

Eric Beaucé

Curriculum Vitae

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Academic Positions

02/2022 - present	Postdoctoral Brinson Fellow	Lamont-Doherty Earth Observatory, Columbia University
09/2021 - 01/2022	Postdoctoral Researcher	Massachusetts Institute of Technology
2016 - 2021	Research/Teaching assistant	Massachusetts Institute of Technology
Ph.D. Thesis: Analyzing the Collective Behavior of Earthquakes to Understand Fault Mechanisms Better. Available at https://tinyurl.com/EBPhDThesisManuscript .		
Supervised by Robert van der Hilst and Michel Campillo.		

Education

2021	Ph.D., Geophysics	Massachusetts Institute of Technology
2016	Master of Science, Physics	École Normale Supérieure de Lyon
2014	Bachelor of Science, Physics	École Normale Supérieure de Lyon

Teaching Experience

2023	Sonic and Visual Representation of Data	Columbia University
Role: Teaching assistant. Level: Graduate.		
Summary: Introduction to data sonification and visualization in Python.		
2022	Introduction to Statistical Seismology	Columbia University
Role: Guest lecturer. Level: Graduate.		
2021	Introduction to Machine Learning in Earthquake Seismology	University of Colorado
Role: Guest lecturer (remote). Level: Undergraduate.		
2019	Essentials of Geophysics	Massachusetts Institute of Technology
Role: Teaching assistant. Level: Graduate.		
Summary: Introduction to seismology, gravity, planetology, magnetism, and geodynamics.		
2018	Physical Principles of Remote Sensing	Massachusetts Institute of Technology
Role: Teaching assistant. Level: Undergraduate.		
Summary: Introduction to wave physics, Maxwell's equations, and their application to radar methods.		

Field Experience

2022, 2023	OBS deployment at the Axial Seamount	Pacific Coast, USA
Deployment of 15 three-component ocean bottom seismometers (OBS) near the Axial seamount, Pacific ocean off the coast of Oregon and Washington. The goal is to capture the next eruption in detail.		
07/2018	Preliminary passive seismic experiment (FaultProbe project)	San Jacinto, California, USA
Deployment of 400 one-component geophones in two arrays on either sides of the San Jacinto Fault. The project aimed to monitor temporal changes of the P-wave velocity on the fault.		

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| 01/2018 | Groundwater flow imaging
Self-potential (SP), resistance and gravity survey to map groundwater flow and identify relevant locations for fresh water wells. | Roseau Valley, Saint Lucia |
| 2016 - 2020 | Diverse subsurface exploration geophysical methods
Educational field trips with the SEG Student Chapter of MIT. Training to active source seismic acquisition (2x24 geophones and one sledge hammer), gravity measurements, SP/resistance and magnetometry. | New England, USA |

Outreach Activity

Seismic Sound Lab

Link to website: <https://seismicsoundlab.github.io/>. The Seismic Sound Lab introduces audiences of all backgrounds and ages to the physics of earthquakes and wave propagation using sonified data as a means of communication. The Seismic Sound Lab brings a major contribution to Lamont-Doherty Earth Observatory's annual Open House event and also regularly showcases its work to campus visitors.

Conference and Seminar Organization

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| 2023 - present | Organizer of weekly divisional seminars at Lamont. |
| 2025 | SSA : Co-organizer of workshop " <i>Building a High-Resolution Earthquake Catalog from Raw Waveforms: A Step-by-Step Guide</i> ". |
| 2025 | Lamont Symposium on Earth Hazards : Moderator of " <i>Challenges in Forecasting Earth Hazards</i> ". |
| 2024 | AGU : Co-organizer of " <i>On the Seismicity of "Stable" Continental Regions: The April 2024 New Jersey Earthquake and Beyond</i> ". |
| 2023 | SSA : Primary organizer of " <i>Deciphering Earthquake Clustering for the Better Understanding of Crustal Deformation Mechanisms</i> ". |
| 2022 | AGU : Co-organizer of " <i>Microseismicity and Fault Slip: Observations, Modeling, and Experiments</i> ". |

Invited Conference Talks and Seminars

- o UC Santa Cruz, Institute of Geophysics and Planetary Physics Seminar (USA, May 2025).
- o US Geological Survey, Moffett Field, Earthquake Science Center Seminar (USA, May 2025).
- o ERC TECTONIC / FEAR Seminars on Earthquake Physics (Online, November 2024).
- o Massachusetts Institute of Technology, Geophysics Seminar (USA, November 2023).
- o Ecole Normale Supérieure, Laboratoire de Géologie (France, October 2023).
- o Los Alamos National Laboratory, Frontiers in Geoscience (USA, June 2023).

Technical and Personal skills

- o **Programming Languages:** C, C++, CUDA, Python, Fortran, Shell, Matlab.
- o **Parallel Computing:** OpenMP, CUDA.
- o **Machine Learning Libraries:** Pytorch, Tensorflow, Keras, Scikit-learn.
- o **Super-computer Job Scheduler:** Slurm, OAR.
- o **Open-source Software Developer** (<https://github.com/ebeauce>):
 - Fast Matched Filter (https://github.com/beridel/fast_matched_filter): Template matching optimized on CPUs and GPUs with Python and Matlab wrappers.
 - BeamPower (<https://github.com/ebeauce/beampower>): Backprojection optimized on CPUs and GPUs with Python wrappers.

- BPMF (https://github.com/ebeauce/Seismic_BPMF): Complete earthquake detection and location workflow using Fast Matched Filter and BeamPower.
- ILSI (<https://github.com/ebeauce/ILSI>): Python package for stress inversion.
- o **Languages:** French (native), English, Spanish.

