Carlos Collado Capell

carlos.colladocapell@epfl.ch www.linkedin.com/in/carlos-collado- carloscollado.eu

Education

EPFL: Swiss Federal Institute of Technology Lausanne Sept. 2023 – Dec. 2025
MSc in Computational Science and Engineering (120 ECTS) *(Grade: 5.43 / 6.00)* *Fellow Mutua Madrileña*

University Carlos III of Madrid Sept. 2019 – May 2023
BSc in Industrial Technologies Engineering (240 ECTS) *(Grade: 9.32 / 10.00)* *Top #1/159 in my year*

- **University of California Berkeley** Exchange Scholarship *(Grade: 3.85 / 4.00)* Aug. 2022 – May 2023
- **Georgia Institute of Technology** Exchange Scholarship *(Grade: 4.00 / 4.00)* Aug. 2021 – May 2022

Professional Experience

European Space Agency (ESA) Sept. 2024 – Feb. 2025
AI Research Intern *Frascati, Italy*

- Pretrained a **Foundation Model** for onboard AI (Φsat-2) via multi-task learning with multi-node **DDP**.
- Created **800+ GB** datasets to pretrain and benchmark model against SOTA models (Prithvi, SatMAE, SeCo).
- Developed a novel Sentinel-2 preprocessing technique that accelerates model training.
- Created a database to compare training policies, architectures, and datasets of Foundation Models for EO.
- First author on upcoming paper, working with experts in onboard AI, Foundation Models, and dataset creation.

Peninsula Clean Energy June 2023 – Sept. 2023
Data Science Intern *Silicon Valley, CA*

- Improved electricity load forecast in Silicon Valley by **10%**, and identified key trends in load divergence of up to **15%** (*SQL*, *Google Cloud Platform*, *Pandas*, *time series*).

Técnicas Reunidas May 2022 – July 2022
Engineering Intern *Madrid, Spain*

- Benchmarked green hydrogen tech and led study on the success rate of energy transition projects *(Excel, SQL)*.

Research Experience

Sensor-Agnostic Foundation Model Compression for Onboard AI Feb. 2025 – July 2025

- Compressing **ViT-based** Foundation Models via **pruning** and **knowledge distillation** (DynamicViT, NViT).
- Pretraining a ViT-Tiny backbone from scratch to benchmark against compressed ViT-Base and ViT-Large.
- Supervised by Prof. Devis Tuia.

Multi-Modal Hate Speech Detection in Videos March 2024 – March 2025

- Finalizing conference publication on a multi-modal model (for video, audio, and text) that outperformed SOTA.
- *Tools*: SLURM, ViT, BERT, Cross-Modal Attention (CMA).
- At Idiap Research Institute (Remote). Supervised by Andrea Cavarallo.

Distributed Multi-Agent Bayesian Optimization in Building Temperature Control Feb. 2024 – July 2024

- *Tools*: Python (SciPy, Pandas, GPy), SLURM, parallel computing (MPI, CUDA).
- Journal paper submitted to IEEE Transactions on Automatic Control (under review).

Performance modeling and cost optimization of a solar desalination system [...] Jan. 2022 – June 2024

- Optimized cost and energy use to competitive market levels via *Particle Swarm Optimization (PSO)*.
- First-author publication in journal *Renewable Energy* (IF 9.0) - https://doi.org/10.1016/j.renene.2024.120866

Skills

Programming: Python (proficient), C++, Linux CLI, Git, Big Data (SQL, Google Cloud), Matlab, Jupyter Notebook.

High-Performance Computing: SLURM, CUDA, multi-node DDP, MPI, GPU/CPU memory profiling, Docker, SSH.

Machine Learning Tools:

- **NLP**: BERT, GPT, T5, RoBERTa; fine-tuning, prompt engineering, in-context learning, RAG, instruction tuning.
- **Computer Vision**: ViT, Swin, DeiT, ResNet, U-Net, MAE; SSL (MoCo, DINOv2).
- **Optimization/Deployment**: Pruning, QAT, AMP, distillation, ONNX, OpenVINO, edge deployment.
- **Frameworks & Tooling**: PyTorch, Weights & Biases, TensorBoard, TensorFlow, Keras, ONNX, Scikit-learn.
- **Learning Paradigms**: Self-supervised learning, few-shot learning, multimodal models, foundation models.

Soft Skills: Scientific writing (papers, abstracts), presentations, team leadership, cross-functional communication.

Other Projects

LLM-powered Education Assistant EPFL April 2025 – June 2025

- Building an assistant to answer students' questions using ChatGPT-distilled preference data and DPO.
- Enhancing efficiency and factuality via quantization and retrieval-augmented generation (RAG).

Other DL Projects UC Berkeley, EPFL Aug. 2022 – June 2024

- Projects on solar jet identification in videos, wikipedia path navigation, and AI biases.

Technology Consultant UC Berkeley - Tetra Pak (Sidel) Jan. 2023 – May 2023

- Optimized energy consumption on production lines, resulting in $47,000 in annual cost savings.

Product Management UC Berkeley Aug. 2022 – Dec. 2022

- Developed a social-based map search engine prototype, integrating Agile practices and strategic business planning, collaborating with experts at GoogleMaps and TripAdvisor.

Distinctions and Awards

- **Nova 111 Student List (2025)**: Selected by Nova as one of the 111 students that *will change the future of Spain*.
- **Bachelor's Degree Extraordinary Award (2023)**: Best academic record of my year (#1/159).
- **Fellowship Mutua Madrileña Foundation (2023)**: To fully cover my master's tuition and accommodation expenses.
- **Award of Excellence of Madrid (2019, 2020, 2021, 2022, 2023)**: Among the top 1% of students in the region.
- **Excellence Award of University Carlos III of Madrid Social Council (2022)**: given to the top 8 students in STEM majors based on academic achievements, among more than 5000 students.
- **Santander Excellence Scholarship (2021, 2022)**: Awarded to top students with extra funding for studies abroad.
- **University Carlos III of Madrid Talent Program (2019)**: Awarded to the top 30 (2%) of admitted STEM students.
- **Honors in University Courses**: Top 5% with excellent grades in 14 courses, for a total of 84 ECTS.

Leadership & Volunteering

- **i-Atlanta President**: Organized activities in Atlanta for international students (budget/team management).
- **Computer Tutor** at an occupational center for women with disabilities.
- **Berkeley Certificate in Technology and Entrepreneurship**: product development, and technical consulting.
- **Berkeley Changemaker Certificate**: first at Berkeley to receive it - critical thinking, communication, and collaboration.
- **Geography Tournament Lead at Georgia Tech**: led the the successful tournament (ideation, budget, regulations).
- **Berkeley Changemaker Project**: involved in cleaning mountain trails to promote nature conservation.