Matteo Alleman

mmallemmann@gmail.com
github.com/kelarion

EDUCATION & EMPLOYMENT	**Columbia University** *Postdoc*, Center for Theoretical Neuroscience, 2025-	New York, USA
	Columbia University *PhD*, Center for Theoretical Neuroscience, 2018-2024	New York, USA
	University College London *BSc, MSci 1st class* Neuroscience 2014-2018	London, UK

PAPERS & PROCEEDINGS

Alleman M., Fusi S. *Unsupervised learning of categorical structure* (UniReps workshop at NeurIPS 2024)

Alleman M., Panichello M., Buschman T., Johnston W. J. *The neural basis of swap errors in working memory* (PNAS 2024)

Alleman M.*, Lindsey J.*, Fusi S. *Task structure and nonlinearity jointly determine learned representational geometry* (ICLR 2024)

Baruchin L., **Alleman M.**, Schröder S. *Reward Modulates Visual Responses in the Superficial Superior Colliculus of Mice* (J. Neurosci. 2023)

Alleman M., Mamou J., Del Rio M. A., Tang H., Kim Y., Chung S. *Syntactic Perturbations Reveal Representational Correlates of Hierarchical Phrase Structure in Pretrained Language Models* (Rep4NLP workshop at ACL 2021)

POSTERS

Alleman M., Panichello M., Buschman T., Johnston W. J. *Selection from working memory can lead to catastrophic misbinding errors* National Institute of Neurological Disorders and Stroke T32 Meeting 2023

Alleman M., Panichello M., Buschman T., Johnston W. J. *Selection from working memory can lead to catastrophic misbinding errors* Computational and Systems Neuroscience (Cosyne) 2022

Schröder S., **Alleman M.**, Harris K.D., Carandini M. *Diverse responses of neurons in mouse superficial superior colliculus during a visual decision task* Society for Neuroscience 2017

INVITED TALKS

Yale Workshop on Abstraction and Relational Reasoning (2023) *Mechanisms of abstraction in shallow networks*

Carnegie Mellon University brAIn seminar (2022) *Probing Syntactic Representations in Transformers with Context Perturbations*

MIT Discussion Group on Language and Computation (2022) *Probing Syntactic Representations in Transformers with Context Perturbations*

CONTRIBUTED TALKS

Convention on the Mathematics of Neuroscience and AI ('Neuromonster') (2024) *Modelling behavioral imprecision from neural representations*

THESES

Columbia PhD |2024
Alleman, M. *Parsing the geometry of distributed representations*

UCL MSci |2018
Alleman, M., Carandini, M. *Ipsilateral stimuli drive visual neurons of the mouse superior colliculus*

UCL BSc |2017
Alleman M., Harris K.D. *Neuronal diversity and function in the superior colliculus*

ACADEMIC AWARDS	**University College London**	
	Dean's List 2015, 2016	
	Sectional Prize for best performance in Neuroscience 2015, 2016	
	Bernstock Prize for highest achievement in MSci Neuroscience 2016	

MENTORS	**Stefano Fusi**	2020-present
	PhD mentor	New York
	Representation and learning of abstract categories	
	W. Jeffrey Johnston	2021-present
	Collaborator	New York
	Neural basis of working memory errors	
	SueYeon Chung	2019-2022
	Rotation mentor and collaborator	New York
	Shared representations and syntactic information in transformers	
	M. Carandini and K. Harris	2016-2018
	BSc and MSci mentor	London
	Neural mechanisms for visual decisions in the superior colliculus	
	Adam Hantman	June-August 2017
	Summer internship mentor	Ashburn
	Cerebellar control of skilled, full-body movements.	
	Jelena Radulovic	July-September 2015
	Summer internship mentor	Chicago
	Contextual fear conditioning in rodents.	

MENTEES	**Mary Jackson**	2023-2024
	High school intern (BRAINYAC program)	New York
	Mechanisms for out-of-distribution generalization in neural networks	