






Seeking a postdoctoral position in remote sensing applied to volcanology

❖ EDUCATION


- 2019–2024
 **Doctoral Degree prepared within the Doctoral School "Fundamental Sciences"**
- Clermont-Auvergne University in Clermont-Ferrand (France)
 - Discipline: Structure and evolution of the Earth and other planets
 - *"Hydrothermal system thermodynamics"*
- 2018–2019
 **Master Degree in Earth Science and planets, environment as a double diploma**
- Clermont-Auvergne University in Clermont-Ferrand (France)
 - Specialization: Magmas and Volcanoes
 - Relevant courses: Geochemistry, Volcanological Systems, Petrology, Magmas Physics
- 2016–2019
 **Master Degree in Geosciences (Engineering program in Earth and Environmental Sciences – Geology)**
- Institut Polytechnique UniLaSalle in Beauvais (France) - **Engineering school (leading institution of higher education)**. Admission is highly selective and the title of Engineer awarded is prestigious
 - Specialization: Mines and Quarries, and Research option the 2nd year
 - Relevant courses: Geology, Geomatics, Signal processing and Geophysics, Prospecting, GIS
- 2014–2016
 **Bachelor Degree in Earth Science**
- Polytech'Paris UPMC in Paris (France) - **Engineering school**, specialized in Earth sciences
 - Relevant courses: Geology, Thermodynamics, Geodynamics, Geophysics, Algorithmic, Computer programming, English

❖ EXPERIENCES


Postdoctoral contracts

- 2024
6 months
 **Postdoctoral position – Laboratoire Magma et Volcans (LMV)– Clermont-Ferrand (France)**
- *Carried on the thesis project on studying heat fluxes of volcanic hydrothermal systems*
 - *Preparation of seminars, conferences and article publications*

PhD "Hydrothermal system thermodynamics"

- 2019–2024
 **PhD candidate – Laboratoire Magma et Volcans (Research Institute) – Clermont-Ferrand (France)**
- Supervised by Andrew Harris
- *Installed a network of temperature and meteorological sensors inside La Fossa crater, Vulcano, Sicily, and collected ground- and satellite-based thermal images;*
 - *Defined the thermal characteristics of the 2021s unrest at La Fossa, Vulcano;*
 - *Calculated heat fluxes from two types of hydrothermal systems (dry and flooded) to review and validate heat flux calculation models using ground- and satellite-based thermal data*

INTERNSHIPS

- 2019
5 months
 **Trainee in remote sensing – Laboratoire Magma et Volcans (Research Institute) – Clermont-Ferrand (France)**
- Research internship, supervised by Andrew Harris
- *Developed a methodology to retrieve plume height time series from a single high resolution satellite image using the shadow casted by the plume on the ground;*
 - *Manipulated for that purpose ETM+, ASTER and Pleiades image data using the ENVI software;*
 - *Compared the results with measures from ground-based visible and thermal cameras.*

2017
4 months



Trainee in support for 3 research teams – Nordic Volcanological Center (Research Institute) – Reykjavik (Iceland)

Research internship, supervised by Àrmann Höskuldsson

- Modelled the 2014 Holuhraun lava flow 3D topography from LiDAR data thanks to the RiSCAN PRO software;
- Helped for 5 days a research team to collect water samples and pH data from groundwater, glacier water, and water coming from the 2014 Holuhraun lava flow;
- Collected ash samples and layers thickness from the eruptions Katla 1918 and Öräfajökull 1362 on the field, and sieved around 50 of these ash samples.

2017–2018
2 months



UniLaSalle Institute – Beauvais (France)

Academic project – Research option, supervised by Hervé Leyrit

- Carried out analog experiments on Mount Etna gravitational collapse using sand, silicon and plaster, with a focus on contact shape between the substrata impact;
- Analyzed pictures using open-source Kappa software from Image J to extract curvatures.

2017–2018
7 months



UniLaSalle Institute – Beauvais (France)

Academic project – Collective project of the 4th year Mines and Quarries students (3 teams of 5 people in competition) CONFIDENTIAL

- Set up a project management methodology (team management, schedules, risks, informational watch, requirement specifications...);
- Created several models: an ArcGIS builder model to automatize quarries prospection depending on several criteria and applicable regulations, a quarry best prospect 3D model using the Coralis software and best prospect area ground coverage and time series using the ENVI software.

2015–2016
2 months



Trainee in analog modelling – Institute of Earth Physics of Paris (Research Institute) – Paris (France)

Research internship

- Designed an experimental protocol to test a magma chamber formation and magma storage hypothesis;
- Modified a Matlab program transforming the color intensity on experiments pictures into thickness of magma storage.

