Yirong Xiong

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Education

Universität Tübingen **2021 – 2023**

M.Sc in Neural Information Processing *Tübingen, Germany*

- Courses: Neural Dynamics, Machine Learning, Signal Processing, Neural coding, Neurophysiology, Animal Handling
- Summer school: The Computational Summer school on Modeling Social and collective behavior (COSMOS)

Beijing Normal University **2018 – 2021**

M.Sc in Psychology *Beijing, China*

- Summer school: Computational Neuroscience (neuromatch academy 2021)

Sun Yat-Sen University **2014 – 2018**

B.Sc in Information Management and Information System *Guangdong, China*

Research Experience

Max Planck Institute for Brain Research, Prof. Gilles Laurent **2023**

Topology and dynamics of camouflage in cuttlefish *Frankfurt, Germany*

- Estimate the topology of camouflage in high dimensional space.
- Investigate the dynamics of behaviour trajectory in camouflage space.

Institute for Neurobiology, Prof. Andrea Burgalossi **2023**

Electrophysiological diversity of head direction neurons in thalamus and presubiculum *Tübingen, Germany*

- Used unsupervised learning to cluster head direction cells based on neural activities.
- Identified cell preferences for clockwise and counterclockwise rotation, to study evolving of head direction representation in rodents.

Max Planck Institute of Animal Behaviour, Dr. Vivek Hari Sridhar **2023 – present**

Drifting and reorientation in ring-attractors *Konstanz, Germany*

- Built ring attractor model and simulated spontaneous network activities.
- Study drift and reorientation for goal-oriented navigation movement and its influence on synaptic strength.

Cluster of Excellence "Machine Learning", Dr. Charley Wu **2022 – present**

rate-distortion theory as a model of human representation learning *Tübingen, Germany*

- Designed an online compositional bandit experiment for representation learning.
- Designed an online experiment for value-based memory.
- Simulated attention-based reinforcement learning model to study expertise effect on value-based memory.

Department of Computer Science, Dr. Anna Levina (Martius) **2022 – 2023**

Dissociated aperiodic and periodic neural dynamics during attention. *Tübingen, Germany*

- Dissociated aperiodic and periodic neural dynamics using LFP data from V1 and V4 in spatial visual attention task.

Max Planck Institute For Ornithology, Dr. Daniela Vallentin **2022**

Juvenile song detection *Seewiesen, Germany*

- Designed juvenile song detection pipeline using DAS.
- Designed UMAP interactive tool to check annotation efficiently.

Institute for Neurobiology, Dr. Lena Veit **2021 – 2022**

UMAP labeling tool *Tübingen, Germany*

- Developed a Web-based tool for visualizing and relabeling syllables (Github link).

Pitch learning model project

- Disentangled factors in context-based pitch learning using regression models.

State Key Laboratory of Cognitive Neuroscience and Learning, Dr. Gaolang Gong **2018 – 2021**

Corpus Callosum Topography Based on dMRI (ccmapping.org) *Beijing, China*

- Developed a track-generating and filtering pipeline using Mrtrix3. Obtained fibers passing through the corpus callosum and connecting left and right hemispheres.
- Generated individual corpus callosum topography based on HCP S1200 Database, and established group-averaged validated topographic maps with different weighting methods.
- Designed a Web-based tool to provide full and interactive access to the topographic result using Three.js, WebGL, and Node.js.

Asymmetries of planum temporale predict lateralization of auditory-language processing

- Defined planum temporale manually and draw masks of relative ROIs.

School of Information Management, Dr. Daifeng Li **2018**

Effects of Different Machine Learning Methods on ADHD classification *Guangdong, China*

- Classified ADHD and control group using SVM, Logistic, CNN.

Papers

Yang, Liyuan, Chenxi Zhao, **Xiong, Yirong**, Suyu Zhong, Di Wu, Shaoling Peng, Michel Thiebaut de Schotten, and Gaolang Gong. "Callosal fiber length scales with brain size according to functional lateralization, evolution, and development". In: *Journal of Neuroscience* 42.17 (2022), pp. 3599–3610.

Bistere, Linda, Carlos Gomez-Guzman, **Xiong, Yirong**, and Daniela Vallentin. "Female vocal feedback promotes song learning in juvenile zebra finches". Under review: Nature Communications. 2023.

Xiong, Yirong, Nir Moneta, Bányai Mihály, and Charley Wu. "Selective memory for reward-relevant features is modulated by expertise during reward learning". *Conference on Cognitive Computational Neuroscience*. 2023.

Xiong, Yirong, Liyuan Yang, Changtong Wang, Chenxi Zhao, Junhao Luo, Di Wu, Yiping Ouyang, Michel Thiebaut de Schotten, and Gaolang Gong. "Population-based cortical mapping of callosal connections in the human brain". https://doi.org/10.21203/rs.3.rs-2210117/v1. 2022.

Conferences & Workshops

Xiong, Yirong. "Population-based cortical mapping of callosal connections in the human brain". In: NeNa Conference (Neurowissenschaftliche Nachwuchskonferenz). 2022.

Xiong, Yirong, Eduardo Blanco-Hernandez, Giuseppe Balsamo, and Andrea Burgalossi. "Electrophysiological diversity of head direction neurons revealed by t-SNE multidimensional embedding". In: *Tübingen Systems Neuroscience Symposium*. 2023.

Xiong, Yirong, Nir Moneta, Bányai Mihály, and Charley M. Wu. "Selective memory for reward-relevant features is modulated by expertise during reward learning". In: *Conference on Cognitive Computational Neuroscience*. 2023.

Xiong, Yirong, Nir Moneta, David Nagy, Bányai Mihály, and Charley M. Wu. "Selective memory for reward-relevant features is modulated by expertise during reward learning". In: *Learning and Decision-Making Workshop*. 2023.

Xiong, Yirong, Liyuan Yang, Chenxi Zhao, Junhao Luo, Di Wu, and Gaolang Gong. "A population-based online interactive atlas of human brain callosal connectivity." In: *Organization for Human Brain Mapping (OHBM) Annual Meeting*. 2021.

Honors & Awards

IMPRS stipends (monthly funding for IMPRS 5-Year MSc/PhD program) – 2021
The First Prize Academic Scholarship of Beijing Normal University – 2020 & 2019
Scientific Research Contributions Scholarship of Beijing Normal University – 2019
Freshman Scholarship of Beijing Normal University – 2018

Skills

Programming Languages: Python, JavaScript, SQL, HTML/CSS, MATLAB
Brain Imaging Tools: FreeSurfer, FSL
Languages: Mandarin(native), English(fluent)

Hobbies

Electronic keyboard, marathon, birdwatching, baking.