ziqi Zhang**, Lauren Waszek, Nicholas Schmerr, *Global Constraints on Mid-mantle Structure and Implications for Earth's Water Cycle*, TBD.

31. ‡ Ziqi Zhang**, Doyeon Kim, **Tolulope Olugboji**, and Vedran Lekic, *The Martian Crust Outside Elysium Planitia: A View from Probabilistic Body Wave Deconvolution*, TBD.

30. ‡ **Tolulope Olugboji**, Tushar Mittal, Sayan Swar, Kevin Haney, *Global mapping of seismo-acoustic coupling reveals the Earth's natural acoustic amplifiers*, TBD.

29. ‡ **Tolulope Olugboji (Invited)**, *Mantle Imaging with Sparse Transforms (Curvelets, Stacklets and Radon Filters)*, Special Issue of Geosciences: Seismology of the Dynamic Deep Earth, ISSN 2076-3263.

28. † Sayan Swar**, Tushar Mittal, **Tolulope Olugboji**, *Interpretable Spectral Representations of Planetary Signals in Vector Spaces*, in review at GJI, Preprint: 10.22541/essoar.177315090.05674244/v1, 2026.

27. † Steve Carr**, **Tolulope Olugboji**, Ziqi Zhang**, Lauren Waszek, Nicholas Schmerr, *Origin of Mantle Discontinuities with Multi-Mode Body-waves: Plates and Plumes*, in review at GJI.

2025

26.† **Tolulope Olugboji**, Joel Legre**, Steve Carr**, Zachary Sudholz, *Global Taxonomy Addresses the Paradox of Strength of Ancient Continents*, in review at Science Advances, 2025.

25.† Rasheed Ajala, Folarin Kolawole, Jean-Joel Legre**, **Tolulope Olugboji**, D. van Herwaarden, A. Fichtner, *Multiscale comparison of early-stage lithospheric deformation styles in magma-poor and magma-rich divergent plate boundaries*, in review at Geoscience Frontiers, Preprint: 10.22541/au.173627299.94095848/v1, 2025.

24.♯ Siyu Xue** and **Tolulope Olugboji**, *AkiNet: A Physics-Informed AI Extracts Waves from Noise*, , JGR-Machine Learning, https://doi.org/10.1029/2025JH000932, 2025.

23.♯ Meng Wang** and **Tolulope Olugboji**, *Deep Algorithm Unrolling for Seismic Migration (iRADnet)*, 2025 IEEE Conference on Computational Imaging Using Synthetic Apertures (CISA), College Park, MD, USA, 2025, pp. 1-5, , doi: 10.1109/CISA64343.2025.11091556.

22.♯ Jean-Joel Legre** and **Tolulope Olugboji**, *The Origin of Africa's Upper Mantle Discontinuities*,, Gcubed https://doi.org/10.1029/2025GC012315, 2025.

21.♯ Ziqi Zhang**, **Tolulope Olugboji**, Doyeon Kim, *Probabilistic Deconvolution of S-waves (SHARP-SS)*, GJI, https://doi.org/10.1093/gji/ggaf073, 2025.

20.♯ Steve Carr**, **Tolulope Olugboji**, Jeffrey Park, Shun-ichiro Karato, *High-resolution Mapping of North America's Mid-Mantle Reflectivity provides Evidence for Dehydration Melting*, Tectonophysics, DOI: doi.org/10.1016/j.tecto.2025.230775, 2025.

2024

19.♯ Steve Carr** and **Tolulope Olugboji**, *A Taxanomy of Upper Mantle Layering in the US*, JGR-Solid Earth, https://doi.org/10.1029/2024JB028781, 2024.

18.♯ Jean-Joel Legre**, Yan Qin, Folarin Kolawole, **Tolulope Olugboji**, *The Intraplate Stress Field of West Africa*, GRL, https://doi.org/10.1029/2023GL107614, 2024.

17.♯ Ziqi Zhang** and **Tolulope Olugboji**, *Crustal Imaging with Noisy Receiver Functions*, BSSA, DOI: 10.1785/0120230254, 2024.

2023

16.♯ **Tolulope Olugboji**, Siyu Xue*, Yuri Tamama*, Jean-Joel Legre**, *Africa's Crustal Architecture Inferred from Probabilistic and Perturbational Inversion of Ambient Noise: ADAMA*, Gcubed, https://doi.org/10.1029/2023GC011086, 2023.

15.♯ **Tolulope Olugboji**, , Ziqi Zhang**, Steve Carr**, Canberk Eckmekci**, Mujdat Cetin, *On the Detection of Upper Mantle Discontinuities with Radon-Transformed Ps Receiver Functions (CRISP-RF)*, GJI, https://doi.org/10.1093/gji/ggad447, 2023.

