

Damien Rouhling

Professeur agrégé in mathematics –
Post-doctoral fellow

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Career history

- 2019 – Present **Post-doctoral fellow**, *Inria Nancy - Grand Est*.
In the CAMUS team.
- 2016 – 2019 **PhD candidate with teaching duty**, *Université Côte d'Azur, Inria Sophia Antipolis - Méditerranée*.
Supervised by Yves Bertot and Cyril Cohen in the MARELLE team.
- 2015 – Present **Professeur agrégé in mathematics**.
Civil servant teacher, temporarily released from my teaching duty since September 1st, 2019.
- 2012 – 2016 **Civil servant student**, *ENS de Lyon*.

Education, diplomas, competitive exams

- 2020 **Qualification aux fonctions de maître de conférences**.
Mandatory qualification to apply for lecturer positions.
- 2016 – 2019 **PhD in computer science**, *Université Côte d'Azur, Inria Sophia Antipolis - Méditerranée*.
Supervised by Yves Bertot and Cyril Cohen, defended on September 30, 2019.
Formalisation Tools for Classical Analysis – A Case Study in Control Theory.
- 2017 **French speaking version of the “My PhD in 180 seconds” competition**.
Local final of French Riviera: <https://www.youtube.com/watch?v=BxCrwOuIIIEI>.
- 2015 – 2016 **Master 2 recherche informatique fondamentale**, *ENS de Lyon*, with highest honours.
Master's degree in theoretical computer science.
- 2015 **Diplôme de l'ENS**, *ENS de Lyon*.
Diploma apart from the standard Bachelor-Master-Doctorate system, awarded by the ENS to students whose education comprises interdisciplinarity, assumption of responsibility and international mobility.
- 2015 **Agrégation de mathématiques**, ranked 98th.
Civil service competitive exam in mathematics.
- 2014 – 2015 **Master 2 pro enseignement spécialité mathématiques**, *ENS de Lyon*.
Master's degree in mathematics; it was mainly a training year for the agrégation.
- 2013 – 2014 **M1 informatique fondamentale**, *ENS de Lyon*.
First year of master in theoretical computer science.
- 2012 – 2013 **Licence informatique fondamentale**, *ENS de Lyon*, with high honours.
Bachelor's degree in theoretical computer science.
- 2012 **Competitive entrance exams for several schools**.
Admitted, among others, in the ENS de Lyon.
- 2010 – 2012 **Classes préparatoires aux grandes écoles**, *Lycée Henri Poincaré, Nancy*.
Two years of training to the entrance exams of some schools, among which the ENS, with majors in mathematics and physics (MPSI-MP*).

- 2010 **Baccalauréat S option mathématiques**, *Lycée Henri Poincaré*, Nancy, with highest honours.
Diploma at the end of high school, scientific stream with speciality in mathematics.

Teaching

- 2018 – 2019 **Teaching assistant**, *IUT R&T*, Sophia Antipolis.
C programming language, Fourier analysis, approximation of functions and asymptotic developments.
Supervisor of the Fourier analysis teaching unit.
- 2017 – 2018 **Teaching assistant**, *IUT R&T*, Sophia Antipolis.
C programming language and Fourier analysis. Supervisor of the Fourier analysis teaching unit.
- 2016 – 2017 **Teaching assistant**, *IUT R&T*, Sophia Antipolis.
C programming language, integral, differential calculus and Fourier analysis.
- 2012 – 2013 **Tutor for ninth grade pupils**, *Collège Joliot-Curie*, Bron.
For the association Trait d'Union of the ENS de Lyon.
Refresher courses in methodology with a view to the brevet des collèges (equivalent to the GCSEs) and to the entrance to high school.

