HARRIET C.P. LAU

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POSITIONS

2023 – present	Assistant Professor, Department of Earth, Environmental and Planetary Sciences Brown University. Providence, RI. USA
2019 – 2023	Assistant Professor, Earth and Planetary Science. University of California Berkeley. Berkeley, CA. USA
2017 – 2019	Junior Fellow, Society of Fellows. Harvard University. Cambridge, MA. USA

EDUCATION

2012 – 2017	Harvard University, USA Ph.D. in Earth and Planetary Sciences Thesis Advisor: Prof. Jerry X. Mitrovica
2008 – 2012	Imperial College London, UK Master of Science in Geophysics (First Class Honors) Thesis Advisors: Drs Saskia Goes & Rhodri Davies
2010 – 2011	Massachusetts Institute of Technology, USA Visiting student, Department of Earth, Atmospheric, & Planetary Sciences Academic Advisor: Prof. Daniel Rothman

AWARDS

2023	CIG (Computational Infrastructure for Geodynamics) Distinguished Lecturer
2022	Packard Fellowship (David and Lucile Packard Foundation)
2022	Jason Morgan Early Career Award (AGU)
2022	Hellman Fellowship (UC Berkeley)
2016	*Graduate Research Award* for Study of the Deep Earth Interior Section (AGU)
2016	Harvard Graduate School of Arts and Sciences *Merit Research Fellowship*
2015	*Best Student Author Award* (Geophysical Journal International)
2015	*Shaler Teaching Award* (Earth and Planetary Sciences, Harvard University)
2013 – 2017	*Certificate for Distinction in Teaching* (2013-2015, 2017)
2013	*Outstanding Student Paper Award* for oral presentation (AGU)
2012	*Student Centenary Prize for outstanding Masters Thesis* (Imperial College London)
2008 – 2012	*Ash Music Scholarship* (Royal College of Music)

TEACHING

2024	*Dynamic Earth* (Semester II, 6 students, Brown University)
2023	*Sea Level Rise (and Fall)* (Semester I, 16 students, Brown University)
2019 – 2022	*The Planet Earth* (UC Berkeley)
2021	*Geodynamics* (UC Berkeley)
2013 – 2017	Teaching Fellow for undergraduate courses *Global Geophysics* and *A Brief History of Earth* (Harvard)
2014	Volunteer Virtual Teaching: Remote lessons in natural disasters at Spring Hill Elementary School, Austin, TX
2011 – 2012	Teaching Assistant for undergraduate course in Statistics/Computing (Imperial)
2009 – 2010	Volunteer science teacher at elementary schools in disadvantaged areas in London (Pimlico Connection)

INVITED CONFERENCE TALKS

AGU (Chicago)	Dec 2022	"The Mechanical Mysteries of Lithospheric Thickness" (Abstract no: MR11A-01)
AGU (New Orleans)	Dec 2021	"Weighing TUZO and JASON individually" (Abstract no: DI13A-05)
AGU (New Orleans)	Dec 2021	"Contributions of Transient Rheology to Geophysical Deformation: Examples from the Deep to Shallow Earth" (Abstract no: DI41A-01)
EGU (Vienna)	Apr 2021	"Frequency Dependent Mantle Viscoelasticity via the Complex Viscosity: cases from Antarctica and North America" (Abstract no: EGU21-1869)
AGU (virtual)	Dec 2020	"Reconciling estimates of viscoelastic mantle structure using transient rheology—Glacial Isostatic Adjustment across North America and Antarctica" (Abstract no: T013-06)
AGU (virtual)	Dec 2020	"How much and where? Exploring Excess Density within the LLSVPs by reconciling Stoneley Mode and Earth Tide Observations" (Abstract no: DI009-03)

