

REGUPATHI (REGU) ANGAPPAN

Postdoctoral Scientist, SandboxAQ & Visiting Scientist, Johns Hopkins University

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🔗 My LinkedIn 📧 reguang 🆔 OrcID 🎓 Google Scholar 📖 Research Gate
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APPOINTMENTS

👤 **Postdoctoral Research Scientist in AI & Geophysics**
Quantum Navigation Team (AQNav), SandboxAQ
📅 Feb. 2024 - Ongoing 📍 Remote, based in Baltimore, USA.

👤 **Visiting Scientist**
Earth & Planetary Sciences, Johns Hopkins University
📅 Feb. 2024 - Ongoing 📍 Baltimore, USA.

👤 **Geophysics Resident**
Quantum Navigation Team (AQNav), SandboxAQ
📅 May. 2023 - Jan. 2024 📍 Remote, based in Baltimore, USA.

👤 **Graduate Researcher**
Earth & Planetary Science, Johns Hopkins University
📅 Aug. 2017 - Feb. 2024 📍 Baltimore, USA.

FELLOWSHIPS & AWARDS

🏆 **ACT-IAC Innovation Champion Award (Team Award - AQNav, SandboxAQ), 📅 2025**
Selected to represent the AQNav team as spokesperson to receive the Innovation Champion Award by ACT-IAC; delivered the keynote address and featured in an ACT-IAC podcast *Accelerating Government*.

🏆 **NASA FINESST, 📅 Fall 2019 - Spring 2023**
Future Investigator in NASA Earth and Space Science and Technology (FINESST), is a 3-year graduate fellowship at \$45k/year (known as NESSF prior to 2019).

🏆 **Journal Club Presentation Award, 📅 2022 & 2021**
Award for best research presentation of the academic year from the Earth and Planetary Science Department at Johns Hopkins University, which includes monetary award of \$2,000, for research related expenses.

🏆 **Dean's Teaching Fellowship, 📅 Spring 2022**
Awarded to teach a proposed class for the 2021-2022 academic year titled, "The Grandeur of You & The Universe" through the Johns Hopkins Krieger School of Arts & Sciences. Fellowship includes a stipend of \$11,500, graduate tuition, and health insurance for the semester the class is taught.

🏆 **Mary Gates Research Scholarship, 📅 Fall 2016 - Summer 2017**
Research Scholarships.

🏆 **PETRONAS Scholar Award, 📅 Fall 2012 - Summer 2017**
Full-ride undergraduate scholarship including stipend from PETRONAS, a Fortune 500, energy company.

EDUCATION

Ph.D. in Earth & Planetary Science
Johns Hopkins University
📅 Aug. 2017 - Feb. 2024

Thesis title: A Tale of Two Terrestrial Dynamos

Advisor: Prof. Sabine Stanley
Co-advisor: Dr. Brian Anderson

B.Sc. with Honors in Earth & Space Science (Physics)

University of Washington, Seattle

📅 Sept. 2013 - June 2017

Minor: Physics & Math

RESEARCH INTERESTS

Machine Learning Artificial Intelligence

Deep Learning Statistical Modeling

Foundation Models

Physics-Informed AI Data Science

Fluid Dynamics Planetary Magnetism

Dynamo Theory Planetary Interiors

Sustainability Climate Solutions

Science Education Science Outreach

Equity, Diversity, & Inclusion in Science & Tech

PROFESSIONAL AFFILIATIONS

- American Geophysical Union (AGU)
Leadership Development/Governance Committee Member, Governance Review Task Force Member, Governance Review Implementation Task Force Member
- JHU Data Science & AI Institute
Researcher
- Open Planetary
Member
- Mary Gates Foundation
Scholar

RESEARCH PATENTS

Detecting and fixing map artifacts

📅 Applied: July 11 2024, Awarded: July 29 2025

U.S. patent No. US 12,372,369 B1, details linked here.

Inventors: Nearye, Patrick L. (SandboxAQ), **Angappan**, **Regupathi**, (SandboxAQ), Moore, Kimberly M. (SandboxAQ).

Geophysical Field Sensing-Based Navigation

📅 Applied: Oct. 23 2024, Awarded: June 19 2025

U.S. patent No. US 12,152,885 B1, details linked here.

Inventors: Moore, Kimberly M. (SandboxAQ), **Angappan**, **Regupathi**, (SandboxAQ), McNeil, Alexander J., (SandboxAQ).

Estimating Magnetic Field Using a Network of Satellites

📅 Applied: Sept. 2 2021, Awarded: May 6 2025

U.S. patent No. US 12,292,542, details linked here.

