# 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 *(expected)* |
| B.Tech (Honors), Electrical Engineering (minor in Physics) | Indian Institute of Technology Madras Chennai, India | 9.11 | 2010 – 2014 |

## PUBLICATIONS

**Journal papers**

- **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
  "Information Flow in Computational Systems"
  *IEEE Transactions on Information Theory (accepted)*

- 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 simulation"
  *IEEE Transactions on Biomedical Engineering*, August 2018

- 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

- Pulkit Grover, **Praveen Venkatesh**
  "An Information-theoretic View of EEG Sensing"
  *Proceedings of the IEEE*, December 2016

**Conference papers**

- **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
  "How *else* can we define Information Flow in Neural Circuits?"
  *(submitted)*

- Sanghamitra Dutta, **Praveen Venkatesh**, Piotr Mardziel, Anupam Datta, Pulkit Grover
  "Fairness under Feature Exemptions"
  *(submitted)*

- 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

- 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

– **Praveen Venkatesh**, Sanghamitra Dutta, Pulkit Grover
"How should we define Information Flow in Neural Circuits?"
*International Symposium on Information Theory (ISIT)*, July 2019

– 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

– 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

– **Praveen Venkatesh**, Pulkit Grover
"Lower Bounds on the Minimax Risk for the Source Localization Problem"
*International Symposium on Information Theory (ISIT)*, June 2017

– **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

– 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**

– **Praveen Venkatesh**, Pulkit Grover
"Understanding Encoding and Redundancy in Grid Cells Using Partial Information Decomposition"
*Computational and Systems Neuroscience (Cosyne)*, February 2020

– **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

– **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

– **Praveen Venkatesh**, Pulkit Grover
"Relating Information Flow and Causal Interventions in Neural Circuits"
*SfN Neuroscience*, October 2019

– **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

– **Praveen Venkatesh**, Pulkit Grover
"An Information-theoretic Framework for Examining Information Flow in the Brain"
*28th Annual Computational Neuroscience Meeting (CNS*2019)*, July 2019

– 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

– 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

– 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

– Ritesh Kumar, **Praveen Venkatesh**, Rui Sun, Gayathri Mohankumar, Arun Antony, 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

– Rui Sun, Pulkit Grover, Rudina Morina, Marie Bremner, **Praveen Venkatesh**, Anto Bagic, 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

– **Praveen Venkatesh**, Ashwati Krishnan, Jeffrey Weldon, Shawn Kelly, Pulkit Grover
"Ultra-resolution Subdermal EEG: Long-term Minimally-invasive Brain Monitoring"
*SfN Neuroscience*, November 2017

– **Praveen Venkatesh**, Pulkit Grover
"High Density EEG: Information-theoretic Limits and Algorithms"
*International Symposium on Information Theory (ISIT), Recent Results*, June 2017

– 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

– **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

– **Praveen Venkatesh**, Pulkit Grover
"Is the Direction of Greater Granger Causal Influence the Same as the Direction of Information Flow?"
*SfN Neuroscience*, October 2015

## 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 from the College of Engineering [2016-17]
at Carnegie Mellon university

– A recipient of the CMLH Fellowship in Digital Health from the [2017-18]
Center for Machine Learning and Health at Carnegie Mellon University

## TEACHING

**At Carnegie Mellon University**

– Teaching Assistant and Co-instructor for *18-898: Introduction to Data Science with*     [Spring, 2017]
  *Applications to Clinical Neural Data*

  – 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]

## 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