Giorgio Giannone

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I work broadly in Generative AI and Probabilistic Deep Learning, with a focus on **Vision-Language Models**, **Conditional Diffusion Models**, **Few-Shot Generation**, and **Hierarchical Variational Inference**.

Experience

Research Scientist, Red Hat — Boston, Massachusetts, USA — *June 2025 - Present*

- AI Innovation Team
  - Bayesian Inference for VLMs and LLMs

Applied Scientist, Amazon — Seattle, Washington, USA — *2024 - 2025*

- Home Innovation and GenAI Team
  - Subject-Driven Generative Models
  - Grounded Vision-Language Models

Visiting Researcher, UCL Centre for Artificial Intelligence — London, UK — *Jan 2024 - March 2024*

- Host: David Barber
  - Multi-Resolution Convolutional Models for Long Sequences
  - Bayesian Inference for Language Models

Research Intern, Microsoft Research — Cambridge, Massachusetts, USA — *Jun 2023 - Sept 2023*

- ML and Statistics Group. Hosts: David Alvarez Melis, Nicolo Fusi
  - Dynamic Vocabulary Augmentation for LLMs

Visiting Collaborator, MIT-IBM AI Lab — Cambridge, Massachusetts, USA — *Jan 2023 - June 2023*

- Model Alignment Team. Host: Akash Srivastava
  - Generative Models for Systems with Constraints
  - Aligning Language Models with Negative Data

Research Scientist (PhD Intern), IBM Research — Zurich, Switzerland — *Jun 2022 - Nov 2022*

- Accelerated Discovery Team. Hosts: Matteo Manica, Teodoro Laino
  - Open-source library GT4SD for conditional generative models
  - Multitask Language Models for Text and Chemistry

Applied Scientist (PhD Intern), Amazon Science — Cambridge & London, UK — *Jul 2021 - Oct 2021*

- Alexa Team. Hosts: Yunlong Jiao, Emine Yilmaz
  - Domain Agnostic Subpopulation Generalisation

Research Engineer, NNAISENSE — Lugano, Switzerland — *Jan 2019 - Jan 2020*

- Deep Learning Team. Managers: Christian Osendorfer, Jonathan Masci
  - Structured Latent Variable Models

Machine Learning Engineer, Pi Campus — Rome, Italy — *Oct 2018 - Dec 2018*

- NLP for large scale data-driven early stage investing

Research Intern, Naver Labs Europe — Grenoble, France — *Feb 2018 - Aug 2018*

- Computer Vision Team. Host: Boris Chidlovskii
  - Deep Learning for Scene Understanding

Co-Founder, SecretAIry (formerly GAiA) — Rome, Italy — *July 2017 - Jan 2019*

- Chatbots to enhance Workplace Communication
  - Selected among 100+ startups to join the EnLabs Incubator

Education

PhD, Generative Machine Learning — Technical University of Denmark, Lyngby, Denmark
June 2020 - Dec 2023

- Few-Shot Generative Models
- Hierarchical Variational Inference
- Thesis: Learning Generative Models with Limited Data
  - Supervisor: Ole Winther; Co-supervisor: Søren Hauberg

Visiting PhD Student, MIT School of Engineering — Cambridge, Massachusetts, USA
Jan 2023 - Sept 2023

- Constrained Diffusion Models for Engineering Design
- Improving Generative Constraint Satisfaction using Invalid Designs
- Evaluating Vision-Language Models for Engineering Tasks
- Research on LLM Agents for CAD design. Co-developer of text2cad.
  - Host: Faez Ahmed, DeCoDE Lab

Master's Degree, Data Science — Sapienza University, Rome, Italy
Sept 2016 - Nov 2018

- Excellence Path & Summa Cum Laude
- Thesis: Multimodal Learning for Scene Understanding
  - Supervisor: Aris Anagnostopoulos; External Supervisor: Boris Chidlovskii

Visiting Graduate Student, NYU Tandon School of Engineering — NYC, New York, USA
Sept 2017 - Jan 2018

- Visualization and Data Analytics Research Center. Host: Enrico Bertini
  - Built an interactive entity retrieval tool to investigate 10M documents

Master's Degree, Mechanical Engineering — Sapienza University, Rome, Italy
Sept 2014 - Jan 2017

- Summa Cum Laude
- Thesis: Bubble Dynamics in Turbulent Shear Flows
  - Supervisor: Carlo Massimo Casciola; Co-supervisor: Paolo Gualtieri

Bachelor's Degree, Mechanical Engineering — Sapienza University, Rome, Italy
Sept 2009 - May 2014

- Thesis: Rapid Prototyping of Metallic Manufacturing

Publications & Patents

Supervision-free Vision-Language Alignment — under-review
Giannone, Li, Feng, Perevodchikov, Chen, Martinez — *2024*

Evaluating Object-centric Realism in Synthetic Images — CVPR 2025
Liang, Corneanu, Feng, Giannone, Martinez — *2024*

Reparameterized Multi-Resolution Convolutions for Long Sequence Modelling — NeurIPS
Cunningham, Giannone, Zhang, Deisenroth — *2024*

Evaluating Vision-Language Models for Engineering Design — Artificial Intelligence Review
Picard, Edwards, Doris, Mann, Giannone, Alam, Ahmed — *2025*

Constraining Generative Models for Engineering Design with Negative Data — TMLR
Regenwetter, Giannone, Srivastava, Gutfreund, Ahmed — *2024*

Aligning Optimization Trajectories with Diffusion Models — NeurIPS
Giannone, Srivastava, Winther, Ahmed — *2023*

