Tanya Wen

I am a research scientist and with a cognitive neuroscience and psychology background. With over 12 years of research experience, I have utilized rigorous experimental design, inferential statistics, along with various tools to understand human behavior, including surveys, electrophysiology, functional imaging, eye-tracking, and virtual reality experiments. I am interested in applying my knowledge in real world settings and UX research.

WORK EXPERIENCE

Applied Perception Scientist
March 2024 – Present
Meta Reality Labs (contract via Magnit), Redmond, U.S.A

- Led the analysis and documentation of four KPI metrics for projects spanning our technology roadmap to evaluate user value.
- Designed and developed pipelines for novel studies to evaluate audio perception on AR/VR devices.
- Collaborated with cross-functional teams, supervised research assistants in initiating data collection of new studies, worked with SWEs to debug Unity Apps, discussed analysis and results with research scientists.
- Trained on spatial audio knowledge, including reading SOFA files, binaural rendering, audiograms, HRTF acquisition, headphone equalization.

Research Scientist
Oct 2022 – March 2024
Naval Health Research Center / Leidos, San Diego, U.S.A

- Analyzed EEG recordings in 50+ traumatic brain injury patients and healthy controls performing tasks in static and dynamic virtual reality environments.
- Designed and programmed four different virtual reality tasks in Unity / C#, using Phidgets to collect sensor data, interact with hardware, and timestamp events.
- Analyzed data from wearable eye-tracker and infrared camera while participants performed a virtual reality military marksmanship task.

Postdoctoral Associate
Oct 2019 – Oct 2022
Center for Cognitive Neuroscience, Duke University, U.S.A

- Demonstrated cognitive training and transfer learning in a series of three experiments using hierarchical Bayesian reinforcement learning models.
- Designed and published three innovative experiments to identify new phenomena in human cognition (transfer learning, temporal memory, and relative effort).
- Collected data from over 800+ participants on Amazon Mechanical Turk across 20+ web-based experiments that I programmed using JavaScript / HTML / CSS.
- Developed fMRI processing pipeline for the lab utilizing the Duke Compute Cluster with SLURM. Wrote Python scripts for conducting general linear models.

PhD Research
Oct 2015 – Sept 2019
MRC Cognition and Brain Sciences Unit, University of Cambridge, United Kingdom

- Used support vector machine on combined MEG/EEG data to quantify the time-course and components of selective attention.
- Differentiated the roles of the MD and DMN networks during execution of task episodes and identified time-courses of these networks.
- Characterized how the MD network responses to task difficulty when it can be offset by increased cognitive resource allocation, compared to when performance is limited by quality of data input.

CONTACT

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- linkedin.com/in/tanya-wen-phd/
- github.com/tanya-wen

SKILLS

Human Subjects Research Skills:
- Experimental design
- Online surveys/studies (MTurk)
- Virtual Reality (VR)
- Eye-tracking
- Behavioral measurements
- Psychophysics
- Participant recruitment
- IRB application

Programming Languages:
- Python (Numpy, Pandas, SciPy, Scikit-learn, Matplotlib, Seaborn)
- MATLAB
- JavaScript / HTML / CSS
- Unity / C#
- Databases (SQL, MongoDB)
- R (lme4, tidyverse, ggplot2)

Quantitative Skills:
- Inferential statistics (t-test, A/B test, ANOVA)
- Regression; General Linear Model
- Exploratory data analysis
- Classification (logistic regression, SVM, KNN)
- Unsupervised learning (PCA, k-means clustering)
- Time series analysis
- Graph theory
- Reinforcement learning

Qualitative Skills:
- Interviews
- Surveys
- Participant observation
- Diary studies

Other tools and skills:
- Microsoft Office
- Adobe Illustrator, Photoshop
- Git and Github
- Scientific writing, documentation

Languages:
- English

Undergraduate Research Assistant Oct 2011 – July 2015
National Cheng Kung University, Taiwan

- Led fMRI study investigating the neural correlates of the Flashed Face Distortion Effect illusion (supported with my research grant from the National Science Council).
- Used network-based statistics to characterize functional connections related to internet addiction.