Research

Talks

- September 2018 **Seminar of the Inria project-team Gallium**, Paris.
Asymptotic Reasoning in Coq.
- June 2018 **Journées FastRelax**, Sophia Antipolis.
Formal Proofs for Control Theory and Robotics: A Case Study.
- January 2018 **International conference CPP**, Los Angeles.
A Stability Proof for the Inverted Pendulum.
- September 2017 **International conference ITP**, Brasilia.
A formal proof in Coq of LaSalle's invariance principle.
- May 2017 **Journées FastRelax**, Paris.
A formal proof in Coq of LaSalle's invariance principle.
- March 2017 **Seminar "Computations and Proofs" of the Inria project-team SpecFun**, Palaiseau.
Refinement: a reflection on proofs and computations.
- January 2017 **National conference JFLA**, Gourette.
Refining the `ring` tactic.
- November 2014 **Journées LAC**, Chambéry.
Constraint systems for proof-search modulo a theory.
- November 2013 **PSATTT international workshop**, Palaiseau.
Delayed instantiation of existential variables in presence of a theory.

Internships

- January 2016 – June 2016 **Research internship**, *Inria*, Sophia Antipolis.
Under the supervision of Cyril Cohen.
Automatic refinements in Coq.
- June 2014 – August 2014 **Research internship**, *Chalmers University of Technology*, Gothenburg, Sweden.
Under the supervision of Thierry Coquand.
Dependently typed lambda calculus with a lifting operator.
- June 2013 – July 2013 **Research internship**, *Laboratoire d'Informatique de l'École polytechnique (LIX laboratory)*, Palaiseau.
Under the supervision of Stéphane Graham-Lengrand and Assia Mahboubi.
Congruence closure and proof-search modulo a theory.

Computer skills

Programming	OCaml, C, C++, Python, Haskell, mainly.
Web	HTML, CSS, Javascript (notions).
Operating systems	Linux (diverse distributions), Microsoft Windows, Mac OS.
Certifications	B2I, C2I2E (French certifications about basic computer skills).
Miscellaneous	L ^A T _E X, Pack Office (notions), Inkscape (notions), Git.

Languages

French	Mother tongue.	
English	Professional use.	<i>Certified at level B2 (CLES2).</i>
German	School level.	<i>Certified at level B1 (Deutsches Sprachdiplom der Kulturministerkonferenz).</i>
Esperanto	Notions.	

Miscellaneous

Involvement in associations	Vice-President of the chess club of Antibes from February 2018 to September 2019, Qualified teacher for the French chess federation, Federal arbiter at the club level.
Driving license	Permis B (license for cars).
First aid	Attestation de formation aux premiers secours (first aid certificate).
Interests	Reading, music, strategy games.

Publications

- [1] Damien Rouhling. *Formalisation Tools for Classical Analysis - A Case Study in Control Theory*. PhD thesis, University of Côte d’Azur, Nice, France, 2019.
- [2] Reynald Affeldt, Cyril Cohen, and Damien Rouhling. Formalization Techniques for Asymptotic Reasoning in Classical Analysis. *Journal of Formalized Reasoning*, October 2018.
- [3] Damien Rouhling. A Formal Proof in Coq of a Control Function for the Inverted Pendulum. In June Andronick and Amy P. Felty, editors, *Proceedings of the 7th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2018, Los Angeles, CA, USA, January 8-9, 2018*, pages 28–41. ACM, 2018.
- [4] Cyril Cohen and Damien Rouhling. A Formal Proof in Coq of LaSalle’s Invariance Principle. In Mauricio Ayala-Rincón and César A. Muñoz, editors, *Interactive Theorem Proving - 8th International Conference, ITP 2017, Brasília, Brazil, September 26-29, 2017, Proceedings*, volume 10499 of *Lecture Notes in Computer Science*, pages 148–163. Springer, 2017.
- [5] Cyril Cohen and Damien Rouhling. A refinement-based approach to large scale reflection for algebra. In *JFLA 2017 - Vingt-huitième Journées Francophones des Langages Applicatifs*, Gourette, France, January 2017.
- [6] Damien Rouhling, Mahfuza Farooque, Stéphane Graham-Lengrand, Assia Mahboubi, and Jean-Marc Notin. Axiomatic Constraint Systems for Proof Search Modulo Theories. In Carsten Lutz and Silvio Ranise, editors, *Frontiers of Combining Systems - 10th International Symposium, FroCoS 2015, Wroclaw, Poland, September 21-24, 2015. Proceedings*, volume 9322 of *Lecture Notes in Computer Science*, pages 220–236. Springer, 2015.