Richard Gao

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EDUCATION

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

PUBLICATIONS & PREPRINTS

1. Trujillo, C. A.*, **Gao, R.***, Negraes, P. D.*, *et al.* Complex oscillatory waves emerging from cortical organoids model early human brain network development. *Cell Stem Cell* **0**, (2019).
2. Moore, S. M., Seidman, J. S., Ellegood, J., **Gao, R.**, Savchenko, A., Troutman, T. D., ... & Voytek, B. (2019). Setd5 haploinsufficiency alters neuronal network connectivity and leads to autistic-like behaviors in mice. *Translational Psychiatry*, 9(1), 24.
3. Haller, M., Donoghue, T., Peterson, E., Varma, P., Sebastian, P., **Gao, R.**, ... & Voytek, B. (2018). Parameterizing neural power spectra. *bioRxiv*
4. **Gao, R.**, Peterson, E. J. & Voytek, B. (2017). Inferring synaptic excitation/inhibition balance from field potentials. *Neuroimage* 158, 70–78.
5. **Gao, R.** (2016)**.** Interpreting the electrophysiological power spectrum. *Journal of Neurophysiology* 115, 628–630.

PEER-REVIEWED CONFERENCE PAPERS

1. **Gao, R**., Christiano, D., Donoghue, T., Voytek, B. (2019). The structure of cognition across computational cognitive neuroscience. *Cognitive Computational Neuroscience*. Poster.
2. **Gao, R.**, Voytek., B. (2019). Hierarchy of cortical population characteristic timescales inferred from field potentials. *Computational and Systems Neuroscience (Cosyne)*. Poster.
3. **Gao, R**., Liao, L., Voytek, B. (2018). Spectral power variation separates oscillatory from non-oscillatory stochastic neural dynamics. *Cognitive Computational Neuroscience*. Poster.
4. **Gao, R.**, Donoghue, T., Voytek, B. (2018) Defining Cognition: cognitive ontology via text-mining and word-embedding. *Cognitive Neuroscience Society (CNS) Annual Meeting*. Poster.
5. **Gao, R**., Donoghue, T., Voytek., B. (2017). Automated generation of cognitive ontology via web text-mining. *CogSci Annual Meeting Proceedings*, 2067-72
6. **Gao, R.**, Voytek, B. (2016). Inferring excitatory and inhibitory synaptic parameters from the local field potential. *Computational and Systems Neuroscience (Cosyne)*. p.103. Poster.
7. **Gao, R.** (2014). Design of a closed-loop electrical stimulation system for treatment of epilepsy. Undergraduate Honour's Thesis.
8. **Gao, R.** (2011). Wireless acquisition of physiological signals for detection of activity engagement in children with communication difficulties. *IBBME Research Symposium*. Talk

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, 10 awardees) **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 (IB) Diploma **2009**

RESEARCH & PROFESSIONAL EXPERIENCE

CAJAL Course on Computational Neuroscience (2019) **Champalimaud**
- Lectures and lab sessions on computational and theoretical neuroscience, with course project.

Computational Neuroscience Summer School (2015) **Redwood Center, UC Berkeley**
- Lectures and lab sessions on computational and theoretical neuroscience.

Research Rotation, (2015, 4 months) **Alysson Muotri, UCSD**
- Modeling Rett syndrome using human induced pluripotent stem cell derived neural cultures.

Research Rotation, (2015, 4 months) **Eran Mukamel, UCSD**
- Neural mass modeling of phase-amplitude coupling changes during anesthesia.

Research Rotation, (2015, 4 months) **Douglas Nitz, UCSD**
- Analyzing single unit and local field potential recordings in rat ventral tegmental area.

Undergraduate Honour's Thesis, (2013-2014, 8 months) **Roman Genov, UofT**
- Designing closed-loop electrical stimulation system for treatment of intractable epilepsy.

Research Associate, (2012-2013, 16 months) **InteraXon Inc (MUSE). Toronto**
- Developing EEG-based BCI algorithms for mindfulness meditation training.

Undergraduate Research, (2011, 8 months) **Tom Chau, UofT**
- Creating a GUI and physiological signal collection system for real-time analysis of affect and feedback in children with communication disorders.

Undergraduate Research, (2010, 8 months) **Adam Anderson, UofT**
- Classifying emotional response to affective stimuli using physiological signals.

TEACHING

Neural Signal Processing (2019 Summer Session I) Course Instructor, **UC San Diego**
- Designed and taught course on neural signal processing: https://github.com/rdgao/cogs118c

Writing Center (Writing Hub) Graduate Writing Consultant, **UC San Diego**
- Holding one-on-one consultations for graduate students from all departments, working on high-level writing concerns in various professional documents, including manuscripts, research statements, resumes/CVs, etc. Paid position.

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 & 2018) 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 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, psychology, 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. Led studios and active learning sessions for designing and reverse engineering artifacts.

REVIEW SERVICES

Neurons, Behavior, Data, analysis, and Theory (1), Journal of Neuroscience (2), PLOS Computational Biology (1), Journal of Cognitive Neuroscience (1), NeuroImage (1)

MENTORSHIP

Tanner Turner, UCSD Applied Mathematics & Computer Science	2016 – 2017
Sitan (Stan) Liu, UCSD Exchange student from Sichuan University	2017
Julio Dominguez, UCSD Cognitive Science	2017 – 2018
Dylan Christiano, UCSD Cognitive Science	2017 – 2018
Lauren Liao, UCSD Mathematics (Probability & Statistics)	2016 – 2019
Christopher Caligiuri, Canyon Crest Academy	2017 –
Adrianna Hohil, UCSD Cognitive Science	2019 –
Lucas Henry, UCSD Cognitive Science	2019 –

References Available Upon Request

REJECTIONS (FailCV)

Papers

- Trujillo, Gao, Negraes et al., 2019 (Cell Stem Cell):
  - Nature (editor), Nature Biotechnology (1st review), Science (1st review), Nature (1st review), Cell (1st review)
- Gao et al., 2017, NeuroImage:
  - Neuron (editor), PNAS (editor, 30 days!), NN (editor), eLife (editor), JNeuro (1st review), JNPhys (1st review)
- Gao, 2015, JNeurophysiol:
  - PLOS, TINS, NeuroImage

Grants

- KIBM2015
- NSERC2015

Conferences

- Cosyne 2018

Summer schools

- Cajal Institute summer school 2018
- Okinanwa Comp Neuro (OCNC2017)
- UW/Allen Brain 2016, 2018
- Woods Hole 2016

PhD applications

- MIT
- Duke
- Caltech (interview)