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".

Employment

Meta – Fundamental AI Research (FAIR)   2022-present
Visiting Researcher, Montréal (CA), Part-time
>   Working with Professor Pascal Vincent on identifiable representation learning and out-of-distribution generalization.

Publications

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)

Presentations

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

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.

Selected Service

Conference Reviewer   2023
International Conference on Artificial Intelligence and Statistics (AISTATS)

Meta Women in AI Steering Committee   2023-2024
Montreal Lead

Reviewer, Mila PhD/MSc applications   2023

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.

Volunteer   2023
WiML, LXAI Workshops at ICML

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   2017-2024

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.

Research internships

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.

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.

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.

Extended abstracts/Posters

<u>V. Barin Pacela</u>, K. Ahuja, S. Lacoste-Julien, P. Vincent. On the Identifiability of Quantized Factors. *RIIAA LATAM 2024*, Quito, Ecuador.

<u>V. Barin Pacela</u>, 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.

<u>V. Barin Pacela</u>, 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.

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)