

# Marcin Sendera

PH.D. IN COMPUTER SCIENCE & DEEP LEARNING RESEARCHER

Kraków, Poland

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## Professional Summary

Probabilistic deep learning researcher with a PhD awarded with distinction (Jagiellonian University, May 2026), reviewed by Arnaud Doucet (University of Oxford / Google DeepMind), Amos Storkey (University of Edinburgh), and Piotr Miłoś (University of Warsaw / IMPAN / Mistral AI). Specialized in diffusion samplers, GFlowNets, generative models, and Bayesian inference, with multiple first-author publications at top-tier conferences like NeurIPS, ICML, and UAI.

Extensive international research experience including a year-long internship at Mila with Prof. Yoshua Bengio. Principal Investigator on a National Science Centre PRELUDIUM grant. Currently a research assistant at Jagiellonian University and AI researcher at NASK – National Research Institute, while exploring postdoctoral and research scientist positions at leading international labs.

## Research Interests

Probabilistic & Bayesian Deep Learning, Diffusion Samplers, GFlowNets, Generative Models, Amortised Variational Inference, AI Safety & Alignment, Reasoning in Generative Models, Machine Unlearning, AI for Science.

## Education

### Jagiellonian University, Doctoral School of Exact and Natural Sciences

Kraków, Poland

PH.D. IN COMPUTER SCIENCE

Oct. 2019 - May 2026

- Successfully defended on May 8, 2026. Awarded with distinction.
- Thesis: *"Probabilistic deep learning: from efficient sampling to principled generation"*. Advisor: Prof. Jacek Tabor.
- Thesis reviewers: Prof. Arnaud Doucet (University of Oxford / Google DeepMind), Prof. Amos Storkey (University of Edinburgh), and Prof. Piotr Miłoś (University of Warsaw / IMPAN / Mistral AI).
- GPA: 5.00/5.00
- Research focus on probabilistic approaches in deep learning, particularly density estimation, sampling from unnormalized distributions, generative models, and Bayesian inference.

### AGH University of Science and Technology

Kraków, Poland

M.SC. IN COMPUTER SCIENCE

Mar. 2017 - Apr. 2019

- GPA: 4.46/5.00
- Thesis: *"Data adaptation in HANDY economy-ideology model"*. Advisor: Prof. Witold Dzwiniel.

### AGH University of Science and Technology

Kraków, Poland

B.ENG. IN COMPUTER SCIENCE

Oct. 2013 - Feb. 2017

- GPA: 4.28/5.00
- Thesis: *"Car Travel Assistant"*. Advisor: Dr. Eng. Łukasz Czekerda.

## Current Positions

### Faculty of Mathematics and Computer Science, Jagiellonian University

Kraków, Poland

RESEARCH ASSISTANT

Mar. 2026 - Present

- Continuing research on probabilistic deep learning within the GMUM group with, e.g., Prof. Jacek Tabor and Dr. Stanisław Jastrzębski.
- Working on improving generative models by geometric properties, reasoning models and developing novel machine unlearning methods.
- Teaching assistant in the course: *"Fundamentals of Artificial Intelligence"*.

### NASK – National Research Institute, Poland

Warsaw, Poland

AI RESEARCH SCIENTIST

Mar. 2026 - Present

- Conducting theoretical and applied research on AI Safety focusing on LLMs and generative models.
- Currently focusing on automatic agentic red teaming, understanding the chain-of-thoughts in reasoning models and improving alignment with probabilistic methods.

## Research Experience

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### Mila – Québec Artificial Intelligence Institute, Université de Montréal

RESEARCH INTERN

Montréal, Canada

Oct. 2023 - Sep. 2024

- Conducted research in the group of Prof. Yoshua Bengio, focusing on improving diffusion samplers, modeling Bayesian posteriors, and Safe AI.
- This collaboration has so far resulted in four papers accepted at top-tier conferences (ICML, NeurIPS), with a leading author role in two of them.
- The collaboration on ongoing projects related to probabilistic inference (e.g., in AI for Science solutions) is still active.

