Dr. Alexis **Gomel**

Personal & contact

Nationality	Spanish and Argentinian	Residence	Munich, Germany
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I'm always looking to challenge myself and grow. I have multiple interest and I like to learn new things constantly, as exampled by my experience working in diverse topics such as optics, fluids and climate. I also enjoy getting involved in my communities, be it in the workplace or in my hobbies.

Education

05/18 - 02/23 **PhD in Physical sciences**, *University of Geneva*, *G.P.A:* 10/10,
Thesis: Nonlinearities in dynamical systems.
Supervisors: Jerôme kasparian, Maura Brunetti

03/08 - 04/17 **M.S Physics**, *Universidad de Buenos Aires*, *G.P.A:* 8.89/10,
Thesis: Rogue waves en lasers modulados en fase (Rogue waves in phase modulated lasers).
Supervisors: Jorge Tredice, Pablo Mininni

Skills

Research	Experience with simulation, experiments and theoretical work.
Technical	Physics experience in Non-linear dynamics, laser physics, fluid mechanics, statistical physics.
Data	Machine learning, data analysis, visualization and storytelling, data cleaning and pre-processing.
Programming	Python, Matlab, Git, Latex, HTML, SQL.
Communication	Strong presentation skills in English and Spanish for expert and non-technical audiences.
Collaboration	Collaboration in interdisciplinary and multicultural teams.
Mentoring	Teaching more than 200 students in schools and universities.
Management	Managing research projects and mentoring master students.
Adaptability	Ability to quickly learn new topics.
Language	Spanish (native), English (proficient), French (intermediate), German (A2 beginner).

Work experience

Mar 24 - Today **Professional break & personal development**, **Munich, Germany**
- Upskilled through online courses in data science, and machine learning.
- Taken part in Kaggle data science competitions to gain real-world experience.
- Developed personal projects which can be found on my website.
- Studying German (A2) to enhance communication skills for professional and personal integration.

Apr 23 - Feb 24 **PDRA Researcher (short contract)**, **Reading, United Kingdom**,
Mathematics of Planet Earth, University of Reading
- Developed and analyzed my own research on climate tipping point using stochastic strongly-forced systems, and early warning signals of abrupt transitions from data properties using statistical techniques to evaluate possible real world applications and policies.
- Developed scripts and algorithms in Python and Matlab for numerical simulation, data analysis and visualization. Developed tools to simulate climate scenarios and assess their impact.
- Worked with interdisciplinary teams to integrate their insights into my climate models as part of the TIPES (Tipping Points in the Earth System) EU horizon 2020 project.
- Relocated internationally for a short-term contract to collaborate with a team of interest.
- **Skills**: Climate science, numerical modeling, nonlinear systems, Python.

May 18 - Feb 23 **Physics PhD Researcher**, **Geneva, Switzerland**,
Nonlinearity and Climate Group, University of Geneva

- Developed a new multi-scale models for gravity waves, enhancing simulations accuracy and understanding of wave phenomena for complex bathymetry scenarios and leading to a high-impact publication.
- Developed a theoretical model for extreme waves caused by bathymetry changes, with implications for coral reefs and coastal areas, using analogies from optical systems.
- Realized and analyzed an experimental validation of the theoretical framework, thanks to a collaboration with the University of Sydney, where I conducted experimental validation in real time using advanced data science techniques and custom KPI, leading to 2 publications in high impact journals.
- Conducted high-energy laser experiments and developed a real-time interface for data analysis to optimize lab efficiency. Results led to a peer-reviewed publication on the dynamical features of laser filamentation transition.
- Collaborated with international teams in Sydney to validate theoretical results, leading to long-term research partnerships.
- Presented research at 3 international conferences, authored 4 peer-reviewed papers and wrote and performed a public defense of my PhD thesis against a panel of international experts.
- **Skills**: Theoretical modeling, numerical simulations, experimental work, scientific communication, collaboration, Python & Matlab.

May 18 - Dec 22 **A1 Assistant**, **Geneva, Switzerland**,
University of Geneva

- Designed and delivered coursework in nonlinear dynamics, and laboratory courses.
- Improved attendance and performance by enhancing coursework experiences, with Python and MATLAB based interactive materials, animations and visualizations.
- Developed remote laboratory materials enabling students to continue practical work during COVID-19 disruptions.
- Taught in both English and French, coordinating with faculty to design exams and optimize course content.
- **Skills:** Mentoring and presentation. Coordination with colleagues and interactive coursework design.

Feb 16 - Apr 16 **Undergraduate Teaching assistant**, **Buenos Aires, Argentina**,
University of Buenos Aires

- Assisted at the university for an introductory course to thermodynamics and quantum mechanics.
- **Skills:** Communication, mentoring, crafting educational materials.

July 15 - Feb 16 **Math substitute teacher**, **Buenos Aires, Argentina**,
Boston & River Plate High Schools

- Substitute math teacher at two different high schools.
- Taught mathematics, developed exams, and customized materials to improve student understanding.
- **Skills:** Communication, mentoring, crafting educational materials.

Selected Publications

[1] Alexis Gomel, Amin Chabchoub, Maura Brunetti, Stefano Trillo, Jérôme Kasparian, and Andrea Armaroli. Stabilization of Unsteady Nonlinear Waves by Phase-Space Manipulation. *Physical Review Letters*, 126(17):174501, mar 2021.

[2] Alexis Gomel, Jean Marc Boyer, Cyrille Metayer, and Jorge R. Tredicce. Extreme Events in Lasers with Modulation of the Field Polarization. *Advances in Condensed Matter Physics*, 2019, 2019.

[3] Alexis Gomel, Corentin Montessuit, Andrea Armaroli, Debbie Eeltink, Amin Chabchoub, Jérôme Kasparian, and Maura Brunetti. Mean flow modeling in high-order nonlinear Schrödinger equations. *Physics of Fluids*, 35(8):087128, 08 2023.

[4] Alexis Gomel, Debbie Eeltink, Geoffrey Gaulier, Jerome Kasparian, and Maura Brunetti. Two statistical regimes in the transition to filamentation. *Optics Express*, jan 2023.