

ARTHUR BAUVILLE

Yokohama, JP | a.bauville@gmail.com
Permanent resident visa

RESEARCHER NUMERICAL METHODS

DATA SCIENTIST

[linkedin](#) | [github](#) | [portfolio](#) | [scholar](#)

SKILLS

Programming languages: Python, C, SQL, MATLAB, Shell, GLSL, JavaScript/HTML/CSS

Libraries and tools: Numpy, Scipy, PyTorch, OpenCV, OpenGL, Amazon AWS

Techniques: finite element, finite difference, smooth particle hydrodynamics, arbitrary eulerian-lagrangian schemes, computational fluid dynamics, machine learning, optimization, deep learning

EXPERIENCE

AXELSPACE – Tokyo, Japan

Image processing pipeline engineer

July 2024 – Present

Earth observation data scientist

July 2022 – June 2024

- R&D to improve geometric and radiometric accuracy of satellite images (optical flow, color-matching, radiometric calibration, error identification).
- Designed and implemented a new geometric image registration algorithm that combined prior knowledge and error filtering that reduces the 99% error from 125 m to 18 m.
- Designed a fast color-matching scheme that ensures continuity across cell boundaries. It allowed for satellite image mosaic of Japan to be computed in parallel (>1 TB data).
- Trained and fine-tuned deep learning models (PyTorch, HuggingFace) for image segmentation
- Supervised and mentored junior members and dispatch workers.

JAPAN AGENCY FOR MARINE-EARTH SCIENCES AND TECHNOLOGY – Yokohama, Japan

Researcher in the Mathematics and Advanced Technology group

Jan 2016 – Mar 2022

- Developed alone a 2D [multiphysics simulation code](#) from scratch (C, Python, OpenGL, OpenMP; >50,000 lines of code). The software employs a finite-difference solver on a staggered grid to simulate Stokes flow with non-linear elasto-visco-plastic rheology and porous flow (i.e., two-phase flow with a two-way coupling). The core functionality is written in C, simulation is set up through a python interface, and visualization is handled by either OpenGL (real time) or Python (post-processing).
- Used the software and analytical methods to investigate geological processes related to rock deformation and geodynamics ([video example](#)).
- Wrote 5 successful research funding projects between 2015 and 2022 for a total of 22.2 M¥.
- Wrote or co-wrote [16 peer-reviewed articles](#) between 2013 and 2021 with >400 cumulated citations.

UNIVERSITY OF MAINZ – Germany

Post-doctoral researcher

Dec 2014 – Dec 2015

- Developed a [library](#) to model 3D geometries based on a multi-layer 2D vector-graphics image (SVG). The library is used to design the initial configurations of numerical simulations
- Numerical simulations on super-computer, remote data analysis and visualization of >10TB data.
- Taught finite-element and machine learning classes (regression, PCA, clustering). BSc., MSc. level.

UNIVERSITY OF LAUSANNE – Switzerland

PhD candidate

Oct 2010 – Nov 2014

- Teaching assistant for the finite element and numerical method classes at the University of Lausanne and ETH Zürich
- Teaching assistant for structural geology and field mapping classes/excursions and Introduction to Geology at University of Lausanne and EPFL.
- Improved the simulation software based on Lagrangian finite element, e.g. wrote a custom interpolation for the remeshing step that leverages the unstructured grid triangular finite elements. It performed 10x faster than the built-in Matlab used previously.

EDUCATION

UNIVERSITY OF LAUSANNE – Switzerland

PhD in Earth Sciences

Nov 2014

UNIVERSITY OF GRENOBLE – France

MSc. in Earth Sciences

Jun 2010

ADDITIONAL

Languages: French, English, Japanese (conversational).

Accolade: Named “[outstanding reviewer 2021](#)” by Geophysical Journal International.

WAI DATATHON 2021 - leader of the first prize winning team (1500\$)

Full stack web-development bootcamp at [Le Wagon - Tokyo](#) (Jan. - Mar. 2022).

Blog on machine-learning including a reimplementation of the [neural style transfer](#) algorithm (PyTorch).

Full list of publication on [Google Scholar](#), PDFs are also available on [my personal page](#).