Inventors: Anderson, Brian J. (JHU APL, MD), **Angappan**, **Regupathi** (JHU, MD), Barnes, Robin J. (JHU APL, MD), Vines, Sarah K. (JHU APL, MD), Stanley, Sabine (JHU, MD).

Five patent applications in preparation

📅 Aug. 2025

Patents on AI-driven generation of geo- and space-physics models from large, unconventional datasets, and a flight planning tool developed within the AQNav team at SandboxAQ.

PUBLICATIONS

📖 Book Chapters

- Gillet, N., Gerick, F., **Angappan**, R., & Jault, D. (2022). A dynamical prospective on interannual geomagnetic field changes. In V. Dehant, M. Manda, A. Cazenave, & L. Moreira (Eds.), *Probing earth's deep interior using space observations synergistically* (Chap. 4, pp. 71–105). doi:<https://link.springer.com/book/9783031392818>
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📄 Research Articles

- **Angappan**, R., Anderson, B. J., Barik, A., Vines, S. K., & Stanley, S. (2025). Fast Global Wave Detection in Geomagnetic Jerk Occurrences with Commercial Satellites. *in review: Nature Geoscience*.
 - Nerrise, F., **Angappan**, R., Phernetton, R., & Neary, P. (2025). PhysVAE: End-to-End Physics-Informed Machine learning for Improving Aeromagnetic Compensation using a Hybrid Variational Autoencoder. *in review: NeurIPS*.
 - Barik, A., & **Angappan**, R. (2024). Planetmagfields: A python package for analyzing and plotting planetary magnetic field data. *Journal of Open Source Software*, 9(97), 6677. doi:10.21105/joss.06677
 - Anderson, B. J., **Angappan**, R., Barik, A., Vines, S. K., Stanley, S., Bernasconi, P. N., Korth, H., & Barnes, R. J. (2021). Iridium Communications Satellite Constellation Data for Study of Earth's Magnetic Field. *Geochemistry, Geophysics, Geosystems*, 22(8), e2020GC009515. doi:<https://doi.org/10.1029/2020GC009515>
 - Gillet, N., Gerick, F., **Angappan**, R., & Jault, D. (2021). A Dynamical Prospective on Interannual Geomagnetic Field Changes. *Surveys in Geophysics*. doi:10.1007/s10712-021-09664-2
 - Perera, V., Mead, C., van der Hoeven Kraft, K. J., Stanley, S., **Angappan**, R., MacKenzie, S., Barik, A., & Buxner, S. (2021). Considering intergroup emotions to improve diversity and inclusion in the geosciences. *Journal of Geoscience Education*, 69(3), 248–252. doi:10.1080/10899995.2021.1881863
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📄 Publications in Preparation

- **Angappan**, R., Barik, A., Anderson, B. J., Viacheslav, M. G., Sorathia, K. A., Philpott, L. C., Johnson, C. L., Stanley, S., *High Precision Characterization of Hermian Birkeland Currents*. Paper describing the spatio-temporal structure of Birkeland currents at Mercury, subsequently correcting for these currents to obtain better characterization of Mercury's core dynamo field. The abstract for the manuscript in preparation is found here.

- **Angappan, R.,** Stanley, S., *Probing Mantle Structure Heterogeneities with Iridium Magnetic Field Data*. Paper describing observations of heterogeneities in Earth's mantle based on global magnetic field variations detected by the Iridium Constellation of communication satellites. The abstract for the manuscript in preparation is found [here](#).
- **Angappan, R.,** *Structuring an Undergraduate Course Focused on Empathy in the Earth and Space Sciences*. Paper describing the pedagogy and structure of a recently taught class, *The Grandeur of You & The Universe*. The abstract for the manuscript in preparation is found [here](#).
- Bell, J., Gupta, A., Moore, K., Sengupta, P., **Angappan, R.,** McNeil, A., Devine, K., Thoram, S., Phernetton, R., *Determining Geophysical Map Requirements for Magnetic Navigation using Cramér Rao Lower Bound Analysis*. Paper quantifying the requirements for geomagnetic maps needed for magnetic navigation when using state-of-the-art navigation filters and AI models.
- **Angappan, R.,** Nerrise, F. *MagNav-VAE: Physics-Informed Machine Learning for Improving Aeromagnetic Compensation using a Hybrid Variational Autoencoder*. Paper describing denoising magnetic data from aircraft with an AutoEncoder comprising of LSTM, Liquid-Time Constant, and Multi-Head Attention Layers that achieve up to a 72 percent reduction in aeromagnetic error.
- **Angappan, R.,** Nerrise, F. *MagNav-VAE: Physics-Informed Machine Learning for Improving Aeromagnetic Compensation using a Hybrid Variational Autoencoder*. Paper on denoising aircraft magnetic data using an AutoEncoder with LSTM, Liquid Time-Constant, and Multi-Head Attention layers, achieving up to 72 percent reduction in aeromagnetic error.
- **Angappan, R.,** Nerrise, F., Moore, K., *Navigating through Magnetic Interference from Magnetospheric-Ionospheric Signals with AI*. Paper describes optimized methods for integrating physics-based insight into AI models to clean and interpret magnetic data, effectively mitigating interference from external and induced magnetospheric and ionospheric fields.
- White paper on *Geophysical Data Requirements for Magnetic Navigation* with the AQNav team at SandboxAQ in collaboration with NOAA and NGA.

