Yun-Fei Liu, PhD

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EDUCATION

PhD and MA, Psychological and Brain Sciences   SEP 2018 – DEC 2023
Johns Hopkins University (JHU), Maryland, USA

MS, Biomedical engineering   SEP 2013 – JUN 2015
National Taiwan University (NTU), Taiwan; GPA: 4.05/ 4.3

BS, Electrical Engineering   SEP 2009 – JUN 2013
National Taiwan University (NTU), Taiwan; GPA: 4.08/ 4.3

PUBLICATIONS

- Miriam Hauptman, **Yun-Fei Liu**, Marina Bedny (2024). Built to Adapt: Mechanisms of Cognitive Flexibility in the Human Brain. *Annual Review of Developmental Psychology*
- **Yun-Fei Liu**, Colin Wilson, Marina Bedny (2024). Contribution of the language network to the comprehension of Python programming code. *Brain and Language*
- **Yun-Fei Liu**, Brenda Rapp, Marina Bedny (2023). Reading Braille by Touch Recruits Posterior Parietal Cortex. *Journal of Cognitive Neuroscience*
- **Yun-Fei Liu**, Janice Chen, Colin Wilson, Marina Bedny (2023), Neural Representations of Algorithms in the Logical Reasoning Network are Recycled for Programming Code Comprehension. *2023 Conference on Cognitive Computational Neuroscience*
- Samuel Nastase, **Yun-Fei Liu** et al. (2021). The "Narratives" fMRI dataset for evaluating models of naturalistic language comprehension. *Scientific data*
- **Yun-Fei Liu**, Judy Kim, Colin Wilson, Marina Bedny (2020). Computer code comprehension shares neural resources with formal logical inference in the fronto-parietal network. *eLife*
- Samuel Nastase, **Yun-Fei Liu**, Hanna Hillman, Kenneth A. Norman, Uri Hasson (2020) Leveraging shared connectivity to aggregate heterogeneous datasets into a common response space. *NeuroImage*
- Fa-Hsuan Lin*, **Yun-Fei Liu***, Hsin-Ju Lee, Claire Chang, Iiro Jaaskelainen, Jyh-Neng Yeh, Wen-Jui Kuo (2019). Differential brain mechanisms during reading human vs. machine translated fiction and news texts. *Scientific Reports *co-first authored*

WORKS IN PREPARATION

- Yun-Fei Liu et al. (in preparation) Reasoning but not language abilities predict programming learning outcome in students without prior programming experience
- Yun-Fei Liu et al. (in preparation) Programming recycles neural representations of algorithms pre-existing in the reasoning network prior to programming education
- Yun-Fei Liu et al. (in preparation) The Cognitive Neuroscience of Programming: A literature review

RESEARCH EXPERIENCE

POSTDOCTORAL RESEARCHER, JOHNS HOPKINS UNIVERSITY, MARYLAND, USA   JAN 2024 – PRESENT
Neuroplasticity and Development lab, supervisor: Dr. Marina Bedny

- Advancing PhD research project on the neuro-cognitive basis of computer programming.

PHD CANDIDATE, JOHNS HOPKINS UNIVERSITY, MARYLAND, USA   SEP 2018 – DEC 2023
Neuroplasticity and Development lab, supervisor: Dr. Marina Bedny

- Headed a project to study the neuro-cognitive basis of computer programming. Led a five-member team across three years, conducting 400+ testing sessions to collect behavioral data from 90+ programming students and neuroimaging data from 30+ students and 25+ expert programmers.
- Managed experimenter and participant logistics, efficiently resolving conflicts and adapting to urgent scheduling changes.
- Applied advanced statistical (e.g., non-parametric statistics, Bayesian inference) and machine learning (e.g., principal component analysis, support vector machine, recurrent neural network) to analyze neuroimaging data.

- Designed and conducted a project on the neural basis of braille reading. Worked closely with 12 congenitally blind individuals during MRI scans, practiced inclusive communication.
- Troubleshot and resolved technical issues with experimental equipment, developed and documented lab analysis scripts, and established standardized protocols for experiment administration and data analysis across the lab.

