Jessica Passlack

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EDUCATION

PhD Neuroscience – University College London (UK) 2024
Wellcome Trust 4-year PhD in Neuroscience

MacAskill Laboratory | Thesis: Investigating the role of nucleus reuniens of the thalamus in integrating context and task rules for decision making

BSc Neuroscience – University of Edinburgh (UK) 2019
First class Bachelor of Science with honours

High school – Internationale Deutsche Schule Brüssel (BE) 2015

RESEARCH EXPERIENCE

Postdoctoral researcher 2024 – current

Duguid Laboratory – University of Edinburgh (UK)
Flexible re-use of existing motor representations for generalization in motor adaptation
Investigating how the interplay of cerebellar and basal ganglia inputs to the motor thalamus supports motor adaptation, using neuropixel recordings, optogenetic inhibition and reinforcement learning models.

Graduate researcher – University College London (UK) 2019 – 2024

PhD project – MacAskill Laboratory
Integration of context and task rules in nucleus reuniens for decision making
Computational modelling of learning in partially observable environments using reinforcement learning and Bayesian statistics in Python. Then testing hypotheses by characterizing the underlying role of prefrontal cortex, thalamus and hippocampus using intersectional viral tracing and manipulation of the circuit during mouse behaviour.

Rotation 2 – Silver Laboratory
Investigating the role of cerebellar granule cells in pattern separation during motor tasks
Two-photon *in-vivo* calcium imaging in head-fixed mice with analysis in MATLAB

Rotation 1 – Burgess Laboratory
Implementing mathematical models of learning and memory updating in neural networks
Computational modelling at algorithmic and neural network level in Python

Undergraduate researcher

Spruston Laboratory – Janelia Research Campus (USA) June – August 2019
Janelia Undergraduate Scholars program
Role of CA3 feedback through dentate gyrus mossy cells in pattern separation

Nolan Laboratory – University of Edinburgh (UK) January – May 2019
Bachelor's dissertation
Context integration through place and grid cell convergence in medial entorhinal cortex

Spruston Laboratory – Janelia Research Campus (USA)　　　June – August 2018
Janelia Undergraduate Scholars program
Investigating hippocampal mossy cell heterogeneity using single-cell RNA sequencing

Greiss Laboratory – University of Edinburgh (UK)　　　May – August 2017
Recipient of the WR Henderson Scholarship
Expanding the genetic code of *C. elegans* to incorporate a photoactive amino acid

Kloosterman Laboratory – Neuro-Electronics Research Flanders (BE)　　May – July 2016
Effect of hippocampal ripple-replay disruption on spatial memory

PUBLICATIONS

AlSubaie R, Wee R, Ritoux A, Mishchanchuk K, **Passlack J**, Regester D & MacAskill A (2021). Control of parallel hippocampal output pathways by amygdalar long-range inhibition. *eLife,* 10.

Gerlei K, **Passlack J**, Hawes I, Vandrey B, Stevens H, Papastathopoulos I & Nolan M (2020). Grid cells are modulated by local head direction. *Nature communications*, 11.

PRESENTATIONS

Talk and tutorial at Janelia Theoretical Neuroscience Workshop (2024). Expanding reinforcement learning models to complex behaviours using Bayesian statistics.

Poster at FENS: **Passlack J**, Bools K, Decaix P & MacAskill A (2024). Parallel pathways in nucleus reuniens of the thalamus regulate the current strategy for decision-making.

Talk at Hippocampus Green Meeting: **Passlack J** (2024). Connecting the hippocampus and prefrontal cortex for flexible behaviour.

STUDENT SUPERVISION

University College London (UK)　　　2020 – 2024
Involved in training students and researchers on computational and laboratory techniques.

Direct mentorship
Philippine Decaix, UCL master's student, 2023 – 2024
Katya Bools, UCL master's student, 2022 – 2023

POSTGRADUATE TEACHING EXPERIENCE

University College London (UK)　　　2020 – 2024
Teaching and marking on neuroscience, data analysis and computer science courses.

Reinforcement learning 2024; Neuroinformatics 2022; Introduction to Neuroscience; Quantitative biology; Methods in Ecology and Evolution 2020/2021