

Christo Kurisummoottil Thomas

LinkedIn : <https://www.linkedin.com/in/christo-k-thomas-436b6516/>

Research Profile: <http://www.eurecom.fr/en/people/kurisummoottil-thomas-christo>

Google Scholar: <http://www.linkedin.com/in/christo-k-thomas-436b6516/>

christokt@vt.edu

+16316406453

Nationality: Indian

OBJECTIVE

Driven by curiosity, a strong work ethic, and a penchant for continuous learning, I am actively seeking opportunities at the crossroads of machine learning and statistical signal processing, particularly in the realm of future wireless systems such as 6G. With approximately six years of experience in the semiconductor industry, I bring a diverse background encompassing hardware ASIC design, verification, and system engineering roles, specifically focusing on the development of physical layer algorithms. My diverse experience has equipped me with a versatile skill set that spans multiple domains and has demonstrated to be a quick learner, allowing me to bring a unique perspective and valuable insights to a wide range of academic/industrial research.

EDUCATION /ACADEMIC EXPERIENCE

Worcester Polytechnique Institute (WPI), Department of Electrical and Computer Engineering, Worcester, MA, USA

Tenure Track Assistant Professor, starting Aug. 2025

Leading Next-Generation Computing and Communication Research

Virginia Tech, Bradley Department of Electrical Engineering, Arlington, Virginia, USA

Postdoctoral Researcher with Prof. Walid Saad, NEWS@VT Lab,

Topic: Next-generation artificial intelligence (AI) for next-generation wireless networks. In particular, focusing on theoretical development of generative AI, causal machine learning, and neurosymbolic AI for building explainable, generalizable and adaptable semantic communications.

June 2022

- July 2025.

University of Illinois, Urbana-Champaign, USA

*Visiting Researcher at Coordinated Sciences Laboratory,
The Grainger College of Engineering*

Mar. 23 - Apr. 06, 2025.

EURECOM (Sorbonne University), France

PhD Student (Supervisor: Prof. Dirk Slock)

2017-2020, Graduation September 30, 2020

Thesis Committee composed of Prof. Martin Haardt (TU Ilmenau, Germany), Prof. Antti Tolli (University of Oulu, Finland), Prof. Merouane Debbah (Huawei, France), Prof. David Gesbert (EURECOM) and Prof. Laura Cottatellucci (FAU, Germany).

Indian Institute of Science (IISc), Bangalore, India

Master of Engineering, Telecommunication

2010-2012

Thesis (Supervisor: Prof. P Vijay Kumar): Signal Design Using Optics for PIR based Intruder Detection and Classification in Wireless Sensor Networks

National Institute of Technology, Calicut

*Bachelor of Technology, Electronics and Communication Engineering
2006-2010*

TECHNICAL SKILLS

Languages : Matlab, C++, C, VHDL, Verilog, System Verilog, Python, Tensorflow, Pytorch

Tools/Framework : Related to IC design - Spyglass – Lint and CDC, Power theatre for power analysis, SystemC, C to RTL using Forte Synthesizer, Verification methodologies OVM and UVM, Design Compiler, Vmanager, eplanner, AXI/OCP Protocol, TCL, ORAN, 3GPP Standards, Gitlab, JIRA.

Research Interests : Statistical Signal Processing and Machine Learning, Game Theory, Integrated Sensing and Communications, Compressed Sensing, Wireless Communications, Digital twin-based wireless networks, Semantic Communications, Fu-

ture Wireless (metaverse/XR/VR), Convex Optimization, Linear Algebra, AI/Machine Learning(ML) (Neuro-Symbolic Reasoning, Domain Invariant ML), Generative AI, Approximate Bayesian Inference Methods such as Variational Bayesian Inference/Belief Propagation, Causal ML, hyper-dimensional computing, Geometric Deep Learning, and Reinforcement Learning.

INDUSTRIAL EXPERIENCE

• Qualcomm Communication Technologies, Espoo, Finland, Staff Engineer, Modem Systems November 2020 - June 2022

Physical layer algorithm development for 5G NR base station devices. Knowledge and working experience in uplink channel estimation and beamforming for massive MIMO systems. Knowledge of 3GPP RAN specifications including LTE and 5G NR. Expert working knowledge in designing analog beamforming for mmWave systems.

