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Damien GAUDIN

Ph.D in Earth Sciences

- *Volcanic lightning in ash clouds*
- *High-speed imaging of explosive volcanism*
- *Heat and gas fluxes of hydrothermal systems*
- *Thermal imaging*



Birth : 23/08/1986
Angers (France)

Cursus

- 2016-** **Marie Curie IF (Individual Fellowship) fellow in the VOLTAIC project** — “*VOLcanic lighTning: a lab and field approach*” under the supervision of Corrado Cimarelli — LMU München (Germany)
- 2012–2016** **Marie Curie ITN (Initial Training Network) fellow in the NEMOH project** — “*Observation and modeling of gas and pyroclast ejection in explosive volcanism*” under the supervision of Jacopo Taddeucci — INGV Roma (Italy)
- 2008–2012** **Ph.D in Earth Sciences** — “*High resolution thermal infrared imaging: potential and limitations for earth sciences*” under the supervision of Christophe Delacourt and Pascal Allemand — Université de Bretagne Occidentale– Laboratoire Domaines Océaniques (UMR 6538) (France)
- 2007–2008** **Master 2 in Earth Sciences**, speciality Physics and Chimestery of Earth and planets, *with honors* — Ecole Normale Supérieure de Lyon (France)
- 2006–2007** **CAPES** (competitive exam for teaching) in Earth Sciences and Biology — Ecole Normale Supérieure de Lyon (France)
- 2004–2006** **Licence et Master 1**, speciality Physics and Chimestery of Earth and planets, *with honors* — Ecole Normale Supérieure de Lyon (France)
- 2002–2004** **Classe préparatoire BCPST** (Biology, Chemistry, Physics, Earth Sciences) — Lycée du Parc, Lyon (France)

Fellowships

- 2014–2016** Research fellowship, INGV Roma
- 2012–2014** Marie Curie ITN fellowship, INGV Roma
- 2011–2012** Teaching assistant, Université de Bretagne Occidentale
- 2008–2011** PhD fellowship from the French Education and Research Ministry
- 2004–2008** Fellow from the Ecole Normale Supérieure de Lyon

Other diploma

- 2010** Diploma for youth leaders and workers (BAFA)
- 2010** European First Aid Certificate (PSC1, ex-AFPS)
- 2005** Driver's license

Publications / congresses

- 10 international rank A publications, *incl. 6 as first author*
- 2 invited presentations in international meetings
- 30 international meeting proceedings

Article reviews

- Reviewer for rank-A international journals:
- Journal of Volcanology and Geothermal Research
 - Earth, Planets and Space

Teaching

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| 2008–2012 | Teaching assistant in licence levels (L1, L2, L3) (284h) — UFR Sciences et Techniques, Université de Bretagne Occidental |
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Supervision

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| 2015 | Co-supervising 2 license stages — INGV Roma |
| 2014 | Co-supervising 2 license stages — INGV Roma |

Administrative involvement

- | | |
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| 2010–2012 | Board member of the Doctoral School Council (Université de Bretagne Occidentale, Brest, France) |
| 2009–2011 | In charge of the organization of short talks for the lab students (Laboratoire Domaines Océaniques, Brest, France) |
| 2009–2012 | Setup and updates of the PhD student websites (Laboratoire Domaines Océaniques, Brest, France) |
| 2004–2005 | Board member of the ENS Lyon student association |

Languages

- French (native)
- English (fluent)
- Italian (good skills)
- Spanish (notions)

