Catriona Osborn Moar

PhD Researcher

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I am a Doctoral Researcher at the Sussex Centre for Consciousness Science, interested in how complexity measures may help quantify the dynamic constraints that shape experience and collective behaviour, both in altered states of human consciousness and in non-human biological systems.

Education

Sussex Neuroscience 4-Year PhD Programme

University of Sussex

Sept 2023 – Sept 2027 Brighton

PhD

- Primary supervisor: Adam Barrett
- Co-Supervisors: Dominique Makowski, Anil Seth
- Project, working title: Complexity and Cognitive Flexibility in Altered States and Non-Human Bio-Collectives

PhD Rotations

- **Complex Systems & Embryonic Movement** (Luc Berthouze): Computational analysis of embryonic movement patterns (change-point detection, wavelets, time-series classification). Outcome: report; ongoing collaboration (Alonso Lab).
- **Visual Illusions & Predictive Processing** (Dominique Makowski): Behavioural and EEG investigation of illusion susceptibility using jsPsych and MNE-Python. Outcome: ASSC27 talk.
- **Dynamics of the Dying Brain** (Adam Barrett, Anil Seth): EEG complexity analysis of human brain activity near death. Outcome: invited talk (MoC5/MPE3).

MRes, with Distinction in Neuroscience

University of Sussex

Sept 2022 – Sept 2023 Brighton

Research Project

Supervisor: Claudio Alonso, Professor of Developmental Neurobiology

Investigating interplay of neural activity and gene expression in the developing fruit fly. Using thermogenetics and semi-quantitative PCR to assess changes in alternative RNA processing, results indicated that increase in pan-neuronal activity during a critical period in late embryogenesis down-regulates the Hox gene, *Ultrabithorax*.

BSc Hons, First Class in Neuroscience

Queen Mary, Univeristy of London

– 2021 London

Research Project

Supervisor: Shafaq Sikandar, William Harvey Research Institute

Awards

Tilli Tansey Prize for "Outstanding Academic Achievement"
Top of cohort for undergraduate studies; 98% dissertation

Chancellor's Masters Scholarship
Competitive scholarship for First Class graduates

Academic prize for "Best Performance in Neuroscience"
Top of cohort for postgraduate study

PhD Studentship
Competitive fully-funded PhD Programme

Travel Grant
Guarantors of Brain Travel Grant Awarded for ASSC27, Tokyo

Skills

Programming Languages

Python R MatLab

Data Analysis

Frequentist & Bayesian Statistics
Signal Processing EEG
Psychophysics Machine Learning

Research Expertise

Cognitive & Computational Neuroscience
Translational & Systems Neuroscience
Molecular & Developmental Biology
Neuropsychology Philosophy
Complex Systems Science

Investigating the pronocicpetive role of neutrophils in a mouse model of chronic pain. Using a model of hyperalgesic priming and neutrophil depletion by monoclonal antibody, our results implicated neutrophils in the development of prolonged ipsilateral and contralateral mechanical hypersensitivity.

Conferences & Workshops

Association for the Scientific Study of Consciousness

Talk

2024 Tokyo

"Visual Illusions: A Window into Perceptual Diversity" Gave a talk in a concurrent session at ASSC27. Presented work investigating behavioural and neural correlates of illusion susceptibility, with a focus on inter-individual differences through the lens of predictive processing. I received a generous travel grant from Guarantors of Brain to participate in this conference.

Mediterranean Society for Consciousness Science Workshop

Participant

2024 Corsica

Participated in MESEC 2024 for an interdisciplinary exploration of non-ordinary states of consciousness. Here, I was part of a discussion group with Thomas Metzinger exploring Minimal Phenomenal Experience. We presented our work and drafted a review of "The Elephant and the Blind", now published.

Models of Consciousness

Talk

2024 Bamberg

"Dying Brain Dynamics: Challenges in Measurement and Interpretation" A colleague and I were invited to give a talk at the MoC5/ MPE3 conference. We presented work analysing the neural dynamics of the dying human brain, explored potential links with phenomenology such as NDEs, and highlighted challenges for this area of research.

Statistical Physics of Cognition Workshop

Participant

2024 London

Attended a two-day workshop exploring statistical physics-based approaches to analysis of neural activity. This built on my interests applying methods from network science and information theory to neuroimaging data, with exposure to diverse approaches such as...

Association for the Scientific Study of Consciousness

Presentation

2025 Crete

"Comparing Complexity Measures for Distinguishing States of Consciousness: Psilocybin Macrodosing and LSD Microdosing" Presented a poster on work comparing complexity measures on EEG data from altered states of consciousness.

Research Interests

- Ongoing activity, thought & experience
- Predictive Coding, (En)active inference
- Complex systems, criticality & emergence
- Altered states of consciousness
- Mental health, critical psychiatry
- Evolution of cognition

Courses & Training

- **Neuromatch Academy: Computational Neuroscience**
- **DataCamp: Machine Learning Scientist**
- **Data Scientist Associate Certification *in progress***
- **AFHEA *in progress***

Employment

Doctoral Tutor
University of Sussex
2024 –

Dog Walker & Photographer
Self-Employed
2021 – 2022

Science & Maths Tutor
Self-Employed
2018 – 2020

Tutor
Explore Learning
2015 – 2017

Tutor
Kumon
2012 – 2015

Professional Affiliations

British Neuroscience Association (member)
Association for the Scientific Study of Consciousness (member)