Muralikrishnan Srinivasan

Curriculum Vitae

+91-9940661976
+46-721893769
muraliksrin@gmail.com
mursri@chalmers.se

Research Interests

Physical Layer security, Machine learning, Deep Learning for Wireless systems, Integrated Next-Generation Networking, Unmanned Aerial Vehicles, Massive MIMO, Extreme value theory, Matrix models for generalized fading, Hypergeometric functions, Optical Interconnects

Current Research

- **Machine learning for Optical Interconnects**
  with **Dr. Henk Wymeersch**
  Dept of Electrical Engineering, Chalmers University of Technology, Gothenburg, Sweden
- **Physical-Layer Security for Beyond 5G**
  with **Dr. Arsenia (Ersi) Chorti**
  ETIS UMR8051, CY Université, ENSEA, CNRS, F-95000, Cergy
- **Air-corridors for Next-Generation Networking**
  with **Dr. Lajos Hanzo, Dr. Kamesh Namuduri and Dr. Sheetal Kalyani**

Doctoral Research

Generalized Fading Channels: Approximations, Asymptotics and Applications

Post-doctoral Experience

November 2020 to October 2021

Postdoctoral researcher - ETIS UMR8051, CY University, ENSEA, CNRS, F-95000, Cergy

December 2021 to current

Postdoctoral researcher - Electrical Engineering, Chalmers University of Technology, Gothenburg, Sweden

Work Experience

June 2012-June 2014

Alcatel-Lucent India Limited - Software Engineer

As a software test engineer, I performed system level testing of Alcatel-Lucent's product - ISAM 7302 - for various network protocols belonging to data-link layer for VDSL and ADSL technology.

Education

2015-2020 **Doctor of Philosophy**
Department of Electrical Engineering
Indian Institute of Technology, Madras

2014-2015 **Master of Technology**
Department of Electrical Engineering
Indian Institute of Technology, Madras

2008-2012 **Bachelor of engineering**
Electronics and Communication Engineering
College of Engineering, Guindy, Anna University

Publications

M. Srinivasan, S. Gopi, S. Kalyani, X. Huang, L. Hanzo, "Airplane-Aided Integrated Next-Generation Networking", in IEEE Transactions on Vehicular Technology, Early access, June 2021

A Subhash, M Srinivasan, S Kalyani, L Hanzo, "Transmit Power Policy and Ergodic Multicast Rate Analysis of Cognitive Radio Networks in Generalized Fading", in IEEE Transactions on Communications, vol. 68, no. 6, pp. 3311-3325, June 2020

M. Srinivasan and S. Kalyani, "Analysis of Outage Probability of MRC with $\eta - \mu$ co-channel interference," in *IEEE Transactions on Vehicular Technology*, vol. 69, no. 1, pp. 738-745, Jan. 2020

A. Subhash, M. Srinivasan and S. Kalyani, "Asymptotic maximum order statistic for SIR in κ–μ shadowed fading," in IEEE Transactions on Communications, vol. 67, no. 9, pp. 6512-6526, Sept. 2019.

S. Gupta, M. Srinivasan, Y. Lin, R. Zhang, S. Kalyani and L. Hanzo, "Performance Analysis of Device-to-Device Communication Underlaying Dense Networks (DenseNets)," in *IEEE Transactions on Vehicular Technology*, vol. 68, no. 9, pp. 9257-9266, Sept. 2019.

M. Srinivasan and S. Kalyani, "Analysis of Massive MIMO With Low-Resolution ADC in Nakagami- m Fading," in *IEEE Communications Letters*, vol. 23, no. 4, pp. 764-767, April 2019.

M. Srinivasan and S. Kalyani, "Analysis of Optimal Combining in Rician Fading With Co-Channel Interference," in *IEEE Transactions on Vehicular Technology*, vol. 68, no. 4, pp. 3613-3628, April 2019.

M. Srinivasan and S. Kalyani, "Secrecy Capacity of $\kappa - \mu$ Shadowed Fading Channels," in *IEEE Communications Letters*, vol. 22, no. 8, pp. 1728-1731, Aug. 2018.

Conference Publications

M. Srinivasan, A. Subhash and S. Kalyani, "Joint power and resource allocation for D2D communication with low-resolution ADC," 2019 53rd Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2019.

M. Srinivasan, S. Skaperas and A. Chorti, " On the Use of CSI for the Generation of RF Fingerprints and Secret Keys", at WSA 2021

M. Srinivasan, S. Skaperas, M. S. Herfeh, and A. Chorti, "Joint Localization-based Node Authentication and Secret Key Generation" at ICC 2022.