CONFERENCES & SEMINARS

2025
(upcoming)

⇒ **Seminar Istituto Nazionale di Geofisica e Vulcanologia (INGV) – February 2 2025, Roma (Italy)**
“Ground- and Satellite-based thermal characterization of the 2021 unrest at Vulcano”

2025
(upcoming)

⇒ **VolcaPot – January 24 2025, Clermont-Ferrand (France)**
“Selective decoupling of soil degassing species and heat flux at surface-sealed hydrothermal systems: evidence from Vulcano”

2024



⇒ **International Summer School “Working on active volcanoes: Lipari-Stromboli-Vulcano” 2nd Edition – June 20 2024, Eolian islands (Italy)**
“Hydrothermal system thermodynamics: What are we going to measure and why are we measuring it?” by Pailot - Bonnétat S. & Harris A. J. L.

2023



⇒ **Working group communication meeting – March 14 2023, INGV Catania (Italy)**
“ANR-DIRE Vulcano project communication” Pailot – Bonnétat S., Rafflin V., Giannoulis M., et al.

2022



⇒ **Working group communication meeting – September 28 2022, INGV Catania (Italy)**
“ANR-DIRE: Data integration from multiprobe sensor networks to assess risk scenarios at volcanic hydrothermal ecosystems” by Pailot – Bonnétat S., Rafflin V., Giannoulis M., et al.

2022



⇒ **Cities on Volcanoes 11 – Session 2.18: Linking remote and local monitoring data through physical volcano models to understand and forecast unrest – June 12-17 2022, Heraklion (Crete)**
“Thermal Remote Sensing of Crises at Hydrothermal Systems: ASTER and La Fossa di Vulcano” (oral presentation) by Pailot - Bonnétat S., Giannoulis M, Harris A. J. L., et al.

2022



- ⇒ **European Geoscience Union (EGU) General Assembly – Session GMPV10.4: Advances in numerical modelling of volcanic hazards** – 23–27 May 2022, Vienna (Austria)
“The 2021 unrest at Vulcano: insights from ground-based and satellites observations” (oral presentation) by Diliberto I. S., **Pailot Bonn  tat S.**, Harris, A. J. L., *et al.*
<https://doi.org/10.5194/egusphere-egu22-11576>

2022



- ⇒ **Working group communication meeting** – March 31 2022, INGV Catania (Italy)
“ANR-DIRE thermal network data update”

2021



- ⇒ **UCA’s Doctoral School Scientific Workshop** – December 2–3 2021, Aubi  re (France)
“Thermal methodologies for tracking the thermal state of hydrothermal systems during crises: case study of the 2021 unrest at La Fossa cone, Vulcano” (poster) by **Pailot - Bonn  tat S.**, Harris A. J. L., Bani P.

2021



- ⇒ **Work meeting with INGV Palermo & Catania following Vulcano’s unrest – October 13 2021**
“Data available from the ANR-DIRE thermal network on Vulcano”

SUMMER SCHOOLS

2021



- ⇒ **6th International Training on Convective and Volcanic Clouds (CVC School)** – training for students with primary research interest in: (1) techniques to detect, monitor, and model convective and volcanic clouds, (2) state-of-the-art instruments and satellite missions (present and future), (3) early warning systems and aviation safety for supporting policymakers.

2019



- ⇒ **1st Stromboli International School of Volcanology** – Working on an active volcano: learning the tools of modern volcanology (field measurements, instruments, data acquisition and processing)

TEACHING & SUPERVISING

2024



- MSc Field camp in Italy** – September 25 2024, Eolian islands (Italy)

Field support and supervision of 15 MSc graduate students

- *Demonstrations of ground-based direct and remote sensing thermal acquisition devices (thermal camera, thermocouples) on the Cave di Caolino area, Lipari (Italy)*

2024



- International Summer School “Working on active volcanoes: Lipari-Stromboli-Vulcano” 2nd Edition** – June 15–23 2024, Eolian islands (Italy)

Field support and supervision of 20 early career participants

- *Small course on introduction to hydrothermal systems and the La Fossa system at Vulcano*
- *Demonstrations of ground-based direct and remote sensing thermal acquisition devices (thermal camera, thermocouples)*
- *Thermal data processing from acquisition to interpretation in the context of unrest at Vulcano*

2023



- International Summer School “Working on active volcanoes: Lipari-Stromboli-Vulcano” 1st Edition** – June 17–24 2023, Eolian islands (Italy)

Field support and supervision of 25 early career participants

- *Demonstrations of ground-based direct and remote sensing thermal acquisition devices*
- *Thermal data processing from acquisition to interpretation in the context of unrest at Vulcano*

2023



- MSc Research Projects** – Clermont Auvergne University (France)

Co-supervision of 2 MSc graduate students

- *Data processing and interpretation on thermal mapping and heat flux densities calculation using temperature data collected in Nisyros, Greece and Po  s, Costa Rica*

