

THOMAS ANDREW LEE

20 Oxford St., Cambridge, MA 02138

talee@fas.harvard.edu

<http://www.seismology.harvard.edu/people/lee.html>



EDUCATION

Harvard University, Cambridge, MA

Graduate Student in Earth and Planetary Sciences

M.A. in passing received Spring 2022, Expected Ph.D. program graduation Spring 2024

Harvard University, Cambridge, MA

Class of 2019, A.B. in Earth and Planetary Sciences,

Cum Laude in Field, High Honors

Waiakea High School, Hilo, HI

Class of 2015, Class Salutatorian

RESEARCH EXPERIENCE

Earth and Planetary Science Department, Harvard University, Cambridge, MA

Seismology Research Group, Graduate Student (September 2019 – Present)

Advisors: Prof. Miaki Ishii & Dr. Paul Okubo (University of Hawai`i)

Researched the seismic signals that arise out of tropical storms and how this data source could be leveraged to improve understanding of storm systems and their evolution over the last century.

Additionally, worked broadly concerning novel uses of analog seismic data (especially ambient noise) and solutions to important problems that must be considered when using this unique data.

Earth and Planetary Science Department, Harvard University, Cambridge, MA

Seismology Research Group, Undergraduate Research Assistant (February 2016 – August 2019)

Advisors: Prof. Miaki Ishii & Dr. Paul Okubo (USGS)

Worked on interpretation of ambient seismic noise correlations in volcanic environments, time synchronization of analog seismograms across stations, digitization of analog seismograms with DigitSeis program, and applications of machine learning to improve digitization algorithms.

United States Geological Survey, Hawai`i Volcanoes National Park, HI

Hawaiian Volcano Observatory, Visiting Scientist (Summer 2017 and 2018)

Advisor: Dr. Paul Okubo

Worked on preservation and digitization of the analog seismogram collection at the observatory and collected data to work on time synchronization of analog records. Took part in field work related to the 2018 eruptive activity of Kilauea.

TEACHING EXPERIENCE

F – Fall Semester, S – Spring Semester

General Education 1098: Natural Disasters (Prof. Brendan Meade), Harvard University, Cambridge, MA – *Teaching Fellow* (2023S)

Prepared materials for, taught lab section, graded, and held office hours. Undergraduate students from a range of disciplines examine natural disasters (e.g., hurricanes, earthquakes, floods) from an Earth-science perspective, learn why these events are so catastrophic, and assess our ability to forecast and mitigate the effects of future events.

General Education 1085: Energy Resources and the Environment (Prof. John Shaw), Harvard University, Cambridge, MA – *Teaching Fellow* (2022S)

Prepared materials for, taught lab section, graded, and held office hours. Undergraduate students from a range of disciplines are taught the full life cycles (i.e., formation, identification, extraction, refinement, use, and disposal) for various energy sources (e.g., coal, petroleum, nuclear, renewables) and the environmental effects which can arise from each step.

Earth and Planetary Sciences 165/265: Introduction to Seismology (Prof. Miaki Ishii), Harvard University, Cambridge, MA – *Teaching Fellow* (2021F)

Prepared materials and designed activities, helped with instruction and course logistics, graded, held office hours, and advised final projects. Undergraduates concentrating in Earth and Planetary Sciences and graduate students are introduced to the behaviours of seismic waves in the Earth and basic analyses which are common in seismology. The course includes a capstone in the form of a project involving preliminary investigative work in a particular part of the field in which they have interest.

Freshman Seminar 23I: GeoSciFi Movies (Prof. Miaki Ishii), Harvard University, Cambridge, MA – *Teaching Fellow* (2020F, 2021F), *Activity Facilitator* (2019F)

Prepared materials and designed activities, helped with instruction, graded, held office hours, and undertook a full redesign of the course to support remote learning in the 2020F semester. Freshman students watch blockbuster films involving natural disasters and then are guided through basic science, back-of-the-envelope calculations, and role-playing activities to determine the feasibility of what is shown on screen.