10 articles in rank A international journals since 2013

- (13.) **Gaudin D.**, Taddeucci J., Scarlato P., Del Bello E., Ricci T., Orr T.R., Houghton B.F., Harris A., Integrating puffing and explosions in a general scheme for Strombolian activity, In prep for *Journal of Geophysical Research – Solid Earth*
- (12.) **Gaudin D.**, Ricci T., Finizola A., Delcher E., Alparone S., Barde-Caubusson S., Brothelande E., Di Gangi F., Gambino S., Inguaggiato S., Milluzzo V., Peltier A., Vita F. Heat flux-based strategies for the thermal monitoring of sub-fumarolic areas: examples from Vulcano and La Soufrière de Guadeloupe. Submitted to *Journal of Volcanology and Geothermal Research*.
- (11.) **Gaudin D.**, Taddeucci J., Scarlato P., Harris A., Bombrun M., Del Bello E., Ricci T. Characteristics of puffing activity revealed by ground-based, thermal infrared imaging: the example of Stromboli volcano (Italy). Submitted to *Bulletin of Volcanology*.
10. **Gaudin D.**, Taddeucci J., Houghton B.F., Orr T.R., Andronico D., Del Bello E., Kueppers U., Ricci T., Scarlato P. 3-D high-speed imaging of volcanic bomb trajectory in basaltic explosive. *Geochemistry, Geophysics, Geosystems – Technical reports: Methods*. (in press)
9. **Gaudin D.**, Beauducel F., Coutant O., Delacourt C., Allemand P., Richon P., de Chabalière J.-B., Hammouya G., 2016. Mass and heat flux balance of La Soufrière volcano (Guadeloupe) from aerial infrared thermal imaging, *Journal of Volcanology and Geothermal Research*, 320, 107-116. doi:10.1016/j.jvolgeores.2016.04.007.
8. Houghton, B.F., Taddeucci, J., Andronico, D., Gonnermann, H.M., Pistolesi, M., Patrick, M.R., Orr, T.R., Swanson, D.A., Edmonds, M., **Gaudin, D.**, Carey, R.J., Scarlato, P., 2016. Stronger or longer: Discriminating between Hawaiian and Strombolian eruption styles. *Geology*, 44(2), 163-166. doi: 10.1130/G37423.1
7. **Gaudin D.**, Finizola A., Delcher E., Beauducel F., Allemand P., Delacourt C., Brothelande E., Peltier A., Di Gangi F., 2015, Seasonal variations of the heat and steam fluxes in fumarolic zones: the example of the Ty Fault (Guadeloupe, Lesser Antilles), *Journal of Volcanology and Geothermal Research*, 302: 273-285. doi: 10.1016/j.jvolgeores.2015.06.015
6. Spina L., Taddeucci J., Cannata A., Gresta S., Lodato L., Privitera E., Scarlato P., Gaeta M., **Gaudin D.**, Palladino D., 2015, Explosive volcanic activity at Mt. Yasur: a characterization of the acoustic events (9-12th July 2011), *Journal of Volcanology and Geothermal Research*, 302: 24-32. doi: 10.1016/j.jvolgeores.2015.06.005
5. **Gaudin D.**, Taddeucci J., Scarlato P., Moroni M., Freda C., Gaeta M., Palladino D., 2014. Pyroclast Tracking Velocimetry illuminates bomb ejection and explosion dynamics at Stromboli (Italy) and Yasur (Vanuatu) volcanoes, *Journal of Geophysical Research*, 119(7): 5384–5397. doi: 10.1002/2014JB011096
4. **Gaudin D.**, Moroni M., Taddeucci J., Scarlato P., Shindler L., 2014. Pyroclast Tracking Velocimetry: A Particle Tracking Velocimetry-based tool for the study of Strombolian explosive eruptions, *Journal of Geophysical Research*, 119(7): 5369–5383. doi: 10.1002/2014JB011095
3. Taddeucci J., Sesterhenn J., Scarlato P., Stampka K., Del Bello E., Peña Fernandez J.J., **Gaudin D.**, 2014. High-speed imaging, acoustic features, and aeroacoustic computations of jet noise from Strombolian (and Vulcanian) explosions, *Geophysical Research Letters*, 41(9): 3096–3102. doi: 10.1002/2014GL059925
2. Allard P., Aiuppa A., Beauducel F., **Gaudin D.**, Di Napoli R., Calabrese C., Parello F., Crispi O., Hammouya G., Tamburello G., 2014. Steam and gas emission rate from La Soufrière volcano, Guadeloupe (Lesser Antilles): implications for the magmatic supply during degassing unrest, *Chemical Geology*, 384: 76–93. doi: 10.1016/j.chemgeo.2014.06.019
1. **Gaudin D.**, Beauducel F., Finizola A., Allemand P., Delacourt C., 2013. Heat flux measurement from thermal infrared imagery in low-flux fumarolic zones: Example of the Ty fault (La Soufrière de Guadeloupe), *Journal of Volcanology and Geothermal Research*, 267: 47–56. doi: 10.1016/j.jvolgeores.2013.09.009

2 invited presentations in international meetings

- IC2. **Gaudin D.**, Taddeucci J., Scarlato P., Harris A., Bombrun M., Del Bello E., Orr T., Precursors and transitions in explosive activity at Stromboli (Aeolian Islands) and implications for shallow vent processes, *AGU Fall Meeting, 2015*.
- IC1. **Gaudin D.**, Taddeucci J., Scarlato P., A bestiary of ordinary vent activities at Stromboli (and what it tells us about vent conditions), *EGU General Assembly, 2015*.

