Pierre Orhan

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My goal? Study learning dynamics thanks to a multidisciplinary profile at the intersection of Mathematics, Artificial Intelligence and experimental Neurosciences.

Education

2021-2025 Ecole Normale Supérieure — PhD in neuroscience and artificial intelligence. Departement d'études cognitives (DEC), Laboratoire des systèmes perceptifs (LSP), supervision of Yves Boubenec (ENS) and JR King (Meta - ENS).

2019-2021 McGill University — Master of Science. Research in computational neuroscience at the Montreal Neurological Institute. Peyrache lab.

2016-2020 Ecole Polytechnique — Master and Engineering degree. Prestigious French 'Grandes Écoles' in engineering. Computer Science, Mathematics, Physics.

2014-2016 Classes préparatoires aux grandes écoles — Stanislas (Paris).

Work experience

2022 — Meta, FAIR Paris, Research internship. Self-supervised learning for sounds processing, BrainAndAI team.

2021 — CNRS, ESPCI Paris, Research ingeneer, Benchenane Laboratory. Decoding of neuronal activity in sleep.

2019 — CNRS, Tokyo. Research internship. Creating D.N.A computing machines for in vivo cancer detection: neural network from equilibrium of sets of D.N.A based chemical reactions.

2019 — Ecole Polytechnique, Research projects: Analyzing volumetric microscopy of neural tissues at scale.

2018 — Visenze, Summer internship, Singapore: clothes recognition through deep learning.

2016 — French Navy, 6 months, as an officer.

Publications

Duszkiewicz, A. J., Orhan, P., Skromne Carrasco, S., Brown, E. H., Owczarek, E., Vite, G. R., Wood, E. R., Peyrache, A. (2024). Local origin of excitatory–inhibitory tuning equivalence in a cortical network. **Nature Neuroscience**, https://doi.org/10.1038/s41593-024-01588-5

Millet, J., Caucheteux, C., Orhan, P., Boubenec, Y., Gramfort, A., Dunbar, E., Pallier, C., King, J.-R. (2022). Toward a realistic model of speech processing in the brain with self-supervised learning. **Advances in Neural Information Processing Systems**, https://hal.science/hal-03808200

Preprint

Orhan, P., Boubenec, Y., King, J.-R. (2024) Algebraic structures emerge from the self-supervised learning of natural sounds. bioRxiv. https://doi.org/10.1101/2024.03.13.584776

Orhan, P., Boubenec, Y., King, J.-R. (2022) Don't stop the training: continuously-updating self-supervised algorithms best account for auditory responses in the cortex. bioRxiv. http://arxiv.org/abs/2202.07290.

Orhan, P., Duszkiewicz, A., Peyrache, A. (2022) Signature of random connectivity in the distribution of neuronal tuning curves. bioRxiv. https://doi.org/10.1101/2022.08.30.505888

Conferences

Orhan, P., Boubenec. Y King, J.-R. (2024) Algebraic structures emerge from the self-supervised learning of natural sounds. Cognitive Computational Neuroscience. CCN

Orhan, P., Normann-Haignere. S, Boubenec. Y King, J.-R. (2024) Hierarchical, structure-yoked integration spontaneously emerges with self-supervised training on speech. Cosyne

Orhan, P., Boubenec. Y King, J.-R. (2022) Don't stop the training: continuously updating self-supervised algorithms best account for auditory responses in the cortex. SFN

Orhan, P., Duszkiewicz, A., Peyrache, A. (2021) Fast-spiking interneurons shape symmetrical tuning to head-direction. SFN

Orhan, P., Duszkiewicz, A., Peyrache, A. (2020) Fast-spiking interneurons support the development of symmetrical head-direction tuning curves. Neuromatch conference

Talks

Paris Ile de France Neural Theory Symposium (ENS). December 2024.

ANN-Human Lang Workshop (University of Amsterdam). June 2024.