

Pin Kwang TAN (alias PK)

pktan@utexas.edu
[pk-hq.github.io](https://github.com/pk-hq)

RESEARCH INTERESTS

Visual perception, calcium imaging, optogenetics, machine learning

EDUCATION

University of Texas at Austin 2021-May 2026
 Graduate Program in Neuroscience, GPA: 3.99

National University of Singapore (NUS) 2014- 2018
 B.Sc. (Hons.) in Life Sciences, *Summa cum laude*

POSITIONS

5th-year Graduate Student, PI: Dr. Eyal Seidemann 2021-May 2026
 Interdisciplinary Program for Neuroscience; Center for Theoretical and Computational Neuroscience
University of Texas at Austin

Research Assistant, PI: Dr. Camilo Libedinsky & Dr. Shih-Cheng Yen 2019-2020
 The N.1 Institute for Health
National University of Singapore, Singapore

Research Intern, PI: Dr. Po-Jang (Brown) Hsieh 2014-2018
 Neuroscience and Behavioral Disorders Program
Duke-NUS Graduate Medical School, Singapore

AWARDS

Institute of Neuroscience, Professional Development Award 2023

Institute of Neuroscience, Outstanding Poster Award 2023

Agency for Science, Technology and Research, Singapore (A*STAR), Chairman's Honors List 2017

A*STAR, Undergraduate Scholarship, Full Undergraduate Funding at NUS 2015

PUBLICATIONS

Jingyang Zhou, Yuzhi Chen, Matt Whitmire, **Pin Kwang Tan**, Jimin Wu, Ashok Veeraraghavan, Jacob T. Robinson, Wilson Geisler, Vincent A Pieribone, Eyal Seidemann (2025) Fast neural population dynamics in primate V1 captured by a genetically encoded voltage indicator. *Under review*

Pin Kwang Tan, Cheng Tang, Roger Herikstad, Arunika Pillay, Camilo Libedinsky (2023). Distinct lateral prefrontal regions are organized in an anterior-posterior functional gradient. *J Neuro*

Pin Kwang Tan, Egor Ananyev and Po-Jang (Brown) Hsieh (2019). Distinct genetic signatures of cortical and subcortical regions associated with human memory. *eNeuro*

CONFERENCE POSTERS (SELECTED)

Pin Kwang Tan, Shun Kobayashi, Spencer Chen, Giacomo Benvenuti, Yuzhi Chen, Eyal Seidemann (2023). Optogenetic stimulation of columns in macaque V1 is sufficient for orientation perception. Poster at *SfN Neuroscience 2023*

Pin Kwang Tan, Shun Kobayashi, Spencer Chen, Giacomo Benvenuti, Yuzhi Chen, Eyal Seidemann (2023). Optogenetic stimulation of columns in macaque V1 is sufficient for orientation perception. Poster at *NETI 2023*

Pin Kwang Tan, Shih-Cheng Yen, Camilo Libedinsky (2019). Co-existence of functional gradients and segregation within the primate lateral prefrontal cortex. Poster at *SfN Neuroscience 2019*

RESEARCH EXPERIENCE

Graduate Student, PI: Dr. Eyal Seidemann
Institute of Neuroscience
University of Texas at Austin

2021-

1. Leading project on causally testing the role of a columnar-scale code for visual perception in the primate V1

- V1 column activity in primate V1 encodes properties of visual stimuli, but its causal role in feature-specific visually-guided behavior is unknown (e.g. orientation discrimination)
- Developed and optimized simultaneous wide-field calcium imaging-and-optogenetics system to image and manipulate V1 column activity in the awake behaving macaque
- World-first demonstration that stimulating a single column is sufficient for feature-specific perception in a visual task
- Discovered canonical cortical property where single column stimulation recruits other similarly-tuned columns to recapitulate the natural stimulus-activated footprint, and enables behavior
- Developed toolkit and protocols for the next generation of large-scale all-optical cortical neuroprosthetics for the read-write of cortical activity

2. Leading project on novel genetically encoded voltage indicators in the primate V1

- Need for genetically encoded reporters of neural activity in macaques, especially fast and high-fidelity indicators that track subthreshold and spiking activity in neurons. Here
- First demonstration of a novel fast and high-fidelity voltage indicator GEVI (*pAce*, FRET-opsin class) in the macaque V1
- Outperforms conventional voltage sensitive dye and GCaMP imaging in temporal frequency when reporting subthreshold and spiking activity of columns with widefield imaging