CONFERENCE PRESENTATIONS

Convened & Chaired Conference Sessions

- *Frontiers in Comprehensive Geomagnetic Field Modeling and Uncertainty Assessment: Enhancing Advanced Applications Including Alternative Navigation.*, AGU Annual Meeting, 2025. Primary Convener: **Angappan, R.** Co-Conveners: Saltus, R., Nair, M., Nielsen, A.
- *Rooted in Joy: Centering Belonging, Accessibility, Justice, Equity, Diversity, and Inclusion (B-A-JEDI) in Earth, Planetary, and Space Science (EPSS) Education and Outreach*, AGU Annual Meeting, 2025. Primary Convener: **Angappan, R.** Co-Conveners: Yasanayake, C., Lao, C., Berrada, M., & Pesciotta, C.
- *Deep Connections: Structures, Dynamics, and Interactions at Earth's Core-Mantle Boundary*, AGU Annual Meeting, 2024. Primary Conveners: **Angappan, R.** & Dobrosavljevic, Vasilije V., Co-Conveners: Barik, A., & Borlina, C., & Hansan, S., & Gülcher, A., & Rizo, H.
- *Empowering A Diverse and Global Earth and Space Science Community through Education and Public Engagement*, AGU Annual Meeting, 2024. Primary Convener: Reano D. Co-Conveners: Zietlow, D., Ulrich, R., & **Angappan, R.**
- *Comprehensive Geomagnetic Field Modeling and Uncertainty Assessment: Enhancing Advanced Applications Including Alternative Navigation*, AGU Annual Meeting, 2024. Primary Convener: Saltus, R. Co-Conveners: Nair, M., Knese, E., & **Angappan, R.**
- *Empowering a Diverse and Global Earth and Space Science Community Through Education and Public Engagement*, AGU Annual Meeting, 2023. Primary Convener: **Angappan, R.** Co-Conveners: Zietlow, D., Ulrich, R., & Reano D.
- *Interdisciplinary Insights into Earth and Planetary Cores*, AGU Fall Meeting, 2022. Primary Convener: **Angappan, R.** Co-Conveners: Gutierrez, S., Berrada, M., & Irving J. C. E.
- *New Insights into Earth's Dynamic Core From Interdisciplinary Perspectives*, AGU Fall Meeting, 2021. Primary Convener: Arveson, S. M. Co-conveners: **Angappan, R.,** Frost, D. A., & Davies C. J.

Keynote Presentations & Panels

- ACT-IAC Emerging Technology & Innovation Conference Award Panelist, May 2025, Maryland, USA. Invited panelist at the American Council for Technology-Industry Advisory Council (ACT-IAC) Emerging Technology & Innovation Conference as part of the Innovation Champions Award recognition, representing the AQNav team. Shared insights on empathy-centered innovation and AI-driven navigation, following AQNav's selection as a national Innovation Champion by the ACT-IAC.
 - **Conference information:** Available [here](#).
 - **Panel Press:** Available [here](#).
 - **Accelerating Government with ACT-IAC Podcast Appearance:** Available [here](#).

Other Panelists and Awardees included Nandita Gududuri (President at APV), and Mike Horton (Vice President & General Manager, National Security, ASRC Federal).

- Breakthrough Discuss 2024, Oxford, UK.

Delivered a keynote, *Understanding & Navigating The Magnetic World with AQ; AI & Quantum*, on advancing AI and quantum technologies to tackle complex challenges in space and exoplanetary sciences, with a focus on planetary magnetic fields and their role in exploration and discovery. The talk highlighted the integration of cutting-edge AI-driven methodologies to enhance scientific insights and innovation across geo- and space physics disciplines while advocating for a diversity, equity, inclusion, and accessibility (DEIA)-centered approach in AI-based research and technology development.

- **Conference information:** Available [here](#).

- **Keynote talk:** Available [here](#).

- **Keynote Panel discussion:** Available [here](#).

