Jacob Sanz-Robinson

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Education

PhD Candidate: Computational Neuroscience   *Sep. 2020 - present*
McGill University, Montreal, QC, Canada - Supervisors: *Jean-Baptiste Poline, Tristan Glatard.*
Thesis topics: *Neuroimaging, Pipeline Reproducibility, Big Data Infrastructures, Bioinformatics, Machine Learning.*

Bachelor of Science: Honours Computer Science, *First Class Honours distinction*   *Sep. 2016 - May 2020*
McGill University, Montreal, QC, Canada - Minor in Musical Science and Technology.

Experience

Graduate Research Assistant, The Neuro, McGill University (NeuroDataScience, Big Data labs.) *Sep. 2020 - present*
• Developed 'NeuroCI', a scalable framework to automate neuroimaging workflows on HPC clusters via Continuous
Integration, running multiple imaging pipelines on large clinical datasets (200GB–500TB) to assess result variability.
• Trained lightweight CNN variants of popular neuroimaging segmentation pipelines (leveraging the FastSurfer
architecture) to reproduce traditional analytical outputs in seconds instead of hours, enabling rapid variability exploration.
• Aggregated segmentation outputs from multiple pipelines to build ensemble-based predictive CNN models for brain age
estimation, achieving improved accuracy over single-pipeline baselines.
• Reduced segmentation review time by ~30% by implementing a quality control system that uses inter-pipeline
discrepancies to flag anomalous results based on researcher-defined metrics (e.g., volumetric measures, Dice overlap).
• *Python, PyTorch, Bash, Git, Docker, Apptainer, HPC (Slurm/SGE), CI/CD, Sk-learn, Unix, Matplotlib.*

Speech Science Intern, Nuance (Microsoft), Montreal, Canada   *May - Sep. 2019*
• Voice Biometrics Team: Refactored pre-processing tools (feature extraction, normalization, augmentation), preventing
errors from inconsistent audio file inputs (naming conventions, formats, headers, codecs). Developed a robust pipeline
integrating these tools with an ensemble of machine learning models (*Python, Librosa, Sk-learn*).
• Transcription Engine Team: Developed an automated redaction tool for sensitive information across call transcriptions,
graphs, and audio recordings, achieving 95% accuracy, enabling secure client demonstrations (*Python, Bash, Librosa)*.

Teaching Assistantships, McGill University
• ABCD ReproNim AI/ML Course: Designed ML assignments and conducted office hours for 80 students, covering
supervised/unsupervised learning and AI applications in Neuroimaging (*Python, Sk-learn, Nilearn*).   *Apr. 2022*
• Neuro-Data-Science Fundamentals (QLS 612): Led lectures, logistics, and exams on Python, Dataframes, and Data
Visualization for 30 students. 88% instructor rating in course evaluations (*Matplotlib, Pandas, Seaborn*).   *Jul. 2021*

Undergraduate Research Assistantships, McGill University   *May 2018 - Dec. 2019*
• DDMAL: Built a system to retrieve and convert Cantus Database musical scores to MIDI (Javascript, MIDI). Made a
Choir SoundFont using sample-based synthesis to play the score on the Cantus website (*Git, Vagrant, Docker, Django*).
• Prometheus lab: Created an Automatic Lip Sync pipeline using Neural Network classification to generate mouth shapes
based on speech type with 84% accuracy (*Python, Keras, CMU Sphinx, Librosa, NumPy)*.

Skills

• **Programming:** Python, Bash, MATLAB, Java, JavaScript, C, C++
• **Data Science and ML:** Sk-learn, XGBoost, PyTorch, Keras, Pandas, NumPy, Matplotlib, Seaborn
• **Data Engineering:** Git, SQL, Docker, Apptainer, Unix, Slurm, SGE, Continuous Integration (GitHub Actions,
CircleCI), DataLad (Data Management)
• **Imaging/Neuroscience:** FSL, ANTs, FreeSurfer, Boutiques, MRIQC, NiLearn, BIDS, DICOM (etc.)
• **Languages:** Native fluency in English and Spanish

Relevant Projects

- [Correlating Anatomical Imaging Quality Metrics with Pipeline Segmentation Discrepancies](#)   Ongoing
- [NeuroCI: Continuous Integration of Neuroimaging Results Across Software Pipelines and Datasets](#)   Ongoing
- [Nipoppy (HPC Feature): Standardized Organization and Processing of Large Clinical Imaging Datasets](#)   Jan. 2025
- [Replication: Longitudinal tensor-based morphometry of early-stage Parkinson's disease brain atrophy](#)   Jul. 2024
- [Bayesian genetic algorithm: Solving mazes (Bayesian Statistics to optimize evolutive process)](#)   May 2020
- [Sentiment analysis CNN for song lyrics using GloVe word embeddings](#)   Nov. 2019
- [Digital audio sampler and modular effects processor](#)   Dec. 2018

Interests

- Playing, writing, recording, and producing music (my music on [Spotify](#) and [Apple Music](#)) • Judo: Cundinamarca departmental champion, 4th place Colombian national championships (2014) • Fitness (kettlebells, spinning).

Selected Awards

- Fonds de recherche du Québec – Nature et technologies ([FRQNT](#)) B2X Research Scholarship   2023
- Unifying Neuroscience and Artificial Intelligence - Québec ([UNIQUE](#)) Excellence Scholarship   2023
- Fonds de recherche du Québec – Nature et technologies ([FRQNT](#)) B1X Research Scholarship   2022
- Canadian Open Neuroscience Platform ([CONP](#)) Research Scholarship.   2021
- McGill J. W. McConnell Scholarship (top 5% of entering class).   2016

Publications and Conferences

- J. Sanz-Robinson, M. Wang, B. McPherson, D. Kennedy, T. Glatard, J.B. Poline. "Open-source platforms to investigate analytical flexibility in neuroimaging". Imaging Neuroscience 2025; vol. 3 ([link](#))
- S. Moia, J. Sanz-Robinson, et al. "Proceedings of the OHBM Brainhack 2022". Aperture Neuro, vol. 4, March 2024 ([link](#))
- J. Sanz-Robinson, M. Torabi, T.J. Wishard, T. Glatard, J.B. Poline. "Is between-pipeline variability affected by image quality?" [Abstract 2469]. Organization for Human Brain Mapping; July 22 - July 26, 2023; Montreal, Canada.
- J. Sanz-Robinson, A. Jahanpour, N. Phillips, T. Glatard, J.B. Poline. "NeuroCI: Continuous Integration of Neuroimaging Results Across Software Pipelines and Datasets". IEEE eScience, vol. 18, October 2022 ([link](#))
- J. Sanz-Robinson, J.B. Poline, T. Glatard. "Continuous Testing of Neuroimaging Results: Applications to Hearing Loss and Brain Structure" [Abstract 1185]. Organization for Human Brain Mapping; June 19 - June 23, 2022; Glasgow, Scotland