• Broadcom Communications Private Ltd, Bangalore, India, Staff 2 , IC Design Team – 4G LTE modem (Mobile and Wireless Group) July 2012 - August 2014

a) Was part of the design team for 4G modem. Major responsibilities included design of Viterbi Decoder and Maximum Likelihood Detector blocks in the receiver datapath of the modem.

b) For the RTL design, I worked on the Lint and CDC analysis of the above blocks and the entire cellular modem core blocks.

c) Got an opportunity to evaluate the possibility of synthesizing the RTL for ML detector block directly from the C code (This was done using HLS tool by Forte).

d) I had also worked on the power analysis for the above blocks using power theatre.

e) Analysis and experiments to improve the area of the design.

f) I was involved in the verification of the viterbi decoder block. The coding was using system Verilog and could get to know and implement using OVM and UVM verification methodologies. The work involved coverpoint coding, regression and coverage closure.

g) Studied LTE Phy Standard and gave presentations to the team.

h) Studied on detail the Control Channel Accelerator (involving viterbi decoder, de-interleaver, de-ratamatching) and MLD and gave presentations to the team on these

• Intel Corporation (through acquisition of Lantiq) , Bangalore, IP Logic Design Engineer

Team – VDSL/G.Fast wired modem team (September 2014 - April 2017)

a) SystemC development of the FFT (Fast Fourier Transform) algorithm for the Virtual Prototype Development for the G.FAST . b) Took initiatives to come up with an optimized architecture for the IIR Filter design for the G.FAST system. The challenge involved with the G.FAST compared to VDSL systems is that they operate at 1Gbps compared to 200/300 for the VDSL systems. This involves rescheduling of most of the physical layer blocks in the VDSL modem. c) Owner of the RTL design for the module involving QAM and Trellis/ Viterbi decoder for the G.FAST system. This module included frequency domain equalization and power computations too. d) Understood the system level concepts well and came up with the architecture to meet the throughput requirement for G.FAST e) RTL designer for the FIR and IIR Filters in the time domain part of the physical layer modem. All these filters were new compared to the VDSL system and involved coding / design from scratch. f) Got Peer Recognition award from Intel for contribution in the Physical layer design activities for G.FAST

PROJECTS

B.tech project-Design of MIMO Transceiver architectures 2009-2010

Extraction, Compression and Storage of ECG signals. 2009

Fast Sparse Bayesian Learning using Learned Approximate Message Passing. Ongoing

RELEVANT COURSES

• Statistical Signal Processing • Probability Theory and Random Process • Fundamentals of optimization • Information Theory • Wireless Communications • Digital

Signal Processing • Digital Communication • Neural Networks and Deep Learning (Coursera) • Machine Learning for Wireless Communications

TEACHING ASSISTANT

Teaching Assistant for courses 1) Statistical Signal Processing, Fall 2017, 2018, 2019 and 2) Signal Processing for Communications, Spring 2018, 2019, 2020.

PROFESSIONAL MEMBERSHIPS

Institute for Electrical and Electronics Engineers (IEEE), Student Member (2017 – Present), Senior Member (2025-Present), IEEE Signal Processing Society (2017 – Present), IEEE Communications Society (2017 – Present), IEEE Vehicular Technology Society (2020 – Present).