INVITED LECTURES

*forthcoming, **virtual

University of Minnesota*	Oct 2024	Department Seminar
TedX New England	Sept 2024	Mind & Life Conference
National Academy of Sciences	May 2024	Committee of Solid Earth Geophysics Glacial Isostatic Adjustment meeting
University of Arizona	Apr 2024	Geosciences Colloquium (*CIG Distinguished Speaker Lecture*)
New Mexico Tech	Mar 2024	EES Department Seminar (*CIG Distinguished Speaker Lecture*)
Columbia University	Nov 2023	Earth Science Colloquium Series
Rutgers University	Nov 2023	Earth and Planetary Science Colloquium (*CIG Distinguished Speaker Lecture*)
University of Wisconsin Madison	Oct 2023	Weeks Lecture Seminar
University of Rhode Island	Oct 2023	Department of Geoscience Lecture
Gordon Research Conference	Jun 2023	Interior of Earth Plenary Speaker
MIT	Mar 2023	COG3 Seminar
UC San Diego**	Oct 2022	Institute of Geophysics and Planetary Physics Seminar
UC Berkeley	Sep 2022	Earth and Planetary Science Seminar
Brown University	May 2022	Department of Earth, Environmental and Planetary Sciences Colloquium
University of Washington	Mar 2022	Department of Earth and Space Sciences Colloquium
UC Santa Barbara**	Jan 2022	Department of Earth Sciences Colloquium
Kiel University**	Sep 2021	4D Deep Dynamic Earth Science Meeting
Universität Bonn**	Feb 2021	Institut für Geodäsie und Geoinformation Seminar
Australian National University**	Feb 2021	Research School of Earth Sciences Seminar
University of Chicago**	Jan 2021	Department of Geophysics Seminar
Stanford University**	Oct 2020	Geophysics Seminar
Caltech Institute of Technology	Mar 2020	Seismological Laboratory Seminar
UCLA	Jan 2020	Earth, Planetary, and Space Science Colloquium
UCSC	Jan 2020	Whole Earth Seminar
SAGE/GAGE Meeting, Portland (OR)	Oct 2019	Plenary Speaker on Earth Rheology and Structure: New Approaches, Applications and Implications for Dynamics
Yale University	Feb 2019	Department of Earth and Planetary Science Colloqiuum
Johns Hopkins University	Nov 2018	Bromery Lecture
University of British Columbia	Sep 2018	Department of Earth, Ocean, and Atmospheric Sciences Colloquium
Study of Earth's Deep Interior Conference, Edmonton, Canada	Jul 2018	Zatman Lecture
University of Michigan	Mar 2018	Smith Lecture
McGill University	Feb 2018	Earth and Planetary Sciences Department GEOTOP Lecture
Massachusetts Institute of Technology	May 2017	Earth, Atmospheric, and Planetary Sciences Lecture
UC Berkeley	Mar 2017	Department of Earth and Planetary Science Colloquium
Brown University	Feb 2017	Lunch Bunch Geophysics Seminar
Princeton University	Oct 2016	Geophysics Brown Bag Seminar
Columbia University	Apr 2016	Lamont-Doherty Earth Observatory Marine Geology and Geophysics, Seismology, Geodesy, and Tectonics Seminar

AWARDED GRANTS

Packard Fellowship (David and Lucile Packard Foundation) (Primary Investigator)	2022 – 2027	"Bridging Solid Earth Geophysics to Earth's Climate: A more Holistic Consideration of Earth System Science". $875,000.
Frontier Research in Earth Sciences (NSF 2311897) (co-Investigator)	2022 – 2027	"Collaborative Research: Towards a new framework for interpreting mantle deformation: integrating theory, experiments, and observations spanning seismic to convective timescales". $499,824.
NASA SSW (80NSSC22K1379) (co-Investigator)	2023 – 2025	"Ocean-to-surface pathways on Enceladus". $53,652.00
Hellman Fellowship (UC Berkeley)	2022 – 2023	"Solid Earth Dynamics across the Pleistocene". $57,000.
Geophysics (NSF 1923865) (Primary Investigator)	2019 – 2024	"Constraints from Multiple Low Frequency Data on the Long Wavelength Density Structure in the Deep Mantle". $595,689.

SERVICE

2024 –	First-year advisor (Brown)
2023 –	Department Graduate student admissions committee (Brown)
2023 –	AGU SEDI Canvassing committee
2023 –	Earthscope Innovation & Integration Advisory Committee
2022 –	Computational Infrastructure for Geodynamics (CIG) Science Steering Committee
2020 – 2022	Louderback Committee member (UC Berkeley)
2020 – 2023	Global Seismic Network Standing Committee (Incorporated Research Institutions for Seismology)
2019 –	Member of the International Association of Geodesy's Joint Study Group
2019 – 2022	Ramsden Committee (UC Berkeley)
2019 – 2021	Member of department's Diversity, Equity, Inclusion and Accessibility Committee (UC Berkeley)

PUBLIC OUTREACH

2024	TedX New England
2021	Geology Bites Podcast
2021	Overactive Earth (UC Berkeley Inspires)
2020 –	Founding member of *GeoContext*, an open-source online resource for lecture material on the historical context of topics within Earth science.