14.♯ Ziqi Zhang** and **Tolulope Olugboji**, *Lithospheric Imaging through Reverberant Layers: Sediments, Oceans, and Glaciers*, JGR Solid Earth, https://doi.org/10.1029/2022JB026348, 2023

2022

13.♯ **Tolulope Olugboji** and Siyu Xue*, *A Reference Dataset of Short-Period Surface Wave Dispersion for Model Update of the African Crust: ADAMA*, Seismological Society of America, 93(3), 1943-1959, 2022.

12.♯ Fadel, Islam, Folarin Kolawole, Mohamed Sobh, D. Sarah Stamps, **Tolulope Olugboji** and Musa Manzi, eds., *Advances in African Earth Sciences.*, Frontiers Media SA, ISSN 9782832505052, 2832505058, 2022.

2021

11.♯ **Tolulope Olugboji**, Manoochehr Shirzaei, Yingping Lu**, Adepelumi, A.A., Kolawole, F., , *On the Origin of Orphan Tremors and Intraplate Seismicity in Western Africa. Front." Earth Sci 9 (2021)*, https://doi.org/10.3389/feart.2021.716630, 2021.

10.♯ Ziqi Zhang** and **Tolulope Olugboji** (2021), *The Signature and Elimination of Sediment Reverberations from Submarine Receiver Functions*, JGR Solid Earth, https://doi.org/10.1029/2020JB021567.

2018

9. @ **Tolulope Olugboji**, *How scientists listening to the earth can unlock Africa's many riches,* Conversation.

2017

8.♯ **Tolulope Olugboji**, Vedran Lekic, William McDonough, *A Statistical Assessment of Seismic Models of the US Continental Crust using Bayesian Inversion of Ambient Noise Surface Wave Data*, special issues in Tectonics, doi:10.1002/2017TC004468.

2016

7.♯ **Tolulope Olugboji**, Jeffrey Park, Shun-ichiro Karato (2016c), *Reply to comment by Kawakatsu and Abe on "The Nature of the Seismic Lithosphere Asthenosphere Boundary beneath Normal Oceanic Mantle from High Resolution Receiver Functions"*, G^3, 17, 3493-3501, doi: 10.1002/2016GC006453

6.♯ **Tolulope Olugboji** and Jeffrey Park (2016b), *Crustal Anisotropy beneath Selected Pacific Ocean Islands from Harmonic Decomposition of Receiver Functions*, G^3, 17, 810-832, doi:10.1002/2015GC006166

5.♯ **Tolulope Olugboji**, Jeffrey Park, Shun-ichiro Karato and Masano Shinohara (2016a), *The Nature of the Seismic Lithosphere Asthenosphere Boundary beneath Normal Oceanic Mantle from High Resolution Receiver Functions*, G^3, 17, 1265-1282, doi: 10.1002/2015GC006214

2015

4.♯ Shun-ichiro Karato, **Tolulope Olugboji**, and Jeffrey Park (2015). *Mechanisms and geologic significance of the mid-lithosphere discontinuity in the continents*, Nature Geosciences, 8, 509-514, doi: 0.1038/ngeo2462.

2014

3.♯ **Tolulope Olugboji** (2014), *Revealing the Fine Structures of the Lithosphere Asthenosphere Boundary*, PhD. Dissertation, Yale University, 286 Pages.

2013

2.♯ **Tolulope Olugboji**, Shun-ichiro Karato, and Jeffrey Park (2013), *Structures of the oceanic lithosphere-asthenosphere boundary: mineral physics modeling and seismological signatures*, G^3, 14, 880-901, doi:10.1002/ggge.20086.

1.♯ AI Oluwaranti, B. S. Afolabi, O. O. Abiona, **T.M. Olugboji**, C. E. Onime, and L. Kehinde. (2013) *Design and Implementation of a University-Based Information Service Center with SMS Notification (Obafemi Awolowo University as a Case Study)*, 70-85. In In Electro/Information Technology (EIT), 2013 IEEE International Conference on (pp. 1-6). IEEE.

Teaching

University of Rochester (Undergraduate & Graduate Courses)

EESC 211 (W), Nature's Fury, Spring '26 ('25, '23, '21, '20, '19)

EESC 214/414, Earth Science Data Analysis, Fall '26 ('21, '19)

EESC 215/415, Seismology and Earth Structure, Fall ('20)

EESC 225/425 (ECE 248), Planetary Seismoacoustics, Spring '23, Fall '25

EESC 410, Stochastic Inverse Modeling in Geophysics, Spring ('21)

EESC xxx, Planetary Exploration with AI, TBD

University of Maryland (Guest Lectures)

GEOL457, Seismology (Dr. Nicholas Schmerr), Source Mechanics, Spring 2015, 2016

GEOL447/647, Observational Seismology (Dr. Vedran Lekic), Introduction to MATLAB, Fall 2015, 2016

Yale University (Teaching Fellowship)