PUBLICATIONS

Journal Papers

- Ratun Rahman, Dinh Nguyen, **Christo Kurisummoottil Thomas**, and Walid Saad, “Towards Heterogeneous Quantum Federated Learning: Challenges and Solutions”, Submitted to IEEE Network, May. 2025.
- Kitae Kim, Yan Kyaw Tun, Md. Shirajum Munir, **Christo Kurisummoottil Thomas**, Walid Saad, and Choong Seon Hong “Vision and Causal Learning Based Channel Estimation for THz Communications”, Submitted to IEEE Transactions on Mobile Computing, Mar. 2025.
- C. K. Sheemar, A. Mahmood, **Christo Kurisummoottil Thomas**, A. Alexandropoulos, J. Querol, S. Chatzinotas and Walid Saad, “Joint Beamforming and 3D Location Optimization for Multi-User Holographic UAV Communications”, Submitted to IEEE Transactions on Communications, , Jan. 2025.
- C. K. Sheemar, **Christo Kurisummoottil Thomas**, A. Alexandropoulos, J. Querol, S. Chatzinotas and Walid Saad, “Joint Holographic Beamforming and User Scheduling with Individual QoS Constraints”, Submitted to IEEE Transactions on Vehicular Technology, , Jan. 2025.
- **Christo Kurisummoottil Thomas**, Omar Hashash, Christina Chaccour and Walid Saad, “Next-Generation Artificial Intelligence (AI) for Next-Generation Wireless Networks: A Roadmap”, IEEE International Network Generations Roadmap (INGR), AI & ML Working Group, Oct. 2024.
- Anoop Anil, **Christo Kurisummoottil Thomas**, Kala S and Walid Saad, “Dual-mode Index Modulation based on Affine Frequency Division Multiplexing”, submitted to Physical Communication, Elsevier, Sep., 2024.
- Shengzhe Xu, **Christo Kurisummoottil Thomas**, Omar Hashash, Nikhil Muralidhar, Walid Saad, and Naren Ramakrishnan, “Large Multi-Modal Models (LMMs) as Universal Foundation Models for AI-Native Wireless Systems ”, IEEE Networks, Jul. 2024.
- Chengsi Liang, Yao Sun, **Christo Kurisummoottil Thomas**, Lina Mohjazi and Walid Saad, “Semantic Communication for the Internet of Sounds: Architecture, Design Principles, and Challenges”, submitted to IEEE Communications Magazine, available at arXiv preprint arXiv:2407.12203, Dec., 2024.
- **Christo Kurisummoottil Thomas**, Walid Saad, “Neuro-Symbolic Causal Reasoning Meets Signaling Game for Emergent Semantic Communications”, IEEE Transactions on Wireless Communications, vol. 23, no. 5, May, 2024.

- Anoop A, **Christo Kurisummoottil Thomas**, and Kala S, “Enhanced spatial modulation based orthogonal time frequency space system ”, IEICE Transactions on Communications, May. 2024.
- Walid Saad, Omar Hashash, **Christo Kurisummoottil Thomas**, Christina Chaccour, Merouane Debbah, Narayan B. Mandayam and Zhu Han, “Artificial General Intelligence (AGI)-Native Wireless Systems: A Journey Beyond 6G ”, To appear in Proceedings of IEEE, available at arXiv:2405.02336, 2025
- Mehdi Chehimi, Christina Chaccour, **Christo Kurisummoottil Thomas**, and Walid Saad, “Quantum Semantic Communications for Resource-Efficient Quantum Networking”, IEEE Communications Letters, vol. 28, no. 4, Apr. 2024.
- **Christo Kurisummoottil Thomas**, Christina Chaccour, Walid Saad, Merouane Debbah, and Cheon Soong Hong, “Causal Reasoning: Charting a Revolutionary Course for Next-Generation AI-Native Wireless Networks ”, IEEE Journal on Vehicular Technology Magazine, Mar., 2024.
- **Christo Kurisummoottil Thomas**, Walid Saad, Yong Xiao, “Causal Semantic Communication for Digital Twins: A Generalizable Imitation Learning Approach”, IEEE Journal on Selected Areas in Information Theory, vol. 4, Nov., 2023.
- Anup Mishra, Yijie Mao, **Christo Kurisummoottil Thomas**, Luca Sanguinetti, and Bruno Clerckx. “Mitigating Intra-Cell Pilot Contamination in Massive MIMO: A Rate Splitting Approach.” Accepted for IEEE Transactions on Wireless Communications, vol. 22, no.5, May. 2023.
- Chandan Kumar Sheemar, **Christo Kurisummoottil Thomas**, Dirk Slock, “Practical Hybrid Beamforming for Millimeter Wave Massive MIMO Full Duplex with Non Ideal Hardware”, IEEE Open Journal of Communications Society, January 2022.
- Parthapratim De., **Christo Kurisummoottil Thomas**, Markku Juntti, “Multi Stage Kalman Filter (MSKF) Based Time-Varying Sparse Channel Estimation with Fast Convergence”, IEEE Open Journal of Signal Processing (OJSP), December 2021, **Top accessed articles for OJSP during 2021-22.**
- Sai Subramanyam Thoota, Dolores Garcia Marti, Özlem Tuğfe Demir, Nuria González Prelcic, **Christo Kurisummoottil Thomas**, Rakesh Mundlamuri, Sameera Bharadwaja Hayavadana, Chandra R. Murthy, Marios Kountouris, Joan Palacios, Joerg Widmer, Cenk M. Yetis, Emil Björnson, Pontus Giselsson, “Site-Specific Millimeter-Wave Sparse Channel Estimation with Hybrid MIMO Architectures”, Accepted for publication to ITU Journal, Special issue on AI/ML solutions in 5G and future networks, February 2021.

