

# KENJI MAILLARD

POST-DOCTORAL RESEARCHER AT INRIA RENNES-BRETAGNE ATLANTIQUE, 30 YEARS OLD

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*email: kenji@maillard.blue*

I am doing research in theoretical computer science, more specifically on dependently typed proof assistants, program verification and formalization of mathematics. My main interest is the interaction of computational effects with dependent type theories.

## 1 Education

**Ph.D.** in Computer Science from [ENS Paris](#) and PSL Research University, France (Jan 2017 to Nov 2019)

**CAP** (Certificate of professional skill, ~ NVQ) in Cuisine from [Ferrandi](#) (Jun 2015)

**M.Sc.** in Computer Science from [ENS Paris](#), France (Sep 2014)

**Licence** in Computer Science from [ENS Paris](#), France (Sep 2012)

## 2 Positions

**Post-doctoral Researcher** (from Dec 2019)

- ▷ under the supervision of [Nicolas Tabareau](#) and [Éric Tanter](#)
- ▷ at [Inria Rennes-Bretagne Atlantique, team Galinette](#), Nantes, France & [University of Chile](#), Santiago, Chile

**Ph.D. student** (Jan 2017 to Nov 2019)

- ▷ under the supervision of [Cătălin Hrițcu](#)
- ▷ on [Principles of Program Verification for Arbitrary Monadic Effects](#)
- ▷ at [Inria Paris, team Prosecco](#)

**Research Intern** (Oct 2016 to Dec 2016)

- ▷ under the supervision of [Nikhil Swamy](#)
- ▷ on the [F\\*](#) language
- ▷ at [Microsoft Research Redmond \(US\)](#)

**Research Intern** (Apr 2016 to Aug 2016)

- ▷ under the supervision of [Rosen Diankov](#)
- ▷ fast collision detections for robotic movement planification
- ▷ at [Mujin inc.](#)

**Research Intern** (Mar 2013 to Aug 2013)

- ▷ under the supervision of [Masahito Hasegawa](#)
- ▷ on Hopf algebras in category of games
- ▷ at [Kyoto University RIMS](#)

### 3 Awards & Fellowship

Ph.D. fellowship from ENS Paris (Allocation Spéciale Normalien), Jan 2017 to Nov 2019

B.Sc & M.Sc. fellowship from ENS Paris (contrat Normalien), Sep 2011 to Aug 2016

### 4 Supervision of research activities

Students and research engineers I (co-)supervised

**Théo Laurent**

- ▷ *Dependent types and effects: towards more flexible systems*. PhD student at Inria Paris, starting from Sep 2020
- ▷ *Engineering and research work on  $F^*$* . Pre-PhD intern, Jun 2018-Dec 2019

Nicolas Margulies *Sort polymorphism in Coq*, M1 research intern, February-June 2021

**Ramkumar Ramachandra** Pre-PhD intern, Aug 2019-Dec 2019

**Antoine Van Muylder** *Relational Dijkstra Monads*. M2 Research Intern, May 2019-Dec 2019

**Jake Silverman** *Graph algorithms in  $F^*$*  Undergraduate, July-August 2017

### 5 Publications

Articles published in a conference with journal proceedings are underlined.

Gradualizing the Calculus of Inductive Constructions Meven Lennon-Bertrand, Kenji

Maillard, Nicolas Tabareau, Éric Tanter, accepted for publication at TOPLAS, to be presented at POPL 2022, <https://arxiv.org/abs/2011.10618>

**SSProve: A Foundational Framework for Modular Cryptographic Proofs in Coq**

Carmine Abate, Philipp G. Haselwarter, Exequiel Rivas, Antoine Van Muylder, Théo Winterhalter, Nikolaj Sidorenko, Catalin Hritcu, Kenji Maillard, Bas Spitters, presented at 34th IEEE Computer Security Foundations Symposium (2021), **distinguished paper**, <https://eprint.iacr.org/2021/397>

The Next 700 Relational Program Logics. Kenji Maillard, Catalin Hritcu, Exequiel Rivas,

Antoine Van Muylder. Proceedings of the ACM on Programming Languages 4(POPL): 4:1-4:33 (2020), <https://arxiv.org/abs/1907.05244>

**Principles of Program Verification for Arbitrary Monadic Effects** Kenji Maillard, Ph.D

dissertation, ENS Paris, Nov 2019, <https://hal.archives-ouvertes.fr/tel-02416788>

Dijkstra Monads for All. Kenji Maillard, Danel Ahman, Robert Atkey, Guido Martínez,

Catalin Hritcu, Exequiel Rivas, Éric Tanter. Proceedings of the ACM on Programming Languages 3(ICFP): 104:1-104:29 (2019), <https://arxiv.org/abs/1903.01237>

**A preview of a tutorial on L (polarized  $\mu\tilde{\mu}$ ),** Kenji Maillard, Étienne Miquey, Xavier Montillet, Guillaume Munch-Maccagnoni, Gabriel Scherer. Extended abstract presented at HOPE 2018

**Recalling a witness: foundations and applications of monotonic state.** Danel Ahman, Cédric Fournet, Catalin Hritcu, Kenji Maillard, Aseem Rastogi, Nikhil Swamy. Proceedings of the ACM on Programming Languages 2(POPL): 65:1-65:30 (2018), <https://arxiv.org/abs/1707.02466>

