

# SOUMYA BASU

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## EDUCATION

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### The University of Texas at Austin, USA

Aug 2014 - Present

PhD in Decision, Information, and Communication Engineering

CGPA: 3.822/4

Adviser: Prof. Sanjay Shakkottai and Prof. Evdokia Nikolova

### Indian Institute of Technology, India

Jul 2009 - May 2014

B.tech(Hons) in Electronics and Electrical Communication Engineering

CGPA: 9.53/10

M.Tech in Telecommunication Systems Engineering

Adviser: Prof. Goutam Das

## RESEARCH INTEREST

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**Online Learning:** Combinatorial Bandits, Optimal Resource Allocation in Queuing Networks

**Machine Learning Theory:** Stochastic Optimization, Unsupervised Learning, Graphical Models

## PUBLICATIONS AND WORKING PAPERS

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### Conference

- **S. Basu**, S. Gutstein, B. Lance, and S. Shakkottai. “Pareto Optimal Streaming Unsupervised Classification”. In: *ICML*. PMLR. 2019
- **S. Basu** and S. Shakkottai. “Switching Constrained Max-Weight Scheduling for Wireless Networks”. In: *INFOCOM*. IEEE. 2019
- **S. Basu**, A. Sundarrajan, J. Ghaderi, S. Shakkottai, and R. Sitaraman. “Adaptive TTL-Based Caching for Content Delivery”. In: *SIGMETRICS*. ACM. 2017
- **S. Basu**, G. Yang, T. Lianeas, E. Nikolova, and Y. Chen. “Reconciling selfish routing with social good”. In: *SAGT*. Springer. 2017
- A. Khodabakhsh, G. Yang, **S. Basu**, E. Nikolova, M. C. Caramanis, T. Lianeas, and E. Pountourakis. “A Submodular Approach for Electricity Distribution Network Reconfiguration”. In: *HICSS*. 2018
- **S. Basu**, T. Lianeas, and E. Nikolova. “New Complexity Results and Algorithms for the Minimum Tollbooth Problem”. In: *Web and Internet Economics*. Springer, 2015
- **S. Basu**, M. Ahmadi, M. Ni, and J. Pan. “Locating primary users in cognitive radio networks by generalized method of moments”. In: *GLOBECOM, 2014*. IEEE. 2014

### Journal

- **S. Basu**, A. Sundarrajan, J. Ghaderi, S. Shakkottai, and R. Sitaraman. “Adaptive TTL-Based Caching for Content Delivery”. In: *IEEE/ACM Transactions on Networking* (2018)
- **S. Basu** and G. Das. “Scheduling Hybrid WDM/TDM Ethernet Passive Optical Networks Using Modified Stable Matching Algorithm”. In: *Journal of Lightwave Technology* (2014)

### Working Papers

- J. Hoffmann, **S. Basu**, S. Goel, and C. Caramanis. “Disentangling Mixtures of Epidemics on Graphs”. In: Under submission, 2019
- **S. Basu**, R. Sen, S. Sanhgavi, and S. Shakkottai. “Blocking Bandits”. In: Under submission, 2019
- **S. Basu** and S. Shakkottai. “Constant Regret in Throughput-optimal Scheduling”. In: Ongoing

## SCHOLASTIC ACHIEVEMENTS

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**Institute Silver Medal**, 2014 for best academic performance in E&ECE Dual, IIT Kharagpur

**Best M.Tech Thesis**, 2014 in E&ECE, IIT Kharagpur

**JBNSTS Scholar**, 2010, **DAAD WISE Scholar**, 2012 & **MITACS Scholar** 2013

## TECHNICAL STRENGTHS

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**Programming:** Python (Pyspark, Pytorch, Pandas), C, C++, SQL    **Computation:** MATLAB

## INTERNSHIPS

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- Software Engineering Intern at Facebook, Menlo Park, USA** Summer 2019  
Cache placement optimization for improved latency performance
- Performance Engineering Intern at Akamai, Cambridge, USA** Summer 2017  
Real-time *TCP mode selection* using cellular connectivity data for mobile users  
Understanding the effect of *user features* on data throughput under different TCP modes
- Research Intern at Panlab, CS, University of Victoria, BC** Summer 2013  
*Cognitive User based Primary User Localization* in Cognitive Radio Network  
Designed *general method of moments* based location estimator using SINR information
- Research Intern at EDA Chair, ECE, Technische Universität Munich** Summer 2012  
*Modular Direct Memory Access Controller* design with WISHBONE protocol

## RELEVANT COURSEWORK

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- Machine Learning:** Large Scale Optimization, Learning with Big-Data, Unsupervised Learning, Big-Data using Spark (edX), Deep Learning Specialization (Coursera)
- Network Analysis:** Advanced Probability in Learning and Networks, Mixing Time in Markov Chains, Information Theory, Communication Networks: Analysis and Design
- Algorithms:** Advanced Data structures, Approximation Algorithms, Graph Theory  
Theory of Computation, Distributed Algorithms, Adaptive Signal Processing

## SELECTED RESEARCH PROJECTS

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- Disentangling Mixtures of Epidemics on Graphs** Feb 2019-May 2019  
Recovering mixture of two weighted graphs from independent samples of SIR epidemics  
Discovering recoverability conditions and designing sample and time efficient algorithms
- Blocking Bandits** Jan 2019- May 2019  
Studying multi armed bandit problem with blocking of arms after respective plays  
Proving computational hardness and  $(1 - 1/e)$  greedy approximation of optimal play  
Designing Greedy UCB and leveraging free exploration for improved regret bounds
- Pareto Optimal Streaming Unsupervised Ensemble Learning** Oct 2017 - Jan 2019  
Joint routing and label-aggregation algorithms for unsupervised ensemble learning  
Using explore-exploit strategy to learn hidden parameters through Tensor decomposition  
Designing two-staged Back-pressure algorithm with hidden transitions for system stability
- Augmented Max-weight with Learning for Wireless Networks** March 2017-Oct 2017  
Designing algorithm for optimizing switching and operational cost with stability constraints  
Designing fallback aided explore-exploit strategy for online learning of channel model  
Providing non-asymptotic MGF bounds for quantifying queue length tail distribution
- Adaptive TTL-Based Caching for Content Delivery** April 2016- Feb 2017  
Achieving Cache hitrate with dynamic multi level TTL caches - verification on 'Akamai' traces

## EXTRA CURRICULAR ACTIVITIES

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- Overnite by ACM/ICPS at Kshitij 2012:** Secured 8th position (out of more than 70 teams)  
**Literacy Drive, National Social Service Scheme:** Tutored underprivileged students  
**Cultural Championships, IIT Kharagpur:** Captain of *Finearts*, and member in *Dramatics* events