

# Vitória Barin Pacela

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GitHub [vitoriapacela](#) Website [vitoriapacela.github.io](http://vitoriapacela.github.io)

## Education

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**Université de Montréal, Mila** 2021–present  
*Ph.D. Computer Science, DIRO*  
Supervisor: Professor [Simon Lacoste-Julien](#).

**University of Helsinki** 2019–2021  
*M.Sc. Data Science*  
**Thesis:** “Independent Component Analysis for Binary Data”.  
Supervisors: Professor [Aapo Hyvärinen](#) and Dr. [Antti Hyttinen](#).

**University of Helsinki** 2015–2019  
*B.Sc. Computer Science*  
Minors in Theoretical Physics and Methodological Sciences (Mathematics and Statistics).  
**Thesis:** “Energy Regression for Imaging Calorimetry with Deep Learning”.

## Publications

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[V. Barin-Pacela\\*](#), [S. Joshi\\*](#), [I. Camacho](#), [S. Lacoste-Julien](#), [D. Klindt](#). *Stop Probing, Start Coding: Why Linear Probes and Sparse Autoencoders Fail at Compositional Generalisation*. **arXiv preprint arXiv:2603.28744**. ([Paper](#))

[V. Barin-Pacela](#), [K. Ahuja](#), [S. Lacoste-Julien](#), [P. Vincent](#). *Operationalizing Quantized Disentanglement*. **arXiv preprint arXiv:2511.20927**. ([Paper](#))

[V. Barin-Pacela](#), [K. Ahuja](#), [S. Lacoste-Julien](#), [P. Vincent](#). *On the Identifiability of Quantized Factors*. 2024. **3rd Conference on Causal Learning and Reasoning (CLear)**. ([Paper](#))

[A. Hyttinen](#), [V. Barin-Pacela](#), [A. Hyvärinen](#). *Binary Independent Component Analysis: A Non-stationarity-based Approach*. **38th Conference on Uncertainty in Artificial Intelligence (UAI)**. 2022. ([Paper](#))

[D. Belayneh](#), [F. Carminati](#), [A. Farbin](#), [B. Hooberman](#), [G. Khattak](#), [M. Liu](#), [J. Liu](#), [D. Olivito](#), [V. Barin Pacela](#), [M. Pierini](#), [A. Schwing](#), [M. Spiropulu](#), [S. Vallecorsa](#), [J-R. Vlimant](#), [W. Wei](#), and [M. Zhang](#). *Calorimetry with Deep Learning: Particle Identification and Simulation for Collider Physics*. **The European Physical Journal C**, 80 (7), 1-31, 2020. ([Paper](#))

## Work Experience

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**Cold Spring Harbor Laboratory** Jun. 2025–Sep. 2025  
*NeuroAI Summer Intern, NY (USA)*  
Worked with Professor [David Klindt](#) on out-of-distribution generalization in the overcomplete setting through sparse coding as an alternative to Sparse Autoencoders. Mentored student from Undergraduate Research Program. Manuscript in preparation.

**Meta – Fundamental AI Research (FAIR)** Oct. 2022–Oct. 2024

*Visiting Researcher, Montréal (CA), Part-time*

Worked with Professor [Pascal Vincent](#) and [Kartik Ahuja](#) on the identifiability of quantized factors [CLEaR 2024] and a practical criterion for quantized disentanglement.

**University of Helsinki**

2020–2021

*Research Assistant, Computer Science Department, Helsinki (FI)*

Worked with Professor Aapo Hyvärinen and Dr. Antti Hyttinen on Independent Component Analysis for binary observations employing identifiable variational autoencoders [UAI 2022].

**Mila – Quebec Artificial Intelligence Institute**

2019

*Summer Research Intern, Université de Montréal, Montreal (CA), Full-time*

Worked under Professor Yoshua Bengio in the project Visualizing the Impact of Climate Change, predicting the streamflow of rivers for flood forecasting.

**Helsinki Institute of Physics**

2017–2018

*Undergraduate Research Assistant, University of Helsinki, Helsinki (FI), Part-time*

Worked in Professor Mikko Voutilainen’s group, a member of the Compact Muon Solenoid (CMS) collaboration, on jet energy reconstruction and fast calorimeter simulation with Generative Adversarial Networks (GANs).

**CERN Openlab (Report) (Talk)**

2018

*Summer Student Intern, CERN, Geneva (CH), Full-time*

Worked with Dr. Maurizio Pierini on fast calorimeter simulation using GANs, at the CMS experiment [LXAI&WiML 2019].

**Caltech Group at LHC’s CMS Experiment**

2017

*Summer Undergraduate Research Fellow, Geneva (CH), Full-time*

Worked under Professor Maria Spiropulu, Dr. Maurizio Pierini, and Dr. Jean-Roch Vlimant employing deep convolutional neural networks to estimate the energy of particles in the Linear Collider Detector calorimeter [EPJC 20].

**Accelerator Laboratory**

2016–2017

*Undergraduate Research Assistant, University of Helsinki, Helsinki (FI), Part-time*

Worked under Professor Kai Nordlund analyzing mechanical properties of nanowires through molecular dynamics simulations.

**California Institute of Technology (Caltech)**

2016

*Summer Undergraduate Research Fellow, Pasadena (USA), Full-time*

Worked under Professor Harry Atwater on the mid-infrared band structure characterization of double-gyroid photonic crystals.

## Invited Talks

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Workshop on Variational Autoencoders. [Bayes Plurinacional](#). October 2025, Bogotá, Colombia.

Quantized Disentanglement: theory and practice.

- [EIA University](#). October 2025, Medellín, Colombia.
- [Bellairs Workshop on Causality](#), February 2025, Barbados.

On the Identifiability of Quantized Factors.

- [Cold Spring Harbor Laboratory](#), October 2024. New York, USA.
- [Institute of Science and Technology Austria \(ISTA\)](#), July 2024. Vienna, Austria.

Introduction to Probability. [Mila GFLowNet Workshop](#). November 2023, Montreal, Canada. [\(Video\)](#)

Análise de Componentes Independentes para Dados Binários. January 2023, Rio de Janeiro, Brazil.

- Instituto de Matemática Pura e Aplicada (IMPA), Seminário Centro Pi. [\(Video\)](#)
- FGV EMap – Escola de Matemática Aplicada, Seminar.

## Selected Awards

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**Amii's Upper Bound Talent Bursary** 2025  
*\$1,250.*

**Mila EDI Scholarship** 2024–2027  
*Excellence Scholarship – Women in AI, \$8,000 per year.*

**Professor Cho Diversity Award** 2021  
*Selected scholar, Mila, \$1,500.*

**Instituto TIM Selected Scholar** 2015–2019  
*Scholarship for medalists of the Brazilian Mathematics Olympiad of Public Schools (OBMEP) enrolled in STEM undergraduate degrees, R\$57,600.*

**Scientific Olympiads** 2009–2014  
*Won 21 prizes in Brazilian scientific competitions during primary and secondary school, including a gold medal at OBMEP. Participated in six summer schools in physics and mathematics.*

## Teaching

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**Teaching Assistant** 2025  
*Université de Montréal, DIRO*

Representation Learning course ([IFT6135-H25 A+B](#)) lectured by Professor [Aaron Courville](#).

Responsibilities: Creating new assignments (theoretical and practical/coding), releasing and correcting assignments, answering students' questions in person and online. Provided material and support for both the French and English versions of the course.

## Selected Service

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**Conference Reviewer**  
*AISTATS 2024 and 2025, CLear 2025, UAI 2025*

**Reviewer, Mila PhD/MSc applications** 2023-2024

**Meta Women in AI Steering Committee** 2023–2024  
*Montreal Lead*

**Mental Health First Aider – Mila** 2023  
*Certified training by the [Mental Health Commission of Canada](#)*

**Mila Library** 2022–2023  
*Created and managed a library of books at Mila.*

## Workshop Reviewer

*SCIS* at ICML 2023, *SPIGM* at ICML 2023, *CRL* at UAI 2022, *WiML* at NeurIPS 2019, *LXAI* at NeurIPS 2019.

**Mila Mental Health Committee** 2023  
*Board member*

**Women in Machine Learning (WiML) Breakout Session** 2023  
*Leveraging Large Scale Models for Identifying and Fixing Deep Neural Networks Biases*  
Co-organized with Polina Kirichenko, Reyhane Askari, Megan Richards, and Mohammad Pezeshki.

**Conference Volunteer** 2023, 2025  
*WiML, LXAI Workshops at ICML 2023, ICML main conference in 2025.*

**Teaching Skills Committee** 2020  
*University of Helsinki, Department of Computer Science*  
Student member, **assessed teaching demonstrations and teaching merits** of candidates to the positions of **professor** and docent.

**International Masterclasses** 2017–2026  
*Invited panelist, Hands on Particle Physics at IFT & NCC – UNESP, São Paulo*  
Participated in round tables in the international day of women and girls in science, as well as in the general masterclasses.

## Extended abstracts/Posters

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V. Barin Pacela, K. Ahuja, S. Lacoste-Julien, P. Vincent. Quantized Disentanglement: A Practical Approach. *SIM Workshop at ICML 2025*, Vancouver, Canada.

V. Barin Pacela, K. Ahuja, S. Lacoste-Julien, P. Vincent. On the Identifiability of Quantized Factors. *RIIAA LATAM 2024*, Quito, Ecuador. (Travel award)

V. Barin Pacela, K. Ahuja, S. Lacoste-Julien, P. Vincent. Identifiability of Discretized Latent Coordinate Systems via Density Landmarks Detection. *SCIS, SPIGM, and LXAI workshops at ICML 2023*, Honolulu, Hawaii, USA. (Travel award)

V. Barin Pacela, Antti Hyttinen, Aapo Hyvärinen. Independent Component Analysis for Binary Data with Variational Autoencoders. *CIFAR DLRL Summer School 2021*, Canada.

V. Barin Pacela, M. Pierini. Fast Calorimeter Simulation with Wasserstein Generative Adversarial Networks. *LXAI and WiML workshops at NeurIPS 2019*, Vancouver, Canada. (Travel award)

B. Hooberman, M. Zhang, W. Wei, V. Barin Pacela, G. Khattak, S. Vallecorsa, A. Farbin, J-R. Vlimant, F. Carminati, M. Spiropulu, M. Pierini. Calorimetry with Deep Learning: Particle Classification, Energy Regression, and Simulation for High-Energy Physics. *DLPS Workshop at NIPS 2017*, Long Beach, California, USA. ([Paper](#))

## Languages

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Portuguese (native), English (fluent), French (advanced), Finnish (elementary)

## Skills

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PYTHON, PYTORCH, GIT, SLURM, L<sup>A</sup>T<sub>E</sub>X

## Yoga

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**Hatha & Vinyasa Yoga Teacher Training (380h)**

2025-2026

*Yoga Sangha, Montreal*

With [Sylvie Tremblay](#) and Sangha's senior faculty.