

# 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: 3.807/4

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** for *optimal resource allocation* in wireless, vehicular, and computation networks

**Mechanism design** with a focus on *risk averse users* in congestion networks

**Approximation algorithm** design and hardness results in *non-convex optimization*

## PUBLICATIONS AND WORKING PAPERS

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### Conference

- **S. Basu**, A. Sundarrajan, J. Ghaderi, S. Shakkottai, and R. Sitaraman. “Adaptive TTL-Based Caching for Content Delivery”. In: *SIGMETRICS*. ACM. 2017
- **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
- **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

### 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

- **S. Basu** and S. Shakkottai. “Switching Constrained Max-Weight Scheduling for Wireless Networks”. In: Submitted, 2018
- **S. Basu**, S. Gutstein, and S. Shakkottai. “Online Unsupervised Ensemble Learning”. In: Under progress, 2018

## 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++    **Computation:** MATLAB, CPLEX

## INTERNSHIPS

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- Performance Engineering Intern at Akamai, Cambridge, USA** Summer 2017  
Real-time *TCP mode selection* using cellular connectivity data for mobile users  
*Reinforcement learning* with average *Throughput* as objective and *TCP modes* as actions
- 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

## RESEARCH PROJECTS

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- Online Unsupervised Ensemble Learning** Oct 2017-Present  
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 Actor-Critic Reinforcement Learning - verification on 'Akamai' traces  
*d-TTL*: A TTL-cache with guaranteed hitrate under non-stationary traffic  
*f-TTL*: Filtering enabled two-level cache with guaranteed hitrate and improved cache size
- Mechanism Design for Risk Averse Routing** Oct 2016-Dec 2016  
Mechanism design in non-linear and non-separable routing games with path tolls  
Hardness results for computing Social optima in risk averse routing games
- Reconciling Selfish Routing with Social Good** July 2015-July 2016  
Effects of path decomposition on routing games on: Fairness, Social cost and Computation
- Algorithms in Minimum Tollbooth Problem (MINTB)** Dec 2014-July 2015  
Designing road tolls with minimum support: Approximation hardness and Algorithms
- Design of Ethernet Passive Optical Network over Coax(EPoC)** July 2013-July 2014  
Integration of CSMA/CD on Coax and TDMA on optical network with high performance guarantees
- Hybrid TDM/WDM scheduling in Ethernet Passive Optical Network** Sept 2012-May 2013  
Pareto optimal Dynamic Bandwidth Assignment (DBA) in EPON in presence of laser tuning time

## RELEVANT COURSEWORK

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

## 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