Adrien **Saurety**

PhD Student

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Summary

I am a 26-year-old PhD student at Institut de Physique du Globe de Paris (IPGP). I like all scientific subject areas. That's why, after having completed a Bachelor's Degree in Earth Science, I completed a Bachelor's in Chemistry and a master's in computational methods for physics and chemistry to acquire further skills. I am currently working on an ab initio molecular dynamic simulation to investigate the behavior of the material during a giant impact in the early solar system.

Education

Lycée Blaise Pascal — ***Clermont-Ferrand***, *France*

Classe préparatoire BCPST — *2016-2018*

- Undergraduate courses to prepare nationwide competitive exams in sciences: Biology, Chemistry, Physic, Geology, and Maths.

ENS de Lyon — ***Lyon***, *France*

BSC Degree in Geology — *2018-2019*

- General geology and specialization in geophysics

ENS de Lyon — ***Lyon***, *France*

BSC Degree in Chemistry — *2019-2020*

- General physic and chemistry and specialization in theoretical chemistry

ENS de Lyon — ***Lyon***, *France*

MSC in Computational Physics and Chemistry — *2020-2022*

- M1 : M1 Chemistry course program of the ENS, mostly specialized in condensate matter physic and theoretical chemistry
- M2 : "Computational Physics and Chemistry" course program of the ENS' Master in chemistry, mostly specialized in condensate matter physic, theoretical chemistry and numerical modelling

Research Experience

ISTerre — ***Grenoble***, *France*

Using machine learning to analyse Magneto-hydrodynamic experimental data — *June-July 2019*

- I worked with Henri-Claude Nataf about his experimental data and we tried to use an Artificial Neural Network to predict missed data.

LGL-TPE — ***Lyon***, *France*

Calcul the friction energy between talc's sheet by DFT — *June-July 2020*

- I worked with Razvan Caracas with the software ABINIT to make DFT computation on talc's sheet.

UCL — ***London***, *England*

An ab initio study of possible pre-melting behaviour in magnesium — *May-July 2021*

- I worked with Lidunka Vočadlo with the software VASP to study the pre-melting of the magnesium under zero pressure and various temperature.

CEED — ***Oslo***, *Norway*

Self-diffusion of noble gases in pyrolite melts — *February-July 2022*

- I worked with Razvan Caracas to compute the diffusivity of noble gases in melted pyrolite at several Pressure-Temperature conditions. We use the software VASP to get inedit and precise diffusion coefficient to constrain the Earth formation's models better.

IPGP — ***Paris***, *France*

Ab initio study of multicomponent silicate system during large and giant impacts — *September 2022-September 2025*

- I am working with Razvan Caracas. We used ab initio molecular dynamics and thermodynamic integration to investigate the behavior of terrestrial and chondritic material under shock.

Caltech — ***Pasadena***, *USA*

Determination of friction coefficient between mineral grain with DFT and MD. — *October 2025-today*

- I am working with Paul Asimov and Willam A. Goddard III. We use DFT and MD to simulate the interaction in between two mineral grain to determine the friction coefficient

Publication

Diffusion, chemical bonding, and kinetic fractionation of noble gases in the primordial magma ocean *GCA*

Adrien Saurety, Ozge Ozgurel, Chris Mohn, Razvan Caracas *2024*

publication available (open access): https://doi.org/10.1016/j.gca.2024.06.021

Impact-induced Vaporization During Accretion of Planetary Bodies *ApJL*

Adrien Saurety, Razvan Caracas, Sean N. Raymond *2025*

publication available (open access): https://doi.org/10.3847/2041-8213/adb30e

Hydrous Chondrite Under Shock *ApJ*

Adrien Saurety, Razvan Caracas *2025*

publication available (open access): https://doi.org/10.3847/1538-4357/ade87f

Presentation

IMA meeting 2022 *Lyon, France*

Study of self diffusion of noble gases in magma ocean *Jul. 2022*

Talk

Goldschmidtt 2023 *Lyon, France*

Behavior of chondrites during large and giant impacts: an ab initio study *Jul. 2023*

Talk

HP4 workshop 2023 *Rostock, Germany*

Thermodynamic integration method to invest impact-induced vaporization *Oct. 2023*

Talk

PURE-6 meeting *Paris, France*

Vaporization event aftershock during the accretion of solar system *Jan. 2024*

Invited talk

AGU Fall meeting 2024 *Washington DC, USA*

Impact induced vaporization during planetary impacts *Dec. 2024*

Poster

Teaching and outreaching

2022	**Teaching assistant,** practical session: general Mathematics for 1st year undergrade	*Paris, France*
2022	**Teaching assistant,** practical session: functional analysis for 1st year undergrade	*Paris, France*
2022	**Teaching assistant,** practical session: experimental physics for 2nd year of undergrade	*Paris, France*
2023	**Teaching assistant,** practical session: functional analysis for 1st year undergrade	*Paris, France*
2023	**Teaching assistant,** practical session: experimental physics for 2nd year of undergrade	*Paris, France*
2024	**Outreach activity,** Fete de la Science	*Paris, France*

Peer-review activity

EPSL

Reviewer *2024*

I reviewed a paper using DFT and MD for EPSL as an expert on these methods.

GCA

Reviewer *2025*

I reviewed a paper using DFT and MD for GCA as an expert on these methods.

Mentor activity

M1 intern: Macéo Pelligrino ***Paris**, France*

2024

- I co-advise Maceo for the three months of his first of year of master internship at IPGP with Razvan Caracas.

Award grant

PhD funding from ENS de Lyon — ***Paris***, *France*

Aug. 2022

- I received funding on the CDSN doctoral grant to conduct my three years PhD research under the supervision of Razvan Caracs at IPGP.

PhD mobility at Chicago — ***Chicago***, *USA*

Sep. 2024

- I received funding from graduate school to spend one month in Andy Campbell's lab at the University of Chicago to work on thermodynamic integration.

Postdoctoral Fellowship — ***Los Angeles***, *USA*

October 2025

- I received funding from the Caltech Division of Geological and Planetary Sciences to start a postdoctoral position in October 2025. I will work on the rheology of the crust using AIMD.

Skills

Software	VASP, Abinit, Avogadro, Gaussian, GROMAC, Docker, Git, CP2K
Programming	Bash, Python, LaTeX, C++, C, Fortran, Matlab
Languages	French (Native), English (C1), Spanish (B1), Russian (A2)
Other skills	Boat licence, driving licence, "Initiateur Alpinisme FFCAM" level 1