LUIS VELA VELA PHD

Sr. AI Scientist & ML Team Lead | Computational Physicist

CONTACT

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CORE COMPETENCIES

ML Engineering & HPC

- PyTorch / TensorFlow
- GPU Computing (A100, H200, mixed precision)
- Distributed Computing (CuPy, Dask, RAPIDS, Numba)
- MLflow / Experiment Tracking

AI Weather & NWP Models

- AI-NWP Deployment (AIFS, Aurora, FourCastNet, GraphCast)
- AI Data Assimilation (system design)
- S2S Forecasting (weather regimes, ensemble methods)
- Probabilistic Verification (CRPS, ensemble statistics)

Data Engineering & Processing

- Satellite Data Processing
- GRIB2 & Data Pipelines
- ERA5 Reanalysis

Programming & Tools

- Python (xarray, NumPy, Pandas, Matplotlib, Cartopy)
- Bash
- FORTRAN
- Git / CI/CD / Conda
- AWS / Cloud

Solution Architecture

- HPC Infrastructure Design
- Technical Discovery
- Client Engagement

Leadership

- ML Team Management (2 direct reports)
- Cross-functional Collab
- Stakeholder Communication

LANGUAGES

- Spanish — Native
- English — Fluent / Professional
- French — Conversational
- Serbian — Conversational
- Czech — Conversational
- German — Working knowledge

KEY ATTRIBUTES

- **Production AI/ML delivery at scale**
- **Scientific rigor & operational focus**
- **Customer success & stakeholder communication**
- **Cross-functional team builder**

PROFESSIONAL SUMMARY

Sr. AI Scientist & ML Team Lead with deep expertise in machine learning, computational physics, and high-performance computing. Leads a team building AI-powered weather forecasting systems at a global satellite data company, with production experience spanning model deployment, large-scale data engineering, and distributed GPU computing. PhD in Computational Physics with a track record across scientific research (Amazon), HPC solution architecture (LuxProvide), and operational AI systems (Spire Global). Combines scientific depth with hands-on ML engineering, team leadership, and client-facing technical communication.

PROFESSIONAL EXPERIENCE

Nov 2022 – Present
• Spire Global, Luxembourg

Sr. AI Scientist & ML Team Lead

Lead a team of ML engineers at a global satellite data and analytics company, building AI-powered weather forecasting systems for energy, maritime, aviation, and smart agriculture markets.

- **AI Model Deployment:** Architected and deployed production infrastructure for multiple AI numerical weather prediction models (AIFS, Aurora), including full pipeline from data ingestion through ensemble-based forecast delivery.
- **Subseasonal Forecasting:** Built S2S forecasting pipelines with weather regime classification and ensemble probability tracking across 46-day forecast horizons.
- **Data Engineering:** Designed multi-source data pipelines handling satellite observations, GRIB2 datasets, and ERA5 reanalysis data at scale.
- **Renewable Energy Forecasting:** Developed weather-to-energy production forecast pipelines, translating atmospheric predictions into wind and solar energy output estimates.
- **Model Verification:** Created forecast intercomparison tooling for multi-model evaluation across ensemble statistics, spatial fields, and weather regime projections.
- **AI-Assisted Development:** Pioneered Claude Code adoption on HPC infrastructure, achieving 6–12x speedup in model repository development.
- **Team Leadership:** Established engineering practices including experiment tracking (MLflow), shared repositories, code review standards, and documentation workflows.

Feb 2021 – Nov 2022
• LuxProvide, Luxembourg

Sr. Solutions Engineer

Designed and delivered custom HPC/AI solutions for enterprise and research clients at Luxembourg's national supercomputing center.

- **Solution Architecture:** Led technical discovery sessions and designed compute solutions for GPU-intensive ML and simulation workloads.
- **GPU Infrastructure:** Evaluated and benchmarked GPU platforms (A100, H200) for client workloads, including mixed-precision training configurations.
- **Client Engagement:** Managed pre-sales technical engagements, proof-of-concept demonstrations, and onboarding for HPC clients across research and industry.

Oct 2019 – Jan 2021
• Amazon, Luxembourg

Research Scientist

- Applied advanced ML and statistical methods to deliver actionable business insights at scale.

EDUCATION

Sep 2013 – Feb 2019
• UC3M, Madrid | UGent, Ghent

PhD in Computational Physics

Specialized in computational methods for complex physical systems. Developed algorithms for HPC environments.

Sep 2011 – Jul 2013
• UC3M, Madrid | UGent, Ghent

MSc in Plasma Physics

Statistical analysis and modeling of complex dynamic systems.

Sep 2007 – Jul 2010
• Charles University, Prague

BSc in Physics

Foundation in computational physics and simulation methods.

ACHIEVEMENTS & RECOGNITION

- Outstanding Colombian Abroad — Award by the Colombian Government
- Summa Cum Laude — PhD Thesis
- Greatest Distinction — 2013 Erasmus Mundus Master
- UNESCO Fellowship — Bachelor Studies Scholarship

SELECTED PUBLICATIONS

- Magneto-hydrodynamical nonlinear simulations of magnetically confined plasmas using smooth particle hydrodynamics (SPH)
- A positioning algorithm for SPH ghost particles in smoothly curved geometries
- ALARIC: An algorithm for constructing arbitrarily complex initial density distributions with low particle noise for SPH/SPMHD applications