28 other international meeting proceedings

- C28. Mintz B.G., Houghton B.F., Orr T.R., Taddeucci J., **Gaudin D.**, Kueppers U., Carey R.J., Scarlato P., Del Bello E., Spattering activity at Halema'uma'u in 2015 and the transition between Hawaiian and Strombolian eruptions, *AGU Fall Meeting, 2016*.
- C27. Sciarra, A., Mézon, C., Finizola, A., Ricci, T., Lucchetti, C., Antoine, R., Beaucamp, B., **Gaudin, D.**, Poret, M., Sansivero, F., Tuccimei, P., Vilardo, G., Multidisciplinary investigations in the Upper Pisciarelli area, Campi Flegrei, Italy. 26th Goldschmidt Conference, 2016.

- C26. Tournigand P.Y., Taddeucci J., Peña Fernandez J.J., **Gaudin D.**, Sesterhenn J., Scarlato P., Del Bello E., Retrieving eruptive vent conditions from dynamical properties of unsteady volcanic plume using high-speed imagery and numerical simulations, *EGU General Assembly*, 2016.
- C25. **Gaudin D.**, Taddeucci J., Scarlato P., Del Bello E., Houghton B., Orr T., Andronico D., Kueppers U., Game of thrown bombs in 3D: using high speed cameras and photogrammetry techniques to reconstruct bomb trajectories at Stromboli (Italy), *AGU Fall Meeting*, 2015.
- C24. Scarlato P., Del Bello E., **Gaudin D.**, Taddeucci J., Ricci T., Cesaroni C., Dynamics of strombolian eruptions at Batu Tara volcano (Indonesia), *AGU Fall Meeting*, 2015.
- C23. **Gaudin D.**, Taddeucci J., Scarlato P., The precursors of Strombolian explosions and how they betray the shallow conduit characteristics, *IUGG General Assembly*, 2015.
- C22. Tournigand P.Y., Taddeucci J., Scarlato P., **Gaudin D.**, Del Bello E., Characterisation of volcanic plume dynamics using high-speed imagery, *IUGG General Assembly*, 2015.
- C21. Taddeucci J., Scarlato P., Del Bello E., **Gaudin D.**, A kilohertz approach to Strombolian-style eruptions, *EGU General Assembly*, 2015.
- C20. Allard, P., Aiuppa A., Beauducel F., Calabrese S., Di Napoli R., Crispi O., **Gaudin D.**, Parello F., Hammouya G., Tamburello G., Steam and gas emission rates from La Soufrière of Guadeloupe (Antilles arc): implications for the magmatic supply degassing during unrest, *EGU General Assembly*, 2015.
- C19. Tournigand P.-Y., Taddeucci J., Scarlato P., **Gaudin D.**, Del Bello E., Field-based study of volcanic ash via visible and thermal high-speed imaging of explosive eruptions, *EGU General Assembly*, 2015.
- C18. **Gaudin D.**, Taddeucci J., Harris A., Orr T., Bombrun M., Scarlato P., When Puffing Meets Strombolian Explosions: A Tale of Precursors and Coda, *AGU Fall Meeting*, 2014.
- C17. Taddeucci J., **Gaudin D.**, Orr T., Scarlato P., Houghton B., Del Bello E., 3D Velocimetry of Strombolian Explosions, *AGU Fall Meeting*, 2014.
- C16. Scarlato P., Taddeucci J., Del Bello E., **Gaudin D.**, Ricci T., Andronico D., Lodato L., Cannata A., Ferrari F., Orr T., Sesterhenn J., Plescher R., Baumgärtle Y., Harris A., Bombrun M., Barnie T., Houghton B., Kueppers U., Capponi A., Broadband Acquisition and Imaging Operation (BAcIO) at Stromboli Volcano (Italy), *AGU Fall Meeting*, 2014.
- C15. **Gaudin D.**, Finizola A., Beauducel F., Brothelande E., Allemand P., Delacourt C., Delcher E., Peltier A., Heat flux measurement from vertical temperature profile and thermal infrared imagery in low-flux fumarolic zones, *EGU General Assembly*, 2014.
- C14. **Gaudin D.**, Taddeucci J., Moroni M., Scarlato P., Algorithm-based high-speed video analysis yields new insights into Strombolian eruptions, *EGU General Assembly*, 2014.
- C13. **Gaudin D.**, Taddeucci J., Scheu B., Valentine G., Capponi A., Kueppers U., Graettinger A., Sonder I., Pyroclast acceleration and energy partitioning in fake explosive eruptions, *EGU General Assembly*, 2014.
- C12. Taddeucci J., Tamburello G., **Gaudin D.**, Scarlato P., Delle Donne D., Aiuppa A., Ripepe M., One for all and all for one: The visual, thermal, geochemical, acoustic, and seismic signature of a single Strombolian explosion, *EGU General Assembly*, 2014.
- C11. Taddeucci J., Valentine G., **Gaudin D.**, Graettinger A.H., Lube G., Kueppers U., Sonder I., White J., Ross P.S., Bowman D.C., Fake ballistics and real explosions : field-scale experiments on the ejection and emplacement of volcanic bombs during vent-clearing explosive activity, *AGU Fall Meeting*, 2013.
- C10. **Gaudin D.**, Moroni, M., Taddeucci, J., Scarlato, P., Shindler L., Eruptions on the fast track, part a) : computational routines for processing visible and thermal high-speed videos of explosive eruptions, *IAVCEI Scientific Assembly*, 2013.
- C9. **Gaudin D.**, Taddeucci, J., Scarlato, P., Moroni, M., Eruptions on the fast track, part b) : The variability of strombolian explosions from high speed thermal and optical videos, *IAVCEI Scientific Assembly*, 2013.
- C8. Aiuppa, A., Allard, P., Beauducel, F., Cardellini, C., Chiodini, G., Di Napoli, R., Federico, C., **Gaudin D.**, Giudice, G., Grassa, F., Pedone, M., Tamburello, G., Quantifying carbon dioxide flux from dormant volcanoes with low-temperature fumarolic activity: demonstration from measurements at la Soufrière, Guadeloupe, and Campi Flegrei, Italy, *IAVCEI Scientific Assembly*, 2013.
- C7. Taddeucci J., Capponi A., Scarlato P., Palladino D.M., Cocomello S., **Gaudin D.**, The slug buster: an analogue experiment for the study of Strombolian explosions, *IAVCEI Scientific Assembly*, 2013.
- C6. **Gaudin D.**, Moroni, M., Taddeucci, J., Shindler, L., Scarlato, P., Eruptions on the fast track: application of Particle Tracking Velocimetry algorithms to visual and thermal high-speed videos of Strombolian explosions, *EGU General Assembly*, 2013.
- C5. Taddeucci J., Scarlato P., **Gaudin D.**, Capponi A., Alatorre-Ibarguengoitia M.A., Moroni M., High-speed imaging of explosive eruptions : applications and perspectives, *EGU General Assembly*, 2013.
- C4. **Gaudin D.**, Beauducel, F., Finizola, A., Allemand, P., Delacourt, C., Richon, P., Coutant, O., de Chabalier, J.-B., Heat and mass flux measurements from thermal infrared imagery : Example of the Soufrière Volcano (Guadeloupe), *AGU Fall Meeting*, 2012.
- C3. **Gaudin D.**, Allemand P., Delacourt C., Subpixelar roughness effects on Mars thermal inertia, *AGU Fall Meeting*, 2011.
- C2. **Gaudin D.**, Delacourt C., Allemand P., Comparison of terrestrial laser scanning and infrared waterline method for deriving very-high resolution DEM of a muddy intertidal zone, *AGU Fall Meeting*, 2010.

