

# Federico Betti

📍 Zurich, Switzerland  
✉ federico.betti@outlook.com  
🌐 fbetti.com  
LinkedIn: federico\_betti  
GitHub: federicoBetti



## Professional Summary

Senior ML Engineer and PhD with 5+ years building and shipping production NLP and multimodal systems. Lead the NLP/LLM roadmap at Y Combinator-backed Typewise, designing retrieval-augmented agents and real-time text prediction for thousands of users. Strong track record of turning state-of-the-art research in multimodal LLM-based evaluation and generative models into robust production systems, with publications at ICCV, ECCV, ACM Multimedia, and IJCV.

## Professional Experience

### Senior ML Engineer

May 2022 – Present

*Typewise - ETH Zurich*

- Own NLP/LLM roadmap for Typewise (YC S22), shipping real-time multilingual text prediction, grammar correction, and conversational agents to 4000+ users.
- Design and implement retrieval-augmented, hierarchical AI agent architectures for customer service automation with human-in-the-loop constraints using LangGraph, achieving over 90% automated resolution rates in specific flows.
- Drove adoption of TDD and tooling, increasing automated test coverage from 15% to 80% across core NLP services.
- Build and maintain production Python services for low-latency inference (<250ms), evaluation, and data pipelines on AWS (testing, CI/CD, observability) to balance accuracy, latency, and cost.
- Collaborate with ETH Zurich research lab to translate AI research into product features; patent pending.
- Work closely with Typewise founders on product strategy, driving a full product pivot and supporting hiring (5+ ML/engineering hires) and internal process optimization.

### AI Research Fellow

Jan 2021 – May 2022

*Leonardo Labs*

- NLP research and development on the davinci-1 HPC to deliver transformer-based AI models for semantic similarity, retrieval, and sentiment analysis using PyTorch. Implemented parallel training over 64+ A100 GPUs.
- Managed cross-functional AI initiatives and projects across different branches of the company, aligning timelines, technical documentation, and deliverables.

### AI Engineer

Jan 2020 – Jan 2021

*Meta-liquid*

- Developed production-grade multimodal AI models in Scala, adapting transformer and generative architectures to strict latency and cost targets.
- Worked on low-level implementations in CUDA to optimize the performance of specific kernels and models.

### Data Scientist

Aug 2019 – Dec 2019

*EnergyWay*

- Delivered NLP analytics for a leading media client by combining Python pipelines (Pandas, PyTorch, scikit-learn) with automated AWS training and deployment workflows.
- Partnered with Innovation Center stakeholders to scope requirements, ship PoCs, and hand over scalable solutions to operations teams.

## Education

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### PhD in Computer Science

Nov 2022 – Jan 2026

*University of Trento*

- Research on making diffusion-based image generation models more efficient and reliable, with a focus on reducing wasted compute and detecting hallucinated content early.
- Designed and evaluated methods for instruction-guided image editing, including multimodal LLM-based evaluators and metrics that better match human judgments of image quality and alignment.

### Alta Scuola Politecnica

2017 – 2019

*Politecnico di Milano*

- Selected for the two-year 150-students honors program jointly run by Politecnico di Milano and Politecnico di Torino, focusing on engineering execution, business design, entrepreneurship, and leadership.

### Visiting Period

2018

*École polytechnique fédérale de Lausanne (EPFL), Switzerland*

### Double Degree MSc in Computer Science and Engineering

2017 – 2019

*Politecnico di Milano / Politecnico di Torino, 110L/110*

### BSc in Computer Engineering

2014 – 2017

*Politecnico Di Milano, 110/110*

## Main Research Publications

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### What Changed? Detecting and Evaluating Instruction-Guided Image Edits with Multimodal Large Language Models

*L Baraldi\*, D Bucciarelli\*, F Betti\*, M Cornia, L Baraldi, N Sebe, R Cucchiara, ICCV 2025*

### Hallucination Early Detection in Diffusion Models

*F Betti, L Baraldi, L Baraldi, R Cucchiara, N Sebe, IJCV 2025*

### Optimizing Resources in Diffusion Models through Hallucination Early Detection

*F Betti, L Baraldi, L Baraldi, R Cucchiara, N Sebe, ECCV 2024*

### Let's ViCE! Mimicking Human Cognitive Behavior in Image Generation Evaluation

*F Betti, J Staiano, L Baraldi, L Baraldi, R Cucchiara, N Sebe, ACM Multimedia 2023*

### Controlled Text Generation using Adversarial Networks

*F Betti, G Ramponi, M Piccardi, INLG 2020*

## Technical Skills

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**AI/ML Frameworks:** PyTorch, TensorFlow, Hugging Face, LangGraph, LangChain

**Programming Languages:** Python, Scala, Java, C, SQL, HTML, CSS, CUDA

**Cloud & Infrastructure:** AWS (EC2, S3, Lambda), MLOps, Docker, Kubernetes, HPC Systems

**AI Specializations:** Natural Language Processing, Computer Vision, Large Language Models, Generative AI, AI Agents

**Development & Tools:** Software Development, Web Development, Linux OS, Git, Agile Frameworks

**Leadership & Management:** Project Management, Team Leadership, Product Development, Strategic Planning, Cross-functional Collaboration

## Additional Experiences

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### SEI Pioneer

2018 – 2019

*Fondazione Agnelli, Alta Scuola Politecnica*

Selected for the ASP/SEI Pioneer entrepreneurship track, co-designing a tech venture with industry mentors and refining investor-ready product strategy.

**Knowai: Knowledge Extraction from Conversations using NLP** September 2018 – June 2019

*Fondazione Agnelli*

Co-founded a proto-startup that built NLP pipelines and dashboards to surface institutional knowledge from conversations, delivering pilots that attracted investor and enterprise interest.

**Polimi Data Scientists - Board Member**

2018 – 2019

*Politecnico di Milano*

Coordinated industry-backed data science events and partnerships that connected students, researchers, and workers across the Politecnico di Milano community.

## Languages

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**Italian:** Mother Tongue

**English:** Professional Knowledge

*IELTS Test 2016*

## Interests

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**Innovation and Startup:** I have completed MBA-like courses with ASP and Fondazione Agnelli, cultivating an entrepreneurial mindset that, when combined with my technical expertise, inspires my pursuit of innovative yet tangible solutions. Currently working within a Y Combinator-backed startup, my interests in emerging technologies continue to grow. I also maintain my knowledge base and stay current with industry trends through extensive reading.

**Technology:** Since a young age, I have been fascinated by new technology trends. More recently, I've focused on non-professional drone flight.

**Sport:** I have played football and basketball since a young age, and I still play them with friends. I consider them a fantastic way to meet new people in different contexts.