Fabien **Siron**

R&D Software Engineer specialized in real-time and embedded systems

About me

Highly motivated Software Engineer and fresh PhD graduate with 6 years of experience in **software development**, **algorithms**, and **software architecture**. Proficient in **C++**, **C**, and **OCaml** (but not only), with strong problem-solving skills thanks to my PhD and a track record of delivering robust and innovative software solutions. Seeking to leverage expertise in the design of **real-time embedded** systems and **formal methods** to contribute to innovative projects.

Education

2023 **PhD diploma, Computer Science**
Centre Inria de l'Université Côte d'Azur · Sophia-Antipolis 🏛
Subject: *Methodology for the formal verification of temporal properties for real-time safety-critical applications based on logical time*

2023 **"Machine Learning" and "Deep Learning" specialization**
DeepLearning.AI · Coursera 🏛

2019 **Engineering diploma, Computer Science**
EPITA · Le Kremlin-Bicêtre 🏛

2016 **Semester abroad, Computer Science**
Staffordshire University · England 🏛

2014 **High-school diploma, Science**
Lycée Ledoux · Besançon 🏛

Skills

· Software development
· Software architecture · Algorithms
· Real-Time Systems · Embedded Systems
· Synchronous Languages · Formal Methods

Programming

OCaml
C
C++
Python
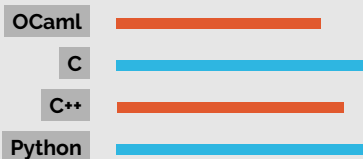
Languages

Francais (Native)
Anglais (TOEIC: 900)

Hobbies

· French Robotics cup (since 2015)
· Music (practicing guitar & piano) · Travels

Work Experience

Since 2019 (> 5 years)	**Asterios Technologies, Safran group (formerly KRONO-SAFE)** R&D Software Engineer · Orsay, then Massy, France 📍 R&D Software Engineer in *Checker*, then *Core* team:

- Currently involved in the development of Asterios Technologies' main product, consisting of a **compiler** for the PsyC language (written in C++) and a **real-time operating system** (written in C) by implementing various functionalities such as the fault and error management service.
- Designed a formal verification methodology (as part of my PhD in partnership with Inria) as well as a prototype **formal verification tool** (written in OCaml) for the PsyC language based on state-of-the-art **symbolic model-checking** along with an optimization procedure to speed-up verification time by up to 95% compared to a naive approach.
- Involved in the development of a tool (written in Python) that performs the **validation of compilations** performed by the Asterios compiler by implementing the tool's frontend (parser and graph analysis), in a context of avionics certification (**DO-330**).
- Contributed to a technical audit by analyzing Asterios features such as inter-process communications using **HAZOP risk and failure analysis** methodology.
- (Co-)Supervised 3 trainees over the years on topics such as **Lingua Franca to PsyC translation** and **random PsyC code generation**, which led to the discovery of 9 bugs in the Asterios toolchain.
- Designed and developed a methodology of **incremental code generation** based on **model driven design** approaches during my initial 6-month internship.

Since 2022 (> 2 years)	**Ecole pour l'Informatique et les Techniques Avancées (EPITA)** Adjunct lecturer · Le Kremlin-Bicêtre 📍 Taught (and created) a lecture on **software testing and validation** for EPITA's embedded and real-time specialization, involving around 40 M1/M2 students for a total of around 20h/year.
2017 (4 months)	**Thales Research & Technologies** Internship · Palaiseau 📍 Designed a **mixed-criticality** platform based on **virtualization**, enabling spatial and temporal isolation between vision and telecom applications.
2016 (2 months)	**Ecole pour l'Informatique et les Techniques Avancées (EPITA)** Internship · Le Kremlin-Bicêtre 📍 Contributed to the initial development of the *Netlink* subsystem in the *Linux system tracer* - *strace* - via the Google Summer of Code program.

Projects

2023 **PsykAnalyst**
CIFRE PhD project · C++, OCaml, Lustre
Formal verification tool for the PsyC language, using Kind2, nuXmv and Prover PSL backend solvers.

2019 **Pegase**
Engineering end-of-study project · C++, Python, OpenCL
GPU-accelerated circuit simulator, with over 30% speed-up on simple but parallelizable benchmarks.

2016 **strace**
Google Summer of Code · C
Initial development of the Netlink subsystem in strace, over 15 commits merged in the mainline.

Publications

2024 *Separation of functional and time interference concerns [...]*, D. Chabrol et al., in : ERTS 2024.

2023 *[...] formal verification [..] for real-time safety-critical applications based on logical time*, F. Siron, PhD.

2023 *Semantics [...] of PsyC based on synchronous Logical Execution Time*, F. Siron et al., in : TCRS 2023.

2022 *The synchronous Logical Execution Time paradigm*, F. Siron et al., in : ERTS 2022.

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