General Education 1137: The Challenge of Human Induced Climate Change: Transitioning to a Post Fossil Fuel Future (Prof. Michael McElroy), Harvard University, Cambridge, MA – *Teaching Fellow* (2021S)

Prepared materials, taught discussion section, graded, and held office hours. Undergraduate students from a range of disciplines learn background information about the science and politics of the climate problem in a lecture component. In the discussion section, students are guided through research of their own to culminate in a comprehensive final paper examining a specific issue relevant to climate and energy.

Earth and Planetary Sciences 99a: Tutorial – Senior Year (Dr. Esther James), Harvard University, Cambridge, MA – *Workshop Leader* (2019F, 2020F, 2021F, 2022F)

Created a Senior Thesis template for LaTeX and led a workshop for Senior Thesis Writers on using LaTeX for writing scientific documents. Sat on panel of former Thesis Writers to talk about the writing process and answer questions from current writers.

Summer Bridge Program, Waiakea High School, Hilo, HI – *AmeriCorps VISTA Summer Associate* (Summer 2015 and 2016)

Prepared materials for, and helped with instruction. Incoming 9th graders work to build strong math and science skills in preparation for high-school geometry and biology.

MENTORING EXPERIENCE

Earth and Planetary Sciences Department Short-Term Summer Projects, Harvard University, Cambridge, MA – 2021, 2022

Worked with incoming freshmen and sophomores on three-week projects funded through the department. Guided students on their individual projects, gave context for the importance of the work, held bi-weekly meetings, and had general conversations with students about the sciences and undergraduate research at Harvard.

Ishii Group Summer Interns, Harvard University, Cambridge, MA – 2020

Advised two undergraduate students on two summer projects. One assessed methods to quantify time uncertainties in global networks of analog seismograms from ISC data, and the other investigated the changes in seismic power that resulted from Hurricane Earl in 2010.

HONORS and AWARDS

American Institute for Conservation Photographic Materials Group Travel Grant – 2023

American Geophysical Union Outstanding Student Presentation Award – 2019, 2021, 2022

Earth and Planetary Sciences Department Graduate Teaching Award – 2022

The Derek Bok Center: Certificate of Distinction in Teaching¹ – 2020F, 2021S, 2021F, 2022S

The Derek Bok Center: Teaching Certificate² – 2022

Bowdoin Prize: Undergraduate Essay in the Natural Sciences – 2019

Hoopes Prize (Outstanding Senior Thesis) – 2019

Incorporated Research Institutions for Seismology Student Travel Grant – 2018

Harvard College Undergraduate Research Program Grant – 2018, 2017

Department of Earth and Planetary Sciences Student Travel Grant – 2018, 2017

¹Given on basis of student-evaluations on a course-by-course basis.

²Given upon completion of trainings and reflections as outlined by the Bok Center.

SERVICES

Session Convener: Legacy Seismic Data Collections: The Present State of and Future Outlook for Data from the Past, Annual Meeting 2023, SSA, San Juan, Puerto Rico, 17-20 Apr.

Session Co-chair: Back to the Future: Innovative New Research with Legacy Seismic Data, Annual Meeting 2021, SSA, online, 19-23 Apr.

PROPOSALS and FUNDING

U.S. Department of State: Investigating the Feasibility of Extracting Digital Data from Analog Microform Seismogram, 19AQMM20P1475, *Fall 2020 – Fall 2021*

Contributed significantly to the writing of and partially funded by this proposal.

U.S. Geological Survey: Implementation of Curvature Correction in DigitSeis for Pen-Type Analog Seismograms, Grant Number G20AS00042, FY 2021

Contributed significantly to the writing of and partially funded by this proposal.

PUBLICATIONS

Lee, T., A. Ringler, R. Anthony, and M. Ishii (in preparation, 2023). Comparison of Co-Recorded Analog and Digital Systems for Characterization of Responses and Uncertainties, to be submitted to *Seismological Research Letters*.