CERTIFICATIONS

- **Programming for Data Science with Python** – Udacity Nanodegree
- **The Complete 2023 Web Development Bootcamp** – Udemy
- **Foundations of eye tracking** – Tobii Academy
- **Unity Junior Programmer** – Unity Technologies
- **Basic Life Support (BLS)** – American Heart Association

EDUCATION

PhD in Medical Science Oct 2015 – Sept 2019
MRC Cognition and Brain Sciences Unit, University of Cambridge, United Kingdom

- Link to thesis: https://www.repository.cam.ac.uk/handle/1810/300579
- Scholarship: Cambridge Commonwealth, European & International Trust

Bachelor of Science, Double Major Sept 2011 – May 2015
Department of Psychology, National Cheng Kung University, Taiwan
Department of Life Sciences, National Cheng Kung University, Taiwan

PUBLICATIONS

Wen, T., & Egner, T. (2023). Context-independent scaling of neural responses to task difficulty in the multiple-demand network. *Cerebral Cortex*, bhac479

Wen, T., Geddert, R.M., Madlon-Kay, S., & Egner, T. (2023). Transfer of learned cognitive flexibility to novel stimuli and task sets. *Psychological Science*, doi: 10.1177/09567976221141854

Wen, T. & Egner (2022). Retrieval context determines whether event boundaries impair or enhance temporal order memory. *Cognition*, 225, 105145

Wen, T., Duncan, J., & Mitchell, D.J. (2020). Hierarchical representation of multistep tasks in multiple-demand and default mode networks. *Journal of Neuroscience*, *40*(40), 7724-7738

Wen, T., Mitchell, D.J. & Duncan, J. (2020). The functional convergence and heterogeneity of social, episodic, and self-referential thought in the default mode network. *Cerebral Cortex*, *30*(11), 5915-5929

Wen, T., Duncan, J., & Mitchell, D. J. (2019). The time-course of component processes of selective attention. *NeuroImage*, 199, 396-407.

Wen, T., Mitchell, D. J., & Duncan, J. (2018). Response of the multiple-demand network during simple stimulus discriminations. *NeuroImage*, 177, 79-87.

Wen, T., Liu, D. C., & Hsieh, S. (2018). Connectivity patterns in cognitive control networks predict naturalistic multitasking ability. *Neuropsychologia*, 114, 195-202.

Lee, K. J., Hsieh, S., & Wen, T. (2017). Spatial Bayesian hierarchical model with variable selection to fMRI data. *Spatial Statistics*. doi: 10.1016/j.spasta.2017.06.002

Wen, T. & Hsieh, S. (2016). Network-based analysis reveals functional connectivity related to internet addiction tendency. *Front. Hum. Neurosci.* 10:6. doi: 10.3389/fnhum.2016.00006

Wen, T. & Hsieh, S. (2015). Neuroimaging of the joint Simon effect with believed biological and non-biological co-actors. *Front. Hum. Neurosci.* 9:483. doi: 10.3389/fnhum.2015.00483

Wen, T. & Kung, C. C. (2014). Using functional magnetic resonance imaging to explore the flashed face distortion effect. *Journal of Vision*, *14*(12), 29. doi:10.1167/14.12.29

- Mandarin Chinese

Neuroimaging analysis:
- atlas-based analysis
- multivariate analysis
- functional connectivity analysis
- ERP analysis

FELLOWSHIPS & AWARDS

- Duke Interdisciplinary Behavioral Research Center Mini-Grant (2019-2020)
- Medical Research Council PhD Studentship (2018-2019)
- Taiwan Cambridge Scholarship (2015-2018)
- Guarantors of Brain Travel Grant (2018 & 2019)
- Percy Lander Studentship in Preventive Medicine (2017 & 2018)
- Ministry of Science and Technology Undergraduate Research Grant (2014 – 2015)
- National Science Council Undergraduate Research Grant (2013-2014)

WORKSHOPS

- CIFAR Winter School on the Neuroscience of Consciousness (2018)
- FSL course (2018)
- MEG UK workshop and annual conference (2017)
- York Centre for Vision Research (CVR) Vision Science Summer School (2014)

AD HOC REVIEWING

- NeuroImage
- Journal of Neuroscience
- Human Brain Mapping
- Neuroscience & Biobehavioral Reviews
- Scientific Reports
- European Psychiatry
- Frontiers in Psychology
- Frontiers in Human Neuroscience
- Neurobiology of Learning and Memory