Other keynote speakers included Dr. Alexis Boukouvalas (Research Engineering Team Lead at DeepMind), Dr. Arpita Roy (Senior Program Scientist at Schmidt Sciences), and Alison Lowndes (Artificial Intelligence Developer Relations at NVIDIA).

Invited Presentation

- **Angappan, R.**, (2024) *Geomagnetic Observations & Models; New Techniques with Unconventional Data and AI*, Presentation to NOAA National Centers for Environmental Information, Geomagnetism Group. Virtual talk, Colorado.
- **Angappan, R.**, Barik, A., Anderson, B. J., Vines, S. K., Stanley, S., (2020) *Geomagnetic Jerks: Observations from the Iridium Constellation of Satellites*, International Space Science Institute. Virtual talk, Bern, Switzerland.
- Anderson, B. J., **Angappan, R.**, Vines, S. K., Sabine, S., Barnes, R. J., (2019) *Rapid cadence estimation of Earth's magnetic field structure reflecting core processes from the Iridium Constellation*, AGU. Invited poster presentation, San Francisco, California.

Select Research Presentations (As First Author)

- **Angappan, R.**, Nerrise, F., Moore, K., (Dec. 2024). *Navigating through Magnetic Interference from Magnetospheric-Ionospheric Signals with AI*, AGU. e-Lightning Oral & Poster Presentation, Washington DC.
- **Angappan, R.**, Anderson, B. J., Barik, A., Vines, S. K., Sabine, S., (2023) *Observing Earth's Rapidly Changing Magnetic Field with Commercial Satellite Constellations*, AGU. e-Lightning Oral & Poster Presentation, San Francisco, CA.
- **Angappan, R.**, Barik, A., Anderson, B. J., Viacheslav, M. G., Sorathia, K. A., Philpott, L. C., Johnson, C. L., Stanley, S., (2022) *Physics-Based Simulation of Mercury's Magnetosphere to Characterize the Magnetic Field Signatures of Birkeland Currents*, AGU. Oral Presentation, Chicago, IL.
- **Angappan, R.**, Stanley, S., (2022) *Designing an Undergraduate Course Focused on Empathy to Empower Scientific Identity and Support Diversity in Earth and Space Sciences*, AGU. Oral Presentation, Chicago, IL.
- **Angappan, R.**, Barik, A., Anderson, B. J., Viacheslav, M. G., Sorathia, K. A., Philpott, L. C., Johnson, C. L., Stanley, S., (2022) *High Precision Characterization of Hermian Birkeland Currents*, COSPAR. Oral presentation, Athens, Greece.
- **Angappan, R.**, Anderson, B. J., Barik, A., Vines, S. K., Sabine, S., (2021) *A Wave of Jerks in Our World's Inside Studied by Phone Joining Space Computers*, AGU. Oral Presentation, New Orleans, LA.
- **Angappan, R.**, Barik, A., Anderson, B. J., Sorathia, K. A., Philpott, L. C., Johnson, C. L., Stanley, S., (2020) *Birkeland Current Correction for Mercury's Core Field Characterization*, AGU. Poster presentation, Virtual. Twitter summary of poster recognized in AGU's From the Prow and social media found [here](#)
- **Angappan, R.**, Anderson, B. J., Vines, S. K., Sabine, S., (2019) *From Drifts to Jerks: Characterizing Variations in the Core Field Globally with Iridium*, AGU. Poster presentation, San Francisco, CA.
- **Angappan, R.**, Anderson, B. J., Vines, S. K., Sabine, S., (2018) *Acceleration, Jerks, and External Signals: Global Characterization of Earth's Field on Sub-Annual Time Scales with Space Constellation Measurements*, AGU. Poster presentation, Washington D.C.
- **Angappan, R.**, Anderson, B. J., Vines, S. K., Sabine, S., (2018) *Sub-Decadal Acceleration in Earth's Main Field*, Study of Earth's Deep Interior (SEDI). Poster presentation, University of Alberta, Edmonton, Canada.
- **Angappan, R.** (2017) *Assessment of Detrital Remanent Magnetization Preserved in Glacial Lacustrine Sediment for High-Resolution Correlation of the Lacustrine Sediment Record throughout the Puget Lowland*, Undergraduate Research Symposium. Oral presentation, Mary Gates Undergraduate Research Symposium, University of Washington, Seattle, WA.
- **Angappan, R.** (2015) *Magnetic Signatures in Sediments*, Undergraduate Research Symposium. Oral presentation, Mary Gates Undergraduate Research Symposium, University of Washington, Seattle, WA.