Conference Papers

- **Christo Kurisummoottil Thomas**, Omar Hashash, Kimia Ehsani and Walid Saad, “Next-Generation Sustainable Wireless Systems: Energy Efficiency Meets Environmental Impact”, Submitted to IEEE International Conference on Communications, Jun. 2025.
- Andrew Neeser, **Christo Kurisummoottil Thomas**, Shengzhe Xu, Naren Ramakrishnan and Walid Saad, “Wireless Knowledge Grounding in Smaller LLMs using Retrieval Augmented Generation and Fine-Tuning”, Accepted to IEEE International Conference on Communications, Jun. 2025.

- Nasrin Gholami, Neda Moghim, **Christo Kurisummoottil Thomas**, and Sachin Shetty, “Flexible Resource Allocation for Semantic Communication in 6G Networks Based on User Requirements”, Submitted to IEEE International Conference on Communications, Jun. 2025.
- Zilu Zhao, Fangqing Xiao, **Christo Kurisummoottil Thomas**, and Dirk Slock, “Reconciling AMP Algorithms derived from Expectation Propagation or the Large System Limit Bethe Free Energy”, Accepted to Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Apr. 2025.
- Anoop Anil, **Christo Kurisummoottil Thomas**, and Kala S, “Affine Frequency Division Multiplexing With Quadrature Index Modulation”, Proceedings of IEEE Emerging Technologies for Intelligent Systems, Feb. 2025.
- **Christo Kurisummoottil Thomas** and Walid Saad, “Hypergame Theory for Decentralized Resource Allocation in Multi-user Semantic Communications”, In Proceedings of IEEE Conference on Decision and Control, Milan, Italy, Dec. 2024.
- Nitisha, Singh, **Christo Kurisummoottil Thomas**, Walid Saad and Emilio Calvanese Strinati, “On the Computing and Communication Tradeoff in Reasoning-Based Multi-User Semantic Communications”, Submitted to IEEE Wireless Communications and Networking Conference (WCNC), available at arXiv:2406.15199, Sep., 2024.
- **Christo Kurisummoottil Thomas** and Emilio Calvanese Strinati and Walid Saad, “Reasoning with the Theory of Mind for Pragmatic Semantic Communication”, In Proceedings of IEEE 21st Consumer Communications and Networking Conference (CCNC), Las Vegas, USA, Jan., 2024.
- **Christo Kurisummoottil Thomas** and Dirk Slock, “Towards Convergent Approximate Message Passing by Alternating Constrained Minimization of Bethe Free Energy”, Information Theory Workshop (ITW), Saint Malo, France, July, 2023.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Alternating Constrained Minimization based Approximate Message Passing”, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Rhodes Island, Greece, Jun., 2023.
- **Christo Kurisummoottil Thomas**, Walid Saad, “Reliable Beamforming at Terahertz Bands: Are Causal Representations the Way Forward”, In Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Rhodes Island, Greece, Jun., 2023.
- Rakesh Mundlamuri, Rajeev Gangula, **Christo Kurisummoottil Thomas**, Florian Kaltenberger, Walid Saad, “Sensing Aided Channel Estimation in Wideband Millimeter-Wave MIMO Systems”, In Proceedings of IEEE International Conference on Communications (ICC), Rome, Italy, Jun., 2023.
- **Christo Kurisummoottil Thomas**, Walid Saad, “Neuro-Symbolic Artificial Intelligence for Intent based Semantic Communication”, IEEE GLOBECOM, 2022.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Generalized swept approximate message passing based kalman filtering for dynamic sparse Bayesian learning”, IEEE European Signal Processing Conference (EUSIPCO), January 18-22, 2021, Amsterdam, The Netherlands (Virtual Conference).
- **Christo Kurisummoottil Thomas**, Rakesh Mundlamuri, Marios Kountouris, “Fast Sparse Bayesian Learning using Learned Approximate Message Passing”, IEEE International Conference SPAWC, Sep., 2021, Lucca, Italy.

