Charline Tessereau

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Positions

Sept. 2021 - Nov 2024 **Postdoctoral position.** Uncertainty, neuromodulators and cognitive control. 2-photon and electrophysiology data analysis, Hierarchical Bayesian Modeling, GLMs, dynamic modeling.
Peter Dayan's lab and **International Brain Lab.**
Max Planck Institute for Biological Cybernetics, Tübingen, Germany.

2015 (6 months) Neotrope - Data Scientist. Emotion clustering from skin conductance raw data. Filtering, development of experimental protocols in order to set-up semi-supervised classification of targeted « emotional states ». Lille, France.

2015 (6 months) SCAlab - Intern in Cognitive and Affective Science Lab. Emotion clustering from physiological data (pupil size, skin conductance and heart rate). Lille, France.

2014 (4 months) Marine Corrosion Lab - Pontificia Universidad Católica de Chile. Intern. Understanding the behaviours of different metals in mining tubes.

Education

PhD - Computational Neuroscience. Models of rapid hippocampal dependent spatial navigation using reinforcement learning. Reinforcement Learning, meta-RL, multi-agent networks and attractor networks. Dec 2021

With Stephen Coombes, Reuben O'Dea (School of Mathematical Sciences) and Tobias Bast (School of Psychology). **School of Mathematics & School of psychology.** University of Nottingham. Nottingham, UK.

MS « Mathematics for Life Sciences ». Mathematics for Neurosciences. Department of Mathematics - Université Paris Saclay, Saclay, France. Oct 2017

Thesis: *Mathematical Modelling and Simulation of Zebrafish's Morphogenesis*. Supervision: Alessandro Sarti, **Centre for Social Analysis and Mathematics, CNRS**, Paris, France.

MS « Psychology of neuro-cognitive processes and affective Sciences ». Department of Psychology - Université de Lille, Lille, France. Oct 2016

Thesis: *Interaction between physiological signals under affective and cognitive load*. Supervision: Laurent Sparrow, **SCALab,** Lille, France.

MS Engineering, Machine learning, Decision making and Data analysis. Oct 2015
Ecole Centrale de Lille, Lille, France.
Thesis: *Real time processing and classification of physiological signals*. Supervision: Laurent Sparrow, **SCALab**, Lille, France.

MS Applied Mathematics (Stochastic processes, Analysis, Topology, Probabilities and Statistics) Oct 2015
Thesis: *Theory of logarithmic potential, orthogonal polynomials and random matrices*. Supervision of Thomas Simon, **Laboratoire Paul Painlevé**, Lille, France. Department of Mathematics - Université de Lille, Lille, France.

Publications

Tessereau, C.; Xuan, F., Mellor; J.R., Dayan; P., and Dombeck, D. «Navigating uncertainty: reward location variability induces reorganization of hippocampal spatial representations». Preprint. 2024.

Findling, C.; …, **Tessereau, C.**, et al. «Brain-wide representations of prior information in mouse decision-making». Preprint. 2023

Tessereau, C.; O'Dea, R.; Coombes, S. And Bast, T. «Reinforcement Learning approaches to hippocampus-dependent flexible spatial navigation». **Brain and neuroscience advances**, 5. 2021.

Tessereau, C. «Reinforcement Learning Approaches to Rapid Hippocampal Place Learning». PhD thesis, University of Nottingham. 2021.

Tessereau, C., Bast, T., O'Dea, R., Coombes, S. "Predictive representations for planning: link between time, space, and efficiency". In prep.

Grants and awards

2021 - 2024	Postdoctoral scholarship. Max Planck Society and International Brain Laboratory.
2021 (6 months)	PhD COVID excellence scholarship + tuition fees. From the School of Mathematical Sciences. Jan 2021 - June 2021.
Sept 2019.	First poster prize. Cambridge neuroscience symposium. Cambridge, UK.
Jan 2019.	First poster prize. Neuroscience @ Nottingham. Nottingham, UK. Jan 2019.
Oct 2018.	Travel grant. To attend the Champalimaud Research symposium. From the British Embassy London. Oct 2018.
Jan 2018.	Travel grant. Simons Foundation and the Wellcome Trust travel grant to attend the IBRO-Simons Computational Neuroscience Imbizo 2018.
2017-2021	PhD Scholarship + tuition fees. From the School of Mathematical Sciences.
2016-2017	MS scholarship. Sophie Germain Excellence Master Scholarship to join the Mathematics for life Science Master Program. From the Fondation Jacques Hadamard.

Invited talks

Max Planck UCL Centre for Computational Psychiatry and Ageing Research. « Uncertainty in reward locations engenders flexible reward codes and a warped spatial metric in the hippocampus.» London, UK. — June 2024

Bristol centre for Synaptic Plasticity, School of Physiology, Pharmacology and Neuroscience. « Uncertainty in reward locations engenders flexible reward codes and a warped spatial metric in the hippocampus.» Bristol, UK — June 2024

Nottingham school of psychology. «Uncertainty in reward locations engenders flexible reward codes and a warped spatial metric in the hippocampus.» Nottingham, UK — June 2024

Mainen lab, Champalimaud Center for the Unknown. « The hippocampus as an unpredicted map: Hippocampal traces of uncertainties induced by changes in reward distributions. » Lisbon, Portugal. — May 2024

RoLi lab, Max Planck institute for Biological Cybernetics. « The hippocampus as an unpredicted map: Hippocampal traces of uncertainties induced by changes in reward distributions. » Tübingen, Germany. — May 2024

