Davide **Belli**

Staff ML Research Engineer

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Work Experience

Qualcomm AI Research

Amsterdam, NL

Staff Research Engineer

Nov. 2019 - Present

- Designed and implemented novel Deep Learning methods for **Perception** (visual and RF domains), **Model Efficiency**, and **Agentic AI** (LLMs):
  - Designed a personalized biometric NN classifier improving accuracy from 90% to 99% AUC on challenging real-world data.
  - Implemented Neural KF and WLS methods for GNSS localisation, reducing positioning error by 50% in noisy urban canyons.
  - Improved efficiency in recent LLMs (Phi 3, Llama 3, Mistral), decreasing memory footprint by 45% and increasing throughput by 40%.
  - Introduced structured representations and architectures in AI Agents, reducing model footprint by 30x at the same task accuracy.
- Integrated solutions in **products released to customers** (Samsung, Google) and **internal departments**. Submitted 11 patent applications.
- Skills and technologies: Python (PyTorch, Hugging Face, NumPy, Matplotlib, Pandas, Hydra), Bash, Git, Docker, Run:ai.

University of Amsterdam

Amsterdam, NL

Graduate Teaching Assistant

Oct. 2018 - Jun. 2019

- Graduate Teaching Assistant for the core courses Machine Learning 1, Deep Learning and Information Retrieval in the MSc AI at UvA.
- Held lab sessions, prepared and corrected exams, homework and lab assignments.

Education

University of Amsterdam

Amsterdam, NL

MSc in Artificial Intelligence

Sep. 2017 - Sep. 2019

- Graduated **Cum Laude**, GPA 8.8/10 (A+)
- Main Courses: Machine Learning, Computer Vision, NLP, Deep Learning, Reinforcement Learning, Information Retrieval
- Skills and technologies: Python (NumPy, Matplotlib, PyTorch, scikit-learn), MATLAB, Git, LaTeX

University of Trento

Trento, IT

BSc in Computer Science

Sep. 2014 - Jul. 2017

- Graduated **Cum Laude**, GPA 110/110
- Main Courses: Algorithms and Data Structures, Programming, Calculus, Linear Algebra, Probability and Statistics, Logic, Databases
- Skills and technologies: C++, Java, Android, Node.js, Git, HTML/CSS, XML

Publications

- *Dynamic Tool Dependency Retrieval for Efficient Function Calling*, **AAAI 2026 IR Frontiers workshop (Oral)**.
  B Patel*, D Belli*, A Jalalirad, M Arnold, A Ermolov, B Major.
- *Neural Augmented Kalman Filters for Road Network assisted GNSS positioning*, **ICML 2025 ML4Wireless workshop**.
  H Gorp*, D Belli*, A Jalalirad, B Major.
- *Efficient LLM Inference using Dynamic Input Pruning and Cache-Aware Masking*, **MLSys 2025**
  M Federici*, D Belli*, M van Baalen, A Jalalirad, A Skliar, B Major, M Nagel P Whatmough.
- *GNSS Positioning using Cost Function Regulated Multilateration and Graph Neural Networks*, **ION GNSS+ 2023**
  A Jalalirad, D Belli, B Major, S Jee, H Shah, W Morrison.
- *Online Adaptive Personalization for Face Anti-spoofing*, **ICIP 2022**.
  D Belli, D Das, B Major and F Porikli.
- *A Personalized Benchmark for Face Anti-spoofing*, **WACV 2022 MAP-A workshop**.
  D Belli, D Das, B Major and F Porikli.
- *Image-Conditioned Graph Generation for Road Network Extraction*, **NeurIPS 2019 GRL workshop**.
  D Belli and T Kipf.
- *Adding Object Detection Skills to Visual Dialogue Agents*, **ECCV 2018 SiVL workshop**.
  G Bani*, D Belli*, G Dagan*, A Geenen*, A Skliar, A Venkatesh, T Baumgartner, E Bruni and R Fernández.
- *Context Encoding Chest X-rays*, **arXiv preprint**.
  D Belli, S Hu, E Sogancioglu and B van Ginneken.
- *Chest X-ray Inpainting with Deep Generative Models*, **arXiv preprint**.
  E Sogancioglu*, S Hu*, D Belli and B van Ginneken.

Patents

- Efficient Plan Sampling for Function Calling LLMs without token generation steps. *In preparation, 2025.*
- Deep Learning methods for Road Network assisted GNSS positioning. *US Patent App. 19/299,160, 2025.*
- Test-time Scaling for Single-turn Function Calling. *US Patent App. 19/270,192, 2025.*
- Adaptive personalization for anti-spoofing protection in biometric authentication systems. *US Patent App. 19/202,524, 2025.*
- Geometric representation and temporal modeling for GNSS localization. *US Patent App. 19/040,909, 2025.*
- Cache-aware dynamic module selection. *US Patent App. 18/902,554, 2025.*
- Global navigation satellite systems (gnss) localization with residual grid representation. *US Patent App. 18/630,717, 2025.*
- Optimizing weighted least square (wls) inputs to improve global navigation satellite systems (gnss) localization. *US Patent App. 18/177,713, 2024.*
- Personalized biometric anti-spoofing protection using machine learning and enrollment data. *US Patent App. 17/658,573, 2022.*

Honors & Awards

2025-26	**Top 12%:** Codeforces contest ranking (Global)	*Amsterdam, NL*
2022-26	**Top 4%:** LeetCode contest ranking (Global)	*Amsterdam, NL*
2019	**1st Place:** Amsterdam Programming Contest	*Amsterdam, NL*
2018	**Top 50%:** ACM-ICPC Nwerc (European Semi-Finals)	*Eindhoven, NL*
2018	**Top 50%:** BAPC Regionals	*Louvain-la-Neuve, BE*
2016	**Bronze Medal:** ACM-ICPC Swerc (European Semi-Finals)	*Porto, PT*
2016-19	**Top 15%:** Google Hashcode	*Amsterdam, NL*
2008-13	**Top 0.1% (7^{th} out of 9000):** International Championships of Mathematical Games (Italian Finals)	*Milan, IT*

Volunteering

2020-26	**Conference Reviewer:** WACV (2022-2023-2024-2025), LoG (2023-2024-2025), ICCV (2021)
2020-26	**Workshop Reviewer:** ML on Graphs (GLF @ NeurIPS 2022-2023, GLB @ WWW 2022-2023, GRL+ @ ICML 2020)
2019-26	**Mentor at LeadTheFuture:** mentorship organization for selected top students in STEM from Italy.
2017-19	**Member and Treasurer at Master Committee:** organizing educational events for master students at UvA.
2015-17	**School Tutor:** teaching Maths, Physics and Computer Science to High School and Bachelor students.