**A monadic framework for relational verification: applied to information security, program equivalence, and optimizations.** Niklas Grimm, Kenji Maillard, Cédric Fournet, Catalin Hritcu, Matteo Maffei, Jonathan Protzenko, Tahina Ramananandro, Aseem Rastogi, Nikhil Swamy, Santiago Zanella Béguelin. CPP 2018: 130-145, <https://arxiv.org/abs/1703.00055>

**Dijkstra monads for free.** Danel Ahman, Catalin Hritcu, Kenji Maillard, Guido Martínez, Gordon D. Plotkin, Jonathan Protzenko, Aseem Rastogi, Nikhil Swamy. POPL 2017: 515-529, <https://arxiv.org/abs/1608.06499>

**A Fibrational Account of Local States** Kenji Maillard, Paul-André Mellies. (2015, July). In Logic in Computer Science (LICS), 2015 30th Annual ACM/IEEE Symposium on (pp. 402-413). IEEE., <https://hal.archives-ouvertes.fr/hal-03066087/>

## 6 Drafts and submitted articles

**The Multiverse: Logical Modularity for Proof Assistants** Kenji Maillard, Nicolas Margulies, Matthieu Sozeau, Nicolas Tabareau, Éric Tanter, under preparation, <https://arxiv.org/abs/2108.10259>

**Mettons de l'ordre dans CIC !** Théo Laurent, Kenji Maillard, [short direction paper \(in French\)](#), presented at JFLA'21

## 7 Presentations

**Mettons de l'ordre dans CIC!** at online WG meeting LHC (Feb 2021)

**Principles of Program Verification for Arbitrary Monadic Effects** thesis defense at Inria Paris (Nov 2019)

**Relative monads for relational reasoning**

- ▷ at LIPN, Paris (Oct 2019)
- ▷ at WG meeting LHC in Lyon (Oct 2019)

**Dijkstra Monads for All**

- ▷ at Logsem, Aarhus University (Aug 2019)
- ▷ at IFCP, Berlin (Aug 2019)
- ▷ at Types in Oslo (Jun 2019)

**Designing Dijkstra Monads**

- ▷ at IMDEA, (Apr 2019)
- ▷ **invited talk** at WG meeting EuTypes in Krakow (Feb 2019)
- ▷ at Prosecco seminar, Inria Paris, France (Dec 2018)
- ▷ at WG meeting Scalp in Paris (Nov 2018)

**An introduction to polarised L calculi** at Gallium seminar, Inria Paris (Oct 2018)

**F\*, from practice to theory**

- ▷ at WG meeting EuTypes in Nijmegen (Jan 2018)
- ▷ at meeting ChoCoLa in Lyon (Dec 2017)

**F\* : Dijkstra-monads at work** semantic WG at IRIF, Paris (Dec 2017)

**Towards a “standard” metatheory for F\*** at WG meeting GeoCal-Lac in Nantes (Nov 2017)

**An equational presentation of the local state monad** at Gallium seminar, Inria Rocquencourt, France (Sep 15)

**A fibrational account of the local state monad** at LICS, Kyoto, Japan (Jul 2015)

## 8 Community service

Program Committee member CoqPL '21

Artifact Evaluation Committee (AEC) member POPL AEC'19, PLDI AEC'19

External Reviews for conferences POPL ('19,'21), ICALP ('20), JFLA ('20), FoSSaCs ('21)

Sub-reviews POPL ('18), ESOP ('18)

## 9 Teaching duties

**Auxiliar (Teaching Assistant) at University of Chile, Santiago, Chile**

- ▷ **Programming Languages (CC4101)** (March-July 2020). 16 hours of teaching/exercices sessions (online), preparation of exercices, homework assignment, examinations. No corrections duties. 60 students, equivalent L3
- ▷ **Compiler Design and Implementation (CC5116)** (August-December 2020) Setting up the course (new lecture), Preparation of homework assignment, teaching/assisting students on assignment (24 hours of lecture) 20 students, equivalent M1

**Teaching Assistant at classe préparatoire Louis Le Grand, Paris, France**

- ▷ Initiation to programming with Maple (September-December 2011) 40 hours of teaching/exercise session (4h × 10). Classes of 15 students, first year of university. Preparation of exercise sheets and corrections.

**Summer Schools Assistant for Exercise sessions**

- ▷ **Models and Tools for Cryptographic Proofs** in Nancy, France, Jul 2017 (~3h)
- ▷ **EuTypes school** in Ohrid, Macedonia, Aug 2018 (~2h)
- ▷ **Coq Andes Summer School**, Santiago, Chile, Jan 2020 (~5h)

## 10 References

**Cătălin Hrițcu** Tenured faculty member and head of the Formally Verified Security group at the Max Planck Institute for Security and Privacy (MPI-SP) in Bochum, Germany

▷ [catalin.hritcu@gmail.com](mailto:catalin.hritcu@gmail.com)

**Shin-Ya Katsumata** Project Associate Professor at National Institute of Informatics

▷ [s.katsumata@gmail.com](mailto:s.katsumata@gmail.com)

**Gilles Barthe** Scientific Director at Max Planck Institute for Security and Privacy, Bochum, Germany

▷ [gjbarthe@gmail.com](mailto:gjbarthe@gmail.com)

**Nicolas Tabareau** Senior Researcher at Inria Rennes, head of the Galinette team

▷ [nicolas.tabareau@inria.fr](mailto:nicolas.tabareau@inria.fr)