G&G 100, Natural Disasters, (Dr. Frank Robinson), Scientific and QR, Tutor Program, *Fall, 2013*

Physics 530, Certificate in Scientific Teaching (Dr. Jenny Frederick), *Spring, 2013*

G&G 100, Natural Disasters (Dr. David Bercovici), *Fall, 2011*

G&G 659, Time Series Analysis with Geoscience Applications (Dr. Jefferey Park), *Fall, 2010*

G&G 201, Mantle Dynamics, Earth Quakes, and Volcanoes (Dr. Jun Korenaga), *Fall, 2009*

Physics SMDEP, (Summer Medical and Dental Education Program), *Summer, 2011, 2012*

Invited Talks

‡ *AGU Keynote ♯ Distinguished Lectures (CIG, IS&T, SEDI)*

73.♯ **GFZ: Helmholtz Centre for Geosciences (Sep 8, 2025)**. Africa Reassembled: AI and Seismic Algorithms Map the Hidden Lithosphere (Rifts and Margins Online Seminar)

72.♯ **Study of Earth's Deep Interior (Jun 23-28, 2024)**. A Global Taxonomy of Upper Mantle Layering.

71.♯ **Imaging Science & Technology (Jan 25, 2024)**. Taking Pictures of Planetary Interiors using Powerful Computers.

70.♯ **University of New Mexico (Nov 4, 2022)**. Stochastic Imaging of Africa's Lithosphere: ADAMA.

69.♯ **Florida International University (Nov 5, 2021)**. The Structure of Oceanic Plates using Machine Learning on Seafloor Vibrations.

68.♯ **McGill University (Oct 22, 2021)**. The Structure of Oceanic Plates.

67.♯ **Univ of Buffalo (Mar. 31, 2021)**, Machine Learning on Ground Vibrations

66.‡ **Tolulope Olugboji**, Siyu Xue, Enting Zhou, Walter Hennings. *Africa Whole & in Parts: Crustal Architecture & Taxonomy from Machine Learning on Noise Maps*, presented at the AGU fall Meeting, December 2022 (2023), Chicago, USA.

65.‡ **Tolulope Olugboji**, Jeffrey Park, Shun-ichiro Karato, Gary Egbert. *Origin of Mid-Lithosphere Discontinuities in the South-Eastern US*, presented at the AGU fall Meeting, December 1-17, 2021, San Francisco, USA.

Invited (‡ upcoming)

64. ‡ **IASTG Conference - Ghana (July 22-24, 2026)**. Crustal Tomography for Resource Exploration

63. ‡ **SEDI Confernce - Townsville Australia (June 29-July 26, 2026)**. EMCR and Mid-Mantle Structure

62. ‡ **Australia National University (June June 26, 2026)**. The Deep Earth Reassembled: Mapping the Global Lithosphere with AI-Powered Planetary Imaging

61. ‡ **University of Toronto (Mar 31, 2026)**. The Deep Earth Reassembled: Mapping the Global Lithosphere with AI-Powered Planetary Imaging

60. **AfricaArray Meeting - South Africa, (Jan 13, 2026)**. Africa reassembled: A whole-mantle perspective on African Tectonics

59. **Gordon Research Conference (June 25, 2025)**. On the Structure and Evolution of the Oceanic Plate

58. **University of Oxford (June 20, 2025)**. On the Detection of Mantle Stratification with Sparse Transforms

57. **University of Cambridge (June 18, 2025)**. On the Nature and Origin of Global Mantle Discontinuities

56. **Wayne State University (Nov. 20, 2024)**. On the Study of Planetary Vibrations: Earth Imaging Signals and Algorithms.

55. **University of Delaware (Sep 26, 2024)**. On the Study of Planetary Vibrations: Earth Imaging Signals and Algorithms.

54. **University of Rochester (Aug xx, 2024)**. On the Study of Planetary Vibrations: Earth Imaging Signals and Algorithms.

53. **University of Memphis (March 22, 2024)**. Earth Imaging with Noisy Signals: Algorithms and New Insights on the Crust, Mantle and Core.

52. **NorthWestern University (Jan 5, 2024)**. Africa Whole & In Parts: Crustal Taxonomy from Machine Learning on Ground Vibrations.

51. **Virginia Tech (Nov 3, 2023)**. Africa Whole & In Parts: Crustal Architecture & Taxonomy from Ground Vibrations.

50. **Solid Earth Doctoral School, Barcelonnette France (Oct 3, 2023)**. Seeing into the Mantle by Sifting through Echoes, Reverbs & Noise.

49. **Meliora Talk, University of Rochester (Oct 13, 2022)**. On Quakes, Bombs, & Earth's Anatomy

48. **Carnegie Institute of Washington (May 12, 2022)**. Seismic Imaging of Ocean Plates in a Water World: Waves, Echoes, and Tides.

