



P.N. 0553-P/159488  
20 November 2024

## One (1) PhD candidate Position

[Ref # ORZ-0695]

The research group of Systems Neuroscience of IMBB under the European Program ERC-2022-STG - **NEURACT** entitled "**Untangling population representations of objects. A closed loop approach to link neural activity to mouse behavior**" (Program Coordinator Prof. Froudarakis) invites applications for one (1) motivated PhD candidate to assist with the understanding of the algorithm that the brain uses to identify objects in our visual environment under the aforementioned EU-funded ERC Research Program.

### About the lab

Our lab investigates how cortical circuits interact to form transformation-invariant object representations that can guide behavior. Natural environment contains a large number of objects with overlapping sensory input, and our brain is capable of using information from different sensory modalities to extract their identities with ease. Yet, despite extensive research in the last few decades, we are still far from having a complete understanding of how the brain creates untangled object representations. If we understood how the cortex achieves this extraordinary ability at the algorithmic level, this would represent a significant advance in our understanding of brain computation in general. To address this question, we combine advanced imaging techniques for recording neural activity with high-throughput behavioral training and computational modeling to study how the activity of large neuronal populations across different cortical regions enables behaving animals to identify and isolate objects in different contexts.

### About the project:

A paramount component of intelligence is our ability to extract useful information in the world through our sensory observations. Object recognition is a fundamental problem in visual perception: every day we depend on our ability to identify objects in our visual environment, and our brain is capable of accomplishing it effortlessly and in a fraction of a second, in spite of immense variation in the sensory information that arrives in our retinas. Understanding the algorithm that the brain uses to do this complex task is a decisive conquest in neuroscience but in order to understand ethologically relevant visual processing, we need to understand how it drives behavior. Despite significant progress characterizing visual processing, we do not understand how the visual system solves visual inference problems in natural environments and we are still far from having a complete understanding of how the brain creates untangled transformation-invariant object representations in the perceptual/visual domain, that can subsequently be used to guide behavior.

The proposed research effort aims to:

- create a state-of-the-art behavioral virtual navigation system for mice,
- combine it with recent advanced functional brain recording techniques and sophisticated neural data analysis to study how objects

### Position Description:

Object recognition is a fundamental problem in visual perception and our brain is capable of accomplishing it effortlessly and in a fraction of a second, in spite of immense variation in the sensory information that arrives in our retinas. The proposed research effort aims to (i) create a state-of-the-art behavioral virtual navigation system for mice, (ii) combine it with recent advanced functional brain recording techniques and sophisticated neural data analysis to study how objects are represented in the activity of large populations of neurons across the visual hierarchy and beyond and (iii) causally relate these representations to the behavior of the animal.

The selected candidate will analyze high-throughput electrophysiological, calcium imaging and behavioral data to discover how the visual system solves visual inference problems in natural environments and gain better understanding of how the brain creates untangled transformation-invariant object representations in the perceptual/visual domain, that can subsequently be used to guide behavior.

**Required qualifications:**

- B.Sc. degree in Biology
- M.Sc degree in Neurosciences
- Enrolled in a PhD Program in Neurosciences
- FELASA or equivalent certificate for animal handling
- At least one high impact publication in scientific journals as author or co-author
- Experience with behavioral experiments on mice
- Experience with molecular techniques and imaging

A/A	Evaluation criteria	Maximum score
1.	B.Sc. degree in Biology (Grade of Diploma)	10
2.	M.Sc in Neurosciences	YES/NO
3.	Enrolled in a PhD Program in Neurosciences	YES/NO
4.	FELASA or equivalent certificate for animal handling	YES/NO
5.	At least one high impact publication in scientific journals as author or co-author	YES/NO
6.	Experience with behavioral training on mice related to object recognition (No experience= 0 points, <12 months = 15 points, >12 months = 30 points)	30
7.	Experience with molecular techniques and imaging (No experience= 0 points, <12 months = 15 points, >12 months = 30 points)	30
8.	Interview where they will be evaluated: (a) Experience and knowledge background in relevant experimental studies and techniques (10 credits) (b) organizational and communication skills (10 points) (c) spirit of cooperation, initiative and self-motivation (10 points)	30
<b>ΣΥΝΟΛΟ</b>		<b>100</b>

