

# Jose Javier Gonzalez Ortiz

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## SUMMARY

I am a Research Scientist at DataBricks part of the Mosaic Research team, where I am investigating how to improve the pretraining and finetuning 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, asynchronous large-scale distributed training, and neural network pruning techniques.

## EDUCATION

**Massachusetts Institute of Technology** 2019-2023

Ph.D. Computer Science

Advised by Prof. John Guttag and Prof. Adrian Dalca

Thesis Topic: Development of more general deep learning models trained to solve multiple problems simultaneously through strategies such as in-context learning and amortized learning with hypernetworks.

**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 Mosaic Research pretraining team, currently investigating how to improve large scale training of LLMs (Large Language Models) from an algorithmic and implementation perspective.

**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 Comillas (awarded to top 3% of students) 2016

## PUBLICATIONS

(\*) equal contribution

### CONFERENCES AND PEER REVIEWED WORKSHOPS

**Jose Javier Gonzalez Ortiz**, John Gutttag, and Adrian Dalca

“Magnitude Invariant Parametrizations Improve Hypernetwork Learning”  
*International Conference on Learning Representations – ICLR (2024)*.

**Jose Javier Gonzalez Ortiz**, John Gutttag, 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 Gutttag, 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 Gutttag

“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 Gutttag

“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 Gutttag

“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 Gutttag, 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 Gutttag, 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 Modles”  
Ph.D. Thesis. Massachusetts Institute of Technology, Oct. 2023.

**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

### TEACHING

<b>Teaching Assistant</b> , 6.5840 Distributed systems (previously 6.824), MIT	2021
<b>Co-organizer, instructor</b> , The Missing Semester of Your CS Education, MIT	2020
<b>Co-organizer, instructor</b> , 6.HT: Hacker Tools, MIT	2019
<b>Teaching Assistant</b> , 6.S191: Introduction to Deep Learning, MIT	2018

### REVIEWER

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

<b>Nvidia Research</b> – Universal Medical Image Segmentation	2023
<b>Path AI</b> – Universal Medical Image Segmentation	2023
<b>Google Brain</b> – Universal Medical Image Segmentation	2023
<b>Samaya AI</b> – Universal Medical Image Segmentation	2023
<b>Microsoft Research New England</b> – Amortized Learning with Hypernetworks	2022
<b>MGH &amp; HMS</b> – Scale-Space Hypernetworks	2022
<b>Cornell Sablab</b> – Scale-Space Hypernetworks	2022
<b>MosaicML</b> – What is the State of Neural Network Pruning?	2021
<b>Sparse NN Workshop</b> – What is the State of Neural Network Pruning?	2021
<b>Facebook AI Montreal</b> – Trade-Offs of Local SGD at Scale	2020
<b>Universidad Pontificia Comillas</b> – Standardizing Evaluation of Neural Network Pruning	2020
<b>Google Research</b> – What is the State of Neural Network Pruning?	2020
<b>Facebook AI Montreal</b> – What is the State of Neural Network Pruning?	2020
<b>Qualcomm Research</b> – 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