47. **Cornell University (Oct 13, 2021)**. Stochastic Imaging of Africa's Lithosphere: ADAMA.

46. **UTexas at Austin (April 23, 2021)**. Submarine Seismic Imaging of the Ocean Plate: Silencing the Singing of Sediments.

45. **UCSB (April 15, 2021)**. Submarine Exploration of Ocean Basins: Silencing the Singing of Sediments.

44. **Lamont Columbia University (April 7, 2021)**. Submarine Exploration of Ocean Basins: Silencing

the Singing of Sediments.

43. **University of Hawaii (Mar. 19, 2021)**. Why are Hotspot Islands Subaerial?

42. **Tulane University (March 12, 2021)**.The African Lithosphere with Probabilistic Seismology.

41. **UCL (Mar 5, 2021)**. Submarine Detection of the Bottom of Oceanic Plates.

40. **University of Maryland (Feb. 24, 2021)**. Submarine Detection of the Bottom of Oceanic Plates.

39. **University of Cambridge (Nov 25, 2020)**. How Sharp is the Bottom Boundary of the Oceanic Plate?

38. **MIT (Nov. 6, 2020)**. On the Origin of Orphan Tremors and Intraplate Seismicity in West Africa.

37. **Georgia Tech (Sept, 2020)**. On the Origin of Orphan Tremors and Seismicity in West Africa.

36. **University of Kentucky (August 5, 2020)**. A Geophysical Investigation of the Puzzle Within Continental Lithosphere.

35. **Brown University (October 21, 2019)**. The Puzzle Within Cratonic Lithosphere: Inferences from Ground Vibrations and Rock Rheology.

34. **AGU Centennial (December 16, 2019)**. Regionalized Properties of the Lowermost Mantle from Spherical Slepian Analysis.

33. **Syracuse, Nelson Lecture (November 14, 2019)**. The Softness in Earth's Stiffest Rocks from Probabilistic Earth Imaging with Ground Vibrations.

32. **Brown University (October 31, 2019)**. Probabilistic Earth Imaging with Ground Vibrations: Explaining the Softness in Earth's Stiffest Rocks.

31. **UR Georgen Institute of Data Sciences (June 26, 2019)**. Probabilistic Earth Imaging with Ground Vibrations: Explaining the Softness in Earth's Stiffest Rocks.

30. **IRIS REU Education and Outreach Talks (May 26-29, 2019)**. Introduction to Seismology.

29. **SSA, Seattle Washington (April 23-26, 2019).** *Slepian Functions.*

28. **Africa Sceince Week (October 23-25, 2019)**. Abuja Nigeria.

27. **AAAS Annual Meeting Flash Talk (Feb. 16, 2019)**. Building a Seismic Network in Africa.

26. **NEF Fellow Spotlight Session (March 26, 2018)**. Kigali Rwanda.

25. **Yale University Career Panel (November 3, 2017)**. The Path to Tenure Track.

24. **Gordon Research Seminar (June 3, 2017)**. Connecting Plates to the Deep Interior.

23. **Colgate University (Feb 5, 2019)**. Understanding the Softness in Earth's Oldest Rock.

22. **Nifty Fifty Talk at Mount Eagle Elementary School: (March 9, 2018)**. Ears to the Ground: Seismic Spectrum and Its Applications.

21. **Binghamton University, Geology, New York, USA (February 9, 2018)**. Structure of the US Continental Crust from Probabilistic Imaging Using Earth-Scope Data.

20. **George Mason University, New York, USA (February 1, 2018)**. Structure of the US Continental Crust from Probabilistic Imaging Using Earth-Scope Data.

19. **MIT - FISH (Spring, 2017)**. *Crustal Structure in the US: A Bayesian Approach.*

18. **University of Rochester (April 5 -6, 2017)**. *Probing the Crust with Seismology: A New Approach.*

17. **UC Los Angeles (March 20-22, 2017)**. *Probing the Crust with Seismology: A New Approach.*

16. **UC Santa Barbara (March 16, 2017)**. *Probing the Crust with Seismology: A New Approach.*

15. **Georgia Tech (Feb. 23 - 24, 2017)**. *Regionalization and Composition of the US Crust by Probabilistic Seismic Fingerprinting.*

14. **Oklahoma State University, Boone Pickens School of Geology (Jan 27, 2017)**. *Understanding the*

Softness in Earth's Lithosphere.

