

SUMIT MUKHERJEE

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RESEARCH INTERESTS

Computational Biology, Machine Learning, Data Science, Systems Biology, Control Theory

EDUCATION

PhD, Electrical Engineering

University of Washington, Seattle GPA 3.83/4.0 Expected December 2017

THESIS - *Unsupervised learning & inference using single cell sequencing data*

Committee - Dr. G. Seelig (Chair), Dr. S. Kannan (Co-Chair), Dr. S. Lee, Dr. W. Noble

Master of Science, Electrical Engineering

Rensselaer Polytechnic Institute, NY GPA 4.0/4.0 May 2013

THESIS - *Passivity based approach to building HVAC control*

Bachelor of Engineering, Power Engineering

Jadavpur University, India GPA 8.63/10.0 May 2011

GRADUATE RESEARCH EXPERIENCE

University of Washington, Seattle, WA

2013 – present

PhD student, Electrical Engineering

- Developed method to identify key regulators of differentiation processes from progressive single cell transcriptomic datasets using differential network analysis
- Developed a unified framework for unsupervised & semi-supervised classification, dimensionality reduction and manifold learning using single cell transcriptomic datasets
- Studied biological noise rejection properties of certain microRNA based network motifs (IFFL's)
- Developed novel low-cost single cell sequencing protocol
- Developing methods to perform scalable online unsupervised or semi-supervised learning with large biological datasets.

University of Washington, Seattle, WA

2015 – present

Student collaborator, eScience Institute

- Used Machine learning to predict connectivity of sidewalks from noisy publicly available data sets
- Developing web interface for manual annotation
- Developing smart adaptive routing tool for pedestrians

Rensselaer Polytechnic Institute, Troy, NY

MS student, Electrical Engineering

2011–2013

- Developed Passivity based controller design framework for building HVAC systems
- Developed passive adaptive control strategy for HVAC systems
- Identified Model Parameters using real data generated at HP Labs San Francisco office

GE Global Research, Niskayuna, NY

Summer intern, Model Based Controls Lab

Summer 2012

- Linear Parameter Varying Modeling of Gas Turbines
- Simulation of building HVAC systems using EnergyPlus

COMPUTING SKILLS

High proficiency: Python, Matlab. Working proficiency: R, SQL, Javascript, C, C++.

SELECTED GRADUATE COURSEWORK

Machine Learning, Machine Learning for Big Data, Statistical Learning Theory, Probabilistic Graphical Models, Computational Biology, Convex Optimization, Data Science for Sequencing (audited), Random Processes, Mathematical Biology, Biological Image Analysis, Networked Dynamical Systems, Iterative Learning Control, Design & Analysis of Algorithms (audited), Algorithms I & II (Coursera), Social Network Analysis (Coursera).

SELECTED PUBLICATIONS

- **S. Mukherjee**, Y. Zhang, S. Kannan, G. Seelig, *UNCURL: Prior knowledge and sampling model informed unsupervised learning with single cell RNA-Seq data*, To be submitted to Nature Methods.
- **S. Mukherjee**, A. Carignano, S. Lee, G. Seelig, *Identifying progressive network perturbation in differentiation from single cell RNA-seq data*, To be submitted to Genome Biology.
- **S. Mukherjee**, A. Carignano, G. Seelig, *Effect of Repression Mechanisms on Noise Suppression in Micro RNA-based Incoherent Feed Forward Loops*, To be submitted to PLOS Computational Biology.
- A. Rosenberg, C. Rocco, R. Muscat, A. Kuchina, **S. Mukherjee**, W. Chen, D. Peeler, Z. Yao, B. Tasic, D. Sellers, S. Pun, G. Seelig, *Scaling single cell transcriptomics through split-pool barcoding*, Submitted to Science.
- N. Bolten, **S. Mukherjee**, V. Sipeeva, A. Tanweer, A. Caspi, *A pedestrian-centered approach for equitable access to built environments*, To appear in IBM Journal of Research and Development (Special issue on Data Science for Social Good).
- **S. Mukherjee**, S. Mishra, J. Wen, *Building temperature control: A passivity-based approach*, Conference of Decision and Controls (CDC-ECC 2012).
- J. Wen, S. Mishra, **S. Mukherjee**, N. Tantisujjatham, M. Minakis, *Building Temperature Control with Adaptive Feedforward*, Conference of Decision and Controls (CDC-ECC 2013).

SELECTED POSTER PRESENTATIONS

- *UNCURL: Prior knowledge and sampling model informed unsupervised learning with single cell RNA-Seq data*, UW Data Science Poster Session. (February 2017)
- *Identifying progressive network perturbation in differentiation from single cell RNA-seq data*, Cell Symposium - Biology, Data Science, Berkeley, CA. (October 2016)
- *Noise Rejection and Buffering by micro RNA based Single Gene Feedforward Loops*, Molecular Programming Project Workshop, SF, CA. (January 2015)
- *Passivity based control of building HVAC systems*, Advanced Manufacturing Conference, Troy, NY. (March 2013)

HONORS AND AWARDS

- One of three nominees of UW EE for Microsoft Research PhD Fellowship 2015–2016
- UW Electrical Engineering Departmental Fellowship
- University of Minnesota, ECE Department Fellowship (Declined)
- DAAD WISE Fellowship Awardee

UNDERGRADUATES SUPERVISED

Michaela Baker (UW Chemical Engineering), Sowmya Dharanipragada (UW CSE).