Friedrich Miescher Institute
for Biomedical Research
24 Fabrikstrasse, Basel, Switzerland

+33 (0) 6 26 32 04 62
hugo.ladret@fmi.ch
hugoladret.github.io
hugoladret
hugoladret
hugoladret

Hugo Ladret

Curriculum Vitae

Education

2024 **Postdoctoral fellow**, Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland.
Keller Lab

2020–2024 **PhD Visual Electrophysiology**, University of Montreal, Montreal, Canada.
Joint PhD ("cotutelle") with ↓

2019–2024 **PhD Computational Neuroscience**, Aix-Marseille University, Marseille, France.

2017–2019 **MSc Cognitive and Integrative Neuroscience**, Aix-Marseille University, Marseille, France.
Valedictorian

2014–2017 **BSc Cell and Molecular Biology**, Aix-Marseille University, Marseille, France.
Honors

Past Work Experience

2019 **Graduate Internship**, *Precision selectivity to natural patterns in the primary visual cortex*.
Visual Neuroscience Laboratory, Montreal, Canada

2018 **Graduate Internship**, *Learning dynamics in a cortical-like spiking neural network*.
Institute of Neurosciences of Timone (INT), Marseille, France

2018 **Computational scientist**, *Unstable system dynamics for visual arts*.
Friche la Belle de Mai, Marseille, France

2018 **Graduate Internship**, *Recurrent connectivity in an bio-inspired deep learning network*.
Institute of Neurosciences of Timone (INT), Marseille, France

2016 **Undergraduate Internship**, *Somatosensory cortical plasticity in the Fragile X Syndrome*.
Mediterranean Neurobiology Institute (INMED), Marseille, France

Scientific Work

Peer-reviewed articles

2024 *Enhancing sparse coding of natural images via biologically-inspired epistemic uncertainty*.
Ladret, Casanova, Perrinet
under review in Neuromorphic Computing and Engineering

2023 *The pulvinar as a hub of visual processing and cortical integration*.
Cortes, **Ladret**, Abbas-Farishta, Casanova,
published in Trends in Neurosciences

2023 *Cortical recurrence supports resilience to sensory variance in the primary visual cortex*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
published in Nature Communications Biology

2021 *Corticothalamic projections gate alpha rhythms in the pulvinar*.
Cortes, Farishta, **Ladret**, Casanova
published in Front. Cell. Neurosci

Talks

2023 *Reverse-engineering cultured neurons using predictive processing*.
Ladret
Telluride Neuromorphic Workshop, Telluride USA

2022 *Making sense of the visual mess*.
Ladret
Aix-Marseille's doctoral schools summit, Marseille FR

2022 *Dealing with sensory variance in the primary visual cortex*.
Ladret
Netherlands Institute of Neuroscience, Amsterdam NL

2022 *Statistics of the sparse representations of natural images*.
Ladret, Perrinet
SIAM Conference, Virtual

2021 *Modulation of orientation selectivity by orientation precision in V1*.
Ladret
GDR Vision, Lille FR

2021 *Dynamics of the processing of orientation precision in the primary visual cortex*.
Ladret, Perrinet
Invited by Bruno Cessac @ DynamicsDays, Sophia-Antipolis FR

Conference proceedings

2023 *Convolutional Sparse Coding is improved by heterogeneous uncertainty modeling*.
Ladret, Perrinet, Casanova
ICLR SNN, Kigali RW

2022 *Learning hetero-synaptic delays for motion detection in a single layer of spiking neurons*.
Grimaldi, Besnainou, **Ladret**, Perrinet
IEEE ICIP, Virtual

Posters

2023 *Computing sensory variance through intracortical recurrence*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
VSS, Tampa USA

2023 *Resilience to sensory uncertainty in the primary visual cortex*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
Cosyne, Montreal CA

2022 *Uncertainty in, uncertainty out: epistemic variance improves encoding of natural images*.
Ladret, Perrinet
GDR Vision, Toulouse FR