Dynamic cognition group, Max Planck institute for Biological Cybernetics.. « The hippocampus as an unpredicted map: Hippocampal traces of uncertainties induced by changes in reward distributions. ». Tübingen, Germany.	Apr 2024
Neuropsychiatry group, Champalimaud Center for the unknown. « The hippocampus as an unpredicted map: Hippocampal traces of uncertainties induced by changes in reward distributions. ». Lisbon, Portugal.	Feb 2024
Workshop "Behavioral flexibility and its neural correlates", Bernstein Conference. « RL approaches to one-trial learning in the watermaze delayed matching to place task ». Berlin, Germany.	Sept 2023
Michael Hasselmo's laboratory. Center for Systems Neuroscience. « RL approaches to one-trial learning in the watermaze delayed matching to place task ». Boston University, MA, USA.	Jul 2023
Human and Machine Cognition lab. Tübingen University. « RL approaches to one-trial learning in the watermaze delayed matching to place task ». Tübingen, Germany.	Dec 2021
LAMFA lab. University Picardie Jules Verne. « Spatial navigation in artificial agents: a reinforcement learning approach ». Amiens, France.	Oct 2020

Accepted talks and posters

Mar 2025	**Poster**. Cosyne Meeting 2024. "Unpredictable Rewards, Predictable Maps: Reward uncertainty induces hippocampal place cell remapping in parallel reference-frames". Montreal, Canada.
June 2024	**Talk.** Hippocampus Green Meeting 2024. "Hippocampal traces of uncertainties induced by stationary and non-stationary reward distributions." London, UK
Feb 2024	**Poster**. Cosyne Meeting 2024. "The hippocampus as an unpredicted map: Hippocampal traces of uncertainties induced by changes in reward distributions." Lisbon, Portugal
Oct 2023	**Talk**. Champalimaud Research Symposium 2023. "Where did my cheese move? Behavioural and hippocampal traces of uncertainties induced by changes in reward distributions." Link to recording.
Jul 2022	**Poster**. FENS Forum 2022 Xuan, F., Tessereau, C., Ashby, M., Clopath, C., Jones, M., Mainen, Z., et al. (2022). Where did my Cheese Move? Behavioural and Hippocampal Traces of Uncertainties Induced by Changes in Reward Distributions. Paris, France.
Nov 2019	**Talk.** Neuromatch online conference. « Reinforcement learning approaches for rapid place learning in the Morris watermaze ».
Sept 2019	**Poster & short talk**: « Towards one-shot learning in spatial navigation: a reinforcement learning approach. ». Cambridge neuroscience symposium. Cambridge, UK.
Jan 2019	**Poster & short talk**: « Towards one-shot learning in spatial navigation: a reinforcement learning approach. ». Neuroscience @ Nottingham. Nottingham, UK.
Jul 2019	**Poster**: « Towards one-shot learning in spatial navigation: a reinforcement learning approach. » UK Neural Computation. Nottingham, UK.
Mar 2019	**Poster**: « Towards one-shot learning in spatial navigation: a reinforcement learning approach. » BNA 2019 Festival of Neuroscience. Dublin, Ireland.
Oct 2018	**Poster**: « Towards one-shot learning in spatial navigation: a reinforcement learning approach. » Champalimaud Research Symposium. Lisbon, Portugal.
Jul 2018	**Talk**: "Solving the spatial navigation watermaze task: a challenge in computational neuroscience". TEX M-Gate summer school on memory. Sissa, Trieste, Italy.

Supervision, teaching and outreach

Teaching:

Module 'Principles of human and machine learning'. Master students from Cognitive science, Psychology and computational neuroscience, 24 hours per semester. University of Tubingen, Germany. 2021 - 2024

Module 'Introduction to RL models'. Master students from the school of psychology. 2 hours per semester. University of Tubingen, Germany. 2021-2024

TA in Probability, Statistics, and Optimisation to undergrads. 6h per week. University of Nottingham, UK. 2017-2021

Supervision: **Master students**:

Alina Krause, 5 months RA, 3 months rotation student and 5 months thesis. "Extracting the dynamics of place cell codes" 2024-

Layla Asalih, 3 months bachelor thesis supervision, thesis title: "RL models for spatial navigation" 2023

Tuga Yousif, 3 months internship via the CaCTüS program, title: "RL models for spatial navigation" 2022

Tutoring: MSc students with disabilities (Dyslexia, TDAH and apraxia) (1h/w) , University of Nottingham, UK. 2017-2021

Outreach:

Lecture: 'AI and psychology' lecture given to high school students, University of Nottingham, 2018, 2019. 2017-2021

Lecture: « What is Artificial Intelligence? » Nottingham Potential Summer School. Sutton Trust Summer School on Psychology, Sociology and Criminology. 2017-2021

Outreach Maths « Family discovery day » University of Nottingham, Nottingham, UK. Understanding resonance. 2018

Academic leadership and service

Workshop Organisation:

Maps in Reinforcement Learning: efficient representations of structure and time in decision-making. RLDM conference 2022, Brown University, Providence, RI, USA

Reviewer: Sciences Advances, eLife.

Internal scientific contributions:

Organisation of Journal Clubs, social events and internal talks at the institute. MPI for Biological Cybernetics & University of Nottingham.

2018 - 2021: PhD representative

2023-2024: Postdoc representative for the international brain laboratory

2023-2024: Head of postdoc representatives at the Max Planck Institute for Biological Cybernetics