

Srivatsan Sridhar

Email: svatsan@stanford.edu

Webpage: ssrivatsan97.github.io

Telegram: t.me/svatsan

Linkedin: www.linkedin.com/in/srivatsan-sridhar

Research Interests: consensus, security, machine learning, information theory
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EDUCATION

Stanford University 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 (worth 73000 USD per year)	2019
• President of India gold medal (ranked 1st out of 1000+ students by GPA in IIT Bombay)	2019
• Prof. K. C. Mukherjee Award (best B. Tech. project among cohort of 120 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 (rank 2 out of 35000+)	2012

WORK EXPERIENCE

Protocol Labs <i>Security Researcher</i> <ul style="list-style-type: none">Studied Sybil and eclipse attacks on distributed hash tablesProposed a detection mechanism for eclipse attacks, evaluated it on the live IPFS DHT with 22K+ nodes	Jun – Sep 2022
Subspace Labs Inc. <i>Security Researcher</i> <ul style="list-style-type: none">Performed a security analysis of Subspace Network – a new Proof-of-Storage consensus protocolProposed an efficient solution to the <i>long-range attack</i> using sequential AES encryptions and fraud proofsDesigned specifications for the decentralized storage network and a super-light client	Jun – Sep 2021

SELECT RESEARCH EXPERIENCE

Blockchains Under Bandwidth Constraints [1] <i>Mentors: David Tse (Stanford), Mohammad Alizadeh (MIT)</i> <ul style="list-style-type: none">Modeling bandwidth constraints and spamming attacks in blockchain networksStudying the impact of network congestion on security and throughput of blockchains	Mar 2020 – present
Optimization using Random Projections [3] <i>Mentors: Mert Pilanci, Ayfer Özgür (Stanford)</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 [2] <i>Mentor: Tsachy Weissman (Stanford)</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 [4] <i>Mentors: Sibiraj Pillai, Manoj M. Prabhakaran (IIT Bombay), 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

PUBLICATIONS AND PREPRINTS

- [1] **Securing Proof-of-Stake Nakamoto Consensus Under Bandwidth Constraint**
Joachim Neu*, **Srivatsan Sridhar***, Lei Yang*, David Tse, Mohammad Alizadeh
ACM Advances in Financial Technologies 2022
- [2] **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
- [3] **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
- [4] **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
- [5] **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.

TEACHING EXPERIENCE

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

SKILLS

Programming: Python, Typescript, C++, Java, Tensorflow, Pytorch
Software: MATLAB, Scilab, Eagle, Quartus
Hardware: Arduino, ATmega, 8085 microprocessor, analog circuits

RELEVANT COURSEWORK

Graduate-level EE courses: Information Theory, Convex Optimization, 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

OTHER PROJECTS

Sampling Arbitrary Latent Variable Distributions in an Autoencoder <i>Course Project : Deep Generative Models (Stanford University)</i> <ul style="list-style-type: none">Proposed an architecture combining autoencoders with flow networks and adversarial learningDemonstrated improved sample quality and smaller Frechet distance scores	Oct – Dec 2019
Digitally Programmable Analog Computer <i>Course Project : Electronic Design Lab (IIT Bombay)</i> <ul style="list-style-type: none">Designed an analog computer to solve linear dynamical systems in real-timeFabricated a prototype used for hardware-in-loop simulations in the power electronics lab	Jan – Apr 2018

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

*first author(s) with equal contribution