Jose Javier Gonzalez Ortiz

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SUMMARY

I am a Research Scientist at DataBricks Mosaic Research, where I work in the Training and Inference Efficiency team investigating how to improve performance and capabilities of large language models. I recently completed my PhD in Computer Science at MIT CSAIL, where I worked on developing efficient deep learning methods, such as few-shot in-context vision models, amortized learning with hypernetworks, and asynchronous large-scale distributed training.

EDUCATION

Massachusetts Institute of Technology   2019-2023

Ph.D. Computer Science (GPA: 5.00/5.00)
Advised by Prof. John Guttag
Thesis: Learning Reconfigurable Vision Models

Massachusetts Institute of Technology   2017-2019

M.Sc. Computer Science (GPA: 5.00/5.00)
Thesis: Learning from Few Subjects with Large Amounts of Voice Monitoring Data
Key Courses: Machine Learning, Computer Vision, Distributed Systems, Computer Systems Security

Universidad Pontificia Comillas   2012-2016

B.Sc. Telematics Engineering, (GPA: 9.95/10.00)
Thesis: A Simple Power Analysis Attack on the TwoFish Key Schedule
Key Courses: Linear Algebra, Operations Research, Computer Architecture, Parallel Computing
Exchange program: University of Michigan, Computer Science (GPA: 3.94/4.00)

RESEARCH AND WORK EXPERIENCE

DataBricks, San Francisco, Research Scientist   2023-Present

- Part of the Training and Inference Efficiency team in Mosaic Research, investigating how to improve performance and capabilities of large language models.

Microsoft Research, Cambridge, Research Intern   2022

- Studied deep learning model mixing dynamics informed by optimal transport dataset distance heuristics.
- Performed experiments on how learned model weight interpolation can outperform finetuning for vision classifiers.

Facebook AI Research, Montreal, Research Intern   2020

- Led a project analyzing distributed training of deep neural networks, with an emphasis on improving generalization performance & reducing communication costs by utilizing post-local SGD.
- Carried out experiments to identify the optimal synchronization trade-off when training ResNet models on ImageNet in a distributed data parallel regime over many nodes.

CERN Openlab, Geneva, Software Engineering Intern   2017

- Benchmarked the ROOT data framework for genomic data storage, improving read speed by over 15x.

University of Michigan, Ann Arbor, Research Assistant   2016

- Developed a machine learning classifier for heart sound classification algorithm based on temporal alignment techniques, MFCC frequency analysis and support vector machines.

Institute for Research in Technology, Madrid, Research Assistant   2014-2015

- Development of applications with Google Glass for people with motor disabilities.

AWARDS

Qualcomm Innovation Fellowship	2018
la Caixa Foundation Fellowship	2017
Undergraduate Excellence Award Universidad Pontificia Comilas (awarded to top 3% of students)	2016
County of Madrid Scholarship for Excellent Academic Performance	2012, 2013, 2014, 2015

PUBLICATIONS

(∗) equal contribution

CONFERENCES AND PEER REVIEWED WORKSHOPS

Dan Biderman, **Jose Javier Gonzalez Ortiz**, Jacob Portes, Mansheej Paul, Philip Greengard, Connor Jennings, Daniel King, Sam Havens, Vitaliy Chiley, Jonathan Frankle, Cody Blakeney, and John P. Cunningham
"LoRA Learns Less and Forgets Less"
Transactions on Machine Learning Research – TMLR (2024).

Marianne Rakic, Hallee Wong, **Jose Javier Gonzalez Ortiz**, Beth Cimini, John Guttag, and Adrian V. Dalca
"Tyche: Stochastic In-Context Learning for Universal Medical Image Segmentation"
Computer Vision and Pattern Recognition Conference – CVPR (2024). Highlight.

Jose Javier Gonzalez Ortiz, John Guttag, and Adrian Dalca
"Magnitude Invariant Parametrizations Improve Hypernetwork Learning"
International Conference on Learning Representations – ICLR (2024).

Jose Javier Gonzalez Ortiz, John Guttag, and Adrian Dalca
"Scale-Space Hypernetworks for Efficient Biomedical Imaging"
Neural Information Processing Systems – NeurIPS (2023).

Jose Javier Gonzalez Ortiz∗, Victor Ion Butoi∗, Tianyu Ma, Mert R. Sabuncu, John Guttag, and Adrian V. Dalca
"UniverSeg: Universal Medical Image Segmentation"
International Conference on Computer Vision – ICCV (2023).