13. **Virginia Tech (Feb 3, 2017)**. *The Structure of the US Crust: New Insights from Probabilistic Seismic Imaging.*

12. **AGU fall meeting, San Francisco, USA (December 12, 2016)**. *The "Seismic LAB": A test for the grain boundary-sliding model.*

11. **AGU fall meeting, San Francisco, USA (December 12, 2016)**. *Multi-scale probabilistic imaging with the USArray.*

10. **The Geological Society of Washington, (September 14, 2016)**. *Mapping the Crustal Structure of the Conterminous USA Using Surface Waves.*

9. **DTM, Carnegie, Washington DC (July 28, 2016)**. *A Re-appraisal of Crustal Structure in North America using Probabilistic Seismic Imaging.*

8. **Lehigh University, Bethlehem PA (Feb 15 & 16, 2016)**. *Seismological Investigations of the Crust and Ears to the Ground: Seismic Spectrum and its Applications.*

7. **University of Maryland, College Park (Feb 5, 2016)**. *Seismological Investigations of the Crust.*

6. **IRIS Minority Recruitment Speaker Series - Howard University (Jan 27, 2016).** *Ears to the Ground: Seismic Spectrum, Applications and Careers.*

5. **Princeton University, New Jersey, USA (April, 2015).** *The Composition of the Continental Crust: A Transdimensional Approach.*

4. **Rutgers University, New Jersey, USA (September 17, 2014)**. *The Bottom Boundary of Earth's Tectonic Plates: A view from Teleseismic Scattered Waves and Anelastic Behaviour of Mantle Minerals*.

3. **Lamont-Doherty Earth Observatory, New York, USA (April 2, 2014).** *The Lithosphere Asthenosphere Boundary: Mineral Physics Modeling, Seismological Signatures, and High Resolution Receiver Function Methods.*

2. **AGU fall Meeting, San Francisco, USA (December 11, 2013).** *Structure of the Oceanic Lithosphere-Asthenosphere Boundary: Seismological Constraints from Receiver Functions.*

1. **Yale University, Bouchet Seminar, (Fall 2012).** *Earth Hubble Telescope: Methods for Investigating Planetary Interiors and Prospecting Earth's Resources.*

Conference Publications

**undergraduate advisee **graduate advisee*

42. Jeffrey Park, William Frazer, **Tolulope Olugboji**, *A Modification of the CRISP-RF Denoising Filter to Sharpen Mid-Mantle Resolution of SS Precursors*, presented at AGU, December, 2024

41. Steve Carr**, Jeffrey Park, **Tolulope Olugboji**, Shun-ichiro Karato, *CRISP-RF Reflectivity Map of North America Suggests Numerous Low-Velocity Features Above and Below the Mantle Transition Zone*, presented at AGU, December, 2024

40. Jean-Joel Legre**, Yan Qin, Folarin Kolawole and **Tolulope Olugboji**, *The Intraplate Stress Field of West Africa (Invited)*, presented at AGU, December, 2024

39. Rasheed Ajala, Folarin Kolawole, Jean-Joel Legre**, **Tolulope Olugboji**, Dirk-Philip van Herwaarden, Andreas Fichtner, *Lithospere-Asthenosphere Boundary Variability in the Magma-Poor Branch of the East African Rift*, presented at AGU, December, 2024

38. Steve Carr** and **Tolulope Olugboji**, *A Taxonomy of Upper-mantle Stratification in the US.*, presented at AGU, December, 2024

37. Ziqi Zhang** and **Tolulope Olugboji**, *Earth's Global Fine Crust Model (with uncertainties) using Denoised Ps and Sp Receiver Functions*, presented at AGU, December, 2024

36. Ziqi Zhang** and **Tolulope Olugboji**, *Imaging Oceanic Lithosphere with Long Period SS Reflections: A Probabilistic Approach*, presented at AGU, December, 2024

35. **Tolulope Olugboji**, Ziqi Zhang**, Steve Carr**, Canberk Eckmekci**, Centin Mujdat, *Seeing into the Mantle by Sifting through Echoes, Reverbs & Noise*, presented at AGU, December, 2023

34. Kaetu Wleh*, Legre Jean-Joel**, Ziqi Zhang, **Tolulope Olugboji**, *Africa's Lithospheric Layering from Sparse Receiver Functions and SS precursors: ADAMA*, presented at AGU, December, 2023

33. Ziqi Zhang** and **Tolulope Olugboji**, *Body-Wave Imaging of the Oceanic Upper Mantle: Methods and Observations*, presented at AGU, December, 2023

32. Carr Steve**, Zhang Ziqi, Lu Xinxuan**, **Tolulope Olugboji**, *On the Detection of Sharp Mantle Discontinuities: Silencing Echoes in the Crust with Sparse Non-linear Radon Filters* , presented at AGU, December, 2022 [@gdoc]

31. Legre Jean-Joel**, Qin Yan, Kolawole Folarin, **Tolulope Olugboji**, *The Seismicity of West Africa: Construction of a Focal Mechanism Catalog with a Sparse Dataset*, presented at AGU, December, 2022 [@gdoc]

30. Ziqi Zhang** and **Tolulope Olugboji**, *Lithospheric Imaging through Reverberant Layers: Sediments, Oceans, and Glaciers*, presented at AGU, December, 2022 [@gdoc]

