

# Eric Beaucé | Curriculum Vitae

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## Academic Positions

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- **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

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- **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

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- **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

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- **Massachusetts Institute of Technology** **Cambridge, USA**  
*Robert D. van der Hilst's teaching assistant for Essentials of Geophysics* 2019  
Introduction to seismology, gravity, planetology, magnetism, and geodynamics at the graduate level.
- **Massachusetts Institute of Technology** **Cambridge, USA**  
*Brent Minchew's teaching assistant for Remote Sensing* 2018  
Introduction to wave physics, Maxwell's equations, and their application to radar methods at the undergraduate level.

## Field Experience

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- **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

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- **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](https://github.com/beridel/fast_matched_filter)): Template matching optimized on CPUs and GPUs with Python and Matlab wrappers.
  - BeamNetResponse (<https://github.com/ebeauce/beamnetresponse>): Backprojection optimized on CPUs and GPUs with Python wrappers.
  - BPMF ([https://github.com/ebeauce/Seismic\\_BPMF](https://github.com/ebeauce/Seismic_BPMF)): Complete earthquake detection and location workflow using Fast Matched Filter and BeamNetResponse.
  - ILSI (<https://github.com/ebeauce/ILSI>): Python package for stress inversion.
- **Languages:** French (native), English, Spanish.

## Peer-reviewed Articles

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### 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. *In review at Journal of Geophysical Research: Solid Earth*. DOI: <https://doi.org/10.1002/essoar.10510912.2>.
- **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>.

### 2021.....

- 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>.
- 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>.

## Articles in Preparation

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- **Eric Beaucé**, Benjamin Holtzman and Piero Poli. The Time Evolution of Earth's Tidal Stress Triggering of Earthquakes in the Decade Preceding the 2019 M7.1 Ridgecrest, CA Earthquake.
- **Eric Beaucé** and Felix Waldhauser. Monitoring the Dynamics of the Axial Seamount with a Seismic Network Covariance Matrix Analysis over a Decade.
- **Eric Beaucé**, Robert D. van der Hilst and Michel Campillo. Spatio-Temporal Evolution of the State of Stress along the Western North Anatolian Fault Thirteen Years after the 1999 M7.4 Izmit Earthquake.