Adrián Sager La Ganga

Software Engineer

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- Machine Learning
- Applied Mathematics

Education

Master of Science, Computational Science & Engineering, EPFL, GPA: 5.57/6.00 — **Sep. 2020 — Feb. 2023**

Bachelor of Science, Computer Engineering, Polytechnic University of Turin, Final grade: 110/110 — **Oct. 2017 — Jul. 2020**

Awards & Interests

2022
- Fellowship from the Swiss *National Centres of Competence in Research* to fund thesis on sustainability
- IEEE Member after participating in *IEEEXtreme* programming competition
- Participated in *LauzHack* 24h hackathon on a sustainable federated learning project

2021
- Selected as member of the EPFL Spacecraft team in the system software team
- Participated in EPFL's Quantum Computing hackathon

2019
- *European Innovation Academy*, Startup Summer Camp (∼200 participants):
  - **Awards** : *U.S. Provisional Patent* from Nixon Peabody; *Top Team*; *HAG Venture Accelerator award*; *10-day Project and People Management Summer School*
  - Selected as CTO in a team of 5 ideating and presenting a prototype for safer space travel, including an investor pitch
- Member of Eta Kappa Nu (electrical engineering and computer science honor society)

2018
- Awarded *Like@Home* hackathon *Reply* prize: Innovate in 24h in a team of 5 using Google's Voice Kit

2017
- Scholarship *ToPolito* (**top 17** best performing international engineering students)
- Young Talents Project (**top 5%** best performing engineering students)

Work Experience

IBM Master Thesis — **Sep. 2022 — Jan. 2023**
IBM Research Zürich — Zürich, Switzerland

- Apply NLP models to predict sustainable chemical reactions
- Proposed novel AI-based metrics employing uncertainty quantification (UQ) techniques
- Make toolkit with visualization and explainable AI utilities to interpret the predictions

System Engineer (Full-time Intern) — **Mar. 2022 — Sep. 2022**
Beyond Gravity — Zürich, Switzerland

- ExoMars rover simulation software for ESA contract (C++):
  - Analyzed accuracy of simulation with real testing of the rover's wheels
  - Improved accuracy of simulation with SOTA techniques
  - Implemented novel detection and filling of missing data in high-resolution Martian terrain
  - Achieved $> \times 3.0$ speedup with SIMD matrix operations and better code structure
  - Created pseudo-3D engine
  - Developed realistic visualization in a game engine (C#)

Data Scientist (Full-time Intern) — **Mar. 2020 — May. 2020**
Dynatrace — Austria

- Presented pipeline to introduce the 7-person team's research in production
- Created Python-to-Java guidelines to optimize Machine Learning algorithms, benchmarking 3 tensor libraries: NumPy, EJML, ND4J
- Designed best-practices for efficient Java code in the EJML tensor library

Academic Projects

Analyze Performance Improvements of Asynchronous Cloud Microservices, — **Oct. 2021 — Jan. 2022**
Advanced Multiprocessor Architecture course (EPFL)
github.com/cs471-MAA/grpc

Computer Vision to stabilize video of a fly's neural activity, Ramdya Lab (EPFL) **Sep. 2021 — Jan. 2022**
- Proposed novel stochastic EMD unsupervised metric based on desired properties, proven convergence and conceptual accuracy
- Proposed 670% faster and 86% more accurate transform than baseline
- Trained UNet and Hypernetwork SOTA from literature with dynamic memory allocation on big dataset
- Achieved and analyzed $\times 1.4$ asymptotic speedup on non-linear transform baseline using GPU

github.com/Sager611/stabilize2p

Develop Minimal Deep Learning Framework with Backprop, Deep Learning course (EPFL) **Apr. 2021 — Jun. 2021**

Distributed Learning: Study of the most Efficient Topologies, Optimization for ML course (EPFL) **Apr. 2021 — Jun. 2021**

github.com/eelismie/OptForML-Project

Deep Learning to predict star properties, Laboratory of Astrophysics (EPFL) **Mar. 2021 — Jul. 2021**
- Trained a Denoising Autoencoder for interpolation of stellar spectra with secondary MLP tail for regression
- Augmented and cross-validated small 888-sample traning set
- 20% better performance than literature by employing a Locally Connected Network with uncertainty estimation
- Formulated a well-documented and structured framework and entry script for research usage at the Lab
- Accepted contract to continue documenting framework in July 2021

Machine Learning to predict protein pair interactions, Machine Learning course (EPFL) **Nov. 2020 — Dec. 2020**
- Compared Siamese CNN to XGboost and MLP using Bayesian Optimization

github.com/maximocrv/ml_protein_interactions

FPGA, CNN inference, Computer Architecture course (Polytechnic University of Turin) **Mar. 2019 — Jul. 2019**
- Programmed 6 CNN layers for inference in an FPGA: 2D Convolution, Max/Mean Pooling, and Sigmoid/ReLu/Tanh activations
- Engineered block design leveraging DMA for CPU-FPGA transmission

gitlab.com/adriansagerlaganga/pynq-cnn-caffe

Skills

Python	• Tensorflow/Keras • PyTorch • JupyterLab • Scikit-learn • SciPy • Pandas • OpenCV (cv2) • Sphinx • JAX (basic)
Programming	• C/C++ • CMake • Assembly for debugging (GDB) • CUDA • OpenMP • Java • C# • JavaScript • HTML/CSS • React & Redux (basic) • Docker • SQL • MatLab • OpenGL • systemd
Teamwork	• Agile Scrum • JIRA • Git
Multiprocessing (Academic)	• Distributed Memory • Datacenters • GPU architecture • ML Accelerators • Cache Coherence • Memory Consistency
Algorithms (Academic)	• Linear Programming • Greedy • Streaming algos. • Randomized algos. • Spectral Graph Theory
Information Security (Academic)	• Binary exploits • Web App Vulnerabilities • TLS • Applied Cryptography • Database Security • Machine Learning and Privacy • Blockchain and Decentralization

Languages

- English (fluent)
- Spanish (native)
- Italian (fluent)
- French (intermediate)