MEMBERSHIPS

2012 –	Member of the European Geosciences Union
2012 –	Member of the American Geophysical Union
2012 –	Associate of the Royal School of Mines

PUBLICATIONS (†PhD student advised by Lau; ††Postdoc advised by Lau; *yet to be published)

[ ] 2024* Adourian††, S., **Lau, H.C.P.**, Ringler, A., Al-Attar, D. "Full Spectrum Normal Mode Tomography Reveals Global Mantle Buoyancy Distribution", *in prep*

[ ] 2024* **Lau, H.C.P.**, Latychev, K. "The Overprint of Transient Rheology on Laterally Heterogeneous Viscosity: Influences on Sea Level change driven by Western Antarctic Ice Sheet Loss", *in prep*

[ ] 2024* **Lau, H.C.P.** and Al Asad†, M. "True and Apparent Polar Wander from Sluggish to Active Lid Tectonics", *in prep*

[ ] 2024* Ringler, A.T., Adourian††, S., **Lau, H.C.P.**, and Wilson, D.C. "An Objective Criteria for Normal Mode Spectral Estimation Parameters", *submitted to Seismological Research Letters.*

[ ] 2024* Coonin†, A., **Lau, H.C.P.**, and Coulson, S. "Fingerprinting Meltwater Pulse 1A Reveals Pole-to-Pole Cascade of Ice Loss", *in review at Nature Geoscience.*

[31] 2024 Al Asad†, M., and **Lau, H.C.P.** "Coupled Fates of Earth's Mantle and Core: Early Sluggish-Lid Tectonics and a Long-lived Geodynamo", *Science Advances*, 10(31).

[30] 2024 Hermosillo Ruiz, A., **Lau, H.C.P.**, and Murray-Clay, R. "Randomness and Retention: Using Weak Resonances to Constrain Neptune's Late-Stage Migration", *Monthly Notices of the Royal Astronomical Society*, 531(1), 1613-1629

[29] 2024 Adourian††, S., Dursun†, M., **Lau, H.C.P.**, and Al-Attar, D. "Adjoint Sensitivity Kernels for Free Oscillation Spectra", *Geophysical Journal International*, 238(1), 257-271.

[28] 2024 **Lau, H.C.P.** "Surface Loading on a Self-gravitating, Linear Viscoelastic Earth: moving beyond Maxwell", *Geophysical Journal International*, 237(3), 1842-1857

[27] 2023 Al Asad†, M., **Lau, H.C.P.**, Crowley, J.W., and Lenardic, A. "Modes of Mantle Convection, Their Staiblity, and What Controls Their Existence", *Journal of Geophysical Research: Solid Earth*, 128(10), e2023JB027274

[26] 2023 **Lau, H.C.P.** "Transient Rheology in Sea Level Change: Implications for Meltwater Pulse 1A", *Earth and Planetary Science Letters*, 609, 118106

[25] 2023 Paxman, G.J.G., **Lau, H.C.P.**, Austermann, J., Holtzman, B.K., Havlin, C. "Inference of the Timescale-Dependent Apparent Viscosity Structure in the Upper Mantle Beneath Greenland", *AGU Advances*, 4(2), e2022AV000751

[24] 2023 Richards, F., Hoggard, M., Ghelichkhan, S., Koelemeijer, P., and **Lau, H.C.P.** "Geodynamic, geodetic, and seismic constraints favour deflated and dense-cored LLVPs", *Earth and Planetary Science Letters*, 602, 117964

[23] 2023 **Lau, H.C.P.**, and Schindelegger, M. "Solid Earth Tides", In Green, M. and Duarte, J. (Eds), *A Journey Through Tides* (Chapter 15, 365-387)

[22] 2022 Ringler, A., …, **Lau, H.C.P.**, et al. "Achievements and Prospects of Global Broadband Seismographic Networks After 30 Years of Continuous Geophysical Observations", *Reviews of Geophysics*, 60(3), e2021RG000749

[21] 2022 Kim, A.J., Crawford, O., Al-Attar, D., **Lau, H.C.P.**, Mitrovica, J.X., and Latychev, K., "Ice age effects on the satellite-derived J_2 datum: Mapping the sensitivity to 3D variations in mantle viscosity", *Earth and Planetary Science Letters*, 581, 117372

[19] 2021 Daher, H., ..., **Lau, H.C.P.**, et al. "Long-term Earth-Moon evolution with high-level orbit and ocean tide models", *Journal of Geophysical Research: Planets*, doi: 10.1029/2021JE006875

[18] 2021 †Robson, A., **Lau, H.C.P.**, Koelemeijer, P.K., and Romanowicz, B. "An analysis of core-mantle boundary Stoneley mode sensitivity and sources of uncertainty", *Geophysical Journal International*, ggab448

[17] 2021 **Lau, H.C.P.**, Austermann, J., Holtzman, B.K., Book, C., Havlin, C., Hopper, E., and Lloyd, A. "Frequency Depdendent Mantle Viscoelasticity via the Complex Viscosity: Cases From Antarctica", *Journal of Geophysical Research: Solid Earth*, 126, e2021JB022622, doi: 10.1029/2021JB022622

[16] 2021 **Lau, H.C.P.**, and Al-Attar, D. "Sensitivity kernels for body tides on laterally heterogeneous planets based on adjoint methods", *Geophysical Journal International*, ggab254

[15] 2021 **Lau, H.C.P.**, and Romanowicz, B. "Constraining Jumps in Density and Elastic Properties at the 660 km discontinuity Using Normal Mode Data via the Backus-Gilbert Method", *Geophysical Research Letters*, 48(9), e2020GL092217.