- **Christo Kurisummoottil Thomas**, Dirk Slock, “Posterior variance predictions in sparse Bayesian learning under approximate inference techniques”, IEEE Asilomar Conference on Signals, Systems and Computers , Nov. 1-5, 2020, CA, Pacific Grove, USA (Virtual Conference).
- **Christo Kurisummoottil Thomas**, Bruno Clerckx, Luca Sanguinetti, Dirk Slock, ”A rate splitting strategy for mitigating intra-cell pilot contamination in massive MIMO”, ICC 2020, IEE International Conference on Communications, 7-11 June 2020, Dublin, Ireland (Virtual conference)
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Rate maximization under partial CSIT for multi-stage/hybrid BF under limited dynamic range for OFDM full-duplex systems”, IEEE 91st Vehicular Technology Conference (VTC-Spring), 25-28 May 2020, Antwerp, Belgium.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “BP-VB-EP based static and dynamic sparse Bayesian learning with Kronecker structured dictionaries”, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 04-08 May 2020, Barcelona, Spain.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Massive MIMO stochastic geometry and analysis of beamforming with partial CSIT”, 6G Wireless Summit, 17-20 March 2020, Levi, Finland.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Low complexity static and dynamic sparse Bayesian learning combining BP, VB and EP message passing”, Asilomar Conference on Signals, Systems and Computers , Nov. 2-5, 2019, CA, Pacific Grove, USA.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Convergence analysis of sparse Bayesian learning under approximate inference techniques”, Asilomar Conference on Signals, Systems and Computers , Nov. 2-5, 2019, CA, Pacific Grove, USA.
- Gopala Kalyana, **Christo Kurisummoottil Thomas**, Dirk Slock, “Sparse Bayesian learning for a bilinear calibration model and mismatched CRB”, EUSIPCO 2019, 27th European Signal Processing Conference, 2-6 September 2019, Coruna, Spain.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Weighted sum rate maximization for hybrid beamforming design in multi-cell massive MIMO OFDM systems”, EUSIPCO 2019, 27th European Signal Processing Conference, 2-6 September 2019, Coruna, Spain.
- **Christo Kurisummoottil Thomas**, Chandan Kumar Sheemar, Dirk Slock, “Multi-stage/hybrid BF under limited dynamic range for OFDM FD backhaul with MIMO SI nulling”, 16th International Symposium on Wireless Communication Systems, Workshop Full Duplex Radio Communications for 5G and Beyond (FDB5G), 27-30 August 2019, Oulu, Finland.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “A Massive MIMO Stochastic Geometry Analysis of Various Beamforming Designs with Partial CSIT”, The 13th Workshop on Spatial Stochastic Models for Wireless Networks (SpasWin), WiOpt 2019, June 07, Avignon, France.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Space alternating variational estimation and Kronecker structured dictionary learning”, International Conference on Acoustics, Speech and Signal Processing , May 12-17, 2019, Brighton, UK.
- **Christo Kurisummoottil Thomas**, Dirk Slock, “Massive MISO IBC reduced order zero forcing beamforming - a multi-antenna stochastic geometry perspective”, Interna-

tional Conference on Computing, Networking and Communications , February 18-21, 2019, Honolulu, Hawaii, USA.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Massive MISO IBC beamforming – a multi-antenna stochastic geometry perspective", IEEE Workshop on Emerging Technologies for 5G and Beyond Wireless and Mobile Networks (Globecom), 9-13 December 2018, Abu Dhabi, UAE.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "SAVED - Space Alternating Variational Estimation for Sparse Bayesian Learning with Parametric Dictionaries", Asilomar Conference on Signals, Systems and Computers , Oct. 29-31, 2018, CA, Pacific Grove, USA.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Space alternating variational Bayesian learning for LMMSE filtering", 26th European Signal Processing Conference (EUSIPCO), 3-7 September 2018, Rome, Italy.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Gaussian variational Bayes Kalman filtering for dynamic sparse Bayesian learning", International conference on time series and forecasting, 19-21 September 2018, Granada, Spain.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Hybrid beamforming design in multi-cell MU-MIMO systems with per-RF or per-antenna power constraints", IEEE 88th Vehicular Technology Conference (VTC-FALL), 27-30 August 2018, Chicago, USA.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Reduced-order zero-forcing beamforming vs optimal beamforming and dirty paper coding and massive MIMO analysis", 10th IEEE Sensor Array and Multichannel Signal Processing Workshop, 8-11 July 2018, Sheffield, UK.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Deterministic annealing for hybrid beamforming design in multi-cell MU-MIMO systems", 19th IEEE International Workshop on Signal Processing Advances in Wireless Communications, 25-28 June 2018, Kalamata, Greece. **Best Student Paper Award**

