Jithin K. Sreedharan

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Professional Summary

- Computer research scientist with a strong background in statistical modeling, data science, and machine learning, and experienced in applying data science techniques to a wide range of domains like telecommunication systems, bioinformatics, and online social networks.
- Strong applied and theoretical research record leading to 6 journal and 13 international conference/workshop publications in highly-selective top-tier venues including SIGKDD, The Web Conference (WWW), SIGMETRICS, Nature Reports, INFOCOM etc.
- Orchestrated complex data mining research projects involving various statistical techniques leading to several invited research talks, grant writings, and multiple collaborations.

Employment

National Science Foundation (NSF) Center for Science of Information
Department of Computer Science, Purdue University West Lafayette, IN, USA
NSF Postdoctoral Researcher 01/2017 – present
Mentors: Prof. Wojciech Szpankowski and Prof. Ananth Grama

- Designed and executed research on recovering temporal information hidden in the dynamic data of social media and biological systems (protein and brain)
- Developed an optimal feature selection algorithm for explainable AI solutions and various approximate solutions for it with reduced time and sample complexity
- Formulated the problem of misinformation spread in online social networks, and designed algorithms for its containment
- Coordinated a team consisting of three senior professors, three postdoctoral researchers, and instituted research collaboration with an interdisciplinary data science team in quantum computing
- Resulted in publications (4 conferences - incl. **The Web Conference (WWW)** and **SIGKDD**), 2 journal - incl. **Nature**, 3 in preparation), 4 grant proposals, and 2 open source libraries. Delivered 17 invited research talks (including Google Research and Adobe Research).

Institut National de Recherche en Informatique et en Automatique (INRIA) and
INRIA-Bell Labs joint lab Sophia Antipolis and Paris, France
PhD Graduate Researcher, Team MAESTRO (renamed to NEO) 08/2013 – 12/2016
Advisor: Dr. Konstantin Avrachenkov

- Designed and analyzed distributed data mining algorithms for graphs to sample, rank and estimate graph properties.
- Developed methods based on reinforcement learning, short random walks, extreme value theory, and spectral graph theory for estimation problems on networked data
- Designed distributed implementation of spectral clustering techniques
- Launched collaborations with researchers from Purdue/CMU (USA), Bell Labs, UFRJ (Brazil), IIT Bombay (India), and IISc Bangalore (India)
- Resulted in publications (5 conferences, 3 journal), and 4 open source libraries. Delivered 7 invited research talks

Indian Institute of Science Bangalore, India
Performance Analysis Lab, Dept. of Electrical Communication Engineering
Research Associate 09/2010 – 04/2013
Advisor: Prof. Vinod Sharma

- Developed and analyzed sequential hypothesis testing algorithms for distributed quickest detection of data anomalies, with various generalizations from parametric to non-parametric setup

- Tested the devised methods in anomaly detection in wireless sensor networks and spectrum sensing in cognitive radios, with aid from Boeing Inc. and Ministry of Communications and Information Technology, Govt. of India
- Resulted in publications (5 conferences, 1 journal), and 2 open source libraries

Robert Bosch Coimbatore and Bangalore, India
System Engineer, Automotive embedded systems in gasoline engines 08/2007 - 12/2008

- Developed and maintained software for engine control units (ECUs)
- Integrated new device drivers and application software modules into a common platform after rigorous hardware and software testing.

Education

Doctor of Philosophy in Computer Science 08/2013 – 12/2016
Institut National de Recherche en Informatique et en Automatique (INRIA) and INRIA-Bell Labs joint lab Sophia Antipolis and Paris, France
Affiliated university: Université Côte d'Azur (Université Nice Sophia Antipolis), France
Thesis title: *Sampling and Inference in Complex Networks*

Master of Science (Engineering), Dept. of Electrical Communication Engg. 09/2009 – 07/2012
Indian Institute of Science (IISc) Bangalore, India
Thesis title: *Spectrum Sensing in Cognitive Radios using Distributed Sequential Detection*

Bachelor of Technology in Electronics and Communication Engineering 08/2003 – 05/2007
Govt. Model Engineering College - Cochin University of Science and Technology Cochin, India
Main project title: *FPGA Implementation of a Probabilistic Neural Network*

Fellowships, Awards, and Honors

- Postdoctoral fellowship from NSF Science and Technology Center for Science of Information
- Postdoctoral fellowship from University of California San Diego Halicioglŭ Data Science Institute (declined)
- ACM SIGMETRICS/PERFORMANCE travel grant 2016
- **Best M.S. thesis medal** - Prof. F. M. Mowdawalla medal - from Indian Institute of Science, Bangalore, India
- PhD fellowship from INRIA-Bell Labs joint lab for the entire duration of PhD
- Ministry of Human Resources and Development (MHRD), Govt. of India, scholarship for graduate studies

Computational Skills

Languages: Python, C++, Matlab
Machine learning: PyTorch, TensorFlow, Scikit-learn
Data analytics: Numpy, Pandas, Scipy, Matplotlib, Jupyter Notebook, Gurobi Optimizer

