Jingjie Li

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Education

School of Life Science and Technology, **Xi'an Jiaotong University(XJTU)**, Xi'an, China. 2015.8.- 2019.7. (Expected)
Major BioMedical Engineering (BME)

4th CLS/McG Neuroscience Summer School, **Peking University(PKU)**, Beijing China. 2016.7.

Summer Undergraduate Research Program (**SURP**), NYU-ECNU Institute of Brain and Cognitive Science, **New York University Shanghai**, China. 2017.6 -2017.9

GPA: 3.5 Math & Science GPA: 3.6

Research Experience

Undergraduate Researcher, Institute of Artificial Intelligence and Robotics, Xi'an Jiaotong University — 2016 03 - *Present*

Advisor: Prof. Badong Chen

Project 1 Visual working memory affects the perception of ambiguous SFM (Structure-From-Motion) by enhancing internal representation

- Studied perceptual memory phenomenon by observing how previous SFM bias the perception of the up-coming SFM using combination of psychophysical experiments and brain imaging technique (fMRI, EEG)
- Showed that the task that keeping rotation speed in mind can strengthen the perceptual memory effect
- Showed that distractors in the delay period could impair the perceptual bias by eliminating the internal representation in MT+, but not effect the storage of VWM
- Revealed that the delay activity (Top-down modulation caused by VWM) in MT+ induced this perceptual memory
- **Presented my results on VSS 2017 conference.[Link]**

Project 2 Decoding visual representation and build up voxel-level visual encoding model based on fMRI signals

- Repeating works from three articles (Miyawaki et al., 2008, Neuron; Kay et al., 2008, Nature; Sprague & Serences, 2013, Nat. Neuroscience)
- Using SVM classifier MVPA to reconstruct 10x10 binary pixels from subject's V1 activity while they are watching that pixels visual image in the fMRI. Reconstruction performance is > 84% **[Link]**
- Modeling voxels activities in visual cortex using the Voxel-Wise Model by constructed a liner receptive field model for every voxels using the Gabor wavelet filter according to the encoding theory of the primary visual cortex
- Got remarkable accuracy in the identification task (about 48.8%, meanwhile the chance level is about 0.8%). **[Link]**
- Shared my code on github.com**[Link]**.

Undergraduate Researcher, NYU-ECNU Institute of Brain and Cognitive Science, NYU Shanghai — 2017 06 - *Present* *(Work remotely till 2017 09)* **[Link]**

Advisor: Prof. Jeffrey Erlich , Dr. Sylvain Dubroqua (Postdoc), Dr. Evgeniya Lukinova (Postdoc)

Project 1 Visual working memory task for the Rodent

- Learned to program the state-of-the-art B-Pod behavioral training system developed by the lab, and designed a 9-stage experiment protocol to train mice to perform a visual working-memory guided orienting task
- The mouse needs to interact with the B-Pod system: using the light color as a cue ,then after a short delay, it will choose the port that matched the cue to gain reward.
- Received highly evaluation from Dr. Erlich. My work is reported at NYU's website.**[link]**

Project 2 History dependance modeling (time-normalization divisive model) of the experiential based delay-reward decision-making tasks for human subjects (Under Evgeniya's project)

- Developed few computational models for measuring and detecting history dependence in experiential based delay-reward decision-making tasks.
- Found that bigger the delay the more history matters. But the parameter responsible for the history is negligibly small
- The model fails to beat the simple hyperbolic model in terms of BIC(Bayesian information criterion) on the same dataset.

Undergraduate Researcher, School of Electrical Engineering, Xi'an Jiaotong University — 2017 10 - 2017 12 **[Link]**

Advisor: Prof.Yinbin Jin, Prof. Gaidi Ning

Project 1 Rodent behaviour measurement and control system using FPGA and MATLAB

- First attempt to make a hardware platform. Successfully built up my own B-Pod system.
- Using FPGA to control LEDs around the mouse port, and to monitoring the IR collector to detect animals' activity. Using MATLAB to drive a FSM(Finite State Machine) to control the FPGA. And record all the experiment data automatically,
- Tested on real rats and mouse.

Lab Visitor, IDG/Mcgovern institute for brain research, Peking University — 2016 07 - 2016 08 [Link]

Advisor: Prof. Fang Fang

- Learned how to actually running my own psychophysics experiments with psychtoolbox
- Learned how to run fMRI experiments, and deal with fMRI raw data using SPM12 and analyze fMRI data using forward encoding model (Sprague & Serences, 2013).

Undergraduate Researcher, Department of BioMedical Engineering, Xi'an Jiaotong University — 2016 11 - 2017 05

Advisor: Prof. Gang Wang

Project 1 Anesthesia monitoring using combination of Bispectral, WT, FFT and entropy analyze in EEG signal.

- Using algorithms like 1) WT, FFT analyze to capture the time-frequency characteristics, 2) using Bispectral to detect phase coupling characteristics, and 3) using entropy\ complexity analyze to capture the none-linearity characteristics of EEG signal.
- Successfully detected significant difference between anesthesia and wake state

Publication

- **Jingjie Li**, Hao Wu, Badong Chen. Visual working memory affects the perception of ambiguous SFM (Structure-From-Motion) by enhancing internal representation, Poster presented at the 17th Annual Meeting of the Vision Sciences Society. Naples, FL.

Funding

- Project Manager, "The Relationship Between Visual Working Memory and Visual Cognition Encoding", National Undergraduate Innovation Training Program (No. GJ201710698093), 10000 RMB, 06 2017 - 06 2018.

Skills

- **Psychophysics** : Psychtoolbox programming(MATLAB) & basic experiment design skills
- **fMRI Data Analyze** : SPM12 Preprocessing and Univariate analyze, MVPA, forward encoding model, voxels activities modeling (Voxel-Wise Model)
- **EEG Data Analyze** : Running EEG experiments with neuroscan devices, ERP analyze using scan 4.5 & Curry 7
- **Rodent Experiment** : Developing and running rodent experiment protocol using B-Pod System (Open source rodent behavior measurement and control).
- **Programming** : C & C++, Python, Matlab, Verilog HDL(FPGA), Assembly language, Git, SQL DB

Honors

- Siyuan Scholarship in Xi'an Jiaotong University, 2016 (40%)
- Outstanding Student in Xi'an Jiaotong University, 2016 (20%)
- Siyuan Scholarship in Xi'an Jiaotong University, 2017 (40%)
- Outstanding Student in Xi'an Jiaotong University, 20167 (20%)

Courses Taken Online [Link]

Introduction to Programming with MATLAB, Machine Learning, Principles of fMRI 1, Neural Networks for Machine Learning