- **Christo Kurisummoottil Thomas**, Dirk Slock, "SAVE – Space alternating variational estimation for sparse Bayesian learning", IEEE Data Science Workshop, June 4-6, 2018, Lausanne, Switzerland.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Variational Bayesian learning for channel estimation and transceiver determination", Information Theory and Applications Workshop, 11-16 February 2018, Pacific Beach, San Diego, USA.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Mixed time scale weighted sum rate maximization for hybrid beamforming in multi-cell MU-MIMO systems", IEEE Workshop on Emerging Technologies for 5G and Beyond Wireless and Mobile Networks (Globecom), 4-8 December 2017, Singapore.

- **Christo Kurisummoottil Thomas**, Dirk Slock, "Noncoherent multi-user MIMO communications using covariance CSIT", Invited paper in Asilomar Conference on Signals, Systems, and Computers, October 29th-November 1st 2017, Pacific Grove, CA, USA.

- A. Chattopadhyay, R. Upadrashta, A. Bhattacharya, T. Choubisa, A. Krishna, V. S. Aswath, S. Vikas, **C. K. Thomas**, A. Rao, B. Dwivedi and S. V. R. Anand, "PIR-based WSN for outdoor deployment". In Proc. IEEE Int. Conf. on Wireless Commun. and Sensor Networks, 2012.

Poster Presentation

- **Christo Kurisummoottil Thomas**, Dirk Slock, “Low complexity static and dynamic sparse Bayesian learning combining BP, VB and EP message passing”, IEEE ISIT, July 7-12, Paris, France.

Research Blog

- IEEE Communications Society Young Professionals, invited blog - <https://yp.comsoc.org/handling-uncertainty-in-the-wireless-channel-a-bayesian-perspective/>

EDITORIAL RESPONSIBILITIES

Guest Editor (Main Topic Editor): Frontiers in Signal Processing Journal, under Research Topics titled ”Variational Inference for Bayesian Signal Processing and Neural Networks”

EDITED BOOKS

W. Saad, C. Chaccour, C. K. Thomas, and M. Debbah, “Foundations of Semantic Communication Networks”, Wiley-IEEE Press, Jan. 2025.

STUDENT SUPERVISIONS

Currently mentoring three PhD students, two master’s student and one undergraduate student at Virginia Tech, across the NEWS@VT lab and VT computer science department.

REVIEWS DONE

International Journals and Conferences

- **Journals:** IEEE Transactions on Signal Processing, IEEE Transactions on Wireless Communications, IEEE Journal on Selected Areas in Communication, IEEE Transactions on Communications, IEEE Signal Processing Letters, ETRI (Wiley), EURASIP Journal on Wireless Communications and Networking, IEEE Transactions on Machine Learning in Communications and Networking, IEEE Communications Magazine IEEE Signal Processing Magazine, and IEEE Internet of Things Journal,
- **IEEE Conferences:** SPAWC 2018-2020, ISWCS 2019, WiOpt 2019, VTC Fall 2019, VTC Spring 2019, PIMRC 2019, VTC Fall 2018, Globecom 2018-2023, ICASSP 2020, ICC 2022-2023 and miscellaneous.
- **TPC Member:** ISWCS 2019, VTC Fall 2023 (session on machine learning and AI for communications) and VTC Fall 2024 (Track: Machine Learning for Communications).

TALKS/ TUTORIALS

- Tutorial on ”Artificial General Intelligence (AGI)-Native Wireless Networks: Challenges and Opportunities”, jointly with Prof. Walid Saad and Omar Hashash, at IEEE Global Communications Conference (GLOBECOM), Capetown, South Africa, Dec. 2024.
- Invited talk on “What Unites AI, 6G, and Common Sense in Shaping Our Future?”, at DMV Tech Nexus: Cyber & AI Salon, DC Startup and Tech Week, Oct. 2024.
- Invited talk on “Next-Generation AI for Next-Generation Wireless Networks”, at Joint Event with Stevens Institute of Technology, NJ, USA, and IEEE TCCN Special Interest Group for AI & ML in Security Rising Star Symposium Series, Aug. 2024.
- Tutorial on “Variational Inference, (Not So) Approximate Bayesian Techniques, and Applications”, jointly with Prof. Dirk Slock, at IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Apr., 2024.
- Invited virtual talk on “Large Multi-Modal Models as Universal Foundation Models for AI-Native Wireless Systems”, at IEEE Future Networks Forum, Mar. 2024.
- Invited virtual talk on “Causal reasoning for wireless networks”, at Institute for Communication and Information Systems, University of Surrey, UK, Dec. 2023.
- Invited virtual talks on ”Causal Reasoning: Charting a Revolutionary Course for Next-Generation AI-Native Wireless Networks”, at Ericsson research, worldwide, Nov. 2023

