Sabine Muzellec

Postdoctoral Researcher

✉ sabinem@yorku.ca

🔗 https://s4b1n3.github.io

Education

July 2025 — PhD in Computer Science
University of Toulouse France
Topic: Introducing oscillatory dynamics in deep neural networks through complex-valued units.
Supervisors: Dr. Rufin VanRullen (CerCo-CNRS), Dr. Thomas Serre (Brown University)

2021 — Master in Artificial Intelligence, Pattern Recognition and Robotics (with honors)
University Paul Sabatier Toulouse, France

2019 — Bachelor in Computer Science - Project Management (with honors)
West Indies University Guadeloupe, France

2018 — Undergrad in Computer Science (with honors)
West Indies University Guadeloupe, France

Work experience

Since August 2025 — Postdoctoral Researcher
York University Toronto, ON, Canada
Topic: Studying models with excitatory and inhibitory cell types and their role in autism
Supervisor: Kohitij Kar

2025 — Research Assistant
York University Toronto, ON, Canada
Topic: Study on brain-ANN alignment
Advisor: Dr. Kohitij Kar. Duration: 2 months

2024 — Visiting Student
York University Toronto, ON, Canada
Topic: Shared Temporal Variance Between Neurons to Compare Object Representation in the Primate IT Cortex and ANNs.
Advisor: Dr. Kohitij Kar. Duration: 3 months

From 2023 to 2025 — Visiting Student
Brown University Providence, RI, USA
Topic: Introducing oscillatory dynamics in deep neural networks through complex-valued units.

From 2022 to 2023 — Research engineer
CerCo - CNRS Toulouse, France
Topic: Introducing oscillatory dynamics in deep neural networks through complex-valued units

2021 — M2 Internship
Brown university - Serre Lab Providence, RI, USA
Topic: Accurate implementation of computational neuroscience models through neural ODES
Supervisor: Dr. Thomas Serre. Duration: 6 months

2020 — M1 Internship
LAAS Toulouse, France
Topic: Designing binary deep neural networks as constraint programming problems
Supervisor: Dr. Mohamed Siala. Duration: 4 months

Awards and Fellowship

June 2025 — Connected Minds Postdoctoral Fellowship
York University Toronto, ON, Canada

May 2025 — Travel Award
Vision Science Society (VSS) Conference USA

From 2024 to 2025 — VISTA Visiting Trainee Award
York University Toronto, ON, Canada

Awards and Fellowship

August 2024 ● The Center for Brains, Minds and Machines (CBMM) Summer Course
Marine Biological Laboratory Woods Hole, MA, USA
The CBMM Summer Course is an NSF funded program jointly organized by MIT and Harvard. **Acceptance rate < 10%**

From 2020 to 2021 ● Master's Degree Excellence Scholarship
ANITI Toulouse, France

Publications

Peer-Reviewed Machine Learning Proceedings

Neurips, ICLR, and ICML have an h5-index of 337, 304, and 268. For reference, Nature and Science Advances have an h5-index of 488 and 223.

- <u>Muzellec, S.</u>, Alamia, A., Serre, T., VanRullen, R. (2025). *Enhancing deep neural networks through complex-valued representations and Kuramoto synchronization dynamics.* Transactions on Machine Learning Research (TMLR).

- <u>Muzellec, S.</u>, Linsley, D., Ashok, A. K., Mingolla, E., Malik, G., VanRullen, R., Serre, T. (2025). *Tracking objects that change in appearance with phase synchrony.* The Thirteenth International Conference on Learning Representations (ICLR).

- Boutin, V., Mukherji, R., Agrawal, A., <u>Muzellec, S.</u>, Fel, T., Serre, T., VanRullen, R. (2024). *Latent Representation Matters: Human-like Sketches in One-shot Drawing Tasks.* Advances in Neural Information Processing Systems 37 (NeurIPS).

- <u>Muzellec, S.</u>, Fel, T., Boutin, V., Andeol, L., VanRullen, R., Serre, T. (2023). *Saliency Strikes Back: How filtering out high frequencies improves white-box explanations.* Proceedings of the 41st International Conference on Machine Learning (ICML).

Neuroscience Conferences

- <u>Muzellec, S.</u>, Kar, K. (2025). *Beyond One-Way Mapping: Linking Model-Brain Asymmetry to Behavioral Predictions in Visual Object Recognition.* Vision Science Society Conference (VSS). **Selected for a talk.** Acceptance Rate: 16.7%

- <u>Muzellec, S.</u>, Linsley, D., Ashok, A. K., Mingolla, E., Malik, G., VanRullen, R., Serre, T. (2024) *Tracking in space and features with phase synchrony.* Cold Spring Harbor: From Neuroscience to Artificially Intelligent Systems (NAISys).

- <u>Muzellec, S.</u>, Linsley, D., Ashok, A. K., Mingolla, E., Malik, G., VanRullen, R., Serre, T. (2024) *Tracking in space and features with phase synchrony.* Conference on Cognitive Computational Neuroscience (CCN).

- <u>Muzellec, S.</u>, Alamia, A., Serre, T., VanRullen, R. (2023). *Benefits of synchrony: Improving deep neural networks using complex values and Kuramoto synchronization.* Conference on Cognitive Computational Neuroscience (CCN).

- <u>Muzellec, S.</u>, Chalvidal, M., Serre, T., VanRullen, R. (2022). *Accurate implementation of computational neuroscience models through neural ODEs.* Conference on Cognitive Computational Neuroscience (CCN). **Selected for a talk.** Acceptance Rate: 5.33%

Under Review

- Alamia, A.*, <u>Muzellec, S.</u>*, Serre, T., VanRullen, R. (2025). *GASPnet: Global Agreement to Synchronize Phases.* Under review at Neurocomputing.

- <u>Muzellec, S.</u>, Kar, K. (2025). *Reverse Predictivity: Going Beyond One-Way Mapping to Compare Artificial Neural Network Models and Brains.* Under review at Nature Machine Intelligence.

In Preparation

- <u>Muzellec, S.</u>*, Alghetaa, Y. H.*, Kornblith, S., Kar, K. (2025). *A Proxy for Identifying the Best Model-Explanation Combination for Human Classification Behavior.*

- <u>Muzellec, S.</u>, Serre, T., VanRullen, R., Kar, K. (2025). *Shared Temporal Variance Between Neurons to Compare Object Representation in the Primate Inferior Temporal Cortex and ANNs.*

Invited Talks

September 2023 at **TorusAI**
Gradient strikes back: How filtering out high frequencies improves explanations.

Supervised Students

Undergraduate Students:
- Lucas Lieberman (M): Brown University, *From March to May 2025*
- Anna Gouédard (F): INP Bordeaux, France, *From May to August 2024*
- Marcus Wong (M): Shenoy Undergraduated, SURFiN, F*rom September 2025 to August 2026*

Professional Service

Official Reviewer:
- ICLR 2025

External Reviewer:
- NeurIPS 2023
- NeurIPS 2024

Emergency Reviewer:
- NeurIPS 2025