### Hutchison-MRC Research Centre, University of Cambridge

RESEARCH INTERN (SUMMER STUDENTSHIP)

Cambridge, UK

Jul. 2018 - Sep. 2018

- Worked in the group of Dr. Shamith Samarajiva on deep learning methods for early cancer detection and multi-class classification from epigenetic (DNA methylation) data.
- Developed a method achieving 98.2% accuracy in multi-class classification between normal data and 13 different cancer types, leading to a journal publication (i.e., "Early detection and diagnosis of cancer with interpretable machine learning to uncover cancer-specific DNA methylation patterns").

## Industry Experience

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### UBS

MACHINE LEARNING ENGINEER

Kraków, Poland

Jan. 2020 - Jul. 2021

- Worked in an AI/ML R&D team to create an automated system for data extraction from various document formats (PDF, PNG, etc.) using state-of-the-art Large Language Models (LLMs).
- Developed an LLM-based solution to support decision-making processes for investments in financial instruments.

### UBS

INTERN IN AI/ML R&D TEAM

Kraków, Poland

Aug. 2019 - Dec. 2019

- Worked in an AI/ML R&D team as an intern, which led to change my position to the Machine Learning Engineer.
- Job was focused on using and evaluating the potential of Large Language Models (LLMs) to different aspects of UBS activity.

## Grants & Awards

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### AWARDS

2025	<b>Witold Lipski Award for Young Computer Scientists</b> , Awarded for outstanding achievements in applied computer science – i.e., for research on probabilistic deep learning. Each year there is only one award in theoretical CS and one in applied CS. Award ceremony at ML in PL Conference 2025, Copernicus Science Centre, Warsaw.	Poland
2023	<b>Best Paper Award Finalist at WACV 2023</b> , For "HyperShot: Few-shot learning by kernel hypernetworks", (i.e., top 12 of 639 papers).	Waikoloa, USA

### GRANTS

2024 – Present	<b>Team Member in CIFAR AI Catalyst Grant</b> , Team Member in the project: "AI Mathematician" (PI: Dr. Nikolay Malkin, University of Edinburgh).	Canada
2022 – 2026	<b>National Science Centre (NCN) PRELUDIUM 21 Grant</b> , Principal Investigator in the project: "How to learn faster: towards better adaptation in Meta-Learning" (Funding: 139,471 PLN).	Poland
2021 – 2026	<b>Scholarships in National Science Centre (NCN) Grants</b> , OPUS 25 (PI: Prof. Jacek Tabor), OPUS 22 & OPUS 19 (PI: Prof. Maciej Zięba).	Poland
2021 – 2022	<b>Mini-grant for Young Scientists, POB DigiWorld</b> , Principal Investigator in the project: "Deep Gaussian Processes for motion tracking with the use of Normalizing Flows" (Funding: 20,000 PLN).	Poland

## Invited Talks & Presentations

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### TALKS

#### **Beyond the Known: Probabilistic Inference for the AI Scientist**

ML IN PL CONFERENCE 2025 / WITOLD LIPSKI AWARD CEREMONY

The talk recording is available online – (click).

*Warsaw, Poland*

*Oct. 2025*

### POSTERS PRESENTATIONS

#### **Revisiting the Equivalence of Bayesian Neural Networks and Gaussian Processes: On the Importance of Learning Activations**

CONFERENCE ON UNCERTAINTY IN ARTIFICIAL INTELLIGENCE (UAI)

*Rio de Janeiro, Brazil*

*Jul. 2025*

#### **SEMU: Singular Value Decomposition for Efficient Machine Unlearning**

INTERNATIONAL CONFERENCE ON MACHINE LEARNING (ICML)

*Vancouver, Canada*

*Jul. 2025*

#### **Outsourced diffusion sampling: Efficient posterior inference in latent spaces of generative models**

INTERNATIONAL CONFERENCE ON MACHINE LEARNING (ICML)

*Vancouver, Canada*

*Jul. 2025*

#### **Improved off-policy training of diffusion samplers**

CONFERENCE ON NEURAL INFORMATION PROCESSING SYSTEMS (NEURIPS)

*Vancouver, Canada*

*Dec. 2024*

#### **Amortizing intractable inference in diffusion models for vision, language, and control**

CONFERENCE ON NEURAL INFORMATION PROCESSING SYSTEMS (NEURIPS)

*Vancouver, Canada*

*Dec. 2024*

#### **HyperShot: Few-Shot Learning by Kernel HyperNetworks**

IEEE/CVF WINTER CONFERENCE ON APPLICATIONS OF COMPUTER VISION (WACV)