RESEARCH SPECIALIST II, PRINCETON UNIVERSITY, NEW JERSEY, USA   **NOV 2017 – JUN 2018**
Hasson Lab, supervisor: Dr. Uri Hasson
- Integrated a decade's worth of legacy big dataset consisting of MRI data collected from 10+ experiments with 300+ participants across ~900 MRI scanning sessions, amounting to more than 135,000 hours of spatio-temporal data; implemented the shared-response model to enable analysis across experiments.
- Collaborated as a key member of a four-member team for a 6-month longitudinal MRI scanning research project.
- Resolved memory-related issues of the "BrainIAK" Python toolbox developed by the lab, enhancing its capability.

RESEARCH ASSISTANT, NATIONAL TAIWAN UNIVERSITY, TAIWAN   **SEP 2016 – SEP 2017**
Lab of Magnetic Resonance in Medicine, supervisor: Dr. Hsiao-Wen Chung
- Explored the application of natural language processing to Mandarin Chinese using latent semantics analysis.

MASTER DEGREE STUDENT, NATIONAL TAIWAN UNIVERSITY, TAIWAN   **FEB 2014 – JUN 2015**
Brain Imaging Lab, supervisor: Dr. Fa-Hsuan Lin
- Designed and implemented a project to investigate the temporal coherence during natural passage reading; applied inter-subject correlation method MRI data collected from 24 individuals.

RESEARCH ASSISTANT, NATIONAL TAIWAN UNIVERSITY, TAIWAN   **SEP 2012 – JAN 2014**
Cell Behavior Lab, supervisor: Dr. Po-Ling Kuo
- Cultivated melanoma cells, A549 cells, and 3T3 cells with strict adherence to standardized procedures while maintaining rigorous progress reports.

OTHER EXPERIENCE

FOUNDING MEMBER AND CHIEF EDITOR, SCI'MORE PODCAST   **AUG 2020 – JUN 2023**
- Edited more than 10 out of the approximately 25 episodes released during my tenure.
- Trained aspiring editors on technical know-hows in interview moderation and audio editing.

SYMPOSIUM ORGANIZER AND SPEAKER
- 2022 annual meeting of the Cognitive Neuroscience Society.
- Title of the talk: "Neural Recycling of Logical Reasoning Network for Programming Code Comprehension".

TEACHING ASSISTANT
- Administrative and technical support: *Linear Algebra; Biomedical Engineering; Scientific Research and Academic Career; Introduction to Psychology; Real World Human Data.*
- Teaching and discussion leading: *Mind, Brain, and Experience; Research Methods in Psychology; Special Topics in Micro- and Nano-Biotechnology.*

GUEST LECTURES, DEPARTMENT OF PSYCHOLOGICAL AND BRAIN SCIENCES, JOHNS HOPKINS UNIVERSITY
- "*If either LOGIC or CODE then not (so much) Language*", at Foundations of Logical Thinking, 2022.
- "*Thinking Animals, Thinking of Animals*", at Introduction to Psychology, JHU, 2019.

BUSINESS DEVELOPMENT AGENT, NEUROSKY COMPANY, TAIWAN   **JUN 2014 – SEP 2015**
- Collaborated with MacKay Memorial Hospital to conduct clinical data collection and analysis for research on heart-rate variability (HRV) algorithm and an ECG device.
- In charge of commercial collaboration campaigns; presented the technology of the company at conferences.
- Conducted literature review and data analysis, presenting findings to the engineering team.

SELECT AWARDS

2023	*G. Stanley Hall Scholar's Award, JHU*
2021	*Alumni Choice Award, Three Minute Thesis competition, JHU*
2021	*Robert S. Waldrop Junior Investigator Award, Dept. of Psychological and Brain sciences, JHU*
2020	*Walter L. Clark Teaching Award, Department of Psychological and Brain sciences, JHU*
2015	*3ʳᵈ Place, Three Minute Thesis competition, NTU*
2013	*Gold Medal Award, Long Story Short presentation competition, NTU*