Works Under Review

M. Srinivasan, A. Chorti, M. Chafii, "Joint Power Control and Clustering in NOMA-enabled Cell-free Massive MIMO" SPAWC 2022.

Computer Skills

Intermediate	Python, Tensor Flow, Keras, C/C++
Expert	MATLAB, Mathematica, LaTeX

Other Works

M. Srinivasan and S. Kalyani, "Approximate Random Matrix Models for Generalized Fading MIMO Channels", arXiv preprint arXiv:1707.09734

S. Shekhar, M. Srinivasan, S. Kalyani, " Outage Probability of Uplink Cell-Free Massive MIMO Network with Imperfect CSI Using Dimension-Reduction Method", arXiv preprint arXiv:2101.07737

N. Nayak, T. Tholeti, M. Srinivasan, S. Kalyani, "Green DetNet: Computation and Memory efficient MIMO Detection", arXiv preprint arXiv:2003.09446

Teaching Assistant Experiences

Digital Modulation and coding, Estimation theory, Fundamentals of Wireless and Cellular communication, Probability theory, Linear Algebra, Information theory

Other Experiences

- Project officer from August 2020 to October 2020 - Algorithm development for improvement in tracking error and adaptive waveform selection for cognitive radar prototype - Dept. of Electrical Engineering, Indian Institute of Technology, Madras
- Member of work-group for standardisation of IEEE P1951.1 on smart cities - November 2020 to Current
- Member of IEEE INGR physical layer security focus group November 2021 to Current

References

Dr. Arsenia Chorti
Email arsenia.chorti@ensea.fr
Position Professor
Employer ETIS, UMR 8051, CY Paris University
ENSEA, CNRS, Cergy

Dr. Henk Wymeersch
Email henkw@chalmers.se
Position Professor
Employer Dept. of Electrical Engineering
Chalmers University of Technology

Dr. Sheetal Kalyani,
Email skalyani@ee.iitm.ac.in
Position Professor
Employer Department of Electrical Engineering
Indian Institute of Technology, Madras

Dr. Lajos Hanzo,
Email lh@ecs.soton.ac.uk
Position Chair of Telecommunications
Employer School of ECS, *Univ. of Southampton*

Social Media

Muralikrishnan Srinivasan
https://www.linkedin.com/in/muralikrishnan-srinivasan-09057752

ANNEXE

CURRENT RESEARCH

HOT-OPTICS project funded by the Swedish Foundation for Strategic Research (SSF).
The goal of the project is to develop optical interconnects (used in data centers, vehicles) with very high throughput and efficiency. The project builds on four leading groups from three departments at Chalmers. One of the objectives of the project is to investigate, implement, and evaluate deep machine learning approaches for component specific and end-to-end optimization and comparative study with conventional approaches.

PHEBE: "Physical-Layer Security for Beyond 5G" Funded by the Paris Seine Initiative
In fifth generation (5G), the flexible allocation of the infrastructure resources under the umbrella of network slicing, brings about the need for introducing quality of security (QoSec) guarantees in service level agreements. Incorporating context awareness in QoSec is projected to allow handle more efficiently aspects related to identifying the risk / threat level and the required security level. In this project, i) evaluation of the security level required in the framework of QoSec by accounting for context, is studied and, ii) physical layer security approaches that can be enabled by context awareness are investigated.

Air-corridors for Next-Generation Networking
with **Dr. Lajos Hanzo, Dr. Kamesh Namuduri, and Dr. Sheetal Kalyani**
Integrating the aerial networks with the terrestrial networks has the potential of increasing both the data rate and the coverage quality of terrestrial networks. Most of these contributions rely on reusing the existing long-term

evolution (LTE) bands, which are already congested in the sub-6GHz bands. The creation of a high-capacity integrated space terrestrial network (ISTN) or a space-air-ground integrated network (SAGIN) for air-corridors is still elusive due to the bandwidth limitation of aerial backbones and owing to the limited area spectral efficiency (ASE) of the air-to-ground (A2G) systems, given their large footprint on the ground. Therefore, a high-rate yet low-cost air-to-ground (A2G) communication backbone is conceived for integrating the space and terrestrial network by harnessing the opportunistic assistance of the passenger planes or high altitude platforms (HAPs) as mobile base stations (BSs) and millimetre wave communication.

DOCTORAL RESEARCH

Generalized fading models - Approximations, Asymptotics and Applications

The major part of my doctoral research focused on developing approximate random matrix models for generalized fading MIMO channels. These models are in terms of the well-studied Wishart matrix. Further, the utility of the results was demonstrated in a wide range of applications for multi-antenna wireless systems. As sub-part of my doctoral research, I worked on analyzing the order statistics and other performance metrics like secrecy capacity of generalized fading channels.