Some Selected Publications (total **6** journal and **13** international conference publications)

- Feature Selection via a Fourier Framework
  Mohsen Heidari†, *Jithin K. Sreedharan*†, Gil Shamir, and Wojciech Szpankowski; †*Equal contribution*
  Under review in NeurIPS, 2020
- Temporal Ordered Clustering in Dynamic Networks: Unsupervised and Semi-supervised Learning Algorithms
  Krzysztof Turowski†, *Jithin K. Sreedharan*†, and Wojciech Szpankowski; †*Equal contribution*
  IEEE International Symposium on Information Theory (ISIT), 2020
- Revisiting Parameter Estimation in Biological Networks: Influence of Symmetries
  Jithin K. Sreedharan†, Krzysztof Turowski†, and Wojciech Szpankowski; †*Equal contribution*
  ACM SIGKDD, 2019 (poster presentation); ***BioKDD***, 2019 (oral presentation)
  IEEE/ACM Transactions on Computational Biology and Bioinformatics, 2020.
- Inferring Temporal Information from a Snapshot of a Dynamic Network
  Jithin K. Sreedharan†, Abram Magner†, Ananth Grama, and Wojciech Szpankowski; †*Equal contribution*
  Nature Scientific Reports, 2019 [impact factor: 4.61]
  Technical details with theoretical analysis and proofs are in the *supplementary material*.

- TIMES: Temporal Information Maximally Extracted from Structures
  Abram Magner[†], *Jithin K. Sreedharan*[†], Ananth Grama, and Wojciech Szpankowski; [†]*Equal contribution*
  *The Web Conference (**WWW**)*, 2018 [acceptance rate: **14.8%**; oral presentation]
- Revisiting Random Walk based Sampling in Networks: Evasion of Burn-in Period and Frequent Regenerations
  Konstantin Avrachenkov, Vivek S. Borkar, Arun Kadavankandy and *Jithin K. Sreedharan*
  Computational Social Networks (Springer International Publishing), 2018
- Recovery of Vertex Orderings in Dynamic Graphs
  Abram Magner, Ananth Grama, *Jithin K. Sreedharan* and Wojciech Szpankowski
  IEEE International Symposium on Information Theory (ISIT), 2017
- Inference in OSNs via Lightweight Partial Crawls
  Konstantin Avrachenkov, Bruno Ribeiro and *Jithin K. Sreedharan* (primary author, alphabetical list)
  *ACM **SIGMETRICS/IFIP**, 2016* [acceptance rate: **13.5%**; oral presentation]
- Distributed Spectral Decomposition in Networks by Complex Diffusion and Quantum Random Walk
  Konstantin Avrachenkov, Philippe Jacquet and *Jithin K. Sreedharan* (primary author, alphabetical list)
  *IEEE **INFOCOM**, 2016* [acceptance rate: **18.25%**; oral presentation]
- Distribution and Dependence of Extremes in Network Sampling Processes
  Konstantin Avrachenkov, Natalia M. Markovich and *Jithin K. Sreedharan*(primary author, alphabetical list)
  Computational Social Networks (Springer International Publishing), 2015
- Spectrum Sensing using Distributed Sequential Detection via Noisy Reporting MAC
  Jithin K. Sreedharan and Vinod Sharma
  Signal Processing (Elsevier & EURASIP), vol 106, 2015 [impact factor: 3.47]

Invited Talks

- Indian Institute of Technology - Delhi, India, July 2020
- Singapore University of Technology and Design, Singapore, May 2020
- Google, Pittsburgh, USA, March 2020
- Wadhwani AI, Mumbai, India, January 2020
- Google Research, Mountain View, USA, November 2019
- Eindhoven University of Technology (TU/e), Eindhoven, Netherlands, May 2019
- Indian Institute of Science, Bangalore, India, April 2019
- Indian Institute of Technology - Madras, India, April 2019
- Indian Institute of Technology - Bombay, India, April 2019
- International Institute of Information Technology, Hyderabad, India, April 2019
- Indian Institute of Technology - Palakkad, India, April 2019
- Indian Institute of Technology - Roorkee, India, February 2019
- Adobe Research, Bangalore, India, May 2018
- Bell Labs Murray Hill, NJ, USA, June 2017
- Dept. of Computer Science, Purdue University, USA, May 2017
- INRIA-Bell Labs common lab seminar, Paris, France, December 2015
- Bell Labs Future X Days, Paris, France, June 2015
- INRIA-Bell Labs common lab seminar, Paris, France, Jan 2015

Community Service

- COVID-19 modeling and prediction for Indiana state, U.S.A., and Kerala state, India.
- Reviewer: ICDM, NeurIPS, SIGMETRICS, ICS, SIGKDD, ISIT, ISMB/ECCB, Performance Evaluation, ACM Transactions on Modeling and Performance Evaluation of Computing Systems, IEEE Transactions on Information Theory, Algorithmica, ACM/IEEE Transactions on Networking, IEEE Transactions on Systems, Man, and Cybernetics: Systems, Physica A, IEEE Transactions on Network Science and Engineering