

# Gabriel Schamberg

gabes@mit.edu

## EDUCATION

---

<b>PhD Electrical Engineering</b>	August 2019
<i>Electrical and Computer Engineering Department, University of California, San Diego (UCSD)</i>	
<b>MS Electrical Engineering</b>	June 2016
<i>Electrical and Computer Engineering Department, UCSD</i>	
<b>BS Computer Engineering</b>	June 2012
<i>Computer Science and Engineering Department, UCSD</i>	

## RESEARCH

---

<b>Research Affiliate</b>	June 2021 – Present
<i>Picower Institute for Learning and Memory, Neuroscience Statistics Research Laboratory, MIT</i>	
<b>Postdoctoral Fellow</b>	October 2019 – June 2021
<i>Picower Institute for Learning and Memory, Neuroscience Statistics Research Laboratory, MIT</i>	
<b>Graduate Student Researcher</b>	December 2014 – August 2019
<i>Neural Interaction Lab, UCSD</i>	
<b>Undergraduate Student Researcher</b>	January 2012 – June 2012
<i>San Diego Supercomputer Center, UCSD</i>	

## TEACHING

---

<b>Co-Instructor, Statistics for Neuroscience Research (9.073)</b>	Spring 2021
<i>Brain and Cognitive Science Department, MIT</i>	
<b>Co-Instructor, Topics in Neural Signal Processing (9.272)</b>	Spring 2020
<i>Brain and Cognitive Science Department, MIT</i>	
<b>Instructor, Fundamentals of Engineering Applications (ENG 10)</b>	Summer 2018
<i>Jacobs School of Engineering, UCSD</i>	
<b>Instructor, Introduction to Engineering III (ENG 3)</b>	Spring 2016
<i>Jacobs School of Engineering, UCSD</i>	
<b>Instructor, Introduction to Engineering II (ENG 2)</b>	Winter 2015
<i>Jacobs School of Engineering, UCSD</i>	
<b>Instructor, Introduction to Engineering I (ENG 1)</b>	Fall 2015
<i>Jacobs School of Engineering, UCSD</i>	

## INDUSTRY

---

<b>Senior Development Engineer</b>	November 2021 – Present
<i>Alimetry</i>	
<b>Analytics Research Intern</b>	June 2017 – September 2017
<i>CoreLogic</i>	
<b>Software Developer</b>	May 2014 – July 2014
<i>Ziva Corporation</i>	
<b>Software Developer</b>	October 2012 – April 2014
<i>NKI Engineering</i>	
<b>Software Developer (Part-time)</b>	June 2011 – December 2011
<i>Teradata</i>	

## PUBLICATIONS

**Journal Publications**

- **G. Schamberg**, M. Badgeley, B. Meschede-Krasa, O. Kwon, and E. N. Brown, “Continuous Action Deep Reinforcement Learning for Propofol Dosing During General Anesthesia,” *Journal of Artificial Intelligence in Medicine*, In Press.
- A. Shanker, J. H. Abel, P. Mathur, E. Work, **G. Schamberg**, A. Sharkey, R. Bose, V. Rangasamy, V. Senthilnathan, E. N. Brown, and B. Subramaniam, “Perioperative Multimodal General Anesthesia Focusing on Specific CNS Targets in Patients Undergoing Cardiac Surgeries: The PATHFINDER Study,” *Frontiers in Medicine*, Volume 8, October 2021.
- **G. Schamberg**, E. N. Brown, “The Titration Paradox is Simpson’s Paradox,” *Clinical Pharmacology and Therapeutics*, Volume 10, Issue 6, December 2021 (Letter to the Editor).
- A. Shanker, J. H. Abel, **G. Schamberg**, and E. N. Brown, “Etiology of Burst Suppression EEG Patterns,” *Frontiers in Psychology*, Volume 12, June 2021.
- J. H. Abel\*, M. A. Badgeley\*, B. Meschede-Krasa, **G. Schamberg**, I. C. Garwood, K. Lecamwasam, S. Chakravarty, D. W. Zhou, M. Keating, P. L. Purdon, and E. N. Brown, “Machine Learning of EEG Spectra Classifies Unconscious States During Propofol-Induced Anesthesia,” *PLoS One*, Volume 16, Number 5, May 2021.
- **G. Schamberg**, W. Chapman, S. Xie, and T. P. Coleman, “Direct and Indirect Effects: An Information Theoretic Approach,” *Entropy*, Volume 22, Issue 8, August 2020 (**Editor’s Choice Article**).
- **G. Schamberg** and T. P. Coleman, “Measuring Sample Path Causal Influences with Relative Entropy,” *IEEE Transactions on Information Theory*, Volume 66, Issue 5, October 2019.
- A. Allegra, A. Gharibans, **G. Schamberg**, D. Kunkel, and T. P. Coleman, “Bayesian Inverse Methods for Spatiotemporal Characterization of Gastric Electrical Activity from Cutaneous Multi-Electrode Recording,” *PLoS One*, Volume 14, Issue 10, October 2019.
- **G. Schamberg**, D. Ba, and T. P. Coleman, “A Modularized Efficient Framework for Non-Markov Time Series Estimation,” *IEEE Transactions on Signal Processing*, Volume 66, Issue 12, June 2018.

