Sophie **Giffard-Roisin**

Chargée de recherche IRD

02-04-1991 (35 years old)

ISTerre, Grenoble Universités, France

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[Sabbatical] Columbia Univeristy, Lamont-Doherty Observatory — *New York, USA*

Fulbright visiting researcher (first year), then visiting scholar — *jan. 2025 - nov. 26*

Employment

ISTerre, Université Grenoble Alpes — *Grenoble, France*

Permanent Research Fellow (Chargée de recherche), Institut de recherche pour le développement — *oct. 2019 - current*

Colorado University and CNRS Paris Saclay — *Boulder, USA and Paris, France*

Postdoctoral position in climate informatics with Claire Monteleoni — *mar. 2018 - aug. 2019*

Inria Sophia Antipolis (Asclepios Group) — *Sophia Antipolis, France*

PhD in machine learning for medical applications — *apr. 2014 - dec. 2017*

Education

Habilitation to Supervise Research (HDR) — *Grenoble, France*

Université Grenoble Alpes, Institut des Sciences de la Terre (ISTerre) — *March 2026*

- Title: Tailored Machine Learning for Geoscientific Data: Understanding and Monitoring Natural Hazards

PhD in Computer Science — *Sophia-Antipolis, France*

Asclepios Research Project, Inria Sophia (Advisors: M. Sermesant, N. Ayache, H. Delingette) — *2014-2017*

- Title: Non-invasive personalisation of cardiac electrophysiological models from surface electrograms

MVA research master (Math, Vision and Learning) — *Paris, France*

Ecole Normale Supérieure (ENS) Cachan — *2013-14*

Master of Science in Engineering — *Saint-Etienne, France*

Ecole Nationale Supérieure des Mines de Saint Etienne — *2010-13*

Supervision

PhDs

* Giuseppe Costantino 2020-23 (defended in Oct. 2023, co-supervision with A. Socquet and M. Dalla Mura, 36 months)
* Tristan Montagnon 2021-24 (co-supervision with J. Hollingworth and E. Pathier), defense in Dec. 24
* Audrey Chouli 2021-25 (defended June 2025, co-supervision with A. Socquet and D. Marsan)
* François Faure 2024-27 (main PhD director)

Internships

2021: M2 Salah-Eddine Boudaour *(one journal paper, went to industry)*, M2 Tristan Montagnon *(one conference proceedings, continued in PhD)*, M2 Lorena Rosell-Guevara *(went back to Ingemmet institute in Peru)*
2022: M1 Ada Abboud *(poster presented at G2)*, M1 Theo Lallemand (*co-author of 1 paper, M2 and PhD at ISterre)*
2023: M2 Alicja Matulewicz in 2023 *(went to industry)*
2024: M2 François Faure in 2024 *(continuing with me on a PhD)*

Post-docs

* Vera Shalaeva 2020-21 - *hired in industry as data scientist since 2021*
* Lea Pousse 2021-22 - *IRD Chargée de recherche since 2022*
* Sarah Visage apr. 2023- apr. 24 - *post-doc in Roma Univ. in sept. 2024 with Fabio Corbi*
* Diego Cusicanqui 2023-25*post-doc at ISTerre*
* Bryan Raimbault dec. 2023 - dec. 24 *post-doc at JPL and hired at CNES*
* Isabelle Rocamora (CNES) nov. 2024 - nov. 26
* Jules Bourcier dec. 2024 - aug. 26

Responsibilities

Teacher

- Teacher of the master course *Introduction to machine learning*, Phitem, Université Grenoble Alpes (24h, since 2023)
- Online free course MOOC (2023) ORISAT: remote sensing of natural hazards, Member of the educational team.
- Training sessions on *Introduction to machine learning for earth science* (2 to 3 days), in spanish (at Intituto Gefisico del Peru and Ingemmet, Peru) - 2022 and 2023

Reviewer

Nature Communications, NeurIPS, ICLR, IEEE TIP, IEEE TGRS, AGU Geophysical Res. Solid Earth, MDPI Remote Sensing, JSTARS, Cold Regions Science and Technology, MDPI Entropy, Coastal Eng. Journal, CVPR EarthVision, NSF Grant