[14] 2020 **Lau, H.C.P.**, Holtzman, B.K., and Havlin, C. "Towards a Self-consistent Characterization of Lithospheric Plates Using Full-spectrum Viscoelasticity", *AGU Advances*, 4(1): e2020AV000205

[13] 2020 Austermann, J., Chen, C.Y., **Lau, H.C.P.**, Maloof, A.C., and Latychev, K. "Constraints on mantle viscosity and Laurentide ice sheet evolution from pluvial paleolake shorelines in the western United States", *Earth and Planetary Science Letters*, 532: 116006

[12] 2019 **Lau, H.C.P.** and Holtzman, B.K. " 'Measures of dissipation in viscoelastic media' extended: Towards continuous characterization across very broad geophysical time scales", Geophysical Research Letters, 46(16): 9544-9553

[11] 2019 **Lau, H.C.P.** and Faul, U. "Anelasticity from Seismic to Tidal Timescales: Theory and Observations", *Earth and Planetary Science Letters*, 508: 18-29

[10] 2018 **Lau, H.C.P.**, Austermann, J., Mitrovica, J.X., Crawford, O., Al-Attar, D., and Latychev, K. "Inferences of Mantle Viscosity based on Ice Age Datasets: The Bias in Radial Viscosity Profiles due to the Neglect of Laterally Heterogeneous Viscosity Structure", *Journal of Geophysics: Solid Earth*, 123: 7237-7252

[9] 2018 Crawford, O., Al-Attar, D., Tromp, J., Mitrovica J.X., Austermann, J., and **Lau, H.C.P.** "Quantifying the sensitivity of post-glacial sea level change to laterally varying viscosity", *Geophysical Journal International*, 214(2): 1324-1363.

[8] 2017 **Lau, H.C.P**., Davis, J.L., Mitrovica J.X., Tromp, J., Al-Attar, D., Latychev, K., and Yang, H.-Y. "Using Tidal Tomography to Constrain Deep Mantle Buoyancy", *Nature*, 551:321-326

[7] 2017 Wilmes, S.-B., Mattias Green, J.A., Gomez, N., Rippeth, T.P., and **Lau, H.C.P.** "Global tidal impacts of large-scale ice-sheet collapses", *Journal of Geophysical Research: Oceans*, 122

[6] 2017 **Lau, H.C.P.**, Faul, U., Mitrovica, J.X., Al-Attar, D., Tromp, J., and Garapic, G. "Anelasticity across Seismic and Tidal Timescales: a Self-Consistent Approach", *Geophysical Journal International*, 208(1): 368-384

[5] 2016 Hay, C.C., **Lau, H.C.P.**, Gomez, N., Austermann, J., Powell, E., Mitrovica, J.X., Latychev, K., and Wiens, D. "Sea-level fingerprints in a region of complex Earth structure: The case of WAIS", *Journal of Climate*, 30(6): 1881-1892

[4] 2016 **Lau, H.C.P.**, Mitrovica, J.X., Austermann, J., Crawford, O., Al-Attar, D., and Latychev, K. "Inferences of Mantle Viscosity Based on Ice Age Datasets: I. Radial Structure", *Journal of Geophysical Research: Solid Earth*, 121: 6991-7012

[3] 2016 Goldberg, S., **Lau, H.C.P.**, Mitrovica, J.X., and Latychev, K. "The Timing of the Black Sea Flood Event: Insights from Modeling of Glacial Isostatic Adjustment", *Earth and Planetary Science Letters* 452: 178-184

[2] 2015 **Lau, H.C.P.**, Yang, H.-Y., Tromp, J., Mitrovica, J.X., Latychev, K., and Al-Attar, D., "A normal mode treatment of semi-diurnal body tides on an aspherical, rotating and anelastic Earth", *Geophysical Journal International* 202(2): 1392-1406

[1] 2015 Davies, D.R., Goes S., **Lau, H.C.P.** "Thermally Dominated Deep Mantle LLSVPs: A Review" in "*The Earth's Heterogeneous Mantle: A Geophysical, Geodynamical, and Geochemical Perspective*". Khan, A., Deschamps, F. (Eds). Springer International Publishing