Lee, T., M. Ishii, and P. Okubo (2022). Assessing the Fidelity of Seismic Records from Microfilm and Paper Media, *Seismological Research Letters*. doi: <https://doi.org/10.1785/0220220134>

Lee, T., Ishii, M., & Okubo, P. (2020). Relative Time Corrections for Historical Analog Seismograms Using the Single-Day Ambient Noise Correlation Function. *Bulletin of the Seismological Society of America*. 110.6 (2020): 3185-3195.

Lee, T. (2019), Detection of a “Silent” Magma Intrusion Using Ambient Seismic Noise Autocorrelation Functions from the 2018 Kilauea, Hawai`i Eruption, Senior Thesis, Harvard University, Cambridge, MA.

Lee, T. (2018). *DigitSeis v1.3: User Manual*. Cambridge, MA: Harvard Seismology. Available at http://seismology.harvard.edu/downloads/DigitSeis/DigitSeis1.3/DigitSeis_Manual_1.3.pdf

Lee, T. (2017). *DigitSeis v1.1: User Manual*. Cambridge, MA: Harvard Seismology. Available at http://seismology.harvard.edu/downloads/DigitSeis/DigitSeis1.1/DigitSeis1.1_Manual.pdf

PRESENTATIONS

*Invited

Lee, T., M. Ishii, P. Okubo (2023). Lessons From Preserving and Extracting Historical Seismic Data, to be presented at 2023 General Assembly, IUGG, Berlin, Germany, 12-20 Jul.

Lee, T., M. Ishii, P. Okubo (2023). Observations of Tropical Storms and the Atmosphere-Ocean Interactions from Seismology, to be presented at 2023 General Assembly, IUGG, Berlin, Germany, 12-20 Jul.

Lee, T., M. Ishii, H. Ishii (2023). An Update on the Development of the DigitSeis Software, to be presented at 2023 Annual Meeting, SSA, San Juan, PR, 17-20 Apr.

Lee, T., M. Ishii, P. Okubo, A. Maloney, and E. Bulat (2023). Photography in Seismology, to be presented at 2023 Winter Meeting, American Institute of Conservators, Photographic Materials Group, Austin, TX, 22-24 Feb.

*Lee, T., M. Ishii, and P. Okubo (2022). Improving Pre-Satellite Era Oceanic Storm Catalogs with Seismology, presented at 2022 Annual Meeting, AGU, Chicago, IL, 12-16 Dec.

Lee, T., M. Ishii, R. Anthony, A. Ringler, and P. Okubo (2022). Developing Standards for and Extracting Metadata from Legacy Seismic Records, presented at 2022 Annual Meeting, AGU, Chicago, IL, 12-16 Dec.

Lee, T., M. Ishii, and P. Okubo (2022). Developing Methods to Characterize Tropical Cyclones via Long-Running Seismic Observations, presented at 2022 Annual Meeting, AGU, Chicago, IL, 12-16 Dec.

*Lee, T. (2022). Investigating the Fidelity of Legacy Data Processing Chains, given at Albuquerque Seismological Laboratory, USGS, Albuquerque, NM, 12 Jul.

Lee, T., M. Ishii, and P. Okubo (2021). Fidelity of Seismic Data on Microformats, presented at 2021 Annual Meeting, AGU, New Orleans, LA, 13-17 Dec.

Lee, T., M. Ishii, and P. Okubo (2021). Characterization of Tropical Cyclones via Seismic Recordings and Implications for Historic Inventories, presented at 2021 Annual Meeting, AGU, New Orleans, LA, 13-17 Dec.

Lee, T., M. Ishii, and P. Okubo (2021). Digitized Legacy Data: Original Paper v. Microform Copies, presented at Joint Scientific Assembly, IAGA-IASPEI, online, 21-27 Aug.

Lee, T., M. Ishii, and P. Okubo (2021). Fidelity of Legacy Data Across Different Media Types, presented at 2021 Annual Meeting, SSA, online, 19-23 Apr.

