

Reach out and grab something: A13 dopamine neurons and their contribution to skilled forelimb movements

- **Supervisors:** [Dr John Apergis-Schoute](#)
- **Studentship Funding:**
 - **Name:** SBBS Studentship
 - **Funder:** School of Biological and Behavioural Sciences (SBBS) at QMUL
- **Application Deadline:** 14th April 2024
- **Expected Start Date:** Sept 2024

Project Overview

Applications are open for a 3-year funded PhD Studentship in the [School of Biological and Behavioural Sciences](#) (SBBS) at Queen Mary University of London.

Reaching out and grabbing an object, such as food or a tool, for it to then be manipulated is a critically important motor action for many mammalian species. Although seemingly effortless in its execution, for such actions to be effective information regarding the object's position and that of ongoing forelimb movements must be continuously updated so the two are aligned. Planning out and executing a successful reach-to-grasp movement is critical for foraging behaviour and consequently are driven by motivational factors important for the animal's survival.

The main objective is to determine how the brain transforms object information into a motor command for reaching out and grasping a target object. In doing so we hope to shed light on how successful grasping actions are generated and subsequently reinforce effective foraging behaviour.

The brain chemical dopamine (DA) is well-known to play an important role in both motivation and motor control and so many theories of dopamine function posit that the two are functionally coupled and together are necessary for effective planning, initiation, and execution of actions for achieving a goal. Successful reach-to-grasp movements fit under this model as they are severely disrupted in DA neurodegenerative disorders such as Parkinson's and Huntington's diseases as well as their corresponding rodent models.

What is not clear however is which DA circuits are important for these forelimb movements and what are their exact contributions to such actions. We have recently identified in rats, a previously uncharacterised DA cell population located medially to the zona incerta known by the name A13 to be important in grasping actions (Garau et al., 2023).

The lab is next focusing on determining the exact contributions of A13 DA neurons on prehensile actions and importantly the incoming and outgoing circuits involved which will form the basis of this advertised PhD research. As such, this research will be critical for positioning the A13 within the functional framework of central DA motor circuits and their relation to DA neurodegenerative diseases.

Research Environment

Experiments will be conducted at a modern newly refurbished research facility with state-of-the-art equipment for monitoring and controlling activity of specific neural circuits in behaving rodents. Some studies will also be carried out in a fully equipped histology lab and imaging suite with light and fluorescence imaging capacity for imaging at subcellular resolution and in living tissue (2-photon).

The lab is located centrally in London, which is a global centre for neuroscience research and in close to proximity to institutes world-renowned in systems neuroscience, including the Sainsbury-Welcome Institute, UCL, King's College London and Imperial College. Locally at QMUL, the lab is part of the ever-growing psychology department with an interactive systems neuroscience group that regularly meets for pitching collaborative research ideas, presenting data, journal clubs and socialising after work.

The PhD candidate will be supervised and taught first-hand various techniques in systems neuroscience including advanced anatomical circuit mapping, optical activity-based imaging and optogenetics in freely-behaving animals and/or ex vivo whole-cell recordings from identified neurons.

They will engage regularly in data talks and journal clubs and will present their data and published articles. As conferences are important for sharing and developing ideas, they will be given the opportunity to regularly attend conferences both domestically and internationally.

[Find out more about the School of Biological and Behavioural Sciences on our website.](#)

Entry Requirements & Criteria

We are looking for highly motivated candidates, with a keen interest in neuroscience. Candidates should have or expecting to receive a first or upper-second class honours degree in an area relevant to the project such as Neuroscience, Psychology and Biology. Candidates must also have experience conducting research in a laboratory environment.

Candidates with programming skills such as Python/Matlab, a good understanding of statistics, and experience of rodent experiments are desirable.

[Find out more about our entry requirements here.](#)

Applicants from outside of the UK are required to provide evidence of their English language ability. [Details can be found on our English Language requirements page.](#)

Funding

The studentship is funded by the School of Biological and Behavioural Sciences (SBBS) at Queen Mary University of London (QMUL). It will cover home tuition fees, and provide an annual tax-free maintenance allowance for 3 years at the UKRI rate (£20,622 in 2023/24).

To classify for Home Fees, this typically means the candidate will have unrestricted access on how long they can remain in the UK (i.e. are a British National, have settled, or pre-settled status, have indefinite leave to remain etc.)

International students will need to cover the difference in fees between the home and overseas basic rate from external sources. [Further details can be found on our PhD Tuition Fees page.](#)

Funding and eligibility queries can be sent to the sbbs-pgadmissions@qmul.ac.uk

How to Apply

Formal applications must be submitted [through our online form](#) by the **stated deadline** for consideration.

Applicants are required to submit the following documents:

- Your CV
- Personal Statement
- References
- Copies of academic transcripts and degree certificates

[Find out more about our application process on our SBBS website.](#)

Informal enquiries about the project can be sent to Dr John Apergist-Schoute at j.apergist-schoute@qmul.ac.uk

Admissions-related queries can be sent to sbbs-pgadmissions@qmul.ac.uk.

Apply Online

The School of Biological and Behavioural Sciences is committed to promoting diversity in science; we have been awarded an Athena Swan Silver Award. We positively welcome applications from underrepresented groups.

<http://hr.qmul.ac.uk/equality/>

<https://www.qmul.ac.uk/sbbs/about-us/athenaswan/>

References

Garau, C., Hayes, J., Chiacchierini, G., McCutcheon, J.E. and Apergist-Schoute, J., 2023. Involvement of A13 dopaminergic neurons in prehensile movements but not reward in the rat. *Current Biology*, 33(22), pp.4786-4797.