

Srivatsan Sridhar

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Research Interests: Blockchains, security, machine learning, information theory

EDUCATION

Stanford University MS and PhD in Electrical Engineering	Stanford, CA 2019 – present
Indian Institute of Technology Bombay B.Tech. with honors in Electrical Engineering. (GPA: 9.85/10.0) Minor in Computer Science and Engineering	Mumbai, India 2015 – 2019

AWARDS AND HONORS

• Edward W. Barnholdt graduate fellowship	2019
• President of India gold medal (ranked 1st by GPA in IIT Bombay)	2019
• Prof. K. C. Mukherjee Award (best B. Tech. project in EE, IIT Bombay)	2019
• Top 1% in National Standard Examination in Physics (NSEP, India)	2015
• KVPY Fellowship with all India rank 57 (Indian Institute of Science)	2013
• Silver medal in Dr. Homi Bhabha Young Scientist Competition	2012

RESEARCH EXPERIENCE

Speeding up Proof-of-Stake Blockchains <i>Mentors: Prof. David Tse, Prof. Mert Pilanci (Stanford University)</i> <ul style="list-style-type: none">Applying novel tools from optimization and probability theory to speed up proof-of-stakeExploring alternate staking rules using VRFs and VDFs to increase throughput while retaining security	Mar 2020 – present
Optimization using Random Projections <i>Mentors: Prof. Mert Pilanci, Prof. Ayfer Özgür (Stanford University)</i> <ul style="list-style-type: none">Proved new tight lower bounds for least squares optimization using Gaussian projectionsProposed a near-optimal shrinkage estimator based on the James-Stein estimator	Jan – May 2020
Compression for Genomic Data <i>Mentor: Prof. Tsachy Weissman (Stanford University)</i> <ul style="list-style-type: none">Demonstrated lossless and lossy compression methods for Nanopore genome sequencing dataAchieved 50% reduction in size with negligible impact on basecalling accuracy	Sep – Dec 2019
Secure Multiparty Computation <i>Mentors: Prof. Sibiraj Pillai, Prof. Manoj M. Prabhakaran (IIT Bombay), Prof. Vinod M. Prabhakaran (TIFR, Mumbai)</i> <ul style="list-style-type: none">Studied communication and randomness lower bounds for secure multiparty computationProved the optimality of a 25-year old protocol for secure computation of 2-bit ANDAdjudged as the best B. Tech. project in EE, IIT Bombay for the year 2019	Jul 2018 – Aug 2019
RF Fingerprinting for Bluetooth Receivers <i>Mentor: Prof. Anantha P. Chandrakasan (Massachusetts Institute of Technology)</i> <ul style="list-style-type: none">Used RF Fingerprinting to classify and authenticate bluetooth transmitters using their raw signalDesigned feature extraction and a neural network to achieve more than 90% classification accuracy	May – Jul 2018
Onset Detection Methods for Piano Music <i>Mentor: Prof. Preeti Rao (IIT Bombay)</i> <ul style="list-style-type: none">Presented a novel feature extraction method for piano note onset detectionAchieved 95% successful note onset detection for monophonic piano music	May 2017 – Feb 2018

PUBLICATIONS

1. **Impact of Lossy Compression of Nanopore Raw Signal Data on Basecall and Consensus Accuracy**
Shubham Chandak, Kedar Tatwawadi, **Srivatsan Sridhar**, Tsachy Weissman
Bioinformatics, Dec 2020
2. **Lower Bounds and a Near-Optimal Shrinkage Estimator for Least Squares using Random Projections**
Srivatsan Sridhar, Mert Pilanci, Ayfer Özgür
IEEE Journal on Selected Areas in Information Theory (JSait) - Estimation and Inference, Nov 2020
3. **Optimality of a Protocol by Feige-Kilian-Naor for Three-Party Secure Computation**
Sibi Raj B. Pillai, Manoj Prabhakaran, Vinod M. Prabhakaran, **Srivatsan Sridhar**
20th International Conference on Cryptology in India, Hyderabad, India, Dec 2019
4. **Energy-Weighted Multi-Band Novelty Functions for Onset Detection in Piano Music**
Krishna Subramani, **Srivatsan Sridhar**, Rohit M. A., and Preeti Rao
Proc. of National Communications Conference 2018, Hyderabad, India.

OTHER PROJECTS

- Sampling Arbitrary Latent Variable Distributions in an Autoencoder** Oct – Dec 2019
Course Project : Deep Generative Models (Stanford University)
- Proposed an architecture combining autoencoders with flow networks and adversarial learning
 - Demonstrated improved sample quality and smaller Frechet distance scores
- Digitally Programmable Analog Computer** Jan – Apr 2018
Course Project : Electronic Design Lab (IIT Bombay)
- Designed an analog computer to solve linear dynamical systems in real-time
 - Fabricated a prototype used for hardware-in-loop simulations in the power electronics lab

TEACHING EXPERIENCE

- Course Assistant – Internet-Scale Consensus in the Blockchain Era** Jan – Mar 2021
Instructor : Prof. David Tse (Stanford University)
- Course Assistant – Statistical Signal Processing** Sep – Dec 2020
Instructor : Prof. David Tse (Stanford University)
- Teaching Assistant – Linear Algebra** Jan – Feb 2017
Instructor : Prof. A. Ranjan (IIT Bombay)
- Teaching Assistant – Quantum Physics** Jul – Nov 2016
Instructor : Prof. S. Umasankar (IIT Bombay)

SKILLS

Languages: English (professional proficiency), Hindi, Tamil (native)
Programming: Python, C++, Java, Tensorflow, Pytorch, VHDL, 8085 assembly
Software: MATLAB, Scilab, GNURadio, Eagle, Quartus
Hardware: Arduino, ATmega, 8085 microprocessor, analog circuits

RELEVANT COURSEWORK

Graduate-level EE courses: Information Theory, Convex Optimization, Cryptography, Scaling Blockchains, Image Processing, Speech Processing, Computer Vision
CS courses: Data Structures and Algorithms, Machine Learning, Deep Generative Models, Computer Networks, Network Security and Cryptography, Advanced Computer Architecture

EXTRACURRICULARS

Music: 18 years of experience in Carnatic (south Indian) classical vocal and violin music 2004 – present
National Service Scheme: 80 hours of teaching underprivileged students in Mumbai 2015 – 2016
Yoga: Formal training from the Art of Living Foundation