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*
07/2018	Preliminary passive seismic experiment (FaultProbe project)	*San Jacinto, California, USA*
01/2018	Groundwater flow imaging	*Roseau Valley, Saint Lucia*
2016 - 2020	Diverse subsurface exploration geophysical methods	*New England, USA*

Outreach Activity

Seismic Sound Lab

The Seismic Sound Lab (`https://seismicsoundlab.github.io/`) engages audiences of all ages and backgrounds with the physics of earthquakes and seismic wave propagation by using sonified data as a communication tool. The Seismic Sound Lab plays a central role in Lamont-Doherty Earth Observatory's annual Open House and frequently presents its work to visitors on campus.

Conference and Seminar Organization

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

Invited Conference Talks and Seminars

- Brown University, Geophysics Seminar (to be presented in March 2026).
- 3rd Workshop on Earthquake Physics and Applications of AI to Tectonic Faulting (Italy, September 2025).
- UC Santa Cruz, Institute of Geophysics and Planetary Physics Seminar (USA, May 2025).
- US Geological Survey, Moffett Field, Earthquake Science Center Seminar (USA, May 2025).
- ERC TECTONIC / FEAR Seminars on Earthquake Physics (Online, November 2024).
- Massachusetts Institute of Technology, Geophysics Seminar (USA, November 2023).
- Ecole Normale Supérieure, Laboratoire de Géologie (France, October 2023).
- Los Alamos National Laboratory, Frontiers in Geoscience (USA, June 2023).

Technical and Personal skills

- **Programming Languages:** C, C++, CUDA, Python, Fortran, Shell, Matlab.
- **Parallel Computing:** OpenMP, CUDA.
- **Machine Learning Libraries:** Pytorch, Tensorflow, Keras, Scikit-learn.
- **Super-computer Job Scheduler:** Slurm, OAR.
- **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):
  Comprehensive earthquake detection and location workflow using `Fast Matched Filter` and `BeamPower`.
- ILSI (https://github.com/ebeauce/ILSI):
  Python package for stress inversion.

○ **Languages:** French (native), English, Spanish.

Submitted Articles

○ **Eric Beaucé**, Piero Poli, Felix Waldhauser, Benjamin Holtzman and Chris Scholz. Shift and increase in tidal modulation of seismicity in the Ridgecrest fault zone before and after the 2019 M7.1 earthquake. *In review at Bulletin of Seismological Society of America*

○ Rodrigo Flores Allende, Léonard Seydoux, **Eric Beaucé**, Luis Fabian Bonilla, Philippe Gueguen, Claudio Satriano. An Enhanced Deep-Learning Catalog of the Mw 8.81 Maule Aftershock Sequence. *In review at Journal of Geophysical Research: Solid Earth*

○ 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 Mw4.8 New Jersey Intraplate Earthquake: Preferential Rupture of an Immature Fault in Frictionally Unstable Basement Rocks. *In review at Journal of Geophysical Research: Solid Earth*

○ Theresa Sawi, **Eric Beaucé**, Benjamin Holtzman, Fabian Walter, Léonard Seydoux. Array-based characterization of glacial seismicity via unsupervised machine-learning. *In review at Journal of Geophysical Research: Machine Learning and Computation*

Articles in Preparation

○ Won-Young Kim, Felix Waldhauser, **Eric Beaucé** and Folarin Kolawole. The Mw4.8 Tewksbury, New Jersey earthquake of 5 April 2024 likely triggered by transient stresses from rapidly refilled nearby reservoir

Peer-reviewed Articles

2025

○ **Eric Beaucé**. Measuring and modelling the occupation probability to characterize the temporal statistics of seismic sequences. *Geophysical Journal International*. DOI: `https://doi.org/10.1093/gji/ggaf433`

○ **Eric Beaucé**, Felix Waldhauser, David Schaff, Won-Young Kim, Folarin Kolawole. The 5 April 2024 $M_w4.8$ Tewksbury, New Jersey aftershock sequence resolved with machine-learning-enhanced detection methods. *Geophysical Research Letters*. DOI: `https://doi.org/10.1029/2024GL113598`

2024

○ 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`

○ 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

○ **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`.

○ **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 Sanchéz-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`.