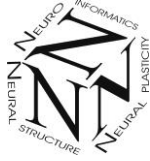




College of Engineering
and Computing

Department of Bioengineering



Center for Neural Informatics, Structures, & Plasticity (CN3)



Hippocampome.org

Dannenberglab.org



OPEN POST-DOC POSITIONS

Two full-time postdoctoral positions are available immediately at George Mason University (Fairfax, Virginia, USA) in the labs of Professors Giorgio Ascoli and Holger Dannenberg in the Center for Neural Informatics, Structures, and Plasticity (CN3) and the Department of Bioengineering

We are looking for **one primarily computational** and **one primarily experimental neuroscientist** working on a joint collaborative **NIH-funded** project focusing on the effects of **age-related changes in cholinergic neuromodulation** of the hippocampus on **memory** decline using **single unit recordings** in freely behaving **mice** and biophysically detailed, large-scale **spiking neural network simulations**.

Project Overview: We are investigating the mechanisms by which aging affects cholinergic modulation in the hippocampal CA3 area and its role in age-related memory loss and cognitive decline, key features of Alzheimer's disease. The project aims to expand a biologically realistic, full-scale spiking neural network model of CA3 by incorporating behavioral dynamics and cholinergic modulation. This will be informed by cutting-edge experimental data on neural firing and acetylcholine release in freely behaving mice, with a focus on spatial memory encoding and retrieval. This collaborative project is funded by the National Institutes of Aging (NIA) of the National Institutes of Health (NIH).

For the *computational* position: We are seeking a computational neuroscientist to further develop a data-driven spiking neural network model of hippocampal area CA3, using the Carlsim environment on Mason's GPU supercomputer and data from Hippocampome.org. The model will simulate encoding and retrieval dynamics, integrating experimental data on cholinergic modulation and neural activity during behavior. This role involves designing, implementing, running, and analyzing simulations to generate and test hypotheses on how aging impacts memory and cognition. Strong C++ & Python expertise is a definitive plus.

For the *experimental* position: We are looking for an experimentalist to acquire single unit recordings of neural activity in hippocampal area CA3 using tetrodes and neuropixels as well as fiber photometry recordings of cholinergic modulation in mice performing spatial memory tasks. The experiments will provide essential data for the project's computational modeling. The goal is to investigate how aging alters hippocampal function and explore potential interventions for memory decline. Prior experience with survival surgeries in mice, electrophysiological recordings and data analysis using Matlab or Python is advantageous.

Duties for both positions include both individual and team work, writing manuscripts for peer-review, and presenting data at scientific conferences, as well as mentoring graduate and undergraduate students.

The [Ascoli](#) and [Dannenberg](#) labs are in the Krasnow Institute, a research-dedicated building on the main (Fairfax) campus of George Mason University, 20 miles from (and on the subway line of) Washington DC.

Both postdoctoral positions are fully benefited as Virginia state employees, including but not limited to a generous retirement package, family health insurance, and paid leave.

Requirements: Successfully completed doctoral degree (PhD, MD, DSc, or equivalent) in Neuroscience, Bioengineering, Cognitive Science, or other relevant STEM fields; collegiality; and good command of English.

Desired qualifications: Quantitative reasoning, attention to details, programming skills in MATLAB and or Python, academic aptitude, scientific interest. *For the experimental position*, experience with in-vivo electrophysiology and/or optogenetics in freely behaving rodent is highly desirable. *For the computational position*, preference will be given to candidates with expertise in spiking neural network modeling and GPU high-performance computing.

Select candidates for the position will be invited to give a talk.

Application instructions:

The complete written application consists of:

- Cover Letter highlighting previous experience and future research and career goals
- CV/Resume
- Coursework transcripts (undergraduate and graduate)
- Links to two sample publications (e.g. peer-reviewed articles, research preprints, thesis)
- 1 Letter of recommendation (preferably from your PhD Advisor), sent separately by the letter writer via email
- 1 Reference (other than your PhD Advisor), sent separately by the reference provider via email

Deadline: Applications will be considered on a rolling basis.

The completed application packet should be emailed directly to:

hdannenb@gmu.edu and ascoli@gmu.edu

Commitment to Diversity, Equity, and Inclusion:

George Mason University has a strong institutional commitment to the achievement of excellence and diversity among its faculty and staff, and strongly encourages candidates to apply who will enrich Mason's academic and culturally inclusive environment. All individuals regardless of race, gender, ethnicity, or disability will be considered.

Research Environment:

The College of Engineering and Computing (CEC) at George Mason University is comprised of the Volgenau School of Engineering and a new School of Computing. The College is a fast-growing force for innovation in research and education. Ranked nationally in the top 100 in both undergraduate and graduate education, the College boasts more than 9,100 students in 37

undergraduate, master's, and doctoral degree programs, including several first-in-the-nation offerings. The College stands out for its leading research in areas such as neurotechnology and computational neuroscience, artificial intelligence, data analytics engineering, cybersecurity engineering, biomedical imaging and devices, community-based healthcare, autonomous systems, 5G/Next G communications, systems architectures, computational biomedicine, advanced materials and manufacturing, sustainable infrastructure, and more. The College encourages multidisciplinary research and provides ample opportunity for faculty to work with other disciplines.

George Mason University is the largest and most diverse public research university in Virginia, with an enrollment of over 39,000 students studying in over 200 degree programs. Mason is an innovative, entrepreneurial institution with national distinction in a range of academic fields. It was classified as an R1 research institution in 2016 by the Carnegie Classifications of Institutes of Higher Education. Mason has campuses in Fairfax, Arlington, and Prince William. Its proximity to Washington, D.C. provides unmatched geographical access to a number of federal agencies and national laboratories. Northern Virginia is also home to one of the largest concentrations of high-tech firms in the nation, providing excellent opportunities for interaction with industry. The region is consistently rated as being among the best places to live in the country, and has an outstanding local public-school system.

The Krasnow Institute at George Mason University is a multi-disciplinary facility devoted to research at the intersection of cognitive psychology, neurobiology, neuroengineering, and computational neuroscience. Experiments and procedures that involve animal work will be performed in the Krasnow Animal Facility (KAF) that houses an AALAC accredited vivarium and dedicated rooms for behavioral experiments and surgical procedures. The Center for Neural Informatics, Structures, and Plasticity (CN3) pursues fundamental breakthroughs in neuroscience by fostering neuroinformatic and computational approaches. By bringing together faculty expertise in these multiple disciplines, the Center provides opportunities for cross-training in neuroscience, psychology, and engineering, both at the graduate and postdoctoral levels.