Yohan Chatelain

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Summary

Researcher with 10 publications in international conferences and journals, I wish to devote myself full-time to software engineering. I have acquired experience in software engineering for nearly 7 years through the 5 open-source projects I contributed to or led in C, C++, and Python; and background knowledge in scientific computations and HPC. I loved teaching algorithms and architecture for 3 years to bachelor to master-level students. I am continuously learning new technologies and processes to make better code.
What I'm learning now: Rust, Zig, C#, Unity.
A detailed version of the Resume is available at https://yohanchatelain.github.io/fullCV.html

Experience

Concordia University | Canada, Quebec, Montreal
Postdoctoral Fellowship | 09/2020 - Present
Goal: Studying numerical instabilities in neuroimaging pipelines

- **Pytracer author**, a trace-based Python tool for visualizing numerical instabilities of Python codes (open-source project / paper)
  - Automatically instruments function with duck-typing and fully written in Python and visualizer in Plotly
  - Supervised an undergraduate internship for optimizing the backend part
- **Fuzzy maintainer**, an ecosystem for evaluating the effect of numerical errors on computational tools (open-source project / paper)
  - Provides Python interpreter & scientific stack (libm, BLAS/LAPACK, NumPy, SciPy, Scikit-learn) using stochastic arithmetic
  - Standalone ready-to-use Docker containers
  - Bug fixer, code reviewer, designer, and new release maker.
- **Significantdigit author**, Python package for solid statistical analysis of Stochastic Arithmetic (open-source project / paper)

University of Versailles Saint Quentin-en-Yvelines | France, Île-de-France, Versailles
Ph.D. student | 10/2016 - 12/2019
Goal: Developing tools for debugging and optimizing floating-point computations in HPC

- **Veritracer author**, a tool for visualizing numerical instabilities over time (open-source project / paper)
  - Automatically instruments floating-point instructions for clang-supported languages (extends Verificarlo project)
  - Implement instrumentation and debug information findings in an LLVM pass (C++) and a post-processing analysis in Python
  - Supervised an undergraduate intern for the development of VeritracerGUI, a Java GUI visualizer backend.
- Development of a Python tool for automatically tuning floating-point precision over time in HPC applications (paper)
  - Demonstrate that lowering the precision is viable and achieves 28% to 67% reduction in the communication volume, lowering the energy and runtime cost for large distributed memory applications (up to 1024 cores)
- **Verificarlo maintainer** (open-source project / paper):
  - Development and optimization of C backends for floating-points manipulations with x2 speedup
  - Development of a C backend to simulate reduced floating-point formats
  - Bug fixer, code reviewer, designer, and new release maker

Intel Corporation | USA, Oregon, Hillsboro
Software Engineer Intern | 01/2019 - 07/2019
Goal: Development of optimized mathematic libraries (Numerics US team)

- Contribution to the development of elementary mathematical functions (libm)
- Code modernization (half of the library's function) for ensuring quality standards
- Setting up continuous integration for validation tests suite with internal tools

University of Versailles Saint Quentin-en-Yvelines | France, Île-de-France, Versailles
Software Developer Intern | 04/2016 - 09/2016
Goal: Internship for Master's degree validation

- **CERE contributor** (open-source project / paper)
  - Development of a new parallel capture in C for shared memory system into the CERE tool
  - Capture memory pages touched by a thread (with the ptrace) to replay them in a new environment
  - CERE's experiments have been scaled up (strong scaling)
- Construction of an energetic prediction model in the HPC context
  - Characterization of applications by a piecewise method by using the CERE tool
  - Microbenchmarking applications to collect hardware performance counters and energy consumption

Education

12/2019 | **PhD**'s degree in Computer sciences | **Université Paris-Saclay** | Versailles, Île-de-France |
09/2016 | **Master**'s degree in **High Performance Computing** | **Université Versailles-Saint-Quentin-en-Yvelines** | Versailles, Île-de-France
06/2014 | **Bachelor**'s degree in Computer sciences | **Université Paris-Sud XI** | Orsay, Île-de-France

Skills

Python, C, C++, Unix, Devops, Git, Docker, HPC, NumPy, OCaml