29. Siyu Xue* and **Tolulope Olugboji**, *Looking for Love across the Hawaiian Swell*, presented at SSA, April, 2022 [@gdoc]

28. Ziqi Zhang** and **Tolulope Olugboji**, *Imaging the Crust and Upper Mantle beneath Oceans, Sediments and Glaciers with Tuned Dereverberation Filters*, presented at SSA, April, 2022 [@gdoc]

27. Steve Carr** and **Tolulope Olugboji**, *Imaging Upper Mantle Discontinuities: The Elimination of Moho Reverberations in Horizontal Receiver Functions (Ps-RFs) using Non-Linear Radon Filters (NRF)*, presented at the SSA, April, 2022 [@gdoc]

26. Jean-Joel Legre** and **Tolulope Olugboji**, *West Africa's Intraplate Seismicity: Brittle Reactivation of Failed Rifts, Metacratons and Cratonic Edges*, presented at the SSA, April, 2022 [@gdoc]

25. Yuri Tamama* and **Tolulope Olugboji**, *Autoadaptive Bayesan Construction of Short-Period Phase Velocity Maps Uncertainties Across Africa*, presented at the AGU, April, 2021 [@gdoc]

24. Siyu Xue* and **Tolulope Olugboji**, *A Reference Dataset of Short-Period Surface Wave Dispersion for Model Update of the African Crust*, presented at the AGU, Dec, 2021 [@gdoc]

23. Ziqi Zhang** and **Tolulope Olugboji**, *Amphibious Seismic Imaging of the Pacific Plate using Amphibous Receiver Functions with Tuned Dereverberation Filters*, presented at the AGU, December, 2021 [@gdoc]

22. Ziqi Zhang** and **Tolulope Olugboji**, *Amphibious Receiver Function Imaging of a Subducting Plate using a Tuned Dereverberation Filter*, presented at the SSA, April, 2021 [@gdoc]

21. Siyu Xue*, Ziqi Zhang**, **Tolulope Olugboji**, *Bayesian Analysis of Ambient Noise Correlation Functions from a Noisy Seismic Network*, presented at the SSA, April, 2021 [@gdoc]

20. Ziqi Zhang** and **Tolulope Olugboji**, *Receiver Function Deconvolution with Noisy Seafloor Seismic Data: Imaging the Lithosphere of a Normal Ocean*, presented at the AGU, Dec., 2020 [@gdoc]

19. Jeffrey Park, **Tolulope Olugboji**, Shun-ichiro Karato, Gary D Egbert ,*Seismic Wave Attenuation and the EAGBS Model for the MLD and LAB*, presented at the AGU, Dec, 2020 [@gdoc].

18. **Tolulope Olugboji**, Jeffrey Park, and Shun-ichiro Karato, *Seismic Evidence for Grain-boundary sliding as the cause of the Seismic LAB*, presented in, Czech Republic, May 22-27, 2016 [pdf].

17. Vedran Lekic, Scott Burdick, **Tolulope Olugboji**, Chao Gao, Erin Cunningham, *Earthscope-enabled Insights into the North American Crust and Mantle*, presented at the GSA meeting, September 25 - 28, 2016, Denver, Colorado, USA.

16. Scott Burdick, **Tolulope Olugboji**, Chao Gao, Erin Cunningham, Vedran Lekic, *Assessing the benefit of USArray with Bayesian methods*, presented at the IRIS meeting, June 8 - 20, 2016, Vancouver, Washing-

ton, USA.

15. **Tolulope Olugboji**, Jeffrey Park, and Shun-ichiro Karato, *Seismic Evidence for Grain-boundary sliding as the cause of the Seismic LAB*, presented in, Czech Republic, May 22-27, 2016 [pdf].

14. **Tolulope Olugboji**, Chao Gao, Vedran Lekic, William McDonough, *Evaluating models of the US Continental Crust using Ambient Noise Datasets: A Transdimensional Approach*, presented at the AGU fall meeting, December 14-18, 2015, San Francisco, USA. [pdf].

13. Chao Gao, **Tolulope Olugboji**, Vedran Lekic, *Constraining anisotropy in the US continental lithosphere using a joint inversion of receiver function and ambient noise data*, presented at the AGU fall meeting, December 14-18, 2015, San Francisco, USA.

12. Vedran Lekic, Chao Gao, **Tolulope Olugboji**, Scott Burdick, *Quantifying Uncertainty Across an Array of Seismic Applications*, presented at the AGU fall meeting, December 14-18, 2015, San Francisco, USA.

11. Julie Schnurr, **Tolulope Olugboji**, Vedran Lekic, *Investigating Sources of Uncertainty in Surface Wave Ellipticity Measurements across the USArray*, presented at the AGU fall meeting, December 14-18, 2015, San Francisco, USA. [pdf]

10. Scott Burdick, **Tolulope Olugboji**, Vedran Lekic, *Investigating Continental Rifting in the Western US with Seismic Methods*, presented at the GSA annual meeting, November 1-4, 2015, Baltimore, Maryland, USA.