**Peer-Reviewed Conference Publications**

- W. De Faria, **G. Schamberg**, and E. N. Brown, “Classifying EEG of Propofol-Induced Unconsciousness in the Presence of Burst Suppression,” *IEEE MIT Undergraduate Research Technology Conference*, October 2020.
- **G. Schamberg**\*, M. A. Badgeley\*, and E. N. Brown, “Controlling Level of Unconsciousness by Titrating Propofol with Deep Reinforcement Learning,” *International Conference on Artificial Intelligence in Medicine*, August 2020 (**Best Paper Award**).
- **G. Schamberg** and T. P. Coleman, “On the Bias of Directed Information Estimators,” *IEEE International Symposium on Information Theory*, July 2019.
- **G. Schamberg** and T. P. Coleman, “A Sample Path Measure of Causal Influence,” *IEEE International Symposium on Information Theory*, June 2018.
- **G. Schamberg**, M. Wagner, D. Ba, and T. P. Coleman, “Efficient Low-Rank Spectrotemporal Decomposition using ADMM,” *IEEE Statistical Signal Processing Workshop*, June 2016.

**Non-Peer Reviewed (Preprints, Workshops, and Invited Papers)**

- B. Cole, **G. Schamberg**, “Unscented Kalman Filter for Long-Distance Vessel Tracking in Geodetic Coordinates,” *arXiv:2111.13254*, November 2021.
- **G. Schamberg**\*, P. Venkatesh\*, “Partial Information Decomposition via Deficiency for Multivariate Gaussians,” *arXiv:2105.00769*, May 2021.
- **G. Schamberg**\*, S. Chakravarty\*, T. Baum, and E. N. Brown, “Inferring neural dynamics during burst-suppression using a neurophysiology-inspired switching state-space model,” *IEEE Asilomar Conference on Signals, Systems, and Computers*, November 2020.
- **G. Schamberg** and T. P. Coleman, “Quantifying Context-Dependent Causal Influences,” *NeurIPS Workshop on Causal Learning*, December 2018.

**Thesis**

- “Information Theoretic Measures and Estimators of Specific Causal Influences,” *University of California, San Diego*, August 2019.

\* denotes equal contribution

---

 INVITED TALKS
 

---

Royal College of Anaesthetists Winter Symposium	December 2020
Information, Signals, and Systems Seminar, <i>Harvard</i>	March 2019
Neuroscience Statistics Research Laboratory Seminar, <i>MIT</i>	March 2019
CRISP Lab Seminar, <i>Harvard</i>	March 2017

---

 CONFERENCE TALKS
 

---

IEEE Asilomar Conference on Signals, Systems, and Computers	November 2020
International Conference on Artificial Intelligence in Medicine	August 2020
IEEE International Symposium on Information Theory	July 2019
Information Theory and Applications Workshop	February 2019
IEEE International Symposium on Information Theory	July 2018

---

 GRANTS AND AWARDS
 

---

<b>Picower Postdoctoral Fellowship</b> <i>Picower Institute for Learning and Memory</i>	October 2019 – June 2021
<b>Innovative Research Grant Award</b> <i>Kavli Institute for Brain &amp; Mind</i>	July 2018
<b>Honorable Mention, Graduate Research Fellowship Program</b> <i>National Science Foundation</i>	April 2015
<b>Jacobs Fellowship</b> <i>Jacobs School of Engineering, UCSD</i>	September 2014 – September 2017
<b>Gordon Scholar</b> <i>Gordon Center for Engineering Leadership, UCSD</i>	September 2009

---

 ACADEMIC INVOLVEMENT
 

---

Tutorial Co-Organizer, <i>IEEE International Symposium on Information Theory</i>	July 2021
Guest Editor, <i>Entropy</i> Special Issue on “Information Flow in Neural Systems”	November 2020
Reviewer, <i>IEEE Transactions on Neural Networks and Learning Systems</i>	October 2020
Reviewer, <i>IEEE Transactions on Signal Processing</i>	January, March 2020
Reviewer, <i>IEEE International Symposium on Information Theory</i>	February 2020, 2021
Reviewer, <i>IEEE Transactions on Information Theory</i>	December 2019
Reviewer, <i>Knowledge Based Systems</i>	December 2018, June 2019
Session Co-Chair, <i>Information Theory and Applications Workshop</i>	February 2017