# Sophie Kaleba

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## Education

2019–2024 **PhD in Computer Science**, *University of Kent*, United Kingdom.
**Programming Languages and Systems (PLAS) group**
*"Context-Guided Splitting: Optimising method dispatch in dynamic languages"*, advised by Stefan Marr and Richard Jones

2017–2019 **MSc in Computer Science**, *Université de Lille*, France.
**Major: Communications and Networking**
*Relevant coursework:* Compilation - Cryptography - Distributed systems - Risk analysis - Networking - System architecture - Virtualisation and cloud computing - System and network security

2015–2017 **BSc in Computer Science**, *Université de Lille*, France.
*Relevant coursework:* Oriented-object design - Functional programming - System programming - Optimization - Programming language theory - Databases - Data structures and algorithms - System architecture

2011–2012 **MSc in Risk and Crisis Management**, *Université Paris 1 - Panthéon Sorbonne*, France.
*Relevant coursework:* Risk management - Crisis management - Crisis communication - Competititve intelligence - Security/safety

2005–2010 **Bsc and MSc in Economics**, *Université de Lille*, France.
**Major: Competitive Intelligence**
*Relevant coursework:* Competitive intelligence - Crisis simulation - Project planning and management - Negotiation - CSR - Geopolitics - International trade - International law - Statistics - Accounting

## Work experience

since April 2025 **Software engineer**, *Raincode*, Brussels.
*Raincode provides the compilers, tools and expertise to modernize legacy systems*
Worked on implementing a C# alternative to several JCL utilities (e.g. file comparison, file copy), and to COBOL services (date conversion). Migrated an IDMS-based database to SQL, with a focus on floating-point numbers accuracy. I also worked on an internal tool which provides to our customers an up-to-date version of the JCL utilities alternatives we offer.

2022 **Research assistant - PLAS group**, *University of Kent*, Canterbury.
*as part of Project CaMELot*
Worked on ways to instrument and analyse the behaviour of dynamic languages running on top of GraalVM. The main results were published in the SPLASH'23 proceedings, and the analysis was later extended to be part of research on concurrency and debugging.

Mar-Aug 2019 **Research intern - Parkas group**, *Inria*, Paris.
*Debloating dynamic applications: a case study in R*, advised by Francesco Zappa Nardelli
Worked on ways to statically debloat dynamic languages such as R. I identified several dynamic -mostly reflective- features in R that could compromise standard static analysis approaches. I then modified an existing R tracer to trace such dynamic behaviors over R packages to get a precise idea of their usage in real-world R code.

Apr-Aug 2017 **Google Summer of Code - Student developer for the Pharo Consortium**, *Inria*, Lille.
*The Pharo consortium supports the development of the Smalltalk dialect Pharo*
Worked on the Pharo runtime, advised by Clément Béra. I refactored part of the AST-to-IR translator in Opal, the source code-to-bytecode compiler. I then mainly worked on the virtual machine profiler available in Squeak. I ported it to Pharo, extended it to get profiling to the bytecode level and added a GUI to the Pharo version.

2013-2015 **Project manager**, *Pôle emploi*, Paris.
*Pôle Emploi is the French employment agency*
Worked on Business Continuity Planning. I co-supervised of the business continuity process and reported to the different decision-making bodies. I was in charge of the project planning and monitoring.

2011-2012 **Risk manager**, *Renault*, Boulogne-Billancourt.
Worked on several tasks related to risk management. I took part in the risk mapping of the Czech branch, co-led training sessions about risk management and led preliminary research on a incident management tool.

Jun-Oct 2010 **Business development intern**, *Business France*, Oslo.
*Advice for French companies willing to export in Norway*
Worked in the wine and spirits team. I conducted a market research about wine and spirits in Norway and co-organised an event where French wine producers and Norwegian importers met.

## Publications

2024 **Context-Guided Splitting: Optimising method dispatch in dynamic languages,** *Sophie Kaleba.* Doctor of Philosophy (PhD) thesis, University of Kent, Canterbury, United Kingdom.

2023 **Don't Trust Your Profiler: An Empirical Study on the Precision and Accuracy of Java Profilers,** *Humphrey Burchell, Octave Larose, Sophie Kaleba and Stefan Marr.* In Proceedings of the 20th ACM SIGPLAN International Conference on Managed Programming Languages and Runtimes (MPLR), pp. 100-113. Oct. 2023, Cascais, Portugal.

2023 **AST vs. bytecode: interpreters in the age of meta-compilation,** *Octave Larose, Sophie Kaleba, Humphrey Burchell and Stefan Marr.* In Proceedings of the ACM on Programming Languages, 7 (OOPSLA), pp. 318–346. Oct. 2023, Cascais, Portugal.

2023 **aedFaCT: Scientific Fact-Checking Made Easier via Semi-Automatic Discovery of Relevant Expert Opinions,** *Enes Altuncu, Jason R. C. Nurse, Meryem Bagriacik, Sophie Kaleba, Haiyue Yuan, Lisa Bonheme and Shujun Li.* Mediate 2023 - 4th News Media and Computational Journalism Workshop, Jun. 2023, Limassol, Cyprus.