*Waikoloa, USA*

*Jan. 2023*

#### **Non-Gaussian Gaussian Processes for Few-Shot Regression**

CONFERENCE ON NEURAL INFORMATION PROCESSING SYSTEMS (NEURIPS)

*Virtual*

*Dec. 2021*

#### **Missing Glow Phenomenon: Learning Disentangled Representation of Missing Data**

INTERNATIONAL CONFERENCE ON NEURAL INFORMATION PROCESSING (ICONIP)

*Virtual*

*Dec. 2021*

## Academic Service

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**Conference Reviewer** ICML (2022, 2024, 2025), NeurIPS (2023, 2025), ICLR (2024, 2025), WACV (2023), COLLAS (2023, 2024)

**Journal Reviewer** TMLR

#### **Summer School Organization**

- Co-organizer for MLSS on Reliability & Safety (2026).
- Co-organizer for MLSS on Drug and Materials Discovery (2025).
- Volunteer for MLSS on Applications in Science (2023).
- Volunteer for MLSS on on Neuroscience (2022).

#### **Academic Representation**

- Council of the Faculty of Mathematics and Computer Science, Jagiellonian University (2022 – 2024).
- Council of the Institute of Computer Science, Jagiellonian University (2022 – 2025).

#### **Memberships**

Member of the Machine Learning Research Group (GMUM) at Jagiellonian University (2019 – Present)

## Publications

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### CONFERENCE PROCEEDINGS

#### **SEMU: Singular Value Decomposition for Efficient Machine Unlearning**

**Marcin Sendera**, Łukasz Struski, Kamil Książek, Kryspin Musiol, Jacek Tabor, Dawid Rymarczyk

*International Conference on Machine Learning (ICML), 2025*

## **Revisiting the Equivalence of Bayesian Neural Networks and Gaussian Processes: On the Importance of Learning Activations**

**Marcin Sendera\***, Amin Sorkhei, Tomasz Kuśmierczyk\*

*Conference on Uncertainty in Artificial Intelligence (UAI), 2025*

## **Outsourced diffusion sampling: Efficient posterior inference in latent spaces of generative models**

Siddarth Venkatraman\*, Mohsin Hasan\*, Minsu Kim, Luca Scimeca, **Marcin Sendera**, Yoshua Bengio, Glen Berseth, Nikolay Malkin

*International Conference on Machine Learning (ICML), 2025*

## **Iterated Denoising Energy Matching for Sampling from Boltzmann Densities**

Tara Akhound-Sadegh\*, Jarrid Rector-Brooks\*, Joey Bose\*, Sarthak Mittal, Pablo Lemos, Cheng-Hao Liu, **Marcin Sendera**, Siamak Ravanbakhsh, Gauthier Gidel, Yoshua Bengio

*International Conference on Machine Learning (ICML), 2024*

## **Improved off-policy training of diffusion samplers**

**Marcin Sendera**, Minsu Kim, Sarthak Mittal, Pablo Lemos, Luca Scimeca, Jarrid Rector-Brooks, Alexandre Adam, Yoshua Bengio, Nikolay Malkin

*Conference on Neural Information Processing Systems (NeurIPS), 2024*

## **Amortizing intractable inference in diffusion models for vision, language, and control**

Siddarth Venkatraman\*, Moksh Jain\*, Luca Scimeca\*, Minsu Kim\*, **Marcin Sendera\***, Mohsin Hasan, Luke Rowe, Sarthak Mittal, Pablo Lemos, Emmanuel Bengio

*Conference on Neural Information Processing Systems (NeurIPS), 2024*

## **Hypershot: Few-shot learning by kernel hypernetworks**

**Marcin Sendera\***, Marcin Przewięźlikowski\*, Konrad Karanowski, Maciej Zięba, Jacek Tabor, Przemysław Spurek

*Proceedings of the IEEE/CVF winter conference on applications of computer vision (WACV), 2023*

## **Missing Glow Phenomenon: Learning Disentangled Representation of Missing Data**

**Marcin Sendera**, Łukasz Struski, Przemysław Spurek

*International Conference on Neural Information Processing (ICONIP), 2021*

## **Non-gaussian gaussian processes for few-shot regression**

**Marcin Sendera**, Jacek Tabor, Aleksandra Nowak, Andrzej Bedychaj, Massimiliano Patacchiola, Tomasz Trzcinski, Przemysław Spurek, Maciej Zieba

