Loïc Peyrot

Postdoctoral researcher

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Nationality: French

Research interests: Type systems, programming languages and functional programming, operational semantics, formal proofs, logic.

Currently

Jan. 2023 – Feb. 2024 **Postdoctoral researcher**, *IRIF (CNRS, Université Paris Cité)*, Paris

Record polymorphism for set-theoretic types

Adding row polymorphism to the framework of semantic subtyping, in an ML-like type system augmented with union, intersection and negation types, and a notion of subtyping given by an interpretation of types as sets. The goal is to extend both the theory and the implementation in the CDuce language.

Publications

FSCD '22 Delia Kesner and Loïc Peyrot. "Solvability for Generalized Applications". In: *7th International Conference on Formal Structures for Computation and Deduction (FSCD 2022)*. Ed. by Amy P. Felty. Vol. 228. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2022, 18:1–18:22. DOI: 10.4230/LIPIcs.FSCD.2022.18

FoSSaCS '22 José Espírito Santo, Delia Kesner, and Loïc Peyrot. "A Faithful and Quantitative Notion of Distant Reduction for Generalized Applications". In: *Foundations of Software Science and Computation Structures*. Ed. by Patricia Bouyer and Lutz Schröder. Cham: Springer International Publishing, 2022, pp. 285–304

FoSSaCS '21 Delia Kesner, Loïc Peyrot, and Daniel Ventura. "The Spirit of Node Replication". In: *Foundations of Software Science and Computation Structures*. Ed. by Stefan Kiefer and Christine Tasson. Cham: Springer International Publishing, 2021, pp. 344–364

Reviewed journal papers

LMCS José Espírito Santo, Delia Kesner, and Loïc Peyrot. "A Faithful and Quantitative Notion of Distant Reduction for the λ-calculus with Generalized Applications". To be published in Logical Methods in Computer Science. 2023

LMCS Delia Kesner, Loïc Peyrot, and Daniel Ventura. "Node Replication: Theory and Practice". To be published in Logical Methods in Computer Science. 2023

Experience

2019 – 2022 **PhD**, *Université Paris Cité (prev. Paris 7), IRIF*, Paris, supervised by Delia Kesner

From Proof Terms to Programs. An operational and quantitative study of intuistionistic Curry-Howard calculi

Operational and quantitative perspectives on two computational models: node replication (internally implementing full laziness), and generalized applications (originating in proof theory). Both were considered within variants of the λ-calculus.

2017 – 2018 **Masters in computer science (MPRI)**, *Université Paris 7*, with high honours

Courses in second year: functional programming and type systems, linear logic and logical paradigms of computation, foundations of proof systems, proof assistants, proofs of programs, finite automata modelling, introduction to category theory, computational structures and logics for natural language modelling.
Courses in first year: advanced functional programming, logical and constraint programming, program interpretation, programming language semantics, computer-assisted proofs, calculabity and complexity, algorithmic, advanced automata and applications.
2nd year thesis Quantitative types for the atomic λ-calculus. Supervised by Delia Kesner.
1st year thesis Encoding algebraic effects with a free monad. Supervised by Yann Régis-Gianas.

July-August 2018 **OCaml software development**, *OCaml Pro*, Paris

Development of *Learn-OCaml-autogen*, a tool to aid the creation of exercises for the learning platform *Learn-OCaml*.
`https://github.com/ocaml-sf/learn-ocaml-autogen`

2014 – 2017 **Bachelor in computer science**, *Université Claude Bernard Lyon 1*

Third year in exchange in Munich University of Applied Sciences.
Internship Development of an internal web application to manage alerts from the ministry of home affairs' national network of transmissions.

Teaching

2021, 2020 **Principe de fonctionnement des machines binaires (L1)**, *Université Paris Cité*, 72h

Circuits, binary representations, error control codes, propositional logic. Tutorial and practical sessions.

2019, 2020 **Introduction à la programmation (L1)**, *Université Paris Cité*, 72h

Introductory programming course, in Java. Tutorial and practical sessions.

2021 **Language C (L2)**, *Université Paris Cité*, 24h

Introduction to C, syntax, pointers, memory management, data structures, debugging, macros, Makefiles. Practical sessions.

2021 **Internet et outils (L1)**, *Université Paris Cité*, 24h

HTML, CSS, PHP, MySQL. Practical sessions.

2020 **Conduite de projet (L2)**, *Université Paris Cité*

Supervision of student projects in Java, with a focus on team organization (scrum/agile methods), collaboration (via git), tests, continuous integration and documentation. Mostly remote due to covid.

Administrative duties

2020 – 2022 **Elected student representative**, *Université Paris Cité – Science faculty*, Research commission

2017 – 2020 **Elected student representative**, *Université Paris 7*, Commission formation et vie universitaire

2017 – 2020 **Elected student representative**, *Computer science department, Université Paris 7*