*Lee, T., M. Ishii, and P. Okubo (2020). The Future is the Past: Challenges with and the Scientific Value of Legacy Seismic Data, presented at 2020 Annual Meeting, AGU, online, 1-17 Dec.

Lee, T., M. Ishii, and P. Okubo (2019). Relative Time Corrections for Digitized Analog Seismograms via the Noise Correlation Function, presented at 2019 Annual Meeting, AGU, San Francisco, CA, 9-13 Dec.

Lee, T., M. Ishii, H. Ishii, and T. Morinaga (2019). Moving Forward by Looking Back: Utilization of Legacy Seismic Data in the Modern Age, presented at 2019 Annual Meeting, AGU, San Francisco, CA, 9-13 Dec.

*Lee, T., M. Ishii, H. Ishii, and T. Morinaga (2019). The Potential of Analog Seismograms for Science and Education, presented at Securing Legacy Seismic Data to Enable Future Discoveries, NSF Supported Workshop, Albuquerque, NM, 18-19 Sep.

*Lee, T., and M. Ishii (2019). Demonstration of DigitSeis.v.1.5 (Breakout Session), presented at Securing Legacy Seismic Data to Enable Future Discoveries, NSF Supported Workshop, Albuquerque, NM, 18-19 Sep.

*Lee, T., and M. Ishii (2019). Relative Time Corrections for Digitized Analog Records, presented at Securing Legacy Seismic Data to Enable Future Discoveries, NSF Supported Workshop, Albuquerque, NM, 18-19 Sep.

Lee, T., M. Ishii, and P. Okubo (2019), Interpretations of and Proposed Model for Progressive Decorrelation of Auto-Correlation Functions on the East Rift Zone of Kilauea during the Volcanic Activity of 2018, presented at 2019 Annual Meeting, SSA, Seattle, WA, 23-26 Apr.

Lee, T., M. Ishii, and H. Ishii (2019). DigitSeis: Near-Fully Automated Conversion of Paper Seismograms to Digital Time Series, presented at 2019 Annual Meeting, SSA, Seattle, WA, 23-26 Apr.

M., Ishii, T. Morinaga, and T. Lee (2019). The Potential of Analogue Seismograms for Science and Education, presented at 2019 Annual Meeting, SSA, Seattle, WA, 23-26 Apr.

Lee, T., M. Ishii, and P. Okubo (2018). Temporal Velocity Changes on the East Rift Zone of Kilauea Concurrent with the Volcanic Activity of 2018 Interpreted from Changes in Single-Station Correlation Functions, presented at 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Lee, T., M. Ishii, and J. Taber (2018). DigitSeis: Opportunities for Digitization of Analog Seismograms Through Educators and Citizen Science, presented at 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Lee, T., M. Ishii, and P. Okubo (2018). Consistent inconsistencies: A new method for assessing time corrections needed for analog seismograms, presented at 2018 Workshop, IRIS, Albuquerque, NM, 12-14 Jun.

Lee, T., and M. Ishii (2017). Teleseism-based relative time corrections for modern analyses of digitized analog seismograms, presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.

SKILLS

Programming – Julia (primary language), MATLAB (primary language), Python, R, basic HTML

Teaching – Zoom, Canvas

Specialty Software – DigitSeis, SLURM, SAC

Writing, Graphics, and Administrative – LaTeX, Adobe Illustrator & Photoshop, Affinity Designer & Photo, Microsoft Office Suite (including Sharepoint), Google Suite (including Drive)

EXTRACURRICULARS

Harvard Earth and Planetary Sciences Geo Club – *Treasurer* (September 2019 – January 2023)

Harvard College Hawai`i Club – *President* (May 2018 - May 2019), *Treasurer* (May 2016 - May 2018)

Harvard College Geosociety – *Board Member* (May 2018 – May 2019)

Music In Hospitals and Nursing-homes Using Entertainment as Therapy – *Treasurer* (January 2016 – January 2018)