Tanya Wen

Research Scientist

I am a quantitative researcher and cognitive neuroscientist. My research involves answering questions about the human brain and behavior. I use a variety of tools, including behavioral measures, questionnaires, electrophysiological recordings, fMRI, eye-tracking, and virtual reality. I am interested in applying my knowledge in real world settings and UX research.

WORK EXPERIENCE

Research Neuroscientist
Oct 2022 – Present
Naval Health Research Center / Leidos, San Diego, U.S.A

- Analyzed EEG recordings in both static and dynamic virtual reality environments in mild traumatic brain injury patients.
- Designed and programmed virtual reality tasks in Unity to examine human performance and eye-tracking in cold weather environments.
- Analyzed eye-tracking data from military marksmanship using conventional saccades/fixations and computer vision algorithms.

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

- Demonstrated how volatility changes in the environment affected switch likelihood and learning rate parameters measured from hierarchical Bayesian reinforcement learning models.
- Using innovative experimental designs, demonstrated for the first time that event boundaries can either impair or enhance temporal order memory and is dependent on whether the original encoding context is absent or present during retrieval.
- Using fMRI, demonstrated that MD regions coded for context-independent task difficulty, and identified regions outside the MD network that were sensitive to context-dependent task difficulty.
- Developed fMRI processing pipeline for the lab utilizing the Duke Compute Cluster to run fMRIPrep for preprocessing and wrote python script for first and second level analysis using the NiPype framework.

PhD Research
October 2015 – September 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, including representation of stimulus identity, target position, target identity, behavioral status, and the template of the cue/target on source-localized MEG/EEG data.
- Differentiated the roles of the MD and DMN networks during execution of task episodes, and identified differential time-courses between networks, as well as characterized regions that coded for the representation of full episodes, individual items, and current position within an episode.
- 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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- twitter.com/tanya_wen

SKILLS

Human Subjects Research Skills:
- Experimental design
- Hypothesis testing
- Visual neuroscience
- Attention and cognitive control
- Online surveys/studies (MTurk)
- Virtual Reality
- Eye-tracking
- Participant recruitment
- IRB application

Programming Languages:
- JavaScript / HTML / CSS
- Python
- R
- MATLAB
- Stan
- Unity / C#

Neuroimaging software:
- SPM12
- fMRIPrep
- Nipype
- Freesurfer
- FSL
- MRIcroGL
- EEGLAB

Statistical analysis:
- Inferential statistics
- General linear modeling
- Multivariate analysis
- Machine learning
- Reinforcement learning
- Graph theory
- SPSS

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

Other tools:
- Microsoft Office
- Adobe Illustrator

Undergraduate Research Assistant   October 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 undergraduate research grant from the National Science Council).
- Used network-based statistics to characterize functional connections related to internet addiction.

EDUCATION

PhD in Medical Science   October 2015 – September 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 Award: Cambridge Commonwealth, European & International Trust

Bachelor of Science, Double Major   September 2011 – May 2015

Department of Psychology, National Cheng Kung University, Taiwan

- Rank: #1
- GPA: 4.00/4.00

Department of Life Sciences, National Cheng Kung University, Taiwan

- GPA: 3.90/4.00

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

- Adobe Photoshop
- Github

Languages:
- English
- Mandarin Chinese

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)
- Seton Cavendish Fund (2018)
- Percy Lander Studentship in Preventive Medicine (2017 & 2018)
- Phi Tau Phi Scholastic Honor Society (2015)
- Ministry of Science and Technology Undergraduate Research Grant (2014 – 2015)
- Foundation for the Advancement of Outstanding Scholarship (2014)
- 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 Human Neuroscience
- Neurobiology of Learning and Memory