

# SALOMON GUINCHARD

<https://salomon73.github.io> | Up to November 29, 2023

## PERSONAL INFORMATIONS

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**Full name:** Salomon Jacques Jean Guinchard

**Date and place of birth:** December 12, 1999, Besançon (France)

**Citizenship:** French

**Address:** 110 Route des Bartelins, 73100 Pugny-chaenod (France)

**Telephone:** +33 6 84 38 40 11

**E-mail:** salomon.guinchard@orange.fr

**Spoken languages:** French (Mother tongue) - English (Fluent) - Spanish (Conversational) - German (Basics) - Russian (Basics)

## EDUCATION

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**Princeton University - Princeton Plasma Physics Laboratory**  
Visiting researcher

*Feb 2023 - Aug 2023*

**Ecole Polytechnique fédérale de Lausanne**  
Master of Science in theoretical physics

*2021 - 2023*

**Ecole Polytechnique fédérale de Lausanne**  
Bachelor of Science in physics

*2017 - 2021*

**Lycée Saint-Ambroise Chambéry**  
Baccalauréat scientifique  
Grade: 17.31/20 (With honor)

*2014 - 2017*

## EXPERIENCE

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**Ecole Polytechnique Fédérale de Lausanne**  
*Thermodynamics Notebook programmer*

Sept. 2021 - Jul. 2022  
*Lausanne (Switzerland)*

- **Aim:** provide additional resources for physics courses at EPFL.

**Ecole Polytechnique Fédérale de Lausanne**  
*Teaching Assistant - Physique avancée I*

Sept. 2021 - Jan. 2023  
*Lausanne (Switzerland)*

- Help first year of Physics Bachelor students solve their physics exercises.
- Help deepen their understanding of the subject during Q&A sessions.

**Ecole Polytechnique Fédérale de Lausanne**  
*Teaching Assistant - Physique avancée II*

Jan. 2021 - July 2021  
*Lausanne (Switzerland)*

- Help first year of Physics Bachelor students solve their thermodynamics exercises.
- Help deepen their understanding of the subject, and improve their intuition.

**Ecole Polytechnique Fédérale de Lausanne**  
*Partial differential equations Notebook Programmer*

Jan. 2021 - July 2021  
Lausanne (Switzerland)

- Programming of a Jupyter Notebook implementing partial differential equations.
- Visual modelisation of heat diffusion in different physical systems.
- Visual modelisation of Turing Patterns arising from Reaction-Diffusion models.
- **Aim:** provide additional resources for physics courses.

**Ecole Polytechnique Fédérale de Lausanne**  
*Teaching Assistant - Analyse avancée I*

Sept. 2019 - Jan. 2020  
Lausanne (Switzerland)

- Help first year of Physics Bachelor students solve their mathematical analysis exercises.
- Help deepen their understanding of the subject during Q&A sessions.

## PUBLICATIONS

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S. Guinchard, W. Sengupta, S. Hudson, *Application of Lagrangian techniques for calculating the on-axis rotational transform*, To be submitted on ArXiv, Dec. 2023.

G. Le Bars, S. Guinchard, P. Kaminski, et al., *Fennecs: A novel particle-in-cell code for simulating the formation of magnetized non-neutral plasmas trapped by electrodes of complex geometries*, Computer Physics Communications, Aug. 2023, Submitted

## UNPUBLISHED WORKS RELATED TO MY STUDIES

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*Effect of magnetic axis torsion and magnetic surfaces ellipticity on the rotational transform and the magnetic shear* - Jan. 2022 - Supervised by A. Baillod and J. Loizu

*Dependence of quasi-helical symmetry and quasi-axisymmetry on magnetic axis torsion and magnetic surfaces ellipticity* - June 2022 - Supervised by A. Baillod and J. Loizu

*Numerical study of the effect of secondary electron emission on the dynamics of electron clouds in gyrotron guns* - Jan. 2023 - Supervised by G. Le Bars and J. Loizu

*Stellarator design and optimization: A novel approach based on variational principles* - Aug. 2023 - Master's thesis - Supervised by S. Hudson, J. Loizu and J.P. Hogge - GPA 6.0/6.0

## CONFERENCES

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S. Guinchard, W. Sengupta, S. R. Hudson, *Application of Lagrangian techniques for calculating the on-axis rotational transform*, To be presented at the 50th EPS conference on Plasma Physics, Jul. 2024.

S. Guinchard, W. Sengupta, S. R. Hudson, *Application of Floquet theory to on-axis rotational transform computation*, SPECTaculars meetings, online invited talk, Nov. 08, 2023.

