

Simon Forest

Postdoctoral researcher

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Current position

- 2021- **Postdoctoral contract**, Aix-Marseille Université, Team *Logique de la Programmation* at *Institut de Mathématiques de Marseille (I2M)*, Supervisor: Lionel Vaux Auclair.
Financed by the ANR project *Probabilistic Programming Semantics*

Education

- 2017-2021 **PhD in Computer Science**, *École Polytechnique*, Subject: Higher categories, Supervisors: Samuel Mimram, Yves Guiraud.
Keywords: higher categories, strict categories, Gray categories, rewriting, presentations, coherence, decidability.
- 2016-2017 **Pre-thesis year**, *ENS Ulm*.
Elaboration of a thesis subject, reading of related articles and courses, redaction of an article.
- 2015-2016 **Master degree in mathematical logic (LMFI)**, *Université Paris 7*, with honours.
Courses: Model theory, Proof theory, Set theory, Complexity theory, Forcing, Descriptive set theory, Correspondence between proofs and programs.
- 2014-2015 **Master degree in computer science (MPRI)**, *ENS Ulm*, with honours.
Courses: Concurrency, Functional programming, Models for programming languages, Combinatorics for computer science, Algorithm analysis, Graph algorithms, Automata theory, Algebraic topology.
- 2012 **Admission to ENS Ulm in Computer Science.**

Teaching

- 2020-2021 **Teaching assistant (ATER)**, *Université de Paris*.
Programming courses in C and C++, Complexity, Network.
- 2017-2020 **Teaching assistant**, *École Polytechnique*.
Introduction to programming and algorithms, Advanced functional programming, Concurrency in JAVA, Machine learning algorithms in C++.

Internships

- 2016 **Category theory (3 months)**, *École Polytechnique*, Paris region.
Generalization of the existing structures for pasting diagrams for ω -categories.
- 2015 **Verification of programs (5 months)**, *Inria*, Paris.
Proof in F^* of the partial correctness of F^* itself.
- 2014 **Quantum computing (5 months)**, *Institute for Quantum Computing*, University of Waterloo, Canada.
Study of the generating properties of certain sets of quantum gates.
- 2013 **Random epidemics (3 months)**, *Inria*, Sophia-Antipolis.
Modeling of epidemics with different random models.

Computer skills

Programming languages C, C++, JAVA, OCAML, F*, HASKELL.

Projects Compiler for a subfragment of C, Solver for the word problem on polygraphs, Implementation of pasting diagram structures for ω -categories.

Thesis

- Simon Forest. “Computational descriptions of higher categories”. Theses. Institut Polytechnique de Paris, Jan. 2021. URL: <https://tel.archives-ouvertes.fr/tel->

Conferences

- Simon Forest and Samuel Mimram. “Describing free ω -categories”. In: *34th Annual Symposium on Logic in Computer Science (LICS)*. 2019, pp. 1–13. DOI: 10.1109/LICS.2019.8785687.
- Simon Forest and Samuel Mimram. “Coherence of Gray Categories via Rewriting”. In: *3rd International Conference on Formal Structures for Computation and Deduction (FSCD 2018)*. Vol. 108. 2018. URL: <https://hal.archives-ouvertes.fr/hal-02154822>.
- Nikhil Swamy et al. “Dependent Types and Multi-Monadic Effects in F*”. In: *Proceedings of the 43rd Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages*. POPL ’16. 2016, pp. 256–270. DOI: 10.1145/2837614.2837655.

Journal articles

- Simon Forest et al. “Exact synthesis of single-qubit unitaries over Clifford-cyclotomic gate sets”. In: *Journal of Mathematical Physics* 56.8 (2015), p. 082201. ISSN: 1089-7658. arXiv: 1501.04944 [quant-ph].

Preprints

- Simon Forest and Samuel Mimram. *Rewriting in Gray categories with applications to coherence*. 2021. arXiv: 2109.05369 [math.CT].
- Simon Forest. *Unifying notions of pasting diagrams*. 2019. arXiv: 1903.00282 [math.CT].