Felix H. Taschbach

Contact Information

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www.felixt.dev/

Research Interests

Computational / Theoretical Neuroscience, Machine Learning, Representation Learning

Education

University of California San Diego (UCSD), La Jolla, California
PhD, Biological Science — estimated graduation: July 2025
Computational neuroscience research as part of the Benna Lab at UCSD and the Tye Lab at the Salk Institute for Biological Studies.
Current GPA: 4.0/ 4.0
Advisors:
Dr. Marcus Benna, UCSD
Dr. Kay Tye, Salk Institute for Biological Studies

Maastricht University, Maastricht, the Netherlands
MSc, Systems Biology — July 2019
GPA: 4.0/4.0 (converted) - graduated *summa cum laude*
Thesis completed at Zuckerman Mind Brain Behavior Institute at Columbia University
Topic: *Decoder-based analysis of internal representations of space from large scale recordings of population activities in the dentate gyrus and CA1 areas of the mouse hippocampus*
Advisors:
Dr. Stefano Fusi, Columbia University
Dr. Judith Peters, Maastricht University
Won MaCSBio Thesis Award from the Maastricht Centre for Systems Biology

BSc, Data Science and Knowledge Engineering — July 2016
GPA: 3.8/ 4.0 (converted)
Thesis completed at Institute for Quantum Information at RWTH Aachen University
Topic: *Classical and Quantum Algorithms for Quantum Simulation*
Advisors:
Dr. Ronald Westra, Maastricht University
Dr. Barbara Terhal, RWTH Aachen University
Independent Study in Quantum Computing supervised by Dr. David Eck

Professional Experience

Visiting Scientist — November 2018 to June 2019
Worked at Mortimer B. Zuckerman Mind Brain Behavior Institute in New York, NY, while I completed my master thesis.

Intern — September 2016 to February 2017
Frontend Developer at bitstars GmbH in Aachen, Germany.

Teaching Experience

Teaching Assistant

Neuromatch Academy: Computational Neuroscience	Summer 2022
BIPN164 - Computational Models of the Brain	Spring 2022
MAT1004 - Imperative Programming	Spring 2017
SCI2011 - Introduction to Programming	Fall 2016

Instructor: Dr. Jerry Spanakis (G.)

Publications

Padilla-Coreano N, Batra K, Patarino M, Chen Z, Rock RR, Zhang R, Hausmann Javier Weddington SB, Patel RR, Zhang YE, Fang H, Keyes LR, Libster A, Matthews GA, Curley JP, **Taschbach FH**, Fiete IR, Lu C, Tye KM. *A cortical-hypothalamic circuit decodes social rank and promotes dominance behavior.* Nature. Preprint available DOI:10.21203/rs.3.rs-94115/v1

Taschbach FH, Stefanini F, Benna MK, Fusi SF. *Abstract representations of space in the mouse dentate gyrus. in prep*

Mills F, Lee CR, Howe JR, Shao S, Lemieux ME, Borio MR, **Taschbach FH**, Patel RR, Keisler MN, Chen HS, Gross AL, Batra K, Tye KM. *Amygdalostriatal transition zone neurons encode sustained valence to direct conditioned behaviors. in prep*

Ramot A, **Taschbach FH**, Wu A, Chen Q, Hu Y, Yang Y, Tye KM, Benna MK,

Komiyama T. *Functional characterization of input-defined neurons within the primary motor cortex during motor learning. in prep*

Coley AA, Delahanty JM, Ramot A, Pamintuan R, Alarcon M, Liu V, Jia C, Advikoluna H, Shathaya S, Batra K, LeDuke D, **Taschbach FH**, Wichmann R, Li H, Fischer KB, Benna MK, Komiyama T, Tye KM. *Visualizing the Longitudinal Development of Stress-Induced Anhedonia From Representations of Valence in the PFC. in prep*

Patel RR, Patarino M, Van Hoek A, Kim K, **Taschbach FH**, Li H, Lee CR, Miranda RL, Batra K, Keyes L, Libster A, Wichmann R, Benna MK, Tye MK. *Amygdala-cortical circuit determinants of social isolation-induced alcohol consumption. in prep*

Matthews GA, Lee CR, Lemieux ME, Brewer EM, Borio M, Miranda RL, Keyes L, Peroni E, Pereira GS, Lopez Moraga A, Pallé A, Kimchi EY, Schneider G, **Taschbach FH**, Chan MG, Padilla-Coreano N, Wichmann R, Benna MK, Tye KM. *Downstream targets of DRN dopamine neurons represent distinct facets of the experience of social isolation. in prep*

Conferences

2019 Conference on Cognitive Computational Neuroscience
Presented a poster on my master thesis research.
Title: Abstract representations of space in the mouse dentate gyrus
accessible under doi.org/10.32470/CCN.2019.1403-0

Languages

German (Native)
English (Fluent in speaking, proficient in writing)

Technical Competencies

Programming languages:
Matlab, Python, R

Summer courses

Neuromatch Academy: Deep Learning — Summer 2021
Neuromatch Academy: Computational Neuroscience — Summer 2020

Research Experience

Rotation Project — November 2020 - March 2021
I analyzed electrophysiological recordings from the hippocampus of freely moving rats and developed filters to find short wave ripple and dentate spikes in real time.
Under the supervision of Dr. Jill Leutgeb and Dr. Stefan Leutgeb at UCSD.

Master Thesis — November 2018 to June 2019
I analyzed neural activity, in vivo, from large populations of dentate gyrus and CA1 neurons of freely moving mice. Using machine learning techniques, I studied the representation of movement direction and position and found that these two variables are more independently encoded than was previously thought.
Advisors:
Dr. Stefano Fusi, Columbia University
Dr. Judith Peters, Maastricht University

Research Project — October 2017 to April 2018
I worked with Dr. Domenica Dibenedetto from the Maastricht Centre for Systems Biology on simulating 3D neuron cultures using NEURON.

Research Project — Winter 2018
Completed group project using statistical analysis of multiple omics datasets of subjects with extra-hepatic cholestasis. The project consisted of a report and presentation of the results.
Supervisor: Dr. Zita Soons, Maastricht University

Bachelor Thesis — January 2016 to June 2016
This thesis described proof-of-principle simulations that were completed to see whether quantum algorithms can already compete with classical algorithms, even if they are run on quantum simulators and therefore do not gain an exponential speed increase by exploiting quantum mechanics. A split-step fourier algorithm was implemented on multiple quantum simulators and compared to an implemented version of the finite-difference time-domain algorithm.
Advisors:
Dr. Ronald Westra, Maastricht University
Dr. Barbara Terhal, RWTH Aachen University