MATTHIEU BAUMANN

System Software Engineer

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PROFILE

Graduated in September 2017 from the ENSIMAG, I began my professional career as a research engineer at the Astronomical Observatory of Strasbourg in March 2018.

Since then, I contribute regularly to open source projects such as Astropy, Astroquery and MOCPy. In parallel, I develop a new major version of Aladin-Lite, a web-app space image survey visualiser.

I am also deeply interested in analog circuit design and micro-controllers programming. On my free time, I am building a modular analog synth.

As of today, **my main interests are focused Rust/C++ low-level system programming**.

EXPERIENCE

Research Engineer

CNRS - CDS/Observatoire de Strasbourg

📅 March 2018 – April 2021   📍 Strasbourg, France

- Development of a new major version of Aladin-Lite developed in Rust compiled to WASM with calls to WebGL2.
- Development and maintenance of MOCPy, an astronomy oriented library allowing to define complex coverage regions on the sphere. MOCPy heavily relies on the HEALPix indexing tessellation scheme.
- Contributor to the Astropy Project written in Python. Development of several Astroquery packages to access the Observatory's services.

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Software Engineer Graduate Intern

ARM

📅 March 2017 – August 2017   📍 Sophia-Antipolis, France

- Implementation of a MLP using Python/tensorflow for filtering Cortex-A ARM pre-generated tests with the goal of obtaining a list of tests maximising its Verilog code coverage.

Software Engineer Summer Intern

SAP SE

📅 June 2016 – August 2016   📍 Walldorf, Germany

- Contribution to the development of SAP HANA (in-memory column oriented database system) by investigating the use of Bloom filters during the scan of a table column.
  Bloom filters are cache-resident data-structures that do not have any false negatives. They can be first checked before doing any memory accesses that could potentially cost cache-misses.

TECHNICAL SKILLS

- Field of interests: Systems Programming in Rust/C, Advanced Algorithms, Operating Systems, Data-structures, Analog/μC Electronics, Computer Graphics, Machine Learning
- Languages: **Rust**/C/**C++**/**Python**/Typescript
- Tools: **Git**, Github, travis-CI, Vim, VsCode, Sphinx
- Libraries/Frameworks:
  - Rust: PyO3 (bindings Rust/Python), Serde (serialization), Rayon (concurrency), wasm-bindgen (JS/WASM bindings), WebGPU.
  - Python: numpy, matplotlib, scikit-learn, tensorflow, astropy
  - Typescript/JS: WebGL, VueJS, ES6

EDUCATION

Master Degree with honors

ENSIMAG - National School of Computer Science and Applied Mathematics of Grenoble

📅 2014-2017   📍 Grenoble

- Specialization: Imaging, Mathematical modelling & Simulation
- Coursework: Advanced Algorithms, Data-structures, OS, C++, Computer Architecture, Computer Graphics, Machine/Deep Learning

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Intensive Prep School specialized in Industrial Physics (PT*)

Lycée Couffignal

📅 2012-2014   📍 Strasbourg, France

PROJECTS

Aladin-Lite

Aladin-Lite is a web application allowing to see spatial image surveys. The more you zoom, the more details you see. The new version developed includes different sky projections, an equatorial grid and the ability to plot thousands of sources rendered as heatmaps. This is developed using Rust/WebGL2 compiled to WebAssembly.

MOCPy

Maintainer of MOCPy, a Python library handling the creation, manipulation and serialisation of coverage maps on the sky.

Rust game dev contributions

Contribution on my free time to the Rust game-dev community. Articles on rib, a collada parser, and Aladin-Lite

Modular synth

Building of an old-school analog synth. Realisation of modules coming from the excellent YuSynth website. Self creation of a clock-divider module using a μC (AVR 8-bits).

HOBBIES

- Musician: Guitar, synths and MAO. Lead guitarist in a rock band.
- Cycling, hiking, running