**Contract Duration:** 12 months with the possibility of extension according to the project needs

**Total budget:** depending on experience and qualifications

**Envisaged starting date:** 01 January 2025

**Application submission:** Interested candidates should submit their application electronically by **November 30, 2024**

**The application should consist of:**

1. CV
2. Brief statement of purpose
3. The names and contact details of two referees
4. Photocopies of academic titles
5. Documents proving qualifications
6. Proof of enrollment in a PhD Program

**Submission of applications:** [orz0695@imbb.forth.gr](mailto:orz0695@imbb.forth.gr)

**Evaluation procedure**

Applications will be evaluated by a three-member evaluation committee. In case of interview procedure, candidates will be invited to participate in person or teleconference.

The candidates with academic titles awarded by foreign Higher Education Institutions must have certificates of recognition from DOATAP – Hellenic National Academic Recognition and Information Center (Hellenic NARIC), either the foreign Higher Education Institutions that award them, are included in the National Register of Recognized Institutions of Higher Education compiled by the DOATAP (<https://www.doatap.gr/anagnorish/mitroa/>).

DOATAP is the official body of the Hellenic Republic for the academic recognition of titles and qualifications awarded by foreign Higher Education Institutions, as well as for the provision of accurate information on the Higher Educations Institutions and qualifications in Greece and abroad.

The announcement of the results will be posted on the website of FORTH-IMBB. This publication confers the right to object to the results within 5 working days of the date of the results announcement.

The selected candidates will be notified personally regarding the success of his/her application and will be requested to submit certified copies of his/her degrees. In the event that the documents submitted to not agree with the original application the candidate will be dismissed.

**GDPR Disclaimer**

FORTH is compliant with all legal procedures for the processing of personal data as defined by the Regulation EU/2016/679 on the protection of natural persons with regard to the processing of personal data. FORTH processes the personal data and relevant supporting documents that you have submitted to us. Processing of that data is carried out exclusively for the needs and purposes of this specific call. Such data shall not be transmitted to or communicated to any third party unless required by law.

FORTH retains the above data up to the announcement of the final results of the call, unless further process and reservation is required by law or for purposes of exercise, enforcement, prosecution of certain one's legitimate legal rights' as defined in the Regulation EU/2016/679 and/or in national law. We inform you that under the Regulation EU/2016/679 you have the rights to be informed about your personal data, access to, rectification and erasure, restrictions of process and objection to as provided by applicable regulation and national laws. We acknowledge also to you, that you have the right to file a complaint to the national Data Protection Authority. For any further information regarding exercise of your personal data protection rights, you may contact the Data Protection Officer at FORTH at [dpo@admin.forth.gr](mailto:dpo@admin.forth.gr).

You have the right to withdraw your application and consent for the processing of your personal data at any time. We inform you that, in this case, FORTH shall destroy such documents and/or supporting documents submitted and shall delete the related personal data.

**APPLICATION FORM**

Name: \_\_\_\_\_  
Surname: \_\_\_\_\_  
Date of birth (dd/mm/yy): \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone number: \_\_\_\_\_  
Email address: \_\_\_\_\_

TO  
**FOUNDATION OF RESEARCH AND TECHNOLOGY (FORTH)**  
**INSTITUTE OF MOLECULAR BIOLOGY AND BIOTECHNOLOGY**

Hereby I submit my application for the position:

In the framework of the project: \_\_\_\_\_

Position code [Ref #] \_\_\_\_\_

Submitted with this application:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

I certify that:

- A) I accept the terms and conditions of the job announcement
- B) I possess all the necessary certificates and documents and I can present them in their original form to the committee without any delay if I am asked to do so
- C) I am able to complete the project within the foreseen time -frame
- D) all the information given in the framework of this application are accurate and true.

Date: \_\_\_\_\_

Applicant name

\_\_\_\_\_  
(signature)