2022 **Who You Gonna Call: Analyzing the Run-Time Call-Site Behavior of Ruby Applications,** *Sophie Kaleba, Octave Larose, Richard Jones, and Stefan Marr.* In Proceedings of the 18th ACM SIGPLAN International Symposium on Dynamic Languages (DLS). pp. 15–28, Dec. 2022, Auckland, New-Zealand.

2021 **Avoiding monomorphization bottlenecks with phase-based splitting,** *Sophie Kaleba.* Companion Proceedings of the 2021 ACM SIGPLAN International Conference on Systems, Programming, Languages, and Applications: Software for Humanity.

2021 **Capturing High-level Nondeterminism in Concurrent Programs for Practical Concurrency Model Agnostic Record and Replay,** *Dominik Aumayr, Stefan Marr, Sophie Kaleba, Elisa Gonzalez Boix and Hanspeter Mössenböck.* The Art, Science, and Engineering of Programming, 2021, Vol. 5, Issue 3, Article 14.

2018 **Garbage Collection Evaluation Infrastructure for the Cog VM,** *Sophie Kaleba, Clément Béra, Eliot Miranda*. In Proceedings of the 13th edition of the International Workshop on Smalltalk Technologies (IWST), Sep. 2018, Cagliari, Italy.

2018 **Assessing primitives performance on multi-stage execution,** *Sophie Kaleba, Clément Béra, Stéphane Ducasse.* In Proceedings of the 13th Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS), Jul. 2018, Amsterdam, Netherlands.

2017 **A detailed VM profiler for the Cog VM,** *Sophie Kaleba, Clément Béra, Alexandre Bergel, Stéphane Ducasse.* In Proceedings of the 12th edition of the International Workshop on Smalltalk Technologies (IWST), Sep. 2017, Maribor, Slovenia. 2017.

## Talks

2022 **Dynamic Language Symposium (DLS'22)**
co-located with SPLASH'22, Auckland (New Zealand)
*"Who You Gonna Call: Analyzing the Run-Time Call-Site Behavior of Ruby Applications"*

2021 **Student Research Competition and Doctoral Symposium**
co-located with SPLASH'21, hybrid
*"Avoiding Monomorphization bottlenecks with Phase-Based splitting"*

2021 **Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems Workshop (ICOOOLPS'21)**
co-located with ECOOP'21, online
*"Avoiding Monomorphization bottlenecks with Phase-Based splitting"*

2020 **Scottish Programming Languages and Verification Summer School**
*"Phase-driven dynamic optimisations"*

2018 **International Workshop on Smalltalk Technologies (IWST'18)**
co-located with ESUG'18, Cagliari (Italy)
*"Garbage Collection Evaluation Infrastructure for the Cog VM"*

2018 **Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems Workshop (ICOOOLPS'18)**
co-located with ECOOP'18, Amsterdam (Netherlands)
*"Assessing primitives performance on multi-stage execution"*

2017 **International Workshop on Smalltalk Technologies (IWST'17)**
co-located with ESUG'17, Maribor (Slovenia)
*"A detailed VM profiler for the Cog VM"*

## Academic involvement and teaching

2019–2023 Teaching assistant: Object-oriented programming, Advanced Object-Oriented programming, Computational creativity, Programming language implementation, at University of Kent, *UK*

2020 Reviewer, Artifact Evaluation Committee at OOPSLA, *online*

2019 Student volunteer at ETAPS, *Prague, Czech Republic*

2018 Student volunteer at ESUG (European Smalltalk User Group), *Cagliari, Italy*

Google Compiler and Programming Language Summit participant, *Munich, Germany*, funded by Google

2017 Student Volunteer at ESUG, *Maribor, Slovenia*

Google Compiler and Programming Language Summit participant, *Munich, Germany*, funded by Google

## Summer schools and trainings

October 2022 **Summer school "Programming Language Implementation Summer School",** about language implementation techniques and programming language research, *Bertinoro (Italy)*.

May 2021 **Summer school "Programming Language Implementation Summer School",** about language implementation techniques and programming language research, *online*.

Aug 2020 **Summer school "Scottish Programming Languages and Verification Summer School",** about compiler Intermediate Representations, *online*.

Sept 2019 **Summer school "Development, Deployment, and Runtime of Context- Aware Software Systems"**, *Dagstuhl and Dresden (Germany)*.

## Scholarships and awards

2019–2023 **Vice Chancellor's Research Scholarship**.

*PhD funded by the School of Computing, University of Kent*

2017 **Best Paper Award,** *IWST'17, Maribor (Slovenia)*.

3rd price for *"A detailed VM profiler for the Cog VM"*

## Languages

French Native speaker

English Proficient (CEFR C1) - IELTS band 8.0 in 2019