Richard Gao

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Education

University of California, San Diego — La Jolla, USA
Ph.D. in Cognitive Science, Advisor: Bradley Voytek — September 2014–Present

The CAJAL Advanced Neuroscience Training Programme — Lisbon, Portugal
Computational Neuroscience — August 10–31, 2019

Redwood Center for Theoretical Neuroscience — Berkeley, USA
CRCNS Course on Mining and Modeling of Neuroscience Data — July 9–20, 2015

University of Toronto — Toronto, Canada
BASc in Engineering Science (Biomedical Engineering), GPA: 3.90/4.00 — September 2009–June 2014

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

Professional Experience

University of California, San Diego — La Jolla, USA
Graduate Writing Consultant, Teaching & Learning Commons — January 2019–March 2020

- Conducted one-on-one consultation sessions with PhD students of all disciplines on writing projects (including journal manuscripts, fellowship/grant proposals, cover letters, etc.), with special emphasis on high-level concerns, clarity, and structural organization. Received training on peer-mentoring and postgraduate writing.

InteraXon Inc. — Toronto, Canada
Research Associate (BASc Degree Professional Internship) — July 2012–August 2013

- Developed EEG–based brain-computer interface (BCI) algorithms for mindfulness meditation neurofeedback training. Programmed in MATLAB, Python, and Processing.js. Conducted user-research studies with real-time visual and audio feedback.

Awards, Fellowships, and Grants

- Boehringer Ingelheim Fonds PhD Travel Grant: $3,000 — 2019
- Kavli Institute for Brain and Mind, Innovative Research Grant: $50,000 — 2017–2018
- NSERC Postgraduate Scholarship-Doctoral: $21,000/year — 2016–2019
- NSERC Alexander Graham Bell Canada Graduate Scholarship (Declined) — 2016
- Cosyne 2016 Travel Grant — 2016
- UCSD Frontiers of Innovation Scholar Program Research Grant: $25,000 — 2015–2016
- UCSD Katzin Fellowship: $10,000/year — 2015–2019
- University of Toronto Engineering Science Award of Excellence (for GPA ¿3.9/4.0) — 2014
- NSERC Industrial Undergraduate Student Research Award: $6000 — 2012-2013
- Undergraduate Student Research Award: $6000 — 2011

Publications & Preprints

1. **Gao, R.**, van den Brink, R. L., Pfeffer, T., Voytek, B. (2020). Neuronal timescales are functionally dynamic and shaped by cortical microarchitecture. *bioRxiv*, https://doi.org/10.1101/2020.05.25.115378.

2. Ghatak, S., Dolatabadi, N., **Gao, R.** et al. NitroSynapsin ameliorates hypersynchronous neural network activity in Alzheimer hiPSC models. *Mol Psychiatry* (2020).

3. Trujillo, C. A.*, **Gao, R.***, Negraes, P. D.*, et al. (2019) Complex oscillatory waves emerging from cortical organoids model early human brain network development. *Cell Stem Cell*, 25(4) 558-69.

4. Cole, S, Donoghue, T., **Gao, R.**, Voytek, B. (2019) NeuroDSP: A package for neural digital signal processing. *Journal of Open Source Software*, 4(36), 1272, https://doi.org/10.21105/joss.01272

5. Núñez, R., Allen, M., **Gao, R.**, Rigoli, C.M., Relaford-Doyle, J., Semenuks, A. (2019). What happened to cognitive science. *Nature Human Behavior*, 3(8), 782-91.

6. Moore, S. M., Seidman, J. S., Ellegood, J., **Gao, R.**, Savchenko, A., Troutman, T. D., et al. (2019). Setd5 haploinsufficiency alters neuronal network connectivity and leads to autistic-like behaviors in mice. *Translational Psychiatry*, 9(1), 24.

7. Haller, M., Donoghue, T., Peterson, E., Varma, P., Sebastian, P., **Gao, R.**, ... & Voytek, B. (2018). Parameterizing neural power spectra. *bioRxiv*, https://doi.org/10.1101/299859

8. **Gao, R.**, Peterson, E. J. & Voytek, B. (2017). Inferring synaptic excitation/inhibition balance from field potentials. *Neuroimage* 158, 70–78.

