

PRAVEEN VENKATESH

Ph.D. Candidate
Dept. of Electrical & Computer Engineering
Carnegie Mellon University

EDUCATION

Program	Institution	CGPA	Years
Ph.D., Electrical & Computer Engineering	Carnegie Mellon University Pittsburgh, PA	3.89	Fall 2014 – 2020 (<i>expected</i>)
B.Tech (Honors), Electrical Engineering (minor in Physics)	Indian Institute of Technology Madras Chennai, India	9.11	2010 – 2014

AWARDS

- A recipient of the *Carnegie Institute of Technology Dean's Fellowship* [2014–15]
- A recipient of the *Henry L. Hillman Presidential Fellowship* [2015–16]
- A recipient of the *Dowd Fellowship* [2016–17]
from the College of Engineering at Carnegie Mellon university
- A recipient of the *CMLH Fellowship in Digital Health* [2017–18]
from the Center for Machine Learning and Health at Carnegie Mellon University
- A recipient of the *ITA Sun Award*, the gold prize for Graduation Day talks [2020]
at the 2020 Workshop on Information Theory and its Applications, San Diego, USA

PUBLICATIONS

Journal papers

6. **Praveen Venkatesh**, Daniel Sneider*, Mohammed Danish*, Nathaniel D Sisterson, Naoir Zaher, Alexandra Urban, Pulkit Grover, R Mark Richardson, Vasileios Kokkinos
“Quantifying a Frequency Modulation Response Biomarker in Responsive Neurostimulation”
(*submitted*)
**Equal contribution*
5. Sanghamitra Dutta, **Praveen Venkatesh**, Piotr Mardziel, Anupam Datta, Pulkit Grover
“Fairness Under Feature Exemptions: Counterfactual and Observational Measures”
(*submitted*)
4. **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
“Information Flow in Computational Systems”
IEEE Transactions on Information Theory, April 2020
3. Alireza Chamanzar, Shilpa George, **Praveen Venkatesh**, Maysamreza Chamanzar, Lori Shutter, Jonathan Elmer, Pulkit Grover
“An Algorithm for Automated, Noninvasive Detection of Cortical Spreading Depolarizations Based on EEG Simulations”
IEEE Transactions on Biomedical Engineering, August 2018

2. Amanda Robinson, **Praveen Venkatesh**, Matthew Boring, Michael Tarr, Pulkit Grover, Marlene Behrmann
[“Very High Density EEG Elucidates Spatiotemporal Aspects of Early Visual Processing”](#)
Scientific Reports, November 2017
1. Pulkit Grover, **Praveen Venkatesh**
[“An Information-theoretic View of EEG Sensing”](#)
Proceedings of the IEEE, December 2016

Conference papers

9. **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
[“How else can we define Information Flow in Neural Circuits?”](#)
International Symposium on Information Theory (ISIT), June 2020
8. Sanghamitra Dutta, **Praveen Venkatesh**, Piotr Mardziel, Anupam Datta, Pulkit Grover
[“An Information-Theoretic Quantification of Discrimination with Exempt Features”](#)
AAAI Conference on Artificial Intelligence (AAAI): Oral presentation, February 2020
7. Aditya Gangrade, **Praveen Venkatesh**, Bobak Nazer, Venkatesh Saligrama
[“Efficient Near-Optimal Testing of Community Changes in Stochastic Block Models”](#)
Neural Information Processing Systems (NeurIPS), December 2019
6. **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
[“How should we define Information Flow in Neural Circuits?”](#)
International Symposium on Information Theory (ISIT), July 2019
5. Zabir Ahmed, Jay Reddy, Kaustubh Deshpande, Ashwati Krishnan, **Praveen Venkatesh**, Shawn Kelly, Pulkit Grover, Maysamreza Chamanzar
[“Flexible Ultra-resolution Subdermal EEG Probes”](#)
Biomedical Circuits and Systems Conference (BioCAS), October 2018
4. Ashwati Krishnan, Ritesh Kumar, **Praveen Venkatesh**, Shawn Kelly, Pulkit Grover
[“Low-cost Carbon Fiber-based Conductive Silicone Sponge EEG Electrodes”](#)
Engineering in Medicine and Biology Conference (EMBC): Oral presentation, July 2018
3. **Praveen Venkatesh**, Pulkit Grover
[“Lower Bounds on the Minimax Risk for the Source Localization Problem”](#)
International Symposium on Information Theory (ISIT), June 2017
2. **Praveen Venkatesh**, Pulkit Grover
[“Is the Direction of Greater Granger Causal Influence the Same as the Direction of Information Flow?”](#)
Allerton Conference on Communication, Control and Computing, September 2015
1. Pulkit Grover, Jeffrey A Weldon, Shawn K Kelly, **Praveen Venkatesh**, Haewon Jeong
[“An Information-theoretic Technique for Harnessing Attenuation of High Spatial Frequencies to Design Ultra-High-Density EEG”](#)
Allerton Conference on Communication, Control and Computing, September 2015

Workshops and Conference abstracts

18. Susan Cheng, Pulkit Grover, **Praveen Venkatesh**
[“Accounting for Synergy is Essential for Inferring Information Flow”](#)
(submitted)
17. **Praveen Venkatesh**, Mohammed Danish, Daniel Sneider, Nathaniel D Sisterson, Pulkit Grover, R Mark Richardson, Vasileios Kokkinos
[“Quantifying Frequency Modulation in Seizures of Patients Undergoing Responsive Neurostimulation”](#)
American Epilepsy Society annual meeting, December 2020

16. **Praveen Venkatesh**, Pulkit Grover
 “[Understanding Encoding and Redundancy in Grid Cells Using Partial Information Decomposition](#)”
Computational and Systems Neuroscience (Cosyne), February 2020
15. **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
 “[Information Flow in Neural Circuits: Formal Definition and Required Neuroengineering](#)”
Information Theory and Applications Workshop (ITA): Graduation Day Talk, February 2020
Winner of the ITA Sun Award: the gold prize for graduation day talks
14. **Praveen Venkatesh**, Vasileios Kokkinos, R Mark Richardson, Pulkit Grover
 “[An automated and configurable seizure segmentation tool for tracking the evolution of seizures](#)”
American Epilepsy Society Annual Meeting (AES), December 2019
13. **Praveen Venkatesh**, Pulkit Grover
 “[Relating Information Flow and Causal Interventions in Neural Circuits](#)”
SfN Neuroscience, October 2019
12. **Praveen Venkatesh**, Pulkit Grover
 “[Revealing Information Paths in the Brain using Synergistic Information](#)”
*CNS*2019 Workshop on Methods of Information Theory in Computational Neuroscience*, July 2019
11. **Praveen Venkatesh**, Pulkit Grover
 “[An Information-theoretic Framework for Examining Information Flow in the Brain](#)”
*28th Annual Computational Neuroscience Meeting (CNS*2019)*, July 2019
10. Sarah M Haigh, Alireza Chamanzar, **Praveen Venkatesh**, Pulkit Grover, Marlene Behrmann
 “Cortical Hyper-Excitability in Migraine to Chromatic Patterns”
Optical Society of America Fall Vision Meeting, September 2018
9. Kaustubh Deshpande, Zabir Ahmed, Jay Reddy, Ashwati Krishnan, **Praveen Venkatesh**, Shawn Kelly, Pulkit Grover, Maysamreza Chamanzar
 “Flexible, Ultra-resolution, Subdermal EEG Probes”
SfN Neuroscience: Nanosymposium, November 2018
8. Alireza Chamanzar, Shilpa George, **Praveen Venkatesh**, Maysam Chamanzar, Jonathan Elmer, Lori Shutter, Pulkit Grover
 “Automated Algorithm and System for Noninvasive Detection of Worsening Brain Injuries”
Military Health System Research Symposium, August 2018
7. Ritesh Kumar, **Praveen Venkatesh**, Rui Sun, Gayathri Mohankumar, Arun Antony, R Mark Richardson, Pulkit Grover
 “[Ultra-high-density scalp EEG outperforms localized invasive ECoG grids in inferring depth of seizure foci](#)”
31st International Congress of Clinical Neurophysiology, May 2018
6. Rui Sun, Pulkit Grover, Rudina Morina, Marie Bremner, **Praveen Venkatesh**, Anto Bagic, R Mark Richardson, Jullie Pan, Alexandra Urban, Naoir Zaher, Arun Antony
 “[Analysis of cortical stimulation data to localize intracranial electrodes using simultaneous scalp and stereo EEG recordings](#)”
American Epilepsy Society annual meeting, December 2017
5. **Praveen Venkatesh**, Ashwati Krishnan, Jeffrey Weldon, Shawn Kelly, Pulkit Grover
 “[Ultra-resolution Subdermal EEG: Long-term Minimally-invasive Brain Monitoring](#)”
SfN Neuroscience, November 2017
4. **Praveen Venkatesh**, Pulkit Grover
 “[High Density EEG: Information-theoretic Limits and Algorithms](#)”
International Symposium on Information Theory (ISIT), Recent Results, June 2017

3. Alireza Chamanzar, Shilpa George, **Praveen Venkatesh**, Wanqiao Ding, Pulkit Grover
 “Systematic and Automated Algorithms for Detecting Cortical Spreading Depolarizations Using EEG and ECoG to Improve TBI Diagnosis and Treatment”
12th World Congress on Brain Injury, March 2017
2. **Praveen Venkatesh**, Wanqiao Ding, Pulkit Grover
 “Data Processing for Reliable Detection of Cortical Spreading Depolarizations Using High-density EEG”
American Epilepsy Society annual meeting, December 2016
1. **Praveen Venkatesh**, Pulkit Grover
 “Is the Direction of Greater Granger Causal Influence the Same as the Direction of Information Flow?”
SfN Neuroscience, October 2015

TEACHING

At Carnegie Mellon University

- Teaching Assistant and Co-instructor for *18-753: Information Theory* [Spring, 2020]
 - Helped redesign this introductory information theory course to focus on information measures, including new topics such as information flow, causality, partial information decomposition, and fairness in machine learning
 - Taught lectures on new measures of information flow in neuroscience
 - Worked closely with students on course projects at the intersection of information theory and neuroscience
- Teaching Assistant and Co-instructor for *18-898: Introduction to Data Science with Applications to Clinical Neural Data* [Spring, 2017]
 - Helped design the course curriculum and homework assignments
 - Taught several lectures on statistics and source localization
 - Worked closely with students on designing and implementing course projects in collaboration with clinicians
- Teaching Assistant for *18-290: Signals and Systems* [Spring, 2015]

At the Indian Institute of Technology, Madras

- Teaching Assistant for *EE4371: Introduction to Data Structures and Algorithms* [Spring, 2014]

MENTORSHIP EXPERIENCE

Undergraduate students

- Wanqiao Ding, Undergraduate in ECE, CMU [2015–17]
- Alankrita Bhatt, Undergraduate from IIT, Kanpur [Summer 2015]
- Susan Cheng, Undergraduate in Physics, CMU; Research Assistant in ECE, CMU [2019–present]
- Daniel Sneider, Undergraduate in ECE, CMU [2019–present]
- Woohyeuk Chang, Undergraduate in Computational Neuroscience, CMU [2020–present]

Masters students

- Ritesh Kumar, Masters in BME, CMU [2017–18]
- Mohammed Danish, Masters in ECE, CMU [2020–present]
- Revanth Banala, Masters in ECE, CMU [2020–present]

RELEVANT COURSEWORK (CMU)

- Real Analysis
- Lebesgue Integration
- Neural Data Analysis
- Information Flows: Communication, Computational and Neuronal
- Estimation, Detection and Identification
- Intermediate Statistics
- Compressive Sensing and Sparse Representations
- Information Theory
- Error Control Coding
- Convex Optimization
- Information Processing and Learning
- Computational Neuroscience (at IIT Madras)