

Gaspard Farge

Maître de conférences (Asst. Prof.) @ Institut de physique du globe de Paris - Université Paris Cité
Fault Physics — Seismology — Complex System Dynamics

✉ Email | 🌐 Website | 🎓 Scholar | 📄 ORCID

PROFILE

In my research, I aim to understand the emergence of ordered patterns of seismicity in complex geological systems such as faults or volcanoes. I study this problem through statistical mechanics models faithfully calibrated to geophysical models and observations of these natural systems. By proposing an observable and deterministic description of the underlying dynamics, I seek to develop a fundamental framework for understanding the degree of predictability of natural hazards. From our laboratories to our classrooms, I strive to cultivate an actively inclusive and welcoming atmosphere in which everyone has the space to flourish.

EDUCATION

2022 **PhD** (Geophysics) @ Institut de physique du globe de Paris (**IPGP**) / U. Paris Cité (**UPC**)
2019 ENS Diploma (MSc eq., Geosciences) @ École Normale Supérieure (**ENS**)
2018 Graduate visiting scholar (Humanities) @ **Columbia University** (NY, USA)
2017 **MSc** (Geophysics) @ **IPGP / ENS**
2015 **BSc** (Earth Sciences) @ **ENS / Université Pierre et Marie Curie**

RESEARCH EXPERIENCE

Maître de conférences (Asst. Prof.) @ Institut de physique du globe de Paris since Sept. 2026

- ▷ Complexity of slip events vs complexity of slip cycles
- ▷ Emergence of synchronization in fault systems

Postdoc @ Laboratoire de Géologie de l'ENS July 2025–August 2026

- ▷ Study of mechanisms underlying seismicity in stable continental interiors: erosion loading vs static fatigue.
Supervisor: Romain Jolivet (ENS, ERC project *iQuake*)
- ▷ Energy budget of seismic and aseismic ruptures. Collaborators: Harsha Bhat, Giuseppe Costantino (ENS)

Postdoc @ Seismo Lab, University of California Santa Cruz, USA March 2023–July 2025

- ▷ Study of [slow slip synchronization](#) in subduction zones. Supervisor: Emily Brodsky (UCSC)
- ▷ Probing the organization of stress on faults through dynamic triggering. Collaborator: Aitaro Kato (UTokyo)

Doctoral Research @ Institut de physique du globe de Paris Sept. 2019–March 2023

- ▷ Modeling of [intermittent fluid circulation processes underlying tremor patterns](#) in subduction faults. Advisors: Claude Jaupart (IPGP), Nikolai Shapiro (ISTerre)

↔ **Fulbright Visiting Researcher @ EQ Science Lab, MIT, USA** Aug. 2021–March 2022

- ▷ [Study of the emergence of synchronization](#) and development of interactions between seismic sources.
Collaborator: William Frank (MIT)
- ▷ [Application of the interaction model to volcanic seismicity](#). Collaborator: Cyril Journeau (ISTerre)

MSc (year 2) Research @ Institut de physique du globe de Paris March 2017–Oct. 2017

- ▷ [Seismological study of low-frequency earthquake sources](#) (slow earthquakes). Supervisor: Nikolai Shapiro

MSc (year 1) Research @ Seismo Lab, University of California Berkeley, USA March 2016–Aug. 2016

- ▷ Study of slip organization at the Calaveras-Hayward fault junction (California). Deployment of field GPS measurements. Supervisor: Roland Bürgmann

AWARDS AND FUNDING

2023	Solemn prize for outstanding Thesis in Science , Chancellerie des Universités de Paris	5 recip., 10,000€
2021	Fulbright Research Fellowship , Franco-American Commission, mobility to MIT	6 months, \$13,000
2019	Best Demo Award , 14th Intl. Symposium on Computer Music Multidisciplinary Research	
2019	Doctoral fellowship , Ministry of higher education and research	3 years
2018	Graduate exchange scholarship , mobility to Columbia University	1 semester
2014	ENS scholarship , École Normale Supérieure	4 years

PUBLICATIONS

8. Brodsky, Farge (2026). How Earthquakes Organize Stress. *Proceedings of the National Academy of Sciences* (in press).
7. Farge, Brodsky (2025). The Big Impact of Small Quakes on Tectonic Tremor Synchronization. *Science Advances* [doi](#)
6. Farge, Jaupart, Frank, Shapiro (2023). Along-strike segmentation of seismic tremor and its relationship with the hydraulic structure of the subduction fault zone. *JGR: Solid Earth* [doi](#)
5. Farge (2022) Sounds of geological plumbing systems: How transient fluid circulation processes in faults and volcanoes shape sources and patterns of microseismicity. *PhD Dissertation, Univ. Paris Cité* [hal](#)
4. Journeau, Shapiro, Seydoux, Soubestre, Koulakov, Jakovlev, Abkadyrov, Gordeev, Chebrov, Droznin, Sens-Schönfelder, Luehr, Tong, Farge, Jaupart (2022). Seismic tremor reveals active trans-crustal magmatic system beneath Kamchatka volcanoes. *Science Advances* [doi](#)
3. Farge, Jaupart, Shapiro (2021). Episodicity and Migration of Low Frequency Earthquakes Modeled With Fast Fluid Pressure Transients in the Permeable Subduction Interface. *JGR: Solid Earth* [doi](#)
2. Paté, Farge, Holtzman, Barth, Poli, Boschi, Karlstrom (2021). Combining audio and visual displays to highlight temporal and spatial seismic patterns. *Journal on Multimodal User Interfaces* [doi](#)
1. Farge, Shapiro, Frank. (2020). Moment-Duration Scaling of Low-Frequency Earthquakes in Guerrero, Mexico. *JGR: Solid Earth* [doi](#)

