

# Adrián Sager La Ganga

## Machine Learning Engineer



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• Software Engineering

• Applied Mathematics

### EDUCATION

**Master of Science, Computational Science & Engineering**, EPFL, Final 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 *IEEEExtreme* 24h 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 pole
  - 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

IBM Research Zürich

Sep. 2022 — Jan. 2023

Zürich, Switzerland

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

#### System Engineer (Full-time Intern)

Beyond Gravity

Mar. 2022 — Sep. 2022

Zürich, Switzerland

- ExoMars rover simulation software for ESA contract (C++):
  - Implemented novel outlier detector and Gaussian Process Regression-based interpolation of high-resolution Martian terrain
  - Reduced integration error in simulation with novel numerical analysis techniques
  - Analyzed accuracy of simulation through real testing of the rover wheels
  - Achieved  $> \times 3.0$  speedup with SIMD matrix operations, better code structure, and concurrency
  - Created pseudo-3D engine for fast visualization
  - Developed realistic visualization in a game engine (C#)

#### Data Scientist (Full-time Intern)

Dynatrace

Mar. 2020 — May. 2020

Austria

- Presented Python-to-Java pipeline to translate the 7-person team's research into production
- Created guidelines to speedup Machine Learning algorithms from Python to Java, benchmarking NumPy, EJML, and ND4J
- Designed best-practices for efficient Java code in the EJML tensor library

### ACADEMIC PROJECTS

#### Analyze Performance Improvements of Asynchronous Cloud Microservices,

Advanced Multiprocessor Architecture course (EPFL)

github.com/cs471-MAA/grpc

Oct. 2021 — Jan. 2022

<b>Computer Vision to stabilize video of a fly's neural activity</b> , Ramdya Lab (EPFL)	<b>Sep. 2021 — Jan. 2022</b>
<ul style="list-style-type: none"> <li>Proposed novel stochastic EMD unsupervised metric based on desired properties, proven convergence and conceptual accuracy</li> <li>Proposed <math>\times 770\%</math> faster and <math>\times 186\%</math> higher accuracy transform than baseline</li> <li>Trained UNet and hypernetwork SOTA on big dataset through dynamic memory allocation</li> <li>Achieved and analyzed <math>\times 1.4</math> asymptotic speedup on non-linear optimal transport baseline using GPU</li> </ul>	
<a href="https://github.com/Sager611/stabilize2p">github.com/Sager611/stabilize2p</a>	
<b>Develop Minimal Deep Learning Framework with Backprop</b> , Deep Learning course (EPFL)	<b>Apr. 2021 — Jun. 2021</b>
<b>Distributed Learning: Study of the most Efficient Topologies</b> , Optimization for ML course (EPFL)	<b>Apr. 2021 — Jun. 2021</b>
<a href="https://github.com/eelismie/OptForML-Project">github.com/eelismie/OptForML-Project</a>	
<b>Deep Learning to predict star properties</b> , Laboratory of Astrophysics (EPFL)	<b>Mar. 2021 — Jul. 2021</b>
<ul style="list-style-type: none"> <li>Trained a Denoising Autoencoder for interpolation of stellar spectra with secondary MLP tail for regression</li> <li>Augmented and cross-validated small 888-sample training set</li> <li>+20% performance over literature by employing a Locally Connected Network with uncertainty estimation</li> <li>Formulated a well-documented and structured framework and entry script for research usage at the Lab</li> <li>Accepted contract to continue documenting framework in July 2021</li> </ul>	
<b>Machine Learning to predict protein pair interactions</b> , Machine Learning course (EPFL)	<b>Nov. 2020 — Dec. 2020</b>
<ul style="list-style-type: none"> <li>Compared Siamese CNN to XGboost and MLP using Bayesian Optimization</li> </ul>	
<a href="https://github.com/maximocrv/ml_protein_interactions">github.com/maximocrv/ml_protein_interactions</a>	
<b>FPGA, CNN inference</b> , Computer Architecture course (Polytechnic University of Turin)	<b>Mar. 2019 — Jul. 2019</b>
<ul style="list-style-type: none"> <li>Programmed 6 CNN layers for inference in an FPGA: 2D Convolution, Max/Mean Pooling, and Sigmoid/ReLU/Tanh activations</li> <li>Engineered block design leveraging DMA for CPU-FPGA transmission</li> </ul>	
<a href="https://gitlab.com/adriansagerlaganga/pynq-cnn-caffe">gitlab.com/adriansagerlaganga/pynq-cnn-caffe</a>	

## SKILLS

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<b>Python</b>	<ul style="list-style-type: none"> <li>Tensorflow/Keras</li> <li>PyTorch</li> <li>JupyterLab</li> <li>Scikit-learn</li> <li>SciPy</li> <li>Pandas</li> <li>OpenCV (cv2)</li> <li>Sphinx</li> <li>JAX (basic)</li> </ul>
<b>Programming</b>	<ul style="list-style-type: none"> <li>C/C++</li> <li>CMake</li> <li>Assembly for debugging (GDB)</li> <li>CUDA</li> <li>OpenMP</li> <li>Java</li> <li>C#</li> <li>JavaScript</li> <li>HTML/CSS</li> <li>React &amp; Redux (basic)</li> <li>Docker</li> <li>SQL</li> <li>MatLab</li> <li>OpenGL</li> <li>systemd</li> </ul>
<b>Teamwork</b>	<ul style="list-style-type: none"> <li>Agile Scrum</li> <li>JIRA</li> <li>Git</li> </ul>
<b>Multiprocessing (Academic)</b>	<ul style="list-style-type: none"> <li>Distributed Memory</li> <li>Datacenters</li> <li>GPU architecture</li> <li>ML Accelerators</li> <li>Cache Coherence</li> <li>Memory Consistency</li> </ul>
<b>Algorithms (Academic)</b>	<ul style="list-style-type: none"> <li>Linear Programming</li> <li>Greedy</li> <li>Streaming algos.</li> <li>Randomized algos.</li> <li>Spectral Graph Theory</li> </ul>
<b>Information Security (Academic)</b>	<ul style="list-style-type: none"> <li>Binary exploits</li> <li>Web App Vulnerabilities</li> <li>TLS</li> <li>Applied Cryptography</li> <li>Database Security</li> <li>Machine Learning and Privacy</li> <li>Blockchain and Decentralization</li> </ul>

## LANGUAGES

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