2022



- MSc Field camp in Italy** – June 2022, Eolian islands (Italy)

Field support and supervision of 15 MSc graduate students

- *Demonstrations of ground-based direct and remote sensing thermal acquisition devices (thermal camera, thermocouples) on the Cave di Caolino area, Lipari (Italy)*

2022



- BSc 1st year tutorial group sessions on the lecture “Earth’s surface / Environments and past life”** – Clermont Auvergne University (France)

Teaching (12 hours)

SCIENTIFIC COMMUNICATION / OUTREACH

- 2024  ⇒ **Participation to Rittmann Conference (6th Edition)** – September 18–20 2024, Catania (Italy)
- 2024 ⇒ **“Generazione Vulcano”** – Photographic project on consequences of volcanoes in the upbringing of adolescents in the Aeolian islands by photographer Giulia Friglieri
- Scientific support & theoretical consultancy, Thermal camera support and processing
- 2024 ⇒ **Le Monde de Jamy “European volcanoes” documentary**
- Production assistant during filming
- 2023 ⇒ **The Possible Island / Vulcaniamo 2nd. Edition** – Art and Science Residency on Vulcano island “Generazione Vulcano” by photographer Giulia Friglieri, project with Vulcano’s dance school
- Thermal camera support and processing, public presentation
- 2022  ⇒ **Participation to Rittmann Conference (5th Edition)** – September 29–October 1 2022, Catania (Italy)
- 2021 ⇒ **The Possible Island / Vulcaniamo 1st Edition** – Art and Science Residency on Vulcano island “Mineral Self” by photographer Roberto Boccacino, pedagogical project with Vulcano’s children
- Thermal camera support and processing, exhibition

❖ Publications

- ♦ [in review at *Bulletin of Volcanology*] **Pailot-Bonnétat S.**, Harris A. J. L., Rafflin V., Bonnetain C. Serravalli A., Vanderklyusen L., Brauner J., Liu C., Ramsey M. (2025) “Internal and external processes driving heat transfer at volcanic hydrothermal systems”
- ♦ [in review at *Geophysical Research Letters*] Aveni S., **Pailot-Bonnétat S.**, Harris A. J. L., Rouwet D., Coppola D. (2025) “Volcanic Radiative Power retrieval from moderate-to-low-temperature features using a single TIR band: validation using volcanic crater lakes and hydrothermal systems”
- ♦ Giannoulis M., **Pailot-Bonnétat S.**, Barra V. and Harris A. J. L. (2024) “External factors driving surface temperature changes above geothermal systems: answers from deep learning”, *Frontiers in Earth Sciences*, 12:1372621. <https://doi.org/10.3389/feart.2024.1372621>
- ♦ Harris A.J.L., **Pailot-Bonnétat S.** (2024) “Inversion of heat loss to obtain conductivity, density, and permeability at bottom-heated surfaces: the case of the hydrothermal system at Vulcano between 2019 and 2023”, *Bulletin of Volcanology* 86, 55. <https://doi.org/10.1007/s00445-024-01746-4>
- ♦ **Pailot-Bonnétat S.**, Harris A. J. L. (2024) “A Thermal Record for Unrest at Vulcano 2020–2022: In Situ Meteorological Data and Soil Temperature Recorded at High Temporal Resolution”, *Bull Volcanol* **86**, 13. <https://doi.org/10.1007/s00445-023-01696-3>
- ♦ **Pailot-Bonnétat S.**, Rafflin V., Harris A. J. L. *et al.* (2023) “Anatomy of thermal unrest at a hydrothermal system: case study of the 2021–2022 crisis at Vulcano”, *Earth Planets Space* **75**, 159. <https://doi.org/10.1186/s40623-023-01913-5>
- ♦ Corradino C., Ramsey M. S., **Pailot-Bonnétat S.**, Harris A. J. L. and Negro C. D. (2023) “Detection of Subtle Thermal Anomalies: Deep Learning Applied to the ASTER Global Volcano Dataset”, *IEEE Transactions on Geoscience and Remote Sensing*, 61:1-15 <https://doi.org/10.1109/TGRS.2023.3241085>
- ♦ Tadini A., Harris A. J. L., Morin J., *et al.* (2022) “Structured elicitation of expert judgement in real-time eruption scenarios: an exercise for Piton de la Fournaise volcano, La Réunion island”, *Volcanica*, 5(1), pp. 105–131. <https://doi.org/10.30909/vol.05.01.105131>
- ♦ **Pailot-Bonnétat S.**, Harris A. J. L., Calvari S., De Michele M., and Gurioli L. (2020) “Plume Height Time-Series Retrieval Using Shadow in Single Spatial Resolution Satellite Images” *Remote Sensing* 12(23):3951. <https://doi.org/10.3390/rs12233951>

❖ References

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