Yirong Xiong

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Education

M.Sc in Neural Information Processing **2021 – 2023**

Universität Tübingen *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)

M.Sc in Psychology **2018 – 2021**

Beijing Normal University *Beijing, China*

B.Sc in Information Management and Information System **2014 – 2018**

Sun Yat-Sen University *Guangdong, China*

Research Experience

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

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

- Conduct experiment on texture encoding in cuttlefish visual system.
- Estimate the topology of camouflage in high dimensional space and investigate the dynamics of behaviour trajectory.

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**

Decision-making spatial navigation *Konstanz, Germany*

- Simulated goal-directed navigation trajectory using ring attractor model.
- Study how environmental and innate factors modulate bifurcation dynamics.

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

Rate-distortion theory as a model of human selective memory *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

Xiong, Yirong, Yang, Liyuan, Wang, Changtong, Zhao, Chenxi, Luo, Junhao, Wu, Di, Ouyang, Yiping, Schotten, Michel Thiebaut de, and Gong, Gaolang. "Population-based cortical mapping of callosal connections in the human brain". In: *Human Brain Mapping* (2024).

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

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

Qin, Peipei, Bi, Qiuhui, Luo, Junhao, Guo, Zeya, Yang, Liyuan, Li, Haokun, Li, Peng, Liang, Xinyu, Kong, Xiangyu, **Xiong, Yirong**, Sun, Bo, Ocklenburg, Sebastian, and Gong, Gaolang. "Microstructural asymmetries of the planum temporale predict functional lateralization of auditory-language processing". Cell Press Multi-Journal Submission. Under review.

Conferences & Workshops

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

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

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

Xiong, Yirong, Yang, Liyuan, Zhao, Chenxi, Luo, Junhao, Wu, Di, and Gong, Gaolang. "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 stipend awarded by Max Planck Institute) – 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, Stan, MATLAB
Brain Imaging Tools: FreeSurfer, FSL
Languages: Mandarin(native), English(fluent)

Hobbies

Electronic keyboard, marathon running, birdwatching, baking.