9. **Tolulope Olugboji**, Chao Gao, Vedran Lekic, William McDonough, Roberta Rudnick, *Evaluating models of the US Continental Crust using Ambient Noise Datasets: A Transdimensional Approach,* presented at the AGU fall meeting, December 14-18, 2015, San Francisco, USA.

8. **Tolulope Olugboji** and Jeffrey Park, *Imaging Ocean-Island Moho and LAB in the Pacific Using Harmonic Decomposition of Receiver Functions: New insights,* presented at the IRIS Workshop, June 8-11, 2014, Sunriver, Oregon, USA.

7. **Tolulope Olugboji** and Jeffrey Park, *Resolving fine layering in crustal structure from recursive frequency domain migration of receiver functions,* presented at the Student Seismology Seminar, Lamont-Doherty Earth Observatory, March 21-22, 2014, New York, USA.

6. Jeffrey Park and **Tolulope Olugboji**, *Constraints on Multilayered Anisotropy Beneath Ocean Islands from Harmonic Decomposition of Receiver Functions*, presented at the AGU fall meeting, December 9, 2013, San Francisco, USA.

5. **Tolulope Olugboji,** *Origin of Mantle Discontinuities: Partial Melting or Sub-solidus Processes? Seismological Tests and Results from Scattered Waves.*, Gordon Research Seminar, June 1-2, 2013.

4. Jeffrey Park and **Tolulope Olugboji**, *How sharp can the lithosphere-asthenosphere boundary be?*, presented at the AGU fall meeting 2012, San Francisco, USA.

3. **Tolulope Olugboji**, Shun-ichiro Karato, and Jeffrey Park, *Mineral Physics-based Interpretation of the LAB: Partial Melting or Sub-solidus Processes?*, presented at the AGU fall Meeting 2012, San Francisco, USA and the Graduate Student Symposium - Lamont, Columbia University

2. Shun-ichiro Karato, and **Tolulope Olugboji**, *On the Origin of the Asthenosphere*, Abstract presented at the European Geophysical Union, General Assembly Meeting, 2012, GD3.6/GMPV6.11/SM4.1/TS1.3

1. **Tolulope Olugboji**, Shun-ichiro Karato, and Jeffrey Park, *Structures of the Lithosphere-Asthenosphere Boundary: Mineral Physics Modeling and Seismological Signatures*, presented at the AGU fall meeting 2011, San Francisco, USA.

Service and Outreach

Editorial Activities

Associate Editor: *Surveys in Geophysics,* Springer Geoscience (Fall, '24-Present)

Guest Editor: *Advances in African Earth Sciences,* Frontiers in Geoscience (Spring, '21)

Manuscript Reviews: *Nature (1), Nature Geosciences (1), Nature Communications (2), Geophysical Research Letters (2), AGU Advances (1), Journal of Geophysical Research, Solid Earth (7), Geochemistry, Geophysics, Geosystems (3), Geophysical Journal International (3), Tectonics (1), Seismological Research Letters (3), Mineralogy and Petrology (1), BSSA (2), EGU-Solid Earth (1), Frontiers (3)*

Book Reviews: *Environmental Data Analysis, 3rd ed.*, Elsevier

Proposal Reviews

Panel Member: *National Science Foundation, EAR-Geophysics*

Panel Member: *National Science Foundation, Marine Geology and Geophysics*

Proposal Reviewer: *National Science Foundation, EAR-Geophysics (4)*

Service to Geophysics/Seismology Community

Canvassing Committee (AGU), Member, 2020/21

International Development Seismology Standing Committee (IRIS), Member, 2020/21

Remote Online Session for Emerging Seismologists (IRIS), Guest Lecturer, 2020/21

Research Experience for Undergraduates (IRIS/NSF), Mentor, 2018-21

Activity at Scientific Meetings

Session co-convener (AGU 2015), *Quantifying uncertainty in seismic methods: from source to structure*

Service to UofR

Co-Chair, Faculty Search Committee (High-pressure Physics and Planetary Science), 2024

Faculty Advisor, Geology and Geomechanics Major, 2022-Present

Member, Graduate Admissions Committee, Georgen Institute of Data Sciecnes, 2012, 2023

Chair, PhD Dissertation Committee (Hasan, Md Kamrul - Computer Science), 2022

Chair, PhD Dissertation Committee (John Y. Kwak - Philosophy), 2022

Member, Selection Committee, Schwartz Discover Grants, 2012, 2023

Member, Selection Committee, Sproull Fellowship, 2019, 2023

Volunteer, Graduate Visitation Program for Administrators, 2019

Outreach to K-12 Students and Educators

Invited Speaker, USA Science and Engineering Festival, Nifty-Fifty, 2015-2016

Special Awards Judge, 67th Annual Prince George's Area Science Fair, Maryland, USA, 2014

Leadership and Advocacy

Publicity Chair, Graduate Student Assembly, Yale University, 2012.

