

Eric Beaucé | Curriculum Vitae

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Academic Positions

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

Education

- **Massachusetts Institute of Technology** **Cambridge, USA**
Ph.D., Geophysics 2021
- **Massachusetts Institute of Technology** **Cambridge, USA**
Master of Science, Geophysics 2018
- **Ecole Normale Supérieure de Lyon** **Lyon, France**
Master of Science, Physics 2016
- **Ecole Normale Supérieure de Lyon** **Lyon, France**
Bachelor of Science, Physics 2014

Pre-Ph.D. Research Experience

- **Institut des Sciences de la Terre** **Grenoble, France**
6-month internship supervised by Michel Campillo 2016
Development of automated methods for earthquake detection, based on template matching, and application to the Southwestern Alps. Analysis of the catalog in terms of Poissonian vs time clustered seismicity.
- **Departemento de Geofísica** **Santiago, Chile**
3-month internship co-supervised by Benoit Derode and Jaime Campos 2015
Source characterization of intermediate-depth earthquakes: estimation of static stress drops

and seismic moments from earthquake spectra.

- **Laboratoire de Géologie, Terre, Planète, Environnement** **Lyon, France**
2-month internship supervised by Vincent Langlois **2014**
Development of a discrete element numerical model of a cohesive granular material in C/C++ to simulate landslides. Cohesion was modeled by Euler-Bernoulli beams.

Teaching Experience

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

Field Experience

- **Axial Seamount** **Pacific Coast, USA**
OBS deployment at the Axial Seamount aboard the Marcus Langseth **September 2022**
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 great details.
- **San Jacinto Fault** **California, USA**
Preliminary passive seismic experiment (FaultProbe project) **July 2018**
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.
- **Roseau Valley** **Saint Lucia**
Groundwater flow imaging **January 2018**
Self-potential (SP), resistance and gravity survey to map groundwater flow and identify relevant locations for fresh water wells.
- **New England** **New England, USA**
Diverse subsurface exploration geophysical methods **2016 - 2020**

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.

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): Complete 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.

Peer-reviewed Articles

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>.

Submitted Articles

- **Eric Beaucé**, Piero Poli, Benjamin Holtzman, Felix Waldhauser and Chris Scholz. Enhanced tidal sensitivity of seismicity before the 2019 M7.1 Ridgecrest, CA earthquake. *Under review at Geophysical Research Letters*.
- **Eric Beaucé**. Statistical Model of Earthquake Occurrence for Local-Scale Seismicity Based on Fractal Clustering. *Under review at Physical Review Letters*.
- Jens-Erik Lundstern, **Eric Beaucé** and Orlando J. Teran. The importance of nodal plane orientation diversity for earthquake focal mechanism stress inversions. *Under review at Geological Society of London*.

Articles in Preparation

- **Eric Beaucé** and Felix Waldhauser. Monitoring the Dynamics of the Axial Seamount with a Seismic Network Covariance Matrix Analysis over a Decade.
- **Eric Beaucé**, William B. Frank, Léonard Seydoux and Piero Poli. BackProjection and Matched-Filtering (BPMF): An Automated Earthquake Detection and Location Workflow