S. Guinchard, S. R. Hudson, W. Sengupta, E. J. Paul, *Lagrangian techniques and on axis rotational transform - Vacuum field energy for coil design*, Seminar given at Columbia University, Aug. 01, 2023.

A. Baillod, S. Guinchard, J. Loizu, J. P. Graves, *Equilibrium  $\beta$ -limit in a quasi-axisymmetric stellarator with self-consistent bootstrap current*, Simons Collaboration on Hidden Symmetries and Fusion Energy Meeting, Princeton (NJ), USA, 2023.

S. Hudson, S. Guinchard, E. Paul, W. Sengupta, C. Aderson, *Minimizing the magnetic energy with prescribed on-axis rotational transform*, SPECtaculars meetings, online talk, May 24, 2023.

G. Le Bars, S. Guinchard, J.-P. Hogge, et al., *FENNECS: A flexible code to simulate non-neutral plasmas trapped in penning-like annular potential wells*, in 49th EPS Conference on Plasma Physics, EPS 2023, Publisher: European Physical Society (EPS), Bordeaux, France, 2023.

## SKILLS

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<b>Analytics and synthesis skills</b>	Strong abilities to analyse and synthetise results (as a former EPFL student).
<b>Physical fields</b>	Plasma physics, quantum physics, astrophysics.
<b>Mathematical fields</b>	Real & complex analysis, optimal transport, topology, group theory.
<b>Typesetting Document</b>	LaTeX, Beamer LaTeX, Office.
<b>Programming</b>	C++, FORTRAN, Python, Bash, Matlab and Mathematica.
<b>Plasma physics related codes</b>	SPEC, Simsopt, BoozXforms.
<b>Tools</b>	MPI, OpenMP, SLURM, Git.

## EXTRACURRICULAR ACTIVITIES

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**Ecole de Musique de Lausanne - EML** 2019 - 2023  
*Pianist student* Lausanne (Switzerland)

- I attended the Music School of Lausanne as a pianist (second cycle), in the class of Galina Lagresle.
- In 2020, I passed the first-cycle exam with distinction (Très bien) and am currently preparing the second-cycle exam.

**SSA EPFL** Jan. - July 2021  
*Team member* Lausanne (Switzerland)

- Part of the conception of a portative camera tracking satellites and polluting spatial debris

**AI4 Mars - JPL (NASA)** March - May 2020  
*Photo/data analyst*

- Photo/data analysis from the rover Curiosity for Hiro Ono - NASA Jet Propulsion Laboratory, in order to apply machine learning to the rover Perseverance

**Aix-Savoie Triathlon** 2015 - 2017  
*Member of the local triathlon club* Aix les Bains (France)

- Participated in competitions

## OTHER INTERESTS

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<b>Music</b>	Classical and Jazz music enthusiast.
<b>Endurance sports</b>	Cycling, Triathlon, Swimming, Ski-Touring and Trail.
<b>Promote environmental awareness</b>	
<b>Reading</b>	Jack London and Boris Vian's works particularly speak to me.
<b>Physics and Mathematics</b>	Nuclear fusion, Quantum physics, Astrophysics, High critical-temperature superconductors, Fractals Optimal transport.

## OTHER PROFESSIONAL EXPERIENCES

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<b>Chantier Marée Haute</b> <i>Stratifier for a shipyard</i>	Oct. 2023 <i>Concarneau (France)</i>
· Sanding and stratification of the hull of fishing trawlers for a shipyard.	
<b>Atelier Alter-Ego</b> <i>Market research for a real estate development company</i>	July 2018 - August 2018 <i>Aix-les-Bains (France)</i>
· Real estate market research in Aix les Bains and Chambéry areas.	
<b>Atelier Alter-Ego</b> <i>Painter</i>	July 2017 <i>Aix-les-Bains (France)</i>
· Painting of the outsides and facades of a renovated 19th century mansion.	
<b>ABM TP</b> <i>Demolition worker</i>	July 2016 <i>Aix-les-Bains (France)</i>
· Dismantling of all interiors of a 19th century mansion.	
<b>Charpente Contemporaine</b> <i>Carpentry worker</i>	June 2015 <i>Grenoble (France)</i>
· 2 weeks summer internship in a carpentry company.	
· Building wooden houses frames and working on construction sites.	
<b>Restaurant Atmosphère</b> <i>Commis chef</i>	January 2014 <i>Le Bourget du Lac (France)</i>
· 2 weeks internship as a commis chef in a 1 Michelin star restaurant.	