- Invited virtual talk on "Causal reasoning and neurosymbolic AI based semantic communications" at Nokia Bell Labs, France, Oct. 2023.
- Invited talk on "Reasoning Foundations for Semantic Communications", at WIoT, Northeastern University, Oct. 2023.
- Tutorial on "Variational Inference, (Not So) Approximate Bayesian Techniques, and Applications", jointly with Prof. Dirk Slock, at IEEE European Signal Processing Conference (EUSIPCO), Sep., 2023.
- Invited talk on "Semantic Communications", at CEA-LETI, Grenoble, France, Aug. 2023.
- Invited talk on "Semantic Communications", at IEEE Twenty-Ninth National Conference on Communications, Guwahati, India, Jan., 2023.
- GdR ISIS (Organisation of Researchers in France) Virtual Conference on Tensor Decompositions: "Approximate Inference based Static and Dynamic Sparse Bayesian Learning with Kronecker Structured Dictionaries", May 27, 2020.
- IEEE Innotech Talk, Topic: "Signal Processing and Communication : Bridging the gap between theory and practice", at AWH Engineering College, Calicut, Kerala, India, Nov. 2016.

TECHNICAL SESSIONS ORGANIZATION

- Workshop co-chair at IEEE Wireless Communications and Networking Conference (WCNC), titled "Semantic Communications for Future Wireless Networks", to be held at Glasgow, Scotland, UK, Mar. 2023.
- Special session co-chair at IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), titled "Variational Inference and Approximate Bayesian Technique", to be held at Rhodes Island, Greece, Jun. 2023.

PROPOSALS FUNDING

- Awarded \$100K for Project Proposal on "Adaptive Intrusion Detection IIT Networks Using LLM-Driven Behavioral Analysis and Deep Reinforcement Learning", by Commonwealth Cyber Security Institute (CCI), Jan. 2025, Role: Co-PI.
- Project Proposal on "Advancing Visual Expertise and Computational Identity among the Future Workforce through Vision Language Models and Neurosymbolic AI", submitted to NSF Edu:Core, Oct. 2024, Role: Co-PI.
- Project Proposal "Preliminary Proposal: Center for Connected and Augmented Intelligence for Resilient Workplaces", submitted to NSF Engineering Research Institute (ERC), Sept. 2024, Role: Senior Personnel.
- Project Proposal "Preliminary Proposal: Center for Connected and Augmented Intelligence for Resilient Workplaces", submitted to NSF Engineering Research Institute (ERC), Sept. 2024, Role: Co-PI.
- Project Proposal for AI research institute submitted to NSF, with the theme "I-ENSURE: An Institute for Explainable, geNeralizable, SUstainable, and REsilient Foundation Models in Engineering Systems", a collaborative institute between Virginia Tech, the University of Maryland, Princeton University, and the University of Miami, Jan. 2024, Role: Senior Personnel.
- Project Proposal on "Explainable and Generalizable Wireless Foundation Models for Resilient Wireless Networking", submitted to Amazon, Oct. 2023, Role: Co-PI.
- Project Proposal on "Semantic Wireless Communications for 6G" selected as rank 1 for science impulse challenge conducted by CEA France, <https://scienceimpulse.cea.fr/>.
- Proposal on the Topic: "Optical signal processing based adaptive RF beamforming technology", was awarded funding by HIRP OPEN, Huawei, 2018.
- Proposal on the tentative topic: "Resilient wireless networks integrating LLMs and cyber physical systems" under preparation to national science foundation (NSF) cyber physical systems program (<https://new.nsf.gov/funding/opportunities/cyber-physical-systems-cps>). Submission planned towards end of the year 2023, Role: Co-PI.
- Proposal on "Wireless Networks with Human-in-the-Loop: AI-Native System Design and Quality-of-Physical Experience", submitted to Interdigital, Aug. 2023.

AWARDS

- Best Student Paper Award at IEEE SPAWC, 2018 for the paper titled, "Determin-

istic annealing for hybrid beamforming design in multi-cