Charline Tessereau

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Professional Summary

Data Scientist and Computational Neuroscience PhD with expertise in machine learning, Bayesian modeling, Reinforcement Learning and advanced data analysis. Proven experience in extracting insights from high-dimensional datasets and creating predictive models. Passionate about solving real-world problems with cutting edge quantitative methods.

Core Skills & Tools

Programming:	Python (NumPy, Pandas, SciPy, PyTorch/TensorFlow), R, MATLAB. Master level C, C++ and SQL.
Data Science:	Statistical modeling, Bayesian inference, reinforcement learning, clustering, predictive analytics, Signal processing, Diffusion modeling
Machine Learning/AI:	Neural networks, Continuous Learning, Multi-agent learning, Attractor networks, deep Reinforcement Learning, 2-photon imaging data analysis, Electrophysiology data analysis, scikit-learn
Other:	Git, Linux, experimental design

Professional Experience

Postdoctoral Researcher **2021 – 2024**
Max Planck Institute for Biological Cybernetics & International Brain Lab, Tübingen, Germany

- Applied advanced machine learning, augmented sampling schemes, and Bayesian methods to large-scale neuroscience datasets (2-photon, electrophysiology).
- Built predictive models of neural activity under uncertainty. Collaborated with international teams of neuroscientists.
- Formulated hypotheses and questions around decision making and cognitive control, and action plans to answer those.
- Led a project from big picture questions, method, hypothesis formulation, to publication in high-impact journals.

Data Scientist **2015**
Neotrope, Lille, France

- Designed clustering algorithms on skin conductance signals to identify emotional states. Contributed to experimental protocols. Processed and extracted signals of interest from high-dimensional signal data.
- Collaborated with interdisciplinary teams to refine real-time data processing pipelines.

Education

PhD in Computational Neuroscience **Dec 2021**
School of Mathematics and School of Psychology, University of Nottingham, Nottingham, UK

- *Thesis:* Reinforcement Learning Approaches to Rapid Hippocampal Place Learning
- *Focus:* Reinforcement Learning, meta-RL, multi-agent networks, and attractor networks. Building biologically plausible agents to perform flexible decision making.

MS in Mathematics for Life Sciences **2017**
Ecole Normale Supérieure and Université Paris Saclay, Saclay, France
Thesis: Mathematical Modelling and Simulation of Morphogenesis.
Focus: Stochastic processes, neural networks, data science, optimization, modeling, tree processes, deep learning, diffusion modeling.

MS in Psychology of Neuro-Cognitive Processes and Affective Sciences **2016**
Université de Lille, Lille, France
Thesis: Interaction Between Physiological Signals Under Affective and Cognitive Load.
Focus: Emotional processes, pathological decision making, science of vision, developmental psychology.

MS in Engineering (Machine Learning, Decision Making & Data Analysis) **2015**
Ecole Centrale de Lille, Lille, France
Thesis: Real-Time Processing and Classification of Physiological Signals.
Focus: Data clustering, machine learning, reinforcement learning.

MS in Applied Mathematics **2015**
Université de Lille, Lille, France
Thesis: Theory of Logarithmic Potential, Orthogonal Polynomials, and Random Matrices.
Focus: Stochastic processes, Analysis, Topology, Probabilities and Statistics.

Selected Achievements & Projects

- **Publications**: Authored 5 publications in machine learning and neuroscience. Google Scholar
- **Awards**: First Poster Prize at Cambridge Neuroscience Symposium, First Poster Prize at Neuroscience @ Nottingham, Postdoctoral scholarship from Max Planck Society, Sophie Germain Excellence Master Scholarship from the Fondation Jacques Hadamard.
- **Selected talks**: Max Planck UCL Centre for Computational Psychiatry and Ageing Research; Bristol centre for Synaptic Plasticity, School of Physiology, Pharmacology and Neuroscience; Workshop "Behavioral flexibility and its neural correlates", Bernstein Conference, Berlin; Center for Systems Neuroscience, Boston University, MA, USA; Cambridge neuroscience symposium. Cambridge, UK. BNA 2019 Festival of Neuroscience, Dublin, Ireland; Champalimaud Research Symposium. Lisbon, Portugal; TEX M-Gate summer school on memory. Sissa, Trieste, Italy.
- **Projects**: Developed emotion clustering algorithms, created predictive models, fitted Bayesian hierarchical decision-making algorithm to behavior and neural data.
- **Reviews**: I was invited to review in high impact journals such as Sciences Advances and Elife.

Additional Information

Teaching & Leadership:

- Teaching: Taught 2 master courses on principles of machine learning for a total of 26 hours per semester.
- Supervision: Successfully led 5 master students to the completion of their master thesis.
- Outreach: 2 outreach lectures per year, and co-built the 'understanding resonance' Maths and Arts project at the science Discovery Day in Nottingham.