Department Representative, Graduate Student Assembly, Yale University, 2010-2012.

Youth Advocacy, Nigerian Association of Computer Science Students, OAU, 2008-2009.

Public Relations Officer, Student Union Government, OAU, 2008-2009.

Field Experience

Cruise Experience

R/V Marcus G. Langseth - Deployment of ocean bottom seismic stations, gravimetry, parasound, airgun and streamer handling for the active source reflection and refraction seismic surveys, data preprocessing, during MGL1004 expedition to the Shatsky Rise, North Pacific, July 17 - September 13, 2010

Passive-Source Seismometer Deployment

Mid-Atlantic Geophysical Integrative Collaboration (MAGIC) - Deployment of 28 broad-band seismometers in the area of the Appalachian mountains to study crustal and mantle structure, as well as infer mountain geography and formation history, October 22 - October 27, 2013

Professional Affiliations

Member, American Geophysical Union, 2009–Present.

Member, Seismological Society of America, 2014–Present.

Member, New York Academy of Science, 2011–Present.

Member, The American Association for the Advancement of Science, 2012–Present

Conferences and Workshops Attended

Cargese France 2024, Summer School, June 3 - 7, 2024

Barcellonette France 2023, Summer School, Oct 3 - 14, 2023

CIDER 2016, Summer Program, June 26 - August 5, 2016

Computational Geophysics Workshop, Princeton, NJ, March 15-16, 2016

IRIS Workshop, Sunriver, OR, June 8-11, 2014

Short Course in Computational Seismology, Earthscope Institute, August 12-16,2013

Gordon Research Conference, June, 2011, 2013, 2017, 2023, 2025

American Geophysical Union, Fall Meeting, San Francisco, CA, December, 2010-2015.

Earthscope Institute on the Lithosphere-Asthenosphere Boundary, September 19-21, 2011, Portland, OR.

Miscellaneous

Scientific Software & Data

8. SPEC2Vec: Vector Representations for Geophysical Data (Python), A framework for transforming geophysical signals and DAS data into compact vector representations. The code includes modules for data generation, time complexity analysis, and feature extraction for seismic pattern recognition. Sayan Kumar Swar., (2026), *Open-source repository*.

7. SHARP-SS: Probabilistic Deblurring of S-Waves (MATLAB), A signal processing utility for planetary imaging with S-wave reflections. The code identifies crust and mantle discontinuities by separating closely spaced reflections: SS precursors and free-surface reflections. Zhang & Olugboji, (2024), *∼2,000 lines of code*.

6. CRISP-RF: Reverberation Filters and Noise (MATLAB), A utility for global geophysical imaging of the upper mantle. The code removes, from the teleseismic body-wave-field (Receiver Functions), reverberations in the crust (and other background noise) Zhang & Olugboji, (2023), *∼12,000 lines of code*.

5. FADER: Resonance Filters in Thin Layers (MATLAB), A utility for global geophysical imaging of the upper mantle. The code removes, from the teleseismic body-wave-field (Receiver Functions), resonances generated by trapped waves in sediments, oceans, and glaciers from scattered Olugboji et al., (2023), *∼1,000 lines of code*.

4. ADAMA: A Dataset and Model Assessment of Africa's Lithosphere, Continent-wide shear velocity model, taxonomy, surface wave dispersion dataset, and codes for producing the data and models, Olugboji and Xue, (2022), Olugboji et al., (2023), *∼ 6,000 lines of code*.

3. Receiver Function Utility (C++ and Python), Unix-like command line utility to compute Ps receiver functions using the method of Park and Levin (2000). Module Extensions: Harmonic stacking in frequency domain (Bianchi et al. (2010); Park and Levin (2016a,b), depth migration, multi-layer sequential H-K stacking (Olugboji and Park (2016b) Olugboji et al. (2016a,c), *∼8,000 lines of code*.

2. Probabilistic Tomography (C++ and Fortran 90), An extension to the Transdimensional tomography code (rj-TOMO) developed by the ANU group at iEarth. Code extends the MPI C libraries with functionality to map azimuthal anisotropy. Code development and testing in progress.

1. Surface wave dispersion (MATLAB), An extension to the surface wave dispersion code (mat_disperse). Original source-code written by the *Lai and Rix* (1998) see also github. Code extends the compuation to Love wave dispersion (working on functionalities to incorporate anisotropy)

Software: iPython, obsPy, SAC, matplotlib, enthoughtPython, GMT, LaTEX, Mathematica, XML.

Programming: C++, C, Fortran, Python, C Shell, Perl, Awk, MATLAB, Java.

Last updated: April 2, 2026