Rémi Parrot

Teaching Assistant

Education

2019–2022 **PhD**, *Centrale Nantes (ECN)*, Nantes, *Timed Petri Nets for the synthesis of pipelined circuits*

2015–2019 **Graduate Engineering School**, *Centrale Nantes (ECN)*, Nantes, *Computer Science and Research*

2013–2015 **Preparatory Classes**, *Lycée Bellevue*, Toulouse, *Physics and Engineering*
Intensive preparation for French Engineering School

2013 **High School Diploma**, *Lycée La Borde Basse*, Castres, *Major in Science*

Experience

Sep. 2023–Aug. 2024 **Teaching Assistant**, *École Centrale de Nantes*, Automatic/Robotics, Nantes–France
Teaching in training for Embedded System engineers.

Nov. 2022–Aug. 2023 **Post-doc**, *Uppsala Universitet*, CSD (Computer Science Division), Uppsala–Sweden
Research on stateful fuzzing for communication protocol.

Sep. 2019–Nov. 2022 **PhD Thesis**, *LS2N*, STR (Système Temps Réel), Nantes–France
- Research on the construction of a pipeline with time and resource constraints, using an approach based on timed Petri Nets ;
- Implementation of a compilation tool from Simulink to VHDL ;
- Creation of a VHDL course for master M1 (master CORO at ECN) ;
- Teaching and supervision of students projects at ECN (master and engineering students).

Apr.–Aug. 2019 **3rd year Internship**, *LS2N*, STR (Système Temps Réel), Nantes–France
Research on the control of formal models with time and cost.

Nov. 2017–Apr. 2018 **Gap year Internship**, *Valwin*, IT service, Nantes–France
Improvement of web site production tools for pharmacies.

Sep.–Oct. 2017 **Gap year formation**, *LS2N*, STR (Système Temps Réel), Nantes–France
Porting of Trampoline RTOS on microcontroller SAM3X8E based on processor ARM Cortex-M3.

Apr.–Aug. 2017 **2nd year Internship**, *Universidad Complutense*, GASS (Grupo de Análisis, Seguridad y Sistemas), Madrid–Spain
Research work of forensic analysis.

Jul.–Aug. 2016 **1st year Internship**, *CCL*, IT service, Castres–France
Web and Software development for a commercial company.

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Research projects

Post-doc — Uppsala Universitet

title Stateful fuzzing of communication protocols

PI Kostis Sagonas and Bengt Jonsson

description **Fuzzing** is a testing technique which consists in providing **random** inputs to the system under test until a bug occurs. Communication protocols have the specificity to (generally) implement **state machines**. Such state machines can be learned using **model learning** techniques. Finally, one can guide the fuzzing in order to explore all the states, and thus as many behaviour of the system as possible.

PhD Thesis — École Centrale de Nantes, LS2N

title Timed Petri Nets for the synthesis of pipelined circuits

supervisors Olivier H. Roux, Mikaël Briday and Malek Ghanes

description This thesis was part of a collaboration with the automotive company **Renault**, with the objective of synthesizing resource and time constraint circuits on **FPGA**. We worked on the **synthesis** of **optimal pipeline** and on its usage for **time-multiplexing**, i.e., the merging of identical circuit portions by sequencing their access. To solve this problem, we reduce it to an **optimal reachability problem** in a new **Timed Petri net** model that we introduced, with *delayable* transitions that can miss their firing date and a specific action called *reset* that resets the clocks of all transitions. We studied the expressivity of this model and proposed a symbolic exploration algorithm.

Languages

French Native language

English Fluent *(level C1)*

Spanish Fluent *(level C1)*

Computing Tools

Languages C, C++, Python, VHDL

Model Checking Roméo, Uppaal

Versioning Git

Compilation GCC, GDB, Xilinx Vivado

Compiler Flex, Bison, Galgas

Formatting LaTeX

Hobbies

Climbing, handwork, juggling, art

Publications

[1] Rémi Parrot, Hanifa Boucheneb, Mikaël Briday, and Olivier H. Roux. Expressiveness and analysis of Delayable Timed Petri Net. In *16th International Workshop on Discrete Event Systems (WODES'22)*, Prague, Czechia, September 2022. IFAC.

[2] Rémi Parrot, Mikaël Briday, and Olivier H. Roux. Pipeline Optimization using a Cost Extension of Timed Petri Nets. In *The 28th IEEE International Symposium on Computer Arithmetic (ARITH 2021)*. IEEE, June 2021.

[3] Rémi Parrot, Mikaël Briday, and Olivier H Roux. Réseaux de Petri temporisés pour la conception et vérification de circuits pipelinés. In *Modélisation des Systèmes Réactifs (MSR'21)*, Paris, France, November 2021.

[4] Rémi Parrot, Mikaël Briday, and Olivier H. Roux. Timed Petri Nets with Reset for Pipelined Synchronous Circuit Design. In *The 42th International Conference on Application and Theory of Petri Nets and Concurrency (Petri Nets 2021)*, volume 12734 of *Lecture Notes in Computer Science*. Springer, June 2021.

[5] Rémi Parrot, Mikaël Briday, and Olivier H. Roux. Design and verification of pipelined circuits with timed petri nets. *Discrete Event Dynamic Systems*, 33(1) :1–24, dec 2022.

[6] Rémi Parrot and Didier Lime. Backward symbolic optimal reachability in weighted timed automata. In Nathalie Bertrand and Nils Jansen, editors, *18th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2020)*, Lecture Notes in Computer Science, pages 41–57, Vienna, Austria, September 2020. Springer.