Select Co-authored Research Presentations

- Sosanya, A., Ouellet, J., **Angappan, R.**, McNeil, A., Thoram, S., Sengupta, P. (Dec. 2025). *Crustal Fourier analysis driven sensor requirements for magnetic anomaly-aided navigation*, AGU Annual Meeting.
- Thoram, S., **Angappan, R.** (Dec. 2025). *Downward continuation of magnetic anomalies for magnetic-aided navigation: An overview of methods, challenges, and equivalent source solutions*, AGU Annual Meeting.
- Barik, A., **Angappan, R.**, (Dec. 2024). *planetMagFields: A Python package for analyzing and visualizing planetary magnetic field data*, AGU. e-Lightning Oral & Poster Presentation, Washington DC.
- Bell, J., Gupta, A., Moore, K., Sengupta, P., **Angappan, R.**, McNeil, A., Devine, K., Thoram, S., Phernetton, R., (Dec. 2024) *Determining Geophysical Map Requirements for Magnetic Navigation using Cramér Rao Lower Bound Analysis*, AGU. e-Lightning Oral & Poster Presentation, Washington DC.
- Perera, V., Mead, C., van der Hoeven Kraft, K. J., Stanley, S., Semken, S., Husman, J., **Angappan, R.**, MacKenzie, S., Barik, A., Buxner, S., (2019) *Considering Intergroup Emotions to Improve Diversity and Inclusion in the Geosciences*, AGU. Oral presentation, San Francisco, CA.
- Anderson, B. J., **Angappan, R.**, Vines, S. K., Sabine, S., (2018) *Satellite Constellation Data for Study of Earth's Magnetic Field*, Study of Earth's Deep Interior (SEDI). Poster presentation, University of Alberta, Edmonton, Canada.

RECENT/CURRENT RESEARCH PROJECTS

Geophysics and AI Input for Quantum Navigation

SandboxAQ

- Leading a collaborative study on optimizing AI models with diverse geo- and space-physics inputs for robust data-processing pipelines in quantum navigation. Enhanced geophysical model forecasts and spatio-temporal characterization of geomagnetic parameters via large-scale data assimilation, informing criteria and regulatory policy for emerging navigation technologies.

AI & Quantum for Innovative Climate Solutions

SandboxAQ - Side Project

- Designed conceptual frameworks for applying AI and quantum technologies to enhance carbon sequestration efficiency, fostering cross-industry collaborations for climate solutions.

Ethical and Responsible Innovation and AI

SandboxAQ - Side Project

- Developed a scalable framework for embedding ethics, accessibility, and justice in AI innovation, creating templates for safe, transparent, and socially aligned systems.

Open-Source Software Development for Magnetic Data Analysis & Visualization

Earth and Planetary Science, Johns Hopkins University & Self-guided Project in Own Time

- **planetMagFields** – Co-developed an open-source Python package for analysis and visualization of planetary magnetic field data, enabling streamlined processing, model evaluation, and cross-planet comparisons. GitHub page linked here
- Leading development of an open-source package for automated magnetic field inversions with visual diagnostics, accuracy assessments, and an integrated LLM-powered notebook that explains the best-fit model and provides contextual planetary field insights (*in preparation*).

Rapid Geomagnetic Field Changes with Iridium Constellation of Satellites

Earth and Planetary Science, Johns Hopkins University

- This work leverages the high cadence global observations of the geomagnetic field with the Iridium satellites and characterizes the spatio-temporal occurrence of rapid geomagnetic field changes globally, yielding insight into core dynamics and properties of Earth's deep interior
- Paper in review: **Angappan, R.**, Barik, A., Anderson, B. J., Vines, S. K., Stanley, S., *Fast Global Wave Detection in Geomagnetic Jerk Occurrences with Commercial Satellites*, in review (expected publication by 2026).

- A Python package that automatically smooths irregular time series of data is made available as part of the study.
- An undergraduate student project focused on making the data interactive and readily accessible alongside creative scientific art, accompanies the study.

Prediction of Geomagnetic Field Changes with Data Assimilation & ML

Self-guided Project in Own Time

- Building time series forecasting machine learning models to predict changes in Earth's magnetic field based on magnetic data from the global Iridium Communication constellation network of satellites.
- Use and develop open-source python packages for geomagnetic data assimilation and core flow inversion to subsequently train and benchmark time series forecasting results.

High Precision Characterization of Mercury's Magnetic Field & Interior Structure

Funded by NASA through FINESST 2019

- Quantified and corrected for Birkeland current contributions in Mercury's MESSENGER data using GAMERA, a complex, high-fidelity, full-scale physics-based magnetospheric simulation, advancing high-precision planetary magnetic field characterization.

Lower Mantle Characterization from Core Magnetic Field Signatures

Earth and Planetary Science, Johns Hopkins University

- This work analyses global geomagnetic field variations to identify how the variations are filtered out by the conductive mantle and characterizes lower mantle structures that are observed.

