

Richard Gao

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EDUCATION

PhD., Cognitive Science, University of California, San Diego **2014 – Present**
BASC., Engineering Science, University of Toronto. **CGPA: 3.9/4** **2014**

PEER REVIEWED PUBLICATIONS

2018

1. Trujillo, C*, **Gao, R***, Negraes, P*, et al. Spontaneous development of functional circuits in organoids resembles programmed early brain development (*in review*).

2017

2. **Gao, R.**, Donoghue, T., Voytek, B. Automated generation of cognitive ontology via web text-mining. *CogSci Annual Meeting Proceedings*, 2067-72 (2017)
3. **Gao, R.**, Peterson, E. J. & Voytek, B. Inferring synaptic excitation/inhibition balance from field potentials. *Neuroimage* 158, 70–78 (2017).

2016

4. **Gao, R.** Interpreting the electrophysiological power spectrum. *Journal of Neurophysiology* 115, 628–630 (2016).
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ACCEPTED ABSTRACTS & PRESENTATIONS

2018

1. **Gao, R.**, Donoghue, T., Voytek, B. Defining Cognition: cognitive ontology via text-mining and word-embedding. *Cognitive Neuroscience Society (CNS) Annual Meeting*. Poster.

2017

1. Liao, L., **Gao, R.**, Voytek, B. Differentiating noise from structure in electrophysiological power spectra. *Society for Neuroscience (SfN) Annual meeting*. Poster.
2. **Gao, R.**, et al. Network oscillations in human iPSC-derived cortical organoids. *Society for Neuroscience (SfN) Annual meeting*. Poster.

2016

1. **Gao, R.**, Voytek, B. Spiking correlates and temporal variability of oscillatory frequency modulation. *Society for Neuroscience (SfN) Annual meeting*. Poster.
2. **Gao, R.**, Voytek, B. Inferring excitatory and inhibitory synaptic parameters from the local field potential. *Computational and Systems Neuroscience (Cosyne)*. p.103. Peer-reviewed abstract & poster presentation.

2015

3. **Gao, R.**, Voytek, B. Exploring the neural basis of the electrophysiological power spectrum. *Society for Neuroscience (SfN) Annual meeting*. Poster
4. Noto, T., Cole, S.R., **Gao, R.**, Peterson, E.J., Voytek, B. Neural network properties can be inferred from electrophysiological power spectral geometry. *Society for Neuroscience (SfN) Annual meeting*. Poster

2014 & Earlier

5. **Gao, R.** Design of a closed-loop electrical stimulation system for treatment of epilepsy. Undergraduate Honour's Thesis.
 6. **Gao, R.** Wireless acquisition of physiological signals for detection of activity engagement in children with communication difficulties. *IBBME Research Symposium*. Talk
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GRANTS & AWARDS

- UCSD CRES Undergrad Research Award (advising Lauren Liao): **\$5,000** 2018
 - Kavli Institute for Brain and Mind, Innovative Research Grant: **\$50,000** 2017
 - NSERC Postgraduate Scholarship-Doctoral: **\$21,000/year** 2016 – 2019
 - NSERC Alexander Graham Bell Canada Graduate Scholarship (Declined) 2016
 - Cosyne 2016 Travel Grant: **\$800** 2016
 - UCSD Frontiers of Innovation Scholar Program Research Grant: **\$25,000** 2015
 - UCSD Katzin Prize. Fellowship: **\$10,000/year** 2014 – 2019
 - Engineering Science Award of Excellence (CGPA 3.9/4 or above) 2014
 - NSERC Industrial Undergraduate Student Research Award. **\$6,000** 2012 – 2013
 - NSERC Undergraduate Student Research Award. **\$6,000** 2011
 - Queen Elizabeth Aim For the Top Scholarship. **\$3,000/year** 2009 – 2014
 - International Baccalaureate Diploma 2009
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TEACHING

Seminar: Representation in the Mind (2018 Spring) Co-Organizer, UC San Diego

- Graduate seminar on the past, present, and future of representation in the mind and other intelligent systems. Covers topics including neural, embodied, and distributed representation.

Introduction to Data Science (2017 Spring, Fall) Teaching Assistant, UC San Diego

- Intro level class on broad topics of data science, including data munging and visualization in Python, statistics and ML, text-mining, and privacy. Class was hosted on JupyterHub.

Introduction to Cognitive Science (2016, 2015) Teaching Assistant, UC San Diego

- Intro level class on various subfields of cognitive science, including neuroscience, linguistics, machine intelligence, and social and embodied cognition.

Machine Learning I (2015) Teaching Assistant, UC San Diego

- Advanced undergraduate class on machine learning algorithms, including Bayesian techniques, clustering, linear classifiers, artificial neural networks, and others.

Introduction to Statistical Analysis (2015) Teaching Assistant, UC San Diego

- Intro level undergraduate class on probability, statistics, and hypothesis testing.

Praxis I: Engineering Design (2014) Design Studio Leader, University of Toronto

- Freshmen class on engineering design processes, communication skills, and critical thinking.
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REVIEW SERVICES

Journal of Neuroscience (1), Journal of Cognitive Neuroscience (1), NeuroImage (1)

MENTORSHIP

Tanner Turner, UCSD Applied Mathematics & Computer Science 2016 – 2017
Lauren Liao, UCSD Mathematics (Probability & Statistics) 2016 –
Sitan (Stan) Liu, UCSD Exchange student from Sichuan University 2017 –
Dylan Christiano, UCSD Cognitive Science 2017 –
Julio Dominguez, UCSD Cognitive Science 2017 –
Christopher Caligiuri, Canyon Crest Academy 2017 –

RESEARCH & PROFESSIONAL EXPERIENCE

2015

Summer School – Computational Neuroscience, Redwood Center, UC Berkeley

- Lectures and lab sessions on computational and theoretical neuroscience.

Research Rotation, 4 months

Alysson Muotri, UCSD

- Modeling Rett syndrome using human induced pluripotent stem cell derived neural cultures.

Research Rotation, 4 months

Eran Mukamel, UCSD

- Neural mass modeling of phase-amplitude coupling changes during anesthesia.

Research Rotation, 4 months

Douglas Nitz, UCSD

- Analyzing single unit and local field potential recordings in rat ventral tegmental area.

2014 & Earlier

Undergraduate Honour's Thesis, 8 months

Roman Genov, UofT

- Designing closed-loop electrical stimulation system for treatment of intractable epilepsy.

Research & Development Intern, 16 months

InteraXon Inc. Toronto

- Developing EEG-based BCI algorithms for mindfulness meditation training.

Undergraduate Research, 4 months,

Tom Chau, UofT

- Creating a GUI and physiological signal collection system for real-time analysis of affect in children with communication disorders.

Undergraduate Research, 4 months

Adam Anderson, UofT

- Classifying emotional response to affective stimuli using physiological signals.

References Available Upon Request