Research Assistant, PI: Dr. Camilo Libedinsky
The N.1 Institute for Health
National University of Singapore, Singapore

2019-2020

1. Leading project on the functional specialization of primate dorsolateral prefrontal cortex (dlPFC) in working memory

- The anatomical organization of the dlPFC is known, but its functional organization is less so. We test if the primate dlPFC shows functional specialization in spatial working memory. I show that anatomically-defined dlPFC subregions show functional distinctions at the level of single neurons and neuronal populations with linear model fitting and machine learning. First author.

2. Assisting project on how the dlPFC encodes sequentially presented stimuli in working memory

- We previously showed that dlPFC maintains target information in working memory by

modifying its coding scheme when presented with a distractor, i.e. 'code morphing'. We test if this phenomenon of code morphing occurs only for task irrelevant stimuli (distractors), or for any stimuli. I collaborate on the experimental design, primate training, and single-unit recording in the primate dlPFC.

Research Intern, PI: Dr. Po-Jang (Brown) Hsieh
Neuroscience and Behavioral Disorders Program
Duke-NUS Graduate Medical School, Singapore

2014-2018

1. **Led a project to identify genetic signatures of cortical-subcortical areas associated with cognition**
 - We combined human whole-brain neuroimaging and brain transcriptome maps to identify the genetic signatures of cortical and subcortical memory. We show that cortical-subcortical genetic profiles were distinct, and this may be relevant in health and disease. First author.
2. **Led a project to investigate the parameters that impact unconscious priming**
 - We assessed parameters relevant for unconscious processing by 1) manipulating parameters of an unconscious priming paradigm (e.g. cue duration, spatial cueing), and 2) measured their impact with a subsequent conscious orientation discrimination task. I conducted the literature review, experimental design, data collection and analysis in MATLAB.
3. **Assisted in investigating the boundaries of unconscious semantic processing**
 - We assessed the extent of unconscious semantic processing by 1) manipulating properties of sentences masked by visual masking (e.g. semantic congruence, spatial cueing) and 2) quantified processing by the time taken for stimuli to break visual suppression. I collaborated on literature review, experiment design, data collection and analysis in MATLAB.

Summer Research Intern, PI: Dr. Camilo Libedinsky
Singapore Institute for Neurotechnology
National University of Singapore, Singapore

2016-2016

1. **Assisted in characterizing temporal dynamics of neurons in the macaque motor cortex**
 - We attempted to create decoding algorithms for a primate brain-machine interface for controlling a motorized wheelchair with intention. I collaborated on creating decoder algorithms, and characterizing of inter- and intra-day single-unit dynamics from primate M1.

TECHNICAL EXPERTISE

Programming languages

MATLAB (8.5 years),
Python (4 years),
bash (3 years),
R (1 year)

Programming

Analysis of high-dimensional high-throughput neural data, machine learning packages (pytorch, tensor)

Animal research

Experimental design, macaque training, construction and testing of novel neural recording and stimulation systems, single-unit recording and analysis of non-human primate electrophysiology data

Human research

Experiment design, data collection and analysis for visual psychophysics. Analysis of human neuroimaging and transcriptome datasets.

RESEARCH MENTORSHIP

Kate Pearce (MIT undergraduate, Neuroscience)

Jun 19 – Jul 19

Charmaine Ter Li Min (NUS undergraduate, Psychology)

Aug 19 – Apr 20

REFERENCES

Camilo LIBEDINSKY, Ph.D.

Assistant Professor

Department of Psychology

National University of Singapore

#05-COR, 28 Medical Drive, Singapore 769199,

Singapore

(+65) 9271 1190 (Mobile)

camilo@nus.edu.sg**Eyal Seidemann, Ph.D.**

Professor

CPS and INS

UT Austin

Dean Keeton, Austin TX78705, Texas

(+1) 512 232 6052 (Office)

eyal@utexas.edu**Po-Jang (Brown) HSIEH, Ph.D.**

Associate Professor

Department of Psychology, National Taiwan University

No. 1, Sec. 4, Roosevelt Rd., Taipei 10617, Taiwan

(+886) 2 3366 3111 (Office)

hsiehpj@ntu.edu.tw