Core Values Centered STEAM Education

Earth and Planetary Science, Johns Hopkins University

- This work identifies the process involved in designing and teaching a Science, Technology, Engineering, Art, and Math (STEAM) class based on core values as a way to build an inclusive STEAM community and responsible global citizens. This builds on the Earth and Space Science class designed and taught around the core value of empathy.

SCIENCE WORKSHOPS & SCHOOLS

Facilitator: STScl 2023 Spring Symposium

STScl

📅 May 2023

📍 Baltimore, USA.

- Facilitator for the *Science Session: Solar System Observations with JWST*, providing demos on using available tools to analyze JWST data for planetary science.
- Github page with jupyter notebook designed for this workshop is available [here](#)

Participant: Fluid Mechanics of Planets & Stars

CISM

📅 Apr. 2023

📍 Udine, Italy.

- Workshop focused on fundamental aspects of fluid mechanics in geo- and astrophysical flows, including introductory material as well as current cutting-edge research, with a focus on instabilities, turbulence, and waves. Discussions on concrete applications to topical geo- and astrophysical problems, with lectures focusing on planetary interiors, atmospheres, and stars. Included practical numerical sessions using the open-source solver Dedalus (<http://dedalus-project.org>), where participants run numerical simulations on their laptops related to the research problems discussed.
- Admission is competitive; about 40 students are selected to attend each year.

Participant: NASA Heliophysics Summer School

NASA, UCAR/CPAESS

📅 Summer 2021

📍 Virtual

- Run by NASA's Living With a Star program and UCAR/CPAESS since 2007, this annual eight-day Summer School focuses on the physics of space weather events that start at the Sun and influence atmospheres, ionospheres and magnetospheres throughout the solar system.
- Admission is competitive; about 35 students are selected to attend each year.

PAST RESEARCH EXPERIENCE & LEADERSHIP

Graduate Research Assistant

Johns Hopkins University

📅 Aug. 2017 – Feb. 2024

📍 Baltimore, MD.

- Analysis of geomagnetic field from Constellation of Iridium satellites & High precision determination of Mercury's magnetic field and interior structure

Undergraduate Researcher

University of Washington

📅 Summer 2014 – Summer 2017

📍 Seattle, WA.

- Assessment of detrital remanent magnetization (DRM) in glacial lacustrine sediments.
- Adviser: Dr. Terry Swanson, Univ. Of Washington, Seattle, WA
- Collaborator: Dr. Bernard Housen, Pacific Northwest Paleomagnetic Lab, Western Washington University

Undergraduate Research Leader

University of Washington

📅 Summer 2014 – Summer 2017

📍 Seattle, WA.

- Student staff member of the Undergraduate Research Program.

TEACHING

🎓 A Global Perspective of Sustainability

Earth and Planetary Science, Johns Hopkins University

📅 Mar. 25th, 2024

📍 Baltimore, MD.

- Guest lecturer in Introduction to Sustainability, AS.271.107, Spring 2024, with a focus on sustainability in the age of AI.

🎓 Our Air & Sky

Earth and Planetary Science, Johns Hopkins University

📅 Oct. 6th, 2023

📍 Baltimore, MD.

- Guest lecturer in Environmental Films & Literature AS.271.315, Fall 2023.

🎓 A Story of Sustainability through Magnetic Fields; From Prediction to Prediction

Earth and Planetary Science, Johns Hopkins University

📅 Mar. 31st, 2023

📍 Baltimore, MD.

- Guest lecturer in Introduction to Sustainability, AS.271.107, Spring 2023.

🎓 Rayleigh Benard and Mantle Convection

Earth and Planetary Science, Johns Hopkins University

📅 Mar. 14th, 2023

📍 Baltimore, MD.

- Guest lecturer in Planetary Interiors, AS.270.404, Spring 2023.

JHU Teaching Assistant for Natural Sciences Orientation Workshop

Johns Hopkins University

 Fall 2022

 Baltimore, MD.

- Co-led a workshop to orient and guide teaching assistants across the Johns Hopkins University's natural science programs.

The Grandeur of You & The Universe

Earth and Planetary Science, Johns Hopkins University

 Spring 2022

 Baltimore, MD.

- Developed a syllabus and taught a course that introduces the fundamentals of Earth, planetary and space sciences in a relatable manner by structuring the class around the core value of Empathy. The class was highlighted by the Johns Hopkins Krieger School of Arts & Sciences magazine article, [found here](#), and accompanying interview [found here](#).

