

Hugo Ladret

Curriculum Vitae

Education

- 2020 **PhD Visual Electrophysiology**, University of Montreal, Montreal, Canada.
Joint PhD ("co-tutelle") with ↓
- 2019 **PhD Computational Neuroscience**, Aix-Marseille University, Marseille, France.
- 2017 **MSc Cognitive and Integrative Neuroscience**, Aix-Marseille University, Marseille, France.
Valedictorian
- 2014 **BSc Cell and Molecular Biology**, Aix-Marseille University, Marseille, France.
2017 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

- 2023 *Enhancing sparse coding of natural images via biologically-inspired epistemic uncertainty.*
Ladret, Casanova, Perrinet
under review in Neural Computation
- 2023 *The pulvinar as a hub of visual processing and cortical integration.*
Cortes, **Ladret**, Abbas-Farishta, Casanova,
under review 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

- 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
Invited by Paolo Papale @ Roelfsema's lab, 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

Best MSc Poster, 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 €.

2019

Excellence Travel Grant from NeuroMarseille 4000 €.

Additional training

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

Italian

Notions

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, L^AT_EX

Teamwork

Communication, Inter-disciplinary work, Scientific writing and reviewing, student monitoring