Julien Corbo

Research Associate

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Research Experience

Research Associate — Rutgers University - Center for Molecular and Behavioral Neuroscience - Polack Lab
Linking learning-induced changes in V1 with behavior 2023–present
Using calcium imaging and whole-brain protein mapping in mice to characterize early computations underlying perceptual decisions.

Postdoctoral Associate — Rutgers University - Center for Molecular and Behavioral Neuroscience - Polack Lab
Contextual modulation of early sensory processing in the primary visual cortex 2019–2022
Using calcium imaging in behaving mice to study how behavioral, multisensory, and temporal contexts shape visual stimulus representation.

PhD Thesis Research — Aix-Marseille University — Laboratoire de Neurosciences Intégratives et Adaptatives (UMR 7260) - with Yoh'i Zennou-Azogui, Nicolas Catz 2014–2018
Time-dependent coding of space in the primary somatosensory cortex
Cortical representation of simultaneous and delayed two-point stimuli with multi-electrode arrays (single units, LFP) and voltage-sensitive dye imaging in rats.

Master's Degree 2nd-year Internship — Aix-Marseille University — Laboratoire de Neurosciences Intégratives et Adaptatives (UMR 7260) - with Nicolas Catz 2014
Time-dependent coding of space in the primary somatosensory cortex
Using extracellular eletrophysiology to study the cortical representation of tactile multi-stimuli patterns

Master's Degree 1st-year Internship — Aix-Marseille University — Laboratoire de Neurosciences Cognitives (UMR 7291) - with Vincent Hok 2013
Functional role of frequency recoding in hippocampal place cells
Tetrode implantations and CA1 recordings in rats exploring different environments to study frequency recoding in place cells.

Education

- **PhD in Neuroscience**, Aix–Marseille University, 2018. *Thesis: From tactile illusions to spatiotemporal integration in the primary somatosensory cortex: impact of the timing of cutaneous stimuli on their cortical representation.*
- **Doctoral Program Coursework (ICN PhD Program, 100h)**, Aix–Marseille University, 2014–2017. Courses: Neuroanatomy, Statistics, Computational Neuroscience, tutored seminars.
- **Master's Degree in Neuroscience**, Aix–Marseille University, 2014. *High honor (rank 1/47).*
- **Bachelor's Degree in Neuroscience**, Aix–Marseille University, 2012. *Highest honor (rank 1/25).*
- **High School Diploma in Science**, Lycée Frédéric Joliot-Curie, 2009. *Highest honor.*

Teaching Experience

Instructor, BNS PhD Program — Rutgers University 2021–present
Course: Neuroscience Foundations.
Somatosensory system, pain and touch (1st-year PhD students; 5h).

Temporary Research and Teaching Associate — Aix–Marseille University 2017–2018
Full-time teaching (288h/year).
Neural functions modeling with Python (3rd-year Bachelor); Scientific programming with Python (2nd-year Bachelor); Applied Statistics with R (2nd-year Bachelor).

Tutor — Aix–Marseille University 2014–2017
Part-time teaching (64h/year).
Neural functions modeling with Python (3rd-year Bachelor); Basic Genetics (1st-year Bachelor).

Technical Skills

Experimental methods: rodent surgery; in vivo electrophysiology (multi-electrode arrays); voltage-sensitive dye imaging; two-photon calcium imaging; whole-brain clearing and protein mapping (iDISCO).
Data analysis & modeling: population coding; dimensionality reduction and manifold analysis; representational geometry; statistical modeling; machine learning for neural decoding.

Programming: MATLAB; Python; R.; SQL
Languages: French (native); English (fluent).

Honors and Awards

- 2026 — Cosyne Presenter Travel Grant (Conference award).
- 2023 — CMBN Mini Symposium, Best Poster Award (Conference award).
- 2022 — FENS Travel Award (Conference award).
- 2019–2021 — Fyssen Foundation Postdoctoral Fellowship (2-year postdoc funding).
- 2014–2017 — Bourse du Ministère de l'Enseignement supérieur, de la Recherche et de la Technologie (3-year PhD funding).

Academic Service

Reviewer
Reviewed manuscripts for *Frontiers*, *eNeuro*, and *PLOS ONE*.

Organisation

- 2015 — Organizing Committee Member, *PhD Days (ICN PhD Program)* — public and scientific conferences.
- 2010–2012 — Vice-President, local neuroscience students' association — organized yearly conferences, debates, exhibitions.

Publications

Peer-reviewed Articles

B. MESZENA, K. T. MURRAY, **CORBO, J.**, OB. ERKAT, M. A. HAJNAL, PO. POLACK, and G. ORBAN (2026). "TAVAE: A VAE with Adaptable Priors Explains Contextual Modulation in the Visual Cortex". In: *International Conference on Learning Representations ICLR*.

CORBO J., ERKAT OB., McCLURE J., KHDOUR H., and POLACK PO. (2025). "Discretized representations in V1 predict suboptimal orientation discrimination". In: *Nature communications* 16.1, p. 41.