Jose Javier Gonzalez Ortiz∗, Kathleen M Lewis∗, Divya M Shanmugam∗, Agnieszka Kurant, and John Guttag
"At the Intersection of Conceptual Art and Deep Learning: The End of Signature"
NeurIPS Workshop on Broadening Research Collaborations in ML (2022).

Jose Javier Gonzalez Ortiz, Jonathan Frankle, Mike Rabbat, Ari Morcos, and Nicolas Ballas
"Trade-Offs of Local SGD at Scale: An Empirical Study"
NeurIPS Optimization for Machine Learning Workshop (2020).

Jose Javier Gonzalez Ortiz∗, Davis Blalock∗, Jonathan Frankle, and John Guttag
"What is the State of Neural Network Pruning?"
Third Conference on Machine Learning and Systems – MLSys (2020).

Jose Javier Gonzalez Ortiz, Davis Blalock, and John Guttag
"Standardizing Evaluation of Neural Network Pruning"
AI Systems Workshop at Symposium on Operating Systems Principles – SOSP (2019).

Jose Javier Gonzalez Ortiz, Daryush Mehta, Jarrad Van Stan, Robert Hillman, John Guttag, and Marzyeh Ghassemi
"Learning from Few Subjects with Large Amounts of Voice Monitoring Data"
Machine Learning for Healthcare Conference (2019).

Ava Soleimany, Harini Suresh, **Jose Javier Gonzalez Ortiz**, Divya Shanmugam, Nil Gural, John Guttag, and Sangeeta Bhatia
"Image Segmentation of Liver Stage Malaria Infection"
ICML Workshop on Computational Biology. 2019.

Jose Javier Gonzalez Ortiz, Cheng Perng Phoo, and Jenna Wiens
"Heart Sound Classification based on Temporal Alignment Techniques"
Computing in Cardiology Conference. IEEE. 2016, pp. 589–592.

THESES

Jose Javier Gonzalez Ortiz
"Learning Reconfigurable Vision Models"
Ph.D. Thesis. Massachusetts Institute of Technology, Oct. 2023. URL: https://dspace.mit.edu/handle/1721.1/153839.

Jose Javier Gonzalez Ortiz
"Learning from Few Subjects with Large Amounts of Voice Monitoring Data"
M.Sc. Thesis. Massachusetts Institute of Technology, June 2019.

Jose Javier Gonzalez Ortiz
"A simple power analysis attack on the TwoFish key schedule"
Bachelor Thesis. Universidad Pontificia Comillas ICAI, July 2016,
Advised by Kevin J. Compton at University of Michigan.

Academic Service

<u>Teaching</u>

Teaching Assistant, 6.5840 Distributed systems (previously 6.824), MIT 2021

Co-organizer, instructor, The Missing Semester of Your CS Education, MIT 2020

Co-organizer, instructor, 6.HT: Hacker Tools, MIT 2019

Teaching Assistant, 6.S191: Introduction to Deep Learning, MIT 2018

<u>Reviewer</u>

Neural Information Processing Systems (NeurIPS) 2022

International Conference on Learning Representations (ICLR) 2022

Neural Information Processing Systems (NeurIPS) 2021

International Conference on Machine Learning (ICML) 2021

Neural Information Processing Systems (NeurIPS) 2020

Machine Learning for Healthcare (MLHC) 2020

Invited Talks

Nvidia Research – Universal Medical Image Segmentation 2023

Path AI – Universal Medical Image Segmentation 2023

Google Brain – Universal Medical Image Segmentation 2023

Samaya AI – Universal Medical Image Segmentation 2023

Microsoft Research New England – Amortized Learning with Hypernetworks 2022

MGH & HMS – Scale-Space Hypernetworks 2022

Cornell Sablab – Scale-Space Hypernetworks 2022

MosaicML – What is the State of Neural Network Pruning? 2021

Sparse NN Workshop – What is the State of Neural Network Pruning? 2021

Facebook AI Montreal – Trade-Offs of Local SGD at Scale 2020

Universidad Pontificia Comillas – Standardizing Evaluation of Neural Network Pruning 2020

Google Research – What is the State of Neural Network Pruning? 2020

Facebook AI Montreal – What is the State of Neural Network Pruning? 2020

Qualcomm Research – Standardizing Evaluation of Neural Network Pruning 2019

Technical Skills

Deep Learning: PyTorch, Transformers

Computer Vision: OpenCV, Torchvision, Skimage, Kornia

Data Science: NumPy, SciPy, Pandas, sklearn, seaborn

Software: Git, Python, C, Go, SQL

DevOps: Docker, Ansible

Databases: Redis, SQLite, LMDB