9. **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 (CCN).* 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 (CCN).* 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.*

Science Communication & Blog Articles

1. See www.rdgao.com/blog

2. Waschke, L., **Gao, R.** (2019). The Magical Number 3. *Nature Human Behavior*, https://socialsciences.nature.com/posts/54636-the-magical-number-3

3. **Gao, R.** (2019). Searching for the Hidden Factors Underlying the Neural Code. *Simons Collaboration Global Brain*, https://www.simonsfoundation.org/2019/07/31/searching-for-the-hidden-factors-underlying-the-neural-code/

Teaching

- **Lead Teaching Assistant** at NeuroMatch Academy — Summer, 2020
  Computational Neuroscience & Machine Learning (NMA2020)
- **Instructor on Record** at University of California, San Diego — Summer Session I, 2019
  Neural Signal Processing (COGS118C) - https://github.com/rdgao/cogs118c
- **Graduate Seminar Co-Organizer** at University of California, San Diego — Spring 2018
  Representation in the Mind (COGS200)
- **Teaching Assistant** at University of California, San Diego — Fall 2018, Fall 2017
  Introduction to Data Science (COGS9)
- **Teaching Assistant** at University of California, San Diego — Fall 2016, Winter 2015
  Introduction to Cognitive Science (COGS1)
- **Teaching Assistant** at University of California, San Diego — Spring 2015
  Introduction to Statistical Analysis (COGS14B)
- **Teaching Assistant** at University of California, San Diego — Fall 2015
  Intro to Machine Learning II. (COGS118B)
- **Teaching Assistant** at University of Toronto — Fall 2014
  Praxis I. Engineering Design (ESC101)

Mentorship

- **Brian Barry**, UCSD Cognitive Science — 2019–Present
- **Lucas Henry**, UCSD Cognitive Science — 2019–Present
- **Christopher Caligiuri**, Canyon Crest Academy Highschool — 2017–Present
- **Adrianna Hohil**, UCSD Cognitive Science — 2019
- **Lauren Liao**, UCSD Mathematics (Probability & Statistics) — 2016–2019
  now Masters in Biostatistics at UC Berkeley; UCSD CRES Undergraduate Research Award
- **Dylan Christiano**, UCSD Cognitive Science — 2017–2018
  now Lab Manager at Stanford University;
- **Sitan (Stan) Liu**, UCSD Exchange student from Sichuan University — 2017
- **Tanner Turner**, UCSD Applied Mathematics & Computer Science — 2016-2017

Review Services

- **eLife** — 1 time, 2020
- **Neuropsychopharmacology** — 1 time, 2020
- **Journal of Neuroscience** — 3 times, 2018-2020
- **NeuroImage** — 2 times, 2017, 2020
- **Neurons, Behavior, Data Analysis, and Theory** — 1 time, 2019
- **PLOS Computational Biology** — 2 times, 2018,2020
- **Journal of Cognitive Neuroscience** — 1 time, 2017

Failures and Rejections

Papers:

- **Gao et al., 2020, BioRxiv** — 5 Editorial rejections
- **Gao et al., 2017, NeuroImage** — 4 Editorial rejections, 2 after Review Round 1
- **Trujillo, Gao, Negraes et al., 2019, Cell Stem Cell** — 1 Editorial rejections, 4 after Review Round 1
- **Gao et al., 2015, J Neurophysiology** — 3 Editorial rejections

Grants:

- **JSMF Postdoctoral Fellowship Awards** — 2020
- **UCSD KIBM IRG** — 2020, 2019, 2015
- **NSERC PGS-D** — 2015

Conferences, Workshops Summer Schools:

- **Cosyne** — 2018
- **FENS CAJAL Computational Neuroscience** — 2018
- **Okinawa Computational Neuroscience** — 2017
- **UW / Allen Brain Institute Dynamic Brain Workshop** — 2018, 2016
- **Woods Hole** — 2016