Submitted Articles

- o Rodrigo Flores Allende, Léonard Seydoux, **Eric Beaucé**, Luis Fabian Bonilla, Philippe Gueguen, Claudio Striano. An Enhanced Deep-Learning Catalog of the Mw 8.81 Maule Aftershock Sequence. *In review at Journal of Geophysical Research: Solid Earth*
- o Folarin Kolawole, Zach Foster-Baril, Leonardo Seeber, Jacob Tielke, Abhishek Prakash, Meritxell Colet, **Eric Beaucé**, Won-Young Kim, Rasheed Ajala, Christine McCarthy, Felix Waldhauser. The 2024 M4.8 New Jersey Earthquake: Preferential Reactivation of Subtle Immature Rough Faults in Frictionally Unstable Basement Rocks. *In review at Geophysical Research Letters*
- o **Eric Beaucé**. Measuring and modelling the occupation probability to characterize the temporal statistics of seismic sequences. *In review at Geophysical Journal International*.

Articles in Preparation

- o Theresa Sawi, **Eric Beaucé**, Benjamin Holtzman, Fabian Walter, Léonard Seydoux. Array-based characterization of glacial seismicity via unsupervised machine-learning. *Will be submitted to Journal of Geophysical Research: Machine Learning and Computation*

Peer-reviewed Articles

2025

- o **Eric Beaucé**, Felix Waldhauser, David Schaff, Won-Young Kim, Folarin Kolawole. The 5 April 2024 M_w 4.8 Tewksbury, New Jersey aftershock sequence resolved with machine-learning-enhanced detection methods. *Geophysical Research Letters*. *In press*.

2024

- o Tanner Acquisto, Anne Bécel, Juan Pablo Canales, **Eric Beaucé**. Structural controls on megathrust slip behavior inferred from a 3D, crustal-scale, P-wave velocity model of the Alaska Peninsula subduction zone. *Journal of Geophysical Research: Solid Earth*. DOI: <https://doi.org/10.1029/2024JB029632>
- o Jens-Erik Lundstern, **Eric Beaucé** and Orlando J. Teran. The Importance of Nodal Plane Orientation Diversity for Earthquake Focal Mechanism Stress Inversions. *Geological Society of London*. DOI: <https://doi.org/10.1144/SP546-2023-63>.

2023

- o **Eric Beaucé**, Piero Poli, Felix Waldhauser, Benjamin Holtzman, and Chris Scholz. Enhanced tidal sensitivity of seismicity before the 2019 M7.1 Ridgecrest, CA earthquake. *Geophysical Research Letters*. DOI: <https://doi.org/10.1029/2023GL104375>.
- o **Eric Beaucé**, William B. Frank, Léonard Seydoux, Piero Poli, Nathan Groebner, Robert D. van der Hilst and Michel Campillo. BackProjection and Matched-Filtering (BPMF): An Automated Earthquake Detection and

Location Workflow. *Seismological Research Letters: Electronic Seismologist*. DOI: <https://doi.org/10.1785/0220230230>.

2022

- **Eric Beaucé**, Robert D. van der Hilst, Michel Campillo. Microseismic Constraints on the Mechanical State of the North Anatolian Fault Thirteen Years after the 1999 M7.4 Izmit Earthquake. *Journal of Geophysical Research: Solid Earth*. DOI: <https://doi.org/10.1029/2022JB024416>.
- **Eric Beaucé**, Robert D. van der Hilst, Michel Campillo. An Iterative Linear Method with Variable Shear Stress Magnitudes for Estimating the Stress Tensor from Earthquake Focal Mechanism Data: Method and Examples. *Bulletin of the Seismological Society of America*. DOI: <https://doi.org/10.1785/0120210319>.
- René Steinmann, Léonard Seydoux, **Eric Beaucé**, Michel Campillo. Hierarchical Exploration of Continuous Seismograms with Unsupervised Learning. *Journal of Geophysical Research: Solid Earth*. DOI: <https://doi.org/10.1029/2021JB022455>.

2021

- Hugo Sánchez-Reyes, David Essing, **Eric Beaucé**, Piero Poli. The Imbricated Foreshock and Aftershock Activities of the Balsorano (Italy) Mw 4.4 Normal Fault Earthquake and Implications for Earthquake Initiation. *Seismological Research Letters*. DOI: <https://doi.org/10.1785/0220200253>.

2019

- **Eric Beaucé**, William B. Frank, Anne Paul, Michel Campillo and Robert D. van der Hilst. Systematic Detection of Clustered Seismicity beneath the Southwestern Alps. *Journal of Geophysical Research: Solid Earth*. DOI: <http://dx.doi.org/10.1029/2019JB018110>.
- Florent Brenguier, Pierre Boué, Yehuda Ben-Zion, F. Vernon, C.W. Johnson, A. Mordret, O. Coutant, P-E. Share, **Eric Beaucé**, D. Hollis, T. Lecocq. Train Traffic as a Powerful Noise Source for Monitoring Active Faults with Seismic Interferometry. *Geophysical Research Letters*. DOI: <http://dx.doi.org/10.1029/2019GL083438>.

2017

- **Eric Beaucé**, William B. Frank and Alexey Romanenko. Fast Matched Filter (FMF): An Efficient Seismic Matched-Filter Search for Both CPU and GPU Architectures. *Seismological Research Letter*. DOI: <https://doi.org/10.1785/0220170181>.