Committees

- Examiner for 8 PhD jurys: A. Karas, MétéoFrance, Mar 2023; R. Bailly, CEA/UGA, Dec 2023; A. Bralet, LISTIC/UGA, 1er Oct 2024; I. Rocamora, 3 Oct 2024; E. Pirot IPGP, 11 dec. 2024; G. Aras, GeoAzur, 16 Dec. 2024; P. Lara, GeoAzur, 17 Dec. 2024; T. Santos, LGL, 20 Jan. 2025.
- Member of professor hiring committee (maître de conférence), LISTIC laboratory, Annecy, 2023.
- Elected as personal representative of the*Conseil du Laboratoire* of ISTerre (2022-24).
- Organizing the *Grand Séminaires* of ISTerre Laboratory (2023-24)

Convener

- Organizing committee of the 2019 and the 2018 Climate Informatics Workshops (including hackathon organization)
- EGU: Member of the convener team of the session *Challenges and Opportunities for Machine Learning in Solid Earth Geophysics*, EGU 2024, Vienna.
- Organizing a bi-monthly seminar in Grenoble area on machine learning and gescience since 2024.

Board Member

- Scientific Council of the Multi-disciplinary Institute of Artificial Intelligence (MIAI) - since 2024
- Scientific Expertise Commitee of the CNRS Sciences de l'Univers et du Numérique program.

Awards & Grants

Grants/ Projects

- *Principal investigator* ANR JCJC 2024-28 grant (350k€), 'EDAM': Earth Deformation from Automatic Mapping
- *Co-leader* of MIAI chaire 2025-29 (600k€), 'MOHAIR': MOnitoring natural Hazards using AI and Remote sensing
- *Principal investigator* of a MIAI 2023 grant (50k€) on landslide detection from InSAR (Co-PI P. Lacroix, ISTerre)
- *Co-PI* of a 2022 CNES 'Projet télédétection innovant' (50k€) on Deep learning for strike-slip fault characterization (with Léa Pousse, ISTerre)
- *Co-PI* of a 2021 MIAI Projet IA émergent (50k €) on Deep Learning for characterizing active faults (with L. Audin, ISTerre)
- *Co-PI* of a 2021 UGA Projet exploratoire et émergent 100k €) on Deep Learning in optical image correlation (with James Hollingsworth, ISTerre)
- *Collaborator* of ERC consolidator project DeepTRIGGER 2020-25 (Anne Socquet, ISTerre)
- *Collaborator* of ERC starting MoniFAULT 2019-23 (Piero Poli, ISTerre)
- *Collaborator* of CNES APR 2021-24 (SHARE project, F. Karbou MétéoFrance)
- *Collaborator* of ANR project REPED-SARX 2022-26 (Yajing Yan LISTIC laboratory)

Awards/Fellowships

- 1-year Fulbright fellowship 2024 (Columbia University visit in 2025)
- Prix d'Excellence PhD of Université Côte d'Azur, 2017
- Best Paper Award, FIMH Conference, *Sparse Bayesian Non-linear Regression for Multiple Onsets Estimation in Non-invasive Cardiac Electrophysiology*, Toronto, Canada, 2017

Invited talks

- *Keynote speaker*: 2025 AI for Earthquakes workshop, Boston University, 2023 EGU conference (Machine learning for understanding Earthquakes Physics session).
- *Invited talks*: Penn State Univ. (2026), MIT Earth Science Seminar (2025), Lamont Columbia University (2025), INSU journée PNTS (2024), EOSC lab. Strasbourg (2024), ERC TECTONIC / FEAR Seminars (2023), Inria Thoth team (2023 and 2026), GDR MADICS MacLean (2022), GDR ISIS (2021), Resif conference (2021), GeoAzur lab. Sophia A. (2021).