JHU Teaching Academy Fellow

Johns Hopkins University

 Aug. 2017 – Aug. 2023

 Baltimore, MD.

- Participating in academic career and science communication training opportunities and teaching practicums. Obtained JHU Teaching academy certification.

Raleigh Benard and Mantle Convection

Earth and Planetary Science, Johns Hopkins University

 Mar. 17th, 2021

 Baltimore, MD.

- Guest lecturer in Planetary Interiors, AS.270.404, Spring 2021.

Setting Up for Success Modules

Earth and Planetary Science, Johns Hopkins University

 Fall 2020

 Baltimore, MD.

- Preparing and co-teaching modules intended to help graduate students be successful in graduate school lead by Prof. Sabine Stanley. Modules I was involved in: Managing Grad School Stress, Applying for Grants and Fellowships, Difficult Conversations, TA'ing, Attending a Conference, and Introduction to Science Communication.

Journal Club Best Practices

Earth and Planetary Science, Johns Hopkins University

 Sept. 15th, 2020

 Baltimore, MD.

- Co-lead a class on best practices for giving effective and inclusive departmental research talks to graduate students.

Boundary Layers

Earth and Planetary Science, Johns Hopkins University

 Nov. 5th, 2019

 Baltimore, MD.

- Guest lecturer in Planetary Fluids, AS.270.423, Fall 2019.

Undergraduate Teaching Assistant

Earth and Space Science, University of Washington

 Jan. 2014 – June 2017


 Seattle, WA.

- Classes taught include Introduction to Earth & Space Science, Mineralogy & Petrology, Field Geology, and seminars in science communication and research.

Peer Assistant for Calculus

American Degree Program, Taylors University

 Dec. 2012 – June 2013


 Kuala Lumpur, Malaysia.

- Selected to teach additional classes to assist undergraduate university students through Calculus I.
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Class Teacher and Tutor

Smart Reader Kids Kindergarten

 Jan. 2012 – May 2012

 Jitra, Malaysia.

- Served as the class teacher for kindergarten students and taught based on the curriculum developed by Smart Readers. Tutored 4th through 6th graders for English, Malay, and Math.
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MENTORING

Jackson Bell

Geophysics Analysis Intern & Skillbridge Intern, AQNav, SandboxAQ

 Fall 2024 - Summer 2024

- Project: Geophysical Data Processing and Geomagnetic Error Quantification
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Emma Cummings

Junior, Computer Science, Johns Hopkins University

 Summer 2022 - Spring 2023

 Baltimore, MD.

- Project: Interactive Visualization of Iridium Geomagnetic Data
 - Outreach Project: Developing visual-art to convey key takeaways from recent publications that involve Iridium geomagnetic data.
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Tuxun (Nick) Lu

Senior, Computer Science & Applied Math and Statistics, Johns Hopkins University

 Summer 2022

 Baltimore, MD.

- Bloomberg Distinguished Professor Summer Undergraduate Program Researcher
 - Project: Characterizing External Magnetic Fields in Earth's Magnetosphere
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Brian Song

Senior, Applied Math and Statistics, Johns Hopkins University

 Fall 2021 – Summer 2022

 Baltimore, MD.

- Project: Iridium Geomagnetic Data Inversion
 - Pursuing a masters degree in Data Science at Johns Hopkins University
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Amirah, Aida; Joe, Andrea; Amira, Anis; Lee, Bing Yu; Abdul Razak, Fatin

Sophomore, Earth and Space Science, Univ. of Washington

 Summer 2016 – Summer 2017

 Seattle, WA.

- Mentorship in paleomagnetic field and lab work & paleomagnetic data analysis
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Hushin, Nadrah

Junior, Earth and Space Science, Univ. of Washington

 Summer 2016 – Summer 2017

 Seattle, WA.

- Mentorship in paleomagnetic field and lab work & paleomagnetic data analysis
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- Currently a Graduate Engineer at Repsol.

PROFESSIONAL SERVICES & LEADERSHIP

AGU Leadership Development Committee

American Geophysical Union

📅 Sep. 2021 – Present

- Task: The committee facilitates the nomination process for selecting candidates for election to the AGU Board and any at-large elected Council positions, ensuring a smooth transition by helping orient them to their new roles and responsibilities. Beyond nominations, the committee plays a critical role in shaping AGU's leadership by identifying the skills, values, outlooks, and leadership criteria essential for an effective and forward-thinking Board and Council. The committee's work directly impacts the composition and effectiveness of AGU leadership. The committee promotes a strategic and organizational mindset toward leadership development, working closely with the Board, Council, committees, and sections to identify and cultivate future leaders. Additionally, we discuss ways to enhance volunteer engagement and satisfaction, ensuring that AGU governance reflects best practices in leadership and inclusivity.

