Yang Wu

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EDUCATION

2023-2027 B.S. in Mathematics | Soochow University
Specialization: Dynamical System and Mathematical Modeling
Taipei City, Taiwan

2023-2027 B.A. in Music Composition | Soochow University
Taipei City, Taiwan

2024 Neuropsychiatric Disorder Summer Associate School | National Taiwan University held by International Brain Research Organization (IBRO)
Taipei City, Taiwan

2024 Cognitive Neuroscience Summer School | National Central University
Taoyuan City, Taiwan

2022-2023 B.A. in Music (Piano Performance) | Florida State University
Tallahassee, FL, United States of America

RESEARCH EXPERIENCE

2025/7 ~Present **James Whittington lab | University of Oxford**
Research Assistant, Department of Experimental Psychology
Advisors: James Whittington and Joseph Warren

- Extending previous work "A tale of two algorithms", modeling hippocampus' cognitive map reorganization using Recurrent Neural Network
- Extending the slot/velocity hypothesis proposed to model the human brain's A-ha moment, and interpreting RNN using decoder.
- Trained RNN with Reinforcement Learning and Supervised Learning (Proximal Policy Optimization, Group Relative Policy Optimization, MoE's Router etc.).

2025/7 ~Present **Kanaka Rajan lab | Harvard University**
Research Assistant, Harvard Medical School / Kempner Institute for the Study of Natural and Artificial Intelligence
Advisors: Ryan Badman and John Vastola

- Analyzing emergent planning-like behaviors ethologically in model-free reinforcement learning agents within naturalistic environments
- Implemented Sparse Autoencoder, Generalized Linear Model, Decoder and Auto-Correlation to probe into agents internal representations and external behavior
- **Publication**: Contributed code and analysis to **Deep RL Needs Deep Behavior Analysis: Exploring Implicit Planning by Model-Free Agents in Open-Ended Environments.** *Advances in Neural Information Processing Systems*, 2025.; formally recognized in acknowledgements.

2025/7 ~Present **Marcelo Mattar lab | New York University**
Research Assistant, Department of Psychology
Advisor: Marcelo Mattar

- Developing **RNN to model human episodic simulation**, i.e. how humans use episodic memory from the past to implement future planning or imagination.

2024/7 ~2025/7 **Yu-Wei Wu lab | Academia Sinica**
Research Assistant, Institute of Molecular Biology
Advisor: Yu-Wei Wu, Yiko Chen

- Using Current-Based Decomposition Method (CURBD) and Dissociative Prioritized Analysis of Dynamics (DPAD) to describe and understand the inter-regional communication between M1, M2 and S1 during mice's motor control.

2024/2 ~2025/3 **Yu-Te Wang lab | Academia Sinica**
Research Assistant, Research Center for Information Technology Innovation
Advisor: Yu-Te Wang

- VR/AR Environment building with Unity
- Building EEG electrode with 3D Printing
- Human EMG, EEG Data Collection/Signal Processing, and CompactCNN for EEG Data analysis. Leading to multiple publications in both conferences and IEEE journal.

PUBLICATIONS

R. Simmons-Edler, R. P. Badman, F. B. Berg, R. Chua, J. J. Vastola, J. Lunger, W. Qian, K. Rajan "Deep RL Needs Deep Behavior Analysis: Exploring Implicit Planning by Model-Free Agents in Open-Ended Environments" *Advances in Neural Information Processing Systems*, 2025.; contribution formally recognized in acknowledgements.

C.-M. Chung, Y.-T. Wang*, J.-B. Lu, Y.-C. Hsu, Y.-J. Su, **Y. Wu**, C.-F. Hung "3D printed watermill-like semi-dry electrodes for BCI applications", *IEEE Transaction on Neural Systems and Rehabilitation Engineering*, 2025.

Y. Wu*, Y.-J. Su, J.-B. Lu, Y.-T. Wang*, T.-H. Cheong "HCI Technologies in rehabilitation: enhancing physical therapy with sEMG, VR and LLM-generated music", *Society for Neuroscience Annual Meeting*, 2024.

Y.-L. Chu, C.-C. Tsao, C.-M. Chung, C.-F. Hung, Y.-Y. Lee, J.-B. Lu, **Y. Wu**, Y.-H. Chen, Y.-T. Wang* "BrainPrint: Innovative Head-Mounted EEG Technology for Secure Personal Identification", *IEEE Brain Discovery & Neurotechnology Workshop*, 2024.

Y. Wu*, Y.-J. Su, J.-B. Lu, Y.-H. Chen, Y.-T. Wang* "RehabVerse: Mixed Reality Solution for Telerehabilitation", *National Biotechnology Research Park Pitch Day*, 2024.

AWARDS / GRANTS / EXTRACURRICULARS

2025 **Computational and Systems Neuroscience Conference (COSYNE) Undergraduate Travel Grants**
2025 Chu-Chin Hsu Scholar
2025 Dean's list (Academic Excellence Award) * 2
2024 Distinction Award, International Information and Communication Technology Innovation Services Award
(BrainPrint: Innovative Head-Mounted EEG Technology for Secure Personal Identification)
2024 National Science and Technology Council Neuroscience Camp
2024 Dean's list (Academic Excellence Award)

2024 Academia Sinica Statistical Science Camp
2024 Finalist, National Biomedical Engineering Award
(BrainPrint: Innovative Head-Mounted EEG Technology for Secure Personal Identification)

TEACHING EXPERIENCE
2024 Teaching assistant for B.A. course “Music Analysis (I)”

PATENT
2024 BrainPrint: an EEG-based coding and decoding mechanism (Ongoing)

SKILLS
Computation&Code: Python, Neural Network, Transformer, Blender, 3D Printing, Git, Matlab, C/C++

Modeling&Analysis: Model Optimization, Sparse Autoencoder, Generalized Linear Model, Reinforcement Learning, EEG/EMG Data Collection

Important Courses Taken (Grades are based on the scale of 100): Linear Algebra (96/100), Advanced Calculus (99/100), Computational Neuroscience (95/100), Statistical Mechanics (87/100), Programming in Life Science (97/100), Life Science (95/100)

LANGUAGES
Mandarin: native
English: fluent/native
Japanese: beginner
French: beginner

MUSICAL WORKS
Milonga – Latin-American piece for Cello and Piano https://vimeo.com/1036267350?share=copy
Zhang Beihai said good-bye to his father – Solo Piano https://vimeo.com/1036267291?share=copy
Weathering With You Movie Trailer – Re-scored by Me
https://vimeo.com/1036267308?share=copy