- C1. **Gaudin D.**, Delacourt C., Allemand P., Jaud, M., Ammann, J., Tisseau C., Cuq V., High resolution DEM derived from thermal infrared images : example of Aber Benoit (France), *IGARSS, 2009*.

Seminars

- S4. **Gaudin D.** (2016). Flux d'énergie et de matière des volcans dormants: apports de la thermométrie et de la télédétection. IPG Paris, France
- S3. **Gaudin D.**, Taddeucci J., Scarlato P., Del Bello E., Ricci T. (2015) High speed imaging of Stromboli activity: implications for the mechanism of explosions and vent conditions, USGS Hawaii Volcano Observatory (USA)
- S2. **Gaudin D.** (2014). Le flux d'énergie des volcans: exemples du Stromboli et de la Soufrière de Guadeloupe. IPG Paris, France
- S1. **Gaudin D.** (2013). Inside strombolian explosions: a statistical analysis of high speed videos from Yasur and Stromboli volcanoes. LMU Munich, Germany

Others

- O2. **Gaudin D.** (2012). Imagerie infrarouge thermique haute résolution : potentiels et limitations pour la géologie (Thèse), Université de Bretagne Occidentale
- O1. Beauducel F., **Gaudin D.** (2010). Imagerie thermique infrarouge sur la Soufrière : Rapport de mission en Guadeloupe 09-28 février 2010, ANR DOMOSCAN / RISKMAT INSU-CNRS (Disponible sur la page web du projet : <https://sites.google.com/site/domoscan/>)