Diffusing the Optimal Topology: A Generative Optimization Perspective — IDETC23
Giannone, Ahmed — *2023*

Unifying Molecular and Textual Representations via Multi-task LM — ICML
Christofidellis*, Giannone*, Born, Winther, Laino, Manica — *2023*

Accelerating Material Design with GT4SD — Nature npj Computational Materials
GT4SD Team (Core Contributor) — *2023*

Few-Shot Diffusion Models — SBM@NeurIPS
Giannone, Nielsen, Winther — *2022*

SCHA-VAE: Hierarchical Context Aggregation for Few-Shot Generation — ICML
Giannone, Winther — *2022*

Method and apparatus for semantic segmentation and depth completion — US Patent
Chidlovskii, Giannone — *2022*

JM1: Worst-group Generalization by Group Interpolation — NeurIPS-W
Giannone, Havrylov, Massiah, Yilmaz, Jiao — *2021*

Hierarchical Few-Shot Generative Models — NeurIPS-W
Giannone, Winther — *2021*

Transformation-aware Variational Autoencoders — tech report
Giannone, Saremi, Masci, Osendorfer — *2020*

Input-filtering NeuralODEs for spiking data — NeurIPS-W
Giannone, Anoosheh, Quaglino, D'Oro, Masci, Gallieri — *2020*

$\mathcal{T}$-VAE: No Representation without Transformation — NeurIPS-W
Giannone, Masci, Osendorfer — *2019*

Learning Common Representation from RGB and Depth Images — CVPR-W
Giannone, Chidlovskii — *2019*

Open-source

GT4SD: Generative Toolkit for Scientific Discovery — 2022

- Library leveraging conditional generative models for accelerated discovery.
- Core Contributor.
- Work on Diffusion Models for images and 3D molecule conformation. The GFlowNet framework. Property Prediction module. Public Hub for model upload. Training Pipelines. Documentation. Tutorials. Testing. CI/CD. Server and Client API. Docker Images for CPU and GPU.

Grants & Awards

GPU Grant, LUMI-G, EuroHPC — Copenhagen, Denmark
PI, Efficient Pre-training of Large Generative Models for Constrained Design — *Nov 2023*

Grant, Otto Mønsted's Foundation — Copenhagen, Denmark
Grant Research Abroad — *Dec 2022*

Grant, Independent Research Fund Denmark — Lyngby, Denmark
DFF PhD Grant — *Jun 2020*

Grant, Perception as Generative Reasoning Workshop — NeurIPS 2019
Complimentary Conference Registration — *Oct 2019*

Grant, Pi School — Rome, Italy
Full tuition covered for the School of AI (3% acceptance rate) — *Oct 2018*

Certificate of Award, Tsinghua University — Beijing, China
Prize for outstanding accomplishments (top 6) — *Aug 2018*

Certificate of Achievement, Naver Labs Europe — Grenoble, France
Prize for the best internship performance — *Jul 2018*

1st Pick, Excellence Path, Master's Degree, Data Science — Rome, Italy
Mar 2018

Admission based on the first year's academic performance

Participation in activities at the School for Advanced Studies

1st Place, Global AI Hackathon, Italian Edition Rome, Italy
Jun 2017

Our team built GAiA, a working assistant chatbot

We won three prizes: Challenge Microsoft, People's Choice, Product Market Fit

Academic Service

Reviewer

Conference: ICML21 (top 10%), AISTATS21, ICML22, NeurIPS22, CVPR2023, NeurIPS23, ICML24, ICLR2025, CVPR 2025, NeurIPS25

Conference (assisted review): ICML19, ICCV19, AAAI20

Journal: TPAMI, TMLR

Workshop: NeurIPS-IBW20, NeurIPS-MetaLearn21, ICML-DeployableGenAI23, ACL-LanguageMolecules24

Teaching

Teaching: Deep Learning (DTU 02456), Bayesian Machine Learning (DTU 02477), Advanced Machine Learning (DTU 02460)

Supervision: two special courses (9 months), two master's thesis (6+6 months), 18 final projects

Volunteering

PAISS18, NeurIPS18, ELLIS Unit Copenhagen, MLLS

Skills

Languages

- Python (proficient); R, Matlab (good knowledge); C, Java, JavaScript (basic knowledge)

Research

- Accelerate, HF Transformers, LaTeX, NLTK, OpenCV, PyTorch, SpaCy, TensorFlow

Software

- AWS, CVX, Docker/podman, FastAPI, Git, GitHub Actions, Gradio, Linux, MinIO, MongoDB, MySQL, Travis

Miscellaneous

Summer/Winther Schools

- OxML22 , ProbAI21, M2L21, SMILES20, EEML20, RegML20, ETH School on PDEs, Tsinghua DL 2018, PAISS18

Talks

- Algorithmic Methods for Data Mining (Sapienza University), Bayesian Reading Group (DTU), MLLS Center (KU), UCL-NLP (London), Amazon Alexa (Cambridge), DeCoDE Lab (MIT)

Online Education

- Coursera: Machine Learning (Oct 2016), Deep Learning (Aug 2017).
- edX:

Computer Science (Nov 2016), Artificial Intelligence (Apr 2017), CS50 (Jan 2021),
Math for Quant Finance (Oct 2021), Causal Diagrams (Nov 2021), Science and Business of Biotech (Jun 2022).

- Udacity: Self-Driving Cars Nanodegree, 1st term (Dec 2017).

Associations/Communities

- Italian Association for Machine Learning (IAML)
- ContinualAI
- TribeAI