

Sacha Ben-Arous

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Education

Ongoing	Master 2 MATH , Paris Dauphine University.
July 2025	Master 1 Hadamard , Paris-Saclay University, ENS Paris-Saclay.
July 2024	Undergraduate degree in Mathematics , Paris-Saclay University, ENS Paris-Saclay.
July 2023	Undergraduate degree in Computer Science , Paris-Saclay University, ENS Paris-Saclay.
July 2022	École Normale Supérieure Paris-Saclay , admission to the competitive national entrance exam.

Internships

- 04/25 - 08/25 **Self-similar singularity formation in fluids**, supervised by Tristan Buckmaster, Courant Institute.
• Computer assisted proof in the context of self-similar singularity formation in fluids.
- 04/24 - 06/24 **Paradifferential K.A.M theory**, supervised by Thomas Alazard, ENS Paris-Saclay.
• Simplified approach of K.A.M-like theorems using the theory of paradifferential operators.
- 06/23 - 07/23 **The MP-LWE problem**, supervised by Alice Pellet-Mary, University of Bordeaux.
• Study of the Learning With Errors (LWE) problem and reduction of some of its polynomial variants.

Summer schools

- August 2025 **NSF-FRG Summer School**, Princeton University, sponsored by Alexandru Ionescu.
• Singularities in incompressible flows: computer assisted proofs and physics-informed neural networks.

Awards

Mathematics Olympiads, Martinique (1st): Ranked 1st among high school students in the department of Martinique, France.

Projects

Go language compiler

- Developed a compiler of a simplified version of the Go language to ASMx86-64.
- Tools Used: OCaml, ASMx86-64, Menhir, Yacc.

Automatic proofs of first order predicates

- Implemented the method of semantic tableaux to constructively prove or refute a first order predicate.
- Tools Used: OCaml, Menhir, Yacc.

Minimal computer

- Emulated, in a custom framework, a simple computer with a cpu and ram, only using logic gates.
- Tools Used: Assembly x86-64.

Custom shell

- Wrote my own shell for Unix OS.
- Tools Used: Bash, C, Menhir, Yacc.

Syntactic analyzer

- Wrote a syntactic analyzer for a toy language that checks whether a program is syntactically correct, then pretty-prints it and performs random specification tests.
- Tools Used: C, Flex.

Technologies

Languages: Python, TeX, Sagemath, OCaml, C, Bash, Assembly x86-64.