Jose Gallego-Posada

CONTACT Montréal, Canada ✉ jgalle29 (at) gmail (dot) com

EDUCATION

Université de Montréal / Mila **2018 - 2024**
Ph.D. in Computer Science GPA: 4.3/4.0 ≡ A$^+$
Supervised by Simon Lacoste-Julien
Thesis: *Constrained Optimization for Machine Learning: Algorithms and Applications*

Universiteit van Amsterdam **2016 - 2018**
M.Sc. in Artificial Intelligence *Cum laude* - GPA: 9.4/10 ≡ A$^+$
Thesis: *Simplicial AutoEncoders: A connection between Algebraic Topology and Probabilistic Modelling* - Committee: Patrick Forré and Max Welling

Universidad EAFIT **2012 - 2016**
B.Sc. in Mathematical Engineering *Cum laude* - GPA: 4.87/5.0 ≡ A$^+$

- Highest graduation GPA on record for the B.Sc. in Mathematical Engineering
- Represented EAFIT in Colombian and Ibero-American University Mathematics Olympiads

RESEARCH INTERESTS

Machine learning, (constrained) optimization, model sparsity, information theory, federated learning, (differential) geometry, equivariance

PROFESSIONAL EXPERIENCE

Visiting Researcher at **Meta AI** *Montréal, CA* **[Jan 2023 - Jan 2024]**
Scalable second-order optimization for deep learning with Michael Rabbat and Michael Shi.

PhD Intern at **Qualcomm AI Research** *Amsterdam, NL* **[Jul-Nov 2022]**
Sparsity techniques in federated learning with Matthias Reisser and Christos Louizos.

PhD Intern at **Qualcomm AI Research** *Amsterdam, NL* **[Jun-Oct 2020]**
Non-uniform data sampling in post-training quantization of deep models with Markus Nagel.

Research Intern at **Sethos Capital Partners** *Medellín, CO* **[Nov 2015 - May 2016]**
Developed a data mining platform for analyzing the financial and social impact of investments in Colombian infrastructure.

SELECTED PUBLICATIONS

- M. Sohrabi, J. Ramirez, T. Zhang, S. Lacoste-Julien and **J. Gallego-Posada**, *On PI Controllers for Updating Lagrange Multipliers in Constrained Optimization*, ICML 2024. [OpenReview] [pdf] [code] [talk]
- M. Hashemizadeh, J. Ramirez, R. Sukumaran, G. Farnadi, S. Lacoste-Julien and **J. Gallego-Posada**, *Balancing Act: Constraining Disparate Impact in Sparse Models*, ICLR 2024. [OpenReview] [pdf] [code]
- HJM. Shi, TH. Lee, S. Iwasaki, **J. Gallego-Posada**, Z. Li, K. Rangadurai, D. Mudigere and M. Rabbat, *A Distributed Data-Parallel PyTorch Implementation of the Distributed Shampoo Optimizer for Training Neural Networks At-Scale*, 2023. [pdf] [code]
- **J. Gallego-Posada**, J. Ramirez, A. Erraqabi, Y. Bengio and S. Lacoste-Julien, *Controlled Sparsity via Constrained Optimization or: How I Learned to Stop Tuning Penalties and Love Constraints*, NeurIPS 2022. [OpenReview] [pdf] [code] [short video] [talk]
- S. Koseki, S. Jameson, G. Farnadi, D. Rolnick, C. Régis, J-L. Denis et al. *AI & Cities: Risks, Applications and Governance*, United Nations Human Settlements Programme (UN-Habitat) Technical Report, 2022. [pdf]
- J. Ramirez and **J. Gallego-Posada**, *L_0onie: Compressing COINs with L_0-constraints*, Sparsity in Neural Networks Workshop 2022. [pdf] [poster] [code]
- S. Basu, **J. Gallego-Posada**, F. Viganò, J. Rowbottom and T. Cohen, *Equivariant Mesh Attention Networks*, TMLR Aug 2022. [OpenReview] [pdf] [code]