MCCLURE J., ERKAT OB., **CORBO J.**, and POLACK PO. (2022). "Estimating How Sounds Modulate Orientation Representation in the Primary Visual Cortex Using Shallow Neural Networks". In: *Frontiers in Systems Neuroscience* 16.

CORBO J., MCCLURE J., ERKAT OB., and POLACK PO. (2022b). "Dynamic distortion of orientation representation after learning in the mouse primary visual cortex". In: *Journal of Neuroscience* 42.21, pp. 4311–4325.

CARON-GUYON J., **CORBO J.**, ZENNOU-AZOGUI Y., XERRI C., KAVOUNOUDIAS A., and CATZ N. (2020). "Neuronal Encoding of Multisensory Motion Features in the Rat Associative Parietal Cortex". In: *Cerebral Cortex* 30.10, pp. 5372–5386.

CORBO J. and CARON-GUYON J. (2018). "Sensory-evoked propagating waves of activity in the primary sensory cortices:poorly understood, yet ubiquitous". In: ***Commentary article**, J. Neurophysiology* 120. DOI: 10.1152/jn.00319.2018.

CORBO J., ZENNOU-AZOGUI Y., XERRI C., and CATZ N. (2018). "Cortical merging in S1 as a substrate for tactile input grouping". In: *eNeuro* 5 (1). DOI: 10.1523/ENEURO.0342-17.2017.

Presentations

Invited Talks

CORBO J. CAGLAR L. (2026). "Learning induces geometric reorganization in the primary visual cortex". *ProAction Lab, University of Coimbra*. 2026.

CORBO J. (2025). "Experience-Driven Restructuring of Sensory Representations in the Visual Cortex". *Institut de Neurosciences de la Timone*. 2025.

CORBO J., CATZ N., XERRI C., and ZENNOU-AZOGUI Y. (2016). "Cortical merging of tactile inputs in S1: micro and mesoscopic substrate of sensory funneling". *French Somatosensory Club annual meeting*. 2016.

Conference Presentations

CORBO J., CAGLAR L., ERKAT OB., and POLACK PO. (2026). "Learning induces geometric reorganization in the primary visual cortex". ***Poster**, COSYNE*. 2026.

CAGLAR L., **CORBO J.**, ERKAT OB., and POLACK PO. (2025a). "The geometry of primary visual cortex representations is dynamically adapted to task performance". ***Poster**, International Conference on Mathematical Neuroscience*. 2025.

– (2025b). "The geometry of primary visual cortex representations is dynamically adapted to task performance". ***Poster**, Computational and Cognitive Neuroscience CCN*. 2025.

CAGLAR L., **CORBO J.**, ERKAT OB., and POLACK PO. (2025c). “The geometry of primary visual cortex representations is dynamically adapted to task performance”. ***Poster**, Computational Neuroscience Society CNS*. 2025.

KHDOUR H., **CORBO J.**, ERKAT OB., and POLACK PO. (2024). “Distortions of the orientation representation space after perceptual training in the different layers of the mouse primary visual cortex”. ***Poster**, CSHL Neural circuits*. 2024.

CORBO J., ERKAT OB., and POLACK PO. (2024a). “Differential V1 information usage between decoder and mouse brain for visual discrimination”. ***Poster**, CSHL From Neuroscience to Artificially Intelligent Systems NAISys*. 2024.

ERKAT OB., **CORBO J.**, MCCLURE J., KHDOUR H., and POLACK PO. (2023). “The Timecourse of Distorted Representations in the Primary Visual Cortex”. ***Poster**,Journal of Vision*. 2023.

– (2022). “Distortion of orientation representation before, during and after learning in the mouse primary visual cortex”. ***Poster**, CSHL Neural circuits*. 2022.

CORBO J., ERKAT OB., MCCLURE J., KHDOUR H., and POLACK PO. (2022a). “Category representation in the mouse primary visual cortex supports orientation discrimination”. ***Poster**, SfN annual meeting*. 2022.

– (2022c). “When the visual cortex stops caring about orientation: feature and category representation in V1 during orientation discrimination”. ***Poster**,FENS annual meeting*. 2022.

– (2022d). “When the visual cortex stops caring about orientation: feature and category representation in V1 during orientation discrimination”. ***Poster**, CSHL Neural circuits*. 2022.

CORBO J., MCCLURE J., KHDOUR H., and POLACK PO. (2019). “Coincident sound modulates visual processing in V1 and improve the mouse’s ability to discriminate orientations”. ***Poster**, SfN annual meeting*. 2019.

CORBO J., ZENNOU-AZOGUI Y., XERRI C., and CATZ N. (2017). “Time-dependent population responses underlying spatial representations in the primary somatosensory cortex: the cortical body map revisited?” *SfN annual meeting*. 2017.

– (2015). “Time-dependent population responses underlying spatial representations in the primary somatosensory cortex: the cortical body map revisited”. ***Poster**, Société des Neurosciences annual meeting*. 2015.

Last updated: May 13, 2026