*Conference on Neural Information Processing Systems (NeurIPS), 2021*

## **Supermodeling: the next level of abstraction in the use of data assimilation**

**Marcin Sendera**, Gregory S Duane, Witold Dzwinel

*International Conference on Computational Sciences (ICCS), 2020*

## JOURNAL ARTICLES

### **From discrete-time policies to continuous-time diffusion samplers: Asymptotic equivalences and faster training**

Julius Berner\*, Lorenz Richter\*, **Marcin Sendera\***, Jarrid Rector-Brooks, Nikolay Malkin

*Transactions on Machine Learning Research (2026). 2026*

### **Early detection and diagnosis of cancer with interpretable machine learning to uncover cancer-specific DNA methylation patterns**

Izzy Newsham, **Marcin Sendera**, Sri Ganesh Jammula, Shamith A Samarajiwa

*Biology Methods and Protocols* 9.1 (2024) bpa028. Oxford University Press, 2024

### **The general framework for few-shot learning by kernel HyperNetworks**

**Marcin Sendera\***, Marcin Przewięźlikowski\*, Jan Miksa, Mateusz Rajski, Konrad Karanowski, Maciej Zięba, Jacek Tabor, Przemysław Spurek

*Machine Vision and Applications* 34.4 (2023) p. 53. Springer, 2023

### **OneFlow: One-class flow for anomaly detection based on a minimal volume region**

Łukasz Maziarka, Marek Śmieja, **Marcin Sendera**, Łukasz Struski, Jacek Tabor, Przemysław Spurek

*IEEE Transactions on Pattern Analysis and Machine Intelligence* 44.11 (2021) pp. 8508–8519. IEEE, 2021

## WORKSHOP PAPERS

### **Solving Bayesian inverse problems with diffusion priors and off-policy RL**

Luca Scimeca\*, Siddarth Venkatraman\*, Moksh Jain\*, Minsu Kim\*, **Marcin Sendera\***, Mohsin Hasan, Alexandre Adam, Yashar Hezaveh, Laurence Perreault-Levasseur, Yoshua Bengio

*ICLR 2025 Workshop on Deep Generative Model in Machine Learning: Theory, Principle and Efficacy*, \* equal contribution, 2025

### **Hi-fi functional priors by learning activations**

**Marcin Sendera\***, Amin Sorkhei, Tomasz Kuśmierczyk\*

*NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty*, \* equal contribution, 2024

### **Amortizing intractable inference in diffusion models for Bayesian inverse problems**

Siddarth Venkatraman\*, Moksh Jain\*, Luca Scimeca\*, Minsu Kim\*, **Marcin Sendera\***, Mohsin Hasan, Luke Rowe, Sarthak Mittal, Pablo Lemos, Emmanuel Bengio

*Proc. Workshop on Machine Learning and the Physical Sciences. Accessed*, \* equal contribution, 2024

### **Flow-based SVDD for anomaly detection**

**Marcin Sendera**, Marek Śmieja, Łukasz Maziarka, Łukasz Struski, Przemysław Spurek, Jacek Tabor

*ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models*, 2021

## PREPRINTS

### **Monitoring the Internal Monologue: Probe Trajectories Reveal Reasoning Dynamics**

Maciej Chrabąszcz, Aleksander Szymczyk, **Marcin Sendera**, Tomasz Trzciniński, Sebastian Cygert  
*arXiv preprint arXiv:2605.18549 (2026)*. 2026

### **BARRIER: Bounded Activation Regions for Robust Information Erasure**

Jan Miksa, Patryk Krukowski, Przemysław Spurek, Dawid Rymarczyk, **Marcin Sendera**  
*arXiv preprint arXiv:2605.15737 (2026)*. 2026

### **AutoLoRA: AutoGuidance Meets Low-Rank Adaptation for Diffusion Models**

Artur Kasymov, **Marcin Sendera**, Michał Stypułkowski, Maciej Zięba, Przemysław Spurek  
*arXiv preprint arXiv:2410.03941 (2024)*. 2024

## References

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Available upon request.

A letter of recommendation from Prof. Yoshua Bengio is available upon request.