- **J. Gallego-Posada**, J. Ramirez and A. Erraqabi, *Flexible Learning of Sparse Neural Networks via Constrained L_0-Regularization*, NeurIPS 2021 LatinX in AI Workshop. [pdf]
- **J. Gallego-Posada** and P. Forré, *Simplicial Regularization*, ICLR 2021 Workshop on Geometrical and Topological Representation Learning. [pdf] [poster]
- S. Vaswani, R. Babanezhad, **J. Gallego-Posada**, A. Mishkin, S. Lacoste-Julien, N. Le Roux, *How to make your optimizer generalize better*, spotlight at NeurIPS 2020 Opt+ML Workshop. Earlier version accepted at Montreal AI Symposium 2020. [pdf]
- **J. Gallego-Posada**, A. Vani, M. Schwarzer and S. Lacoste-Julien, *GAIT: A Geometric Approach to Information Theory*, oral at NeurIPS 2019 Workshop on Information Theory and ML; AISTATS 2020. [pdf] [short video] [talk]
- **J. Gallego-Posada** and P. Forré, *Simplicial AutoEncoders: A connection between Algebraic Topology and Probabilistic Modelling*, MSc Thesis, 2018. [pdf]
- F. Oliehoek, R. Savani, **J. Gallego-Posada**, E. van der Pol and R. Groß, *Beyond Local Nash Equilibria for Adversarial Networks*, Benelearn, 2018. [pdf]
- **J. Gallego-Posada**, D. Montoya-Zapata, and O. Quintero-Montoya, *Detection and Diagnosis of Breast Tumors using Deep Convolutional Neural Networks*, in Proceedings of the XVII Latin American Conference on Automatic Control, Universidad EAFIT, pp. 11–17, 2016. [pdf]
- **Jose Gallego-Posada** and M. Puerta, *Interval Analysis and Optimization Applied to Parameter Estimation under Uncertainty*, Boletim da Sociedade Paranaense de Matemática, vol. 36, no. 2, pp. 107-124, 2018. [pdf]

Awards

- Sep 2021 - **Excellence in Teaching Award** - *Université de Montréal*
- May 2021 - **PhD Excellence Scholarship**, *IVADO*
- Feb 2021 - **Doctoral Research Diversity Award** - *Microsoft/Mila*
- Aug 2018 - ***Cum laude* graduation** - *Universiteit van Amsterdam*
- Jul 2016 - ***Cum laude* graduation** - Top university-wide GPA - *Universidad EAFIT*
- Jun 2016 - **Saber PRO Award in Engineering** (Top 0.3%) - *Min. of Education, Col.*
- Jan, Jun 2013, Jun 2014, Jan 2015 - **B.Sc. Honors Scholarship** - *Universidad EAFIT*
- Jun 2012 - **ICFES Andres Bello Award in Chemistry** - *Department of Antioquia*
- Dec 2011 - Top 100/370k (Top 0.02%) in Colombian National High School Examination

Academic Service

- General chair for the LatinX in AI Workshop at ICML 2023.
- Elected lab representative for graduate students at Mila during 2020-2021 and 2021-2022.
- Program Committee chair for the LatinX in AI Workshop at NeurIPS 2021.
- Reviewer for Journal of Machine Learning Research; ICLR 2024; Montreal AI Symposium 2020-2022; LXAI Workshop at ICML 2021.
- Co-organizer of the Job Market Talks - a seminar at Mila in which external speakers coach students on the diverse aspects of the academic and industrial job markets.
- Content creator for the lectures on Optimization at Neuromatch DL Academy 2021.

Teaching Experience

Teaching Assistant at **Mila**, **Université de Montréal** *Montréal, CA* **[2019 - 2022]**

Graduate-level courses on Probabilistic Graphical Models by Simon Lacoste-Julien (Fall 2019 and 2020) and Theoretical Principles for Deep Learning by Ioannis Mitliagkas (Winter 2020, 2021 and 2022).

Teaching Assistant at **Vrije Universiteit Amsterdam** *Amsterdam, NL* **[2017]**

Graduate-level Computational Intelligence and undergrad Machine Learning courses offered by the joint VU/UvA program in AI under the coordination of Evert Haasdijk.

Teaching Assistant at **Universidad EAFIT** *Medellín, CO* **[2014]**

Undergraduate course on Statistics by Myladis Cogollo.