Selected Publications after PhD (see Scholar account)

2026	**Volcanica**, VIGIA-PlumeNet and VIGIA-PlumeData: Open-Source AI Segmenting Model and Database For Volcanic Plumes and Emissions From Optical Cameras S. Giffard-Roisin, Y. Moussallam, S. Valade, E. Ramos, T. C. Wilkes, R. Campion.	*Journal*
2025	**IEEE Transactions on Geoscience and Remote Sensing**, GeoFlowNet: Fast and Accurate Sub-pixel Displacement Estimation From Optical Satellite Images based on Deep Learning T. Montagnon, J. Hollingsworth, E. Pathier, M. Marchandon, M. Dalla Mura, S. Giffard-Roisin.	*Journal*
2025	**IEEE Transactions on Geoscience and Remote Sensing**, GeoFlowNet-SAR: Earthquake Displacement Estimation from Synthetic Aperture Radar Images J. Wang, J. Hollingsworth, E. Pathier, T. Montagnon, W. Li, M. Zhang, R. Tao, J. Chanussot, S. Giffard-Roisin.	*Journal*
2025	**Seismica**, ScarpLearn: an automatic scarp height measurement of normal fault scarps using convolutional neural networks L. Pousse-Beltran, T. Lallemand, L. Audin, P. Lacan, A. Nuñez-Meneses, S. Giffard-Roisin. .	*Journal*
2024	**Journal of Geophysical Research-Machine learning**, Sub-Pixel Displacement Estimation with Deep Learning: Application to Optical Satellite Images Containing Sharp Displacements T. Montagnon, S. Giffard-Roisin, M. Dalla Mura, M. Marchandon, E. Pathier, J. Hollingsworth.	*Journal*
2024	**IEEE Journal of Selected Topics in Applied Earth Obs. and Remote Sensing**, Denoising of Geodetic Time Series Using Spatiotemporal Graph Neural Networks: Application to Slow Slip Event Extraction. G. Costantino, S. Giffard-Roisin, M. Dalla Mura, A. Socquet	*Journal*
2024	**Seismica**, Deep learning detects uncataloged low-frequency earthquakes across regions. J. Münchmeyer, S. Giffard-Roisin, M. Malfante, W. Frank, P. Poli, D. Marsan, A. Socquet.	*Journal*
2023	**Nature Comm. Earth & Env.**, Multi-station deep learning on geodetic time series detects slow slip events in Cascadia G. Costantino, S. Giffard-Roisin, M. Radiguet, M. Dalla Mura, D. Marsan, A. Socquet.	*Journal*
2023	**Scientific Reports**, Classification of red cell dynamics with convolutional and recurrent neural networks: a sickle cell disease case study M. Darrin, A. Samudre, M. Sahun, S. Atwell, C. Badens, A. Charrier, E. Helfer, A. Viallat, V. Cohen-Addad, S. Giffard-Roisin.	*Journal*
2023	**Journal of Geophysical Research**, Seismic source characterization from GNSS data using deep learning G. Costantino, S. Giffard-Roisin, D. Marsan, M. Radiguet, M. Dalla Mura, A. Socquet.	*Journal*
2022	**Geophysical Journal International**, Interpreting convolutional neural network decision for earthquake detection with feature map visualisation, backward optimisation and layer-wise relevance propagation methods. J. Majstorović, S. Giffard-Roisin, & P. Poli.	*Journal*
2022	**Earthquake Spectra**, Testing machine learning models for seismic damage prediction at a regional scale using building-damage dataset compiled after the 2015 Gorkha Nepal earthquake. S. Ghimire, P. Guéguen, S. Giffard-Roisin, and D. Schorlemmer	*Journal*
2022	**Frontiers in Remote Sensing**, Land cover classification of the Alps from InSAR temporal coherence matrices. Giffard-Roisin, S., Boudaour, S., Doin, M. P., Yan, Y., & Atto, A.	*Journal*
2021	**Journal of Geophysical Research**, Designing conv. NN pipeline for near-fault earthquake catalog extension using single-station waveforms. J. Majstorović, S. Giffard-Roisin, P. Poli	*Journal*
2020	**Frontiers in Big Data - Data-driven Climate Sciences**, Tropical Cyclone Track Forecasting using Fused Deep Learning from Aligned Reanalysis Data. S. Giffard-Roisin et al.	*Journal*