Physics of the Earth and Planetary Interiors Journal Reviewer

📅 2024

Journal of Geophysical Research (JGR) Planets Reviewer

📅 2024

Geophysical Research Letters (GRL) Reviewer

📅 2024

Journal of Geophysical Research (JGR) Solid Earth Reviewer

📅 2023

AGU Governance Review Task Force Implementation Team

American Geophysical Union

📅 Jul. 2022

- Task: Using the work of the full task force and the feedback received to develop a final structure for the AGU Board and Council. This team will recommend bylaw changes, a socialization strategy and an implementation plan in line with AGU's strategic plan and the task force's recommendations.

Graduate Student Buddy Program Leader

Earth and Planetary Science, Johns Hopkins University

📅 Aug. 2021 – Aug. 2022

- Task: Co-lead the graduate student buddy program, focused on graduate student mentorship and community building, where starting graduate students are paired with senior graduate student volunteers.

AGU Governance Review Task Force

American Geophysical Union

📅 Dec. 2020 – Aug. 2022

- Task: Identify how AGU currently works and make recommendations about what is needed to accomplish AGU's new mission, vision and strategic plan. What governance model will enable AGU to continue to lead boldly into the future? What kind of leaders are needed? Where can our volunteer/staff partnerships be strengthened.

Bromery Series Committee

Earth and Planetary Science, Johns Hopkins University

📅 Jan. 2020 – Sep. 2022

- Task: Identify and invite a diverse lineup of speakers for the department's colloquium (Bromery Series) and organize the agenda for each seminar. Streamline the speaker selection process and ensure it is inclusive.

Future of Teaching Evaluations Focus Group Committee

Johns Hopkins University

📅 Spring 2022

- Task: Evaluating how to improve our methods of evaluating teaching effectiveness at Johns Hopkins University as part of a selected graduate student focus group.

Executive Secretary

NASA ROSES Review Panel

📅 2021

Outreach Coordinator

Earth and Planetary Science, Johns Hopkins University

📅 Sep. 2017 – Jan. 2020

- Task: Collaborate with local schools, institutes, and meet up groups to plan and implement outreach activities.

AWARD & FELLOWSHIP NOMINATIONS



Schmidt Science Fellowship, 📅 Fall 2022

Nomination from Johns Hopkins University.



Miller Research Fellowship, 📅 Fall 2022

Nomination from Dr. Bruce Buffett and selected by Earth & Planetary Science Department at University of California, Berkeley.



Stanford Science Fellowship, 📅 Fall 2022

Nomination from Dr. Sonia Tikoo-Schantz at the Doerr School of Sustainability, Stanford University.

LEADERSHIP NOMINATIONS



Board of Directors, American Geophysical Union 📅 2024

Nomination from American Geophysical Union leadership. Declined for the 2024 term but expressed interest in future opportunities.

OTHER EMPLOYMENT, LEADERSHIP, AND COMMUNITY SERVICES

Selected participant

Baltimore Planning Academy

📅 Spring 2026 Cohort

- The Baltimore Planning Academy is a civic leadership program that builds community knowledge and leadership around urban planning, zoning, and development, connecting residents to city resources and empowering them to shape the future of their neighborhoods. Selected to participate through competitive application process.

Founder & Lead

Braintrust for Change

📅 Launch in Aug. 2024

- Leading a group of committed collaborators to manifest systemic change in the community on topics ranging from climate change to combating the loneliness epidemic by taking a radical reimagination of solutions and startup-like implementation of solutions.
-

Advisor

Counselab

📅 Aug. 2021 – Oct. 2022

- Invited to be professional advisor and mentor especially in the field of planetary science, physics and geoscience education to those who seek guidance to access the following disciplines.
-

Assistant Resident Director

Haggett Hall, Housing & Food Services, University of Washington

📅 Aug. 2015 – June 2017

📍 Seattle, WA.

- Advised and supervised resident advisers in the community.
 - Primary adviser for Rick's Café, a fully student run cafe on campus.
 - Managed and oversaw facilities and custodial services in residence halls.
 - Helped with all administrative tasks in residence hall.
 - Managed student conduct load within the university's residential life unit
-

Resident Advisor

Mercer Hall, Housing & Food Services, University of Washington

📅 Aug. 2014 – June 2015

📍 Seattle, WA.

- Fostered an inclusive and welcoming community in residence communities to enrich the undergraduate experience of students.
 - Lead community development and resident engagement programs.
-

Faith Talks Speaker

MSA, University of Washington

📅 2015 & 2016

📍 Seattle, WA.

- Invited speaker at interfaith conference hosted by the Muslim Student Association.