2022 *Dynamics of response's accuracy in the visual cortical area 21a*.
Ikan, Cortes, **Ladret**, Laplante, Casanova
SfN, San Diego USA

2022 *Input variance and V1*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
INT X Anniversary, Marseille FR

2022 *Dynamic Ultrasound Localisation Microscopy Achieves Quantitative pulsatility Measurements in the Whole Brain Using Kalman Filtering*.
Bourquin, Perrot, Porée, Belgharbi, Cortes, Miquel, Bélanger, **Ladret**, Ikan, Thorin, Lesage, Provost
IEEE US, Virtual

2022 *Recurrent cortical connectivity in the primary visual cortex supports robust encoding of natural sensory inputs*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
FENS, Paris FR

2022 *Decoding spiking motifs using neurons with heterosynaptic delays*.
Besnainou, Grimaldi, **Ladret**, Perrinet
AREADNE, Santorini GR

2022 *A resilient neural code in V1 to process natural images*.
Ladret, Perrinet
AREADNE, Santorini GR

2021 *Modulation of orientation selectivity by orientation precision*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
SfN, Virtual

2021 *Decoding orientation distributions from noisy observations in the primary visual cortex*.
Ladret, Perrinet
Champalimaud's Dialogues on Neural and Machine Intelligence, Lisbon PT

2021 *Processing of orientation precision in the primary visual cortex*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
NeuroFrance Annual Meeting, Strasbourg FR

2021 *How are natural images perceived in the primary visual cortex ?*.
Ladret, Cortes, Ikan, Chavane, Casanova, Perrinet
Vision Science & Optometry Research Group, Montreal CA

2019 — *Orientation selectivity to synthetic natural patterns in a cortical-like model of the cat primary visual cortex.*
Ladret, Cortes, Perrinet, Casanova
SfN, Chicago USA

2019 — *Comparative decision making in the Posterior Parietal Cortex : proof of concept.*
Ladret, Ibos
SfN, Chicago USA

2019 — *Learning dynamics in a neural network model of the primary visual cortex.*
Ladret, Cortes, Casanova, Perrinet
Vision Health Research Network, Quebec CA
Vision Science & Optometry Research Group, Montreal CA

2018 — *Selectivity to oriented patterns of different precisions.*
Ladret, Perrinet
GDR Vision, Paris FR

Funding

2022	International VHRN collaboration grant (joint with Pr. Casanova and Dr. Perrinet)	28,050 €.
2021	PhD scholarship "Artificial Intelligence for Medicine" from the U. of Montréal	10,400 €.
2020	Additional PhD funding from the French Research Ministry	7080 €.
2019	PhD fellowship from the French Research Ministry	63,720 €.

Awards

2023 — Prize for high impact publication, Vision Health Research Network Meeting.
2019 — Best MSc Poster, Vision Health Research Network Meeting.
2019 — Excellence Exchange Program, NeuroMarseille.

Additional training

2024	FELASA-equivalent training category C (rodents)	Paris FR.
2024	FELASA-equivalent training category B (rodents)	Paris FR.
2023	Telluride Neuromorphic Workshop (project lead: interfacing in vitro neurons w/ software)	INE, Colorado USA.
2022	Rauischholzhausen Vision Summer School	Marburg and Giessen Universities, GER.
2022	Project management : Agile methods	Centrale Lille (Online) FR.
2020	Biohazard management	University of Montreal CA.
2019	Animal handling (felines)	University of Montreal CA.
2019	Animal handling (rodents)	University of Montreal CA.

Skills

Languages	French	*Native speaker*
	English	*Fluent*
	Spanish	*Conversational*
Programming	Python, MATLAB, R	*Machine Learning, Spiking Neural Networks, Deep learning*
Biology	Cell biology	*Molecular biology, Optical microscopy, Cell culture*
	Neuroscience	*Electrophysiology, Animal handling, Theoretical neuroscience*
Tools	GitHub, Jupyter, PyCharm, VSCode, Microsoft Office Suite, LaTeX	
Teamwork	Communication, Inter-disciplinary work, Scientific writing and reviewing, student monitoring	