In preparation:

- i) Probing the organization of stress in the slow-slipping megathrust. Farge, Kato, Brodsky
- ii) Laws of tremor dynamic triggering by earthquakes in the near-field. Farge, Kato, Brodsky

Reviewer for: AGU Advances Acta Geophysica Geophysical Research Letters Journal of Geophysical Research : Solid Earth Physics of the Earth and Planetary Interiors Seismica

SCIENTIFIC DISSEMINATION

Invited Seminars

- 2026 (i) French Network on Subduction Zone science webinar series
- 2025 vii) Laboratoire de Géologie de l'ENS, Paris, vi) IPGP, Paris, v) GFZ, Potsdam, iv) UC Santa Cruz, iii) USGS Earthquake Science Center, CA, ii) ITES, Strasbourg, i) Laboratoire de Géologie de l'ENS, Paris
- 2024 ii) University of Oregon, Eugene, i) Géoazur, Sophia-Antipolis
- 2023 iv) UC Berkeley, iii) LDEO Columbia University, NY, ii) UC Santa Cruz, i) ISTERre, Grenoble
- 2022 i) PhD Defense, IPGP
- 2021 iv) Earth Resources Laboratory, Massachusetts Institute of Technology, iii) Laboratoire de Géologie de l'ENS, ii) IPGP, Paris i) ISTERre, Grenoble

Invited Conference Participation

- 2025 ii) AGU Fall meeting, *Seismic cycle and aseismic transients* session, i) Fluids in Subduction workshop, Cascadia Region Earthquake Science Center (CRESCENT), Portland, OR (*Keynote Speaker*)
- 2024 i) Collaboratory for the Study of Earthquake Predictability, SCEC 2024, CA (*Keynote Speaker*)

Public Outreach

Sonification and animation of seismological data: Library of seismological sounds for educational, scientific and artistic purposes, production of ambient sounds for an [artist collective](#), presentation of [sonified animations](#) at para-scientific events (celebrations, science festivals...).

Press coverage of scientific results: University [press](#), local radio, broad-audience scientific journal [article](#).

STUDENT SUPERVISION

Joséphine Lhuizière, undergraduate intern (SU) @ **LGENS**

Jun. 2026

▷ Identifying candidate earthquakes for detecting seismic waves from InSAR images.

Bilal Sarr, undergraduate intern (CPES-PSL) @ **LGENS**

Jan.–Jun. 2026

▷ Numerical study of earthquake statistics as a function of tectonic loading: plate boundaries vs continental interiors.

Sirena Motter, undergraduate intern @ **UC Santa Cruz**

Aug. 2024–Sept. 2025

▷ Temporal vs spatial organization of tremor in the Nankai subduction, *recipient of an undergraduate research award for this work*, poster presentation at the 2025 Statewide California Earthquake Science Center conference.

TEACHING EXPERIENCE

Maître de conférence @ IPGP / Univ. Paris Cité, 192h / yr

Since Sept. 2026–

▷ Calculus for Earth Sciences (1st year undergrad)

▷ Statistics for Earth Sciences (3rd year undergrad)

▷ Projects in Scientific Computing for Geophysical problems (2nd year grad)

Supervision of student projects M2 level @ IPGP / Univ. Paris Cité, 5×4h

Nov. 2025–Jan. 2026

▷ Course: Scientific computing for geophysical problems. Project: Exploring interactions between tectonic tremor and earthquakes around the Tōhoku earthquake (2011) rupture. Students: D. Lkhagva, R. Hutchison.

Teaching Assistant @ IPGP / Univ. Paris Cité, 64h/year, 2 years

Sept. 2019–June 2021

▷ Thermodynamics (1st year undergrad)

▷ Mathematics for Earth Sciences (2nd year undergrad)

▷ Data analysis for Earth Sciences (1st year grad)

▷ Inverse problems (2nd year grad)

Oral examiner @ Classe prépa. Lycée Henri IV, Paris (2h/week)

Jan.–Dec. 2015

▷ Oral examinations in Physics-Chemistry, Biology and Earth Science track (BCPST)

SCIENTIFIC COMMUNITY SERVICE

EGU26 — Convener: SM4.4 Why do we hear silent slip?

AGU25 — Convener: S006 Collective behavior in seismology, S021 Why do we hear silent slip?

UC Santa Cruz 2023–2025 — Organizer of *Seismo Lab* seminars.

IPGP 2020–2021 — Member of the organizing committee of the doctoral school conference (2 editions).