Vitória Barin Pacela

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Education

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

V. Barin-Pacela, K. Ahuja, S. Lacoste-Julien, P. Vincent. Operationalizing Quantized Disentanglement. **Under submission**. (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

Cold Spring Harbor Laboratory Jun. 2025–Sep. 2025
NeuroAI Summer Intern, NY (USA)
Worked with Professor David Klindt on out-of-distribution generalization with sparse coding. 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 on identifiable representation learning/disentanglement and collaborated with Dr. Kartik Ahuja. Project on the identifiability of quantized factors published at CLeaR 2024 and another paper under submission.

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

Workshop on Variational Autoencoders. **Bayes Plurinacional**. October 2025, Bogotá, Colombia.

Quantized Disentanglement: theory and practice.

- **Bellairs Workshop on Causality**, February 2025, Barbados.
- **EIA University**. October 2025, Medellín, Colombia.

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

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

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

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 2017–2025
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

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

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

Skills

Python, PyTorch, Git, Slurm, LaTeX

Yoga

Hatha & Vinyasa Yoga Teacher Training (380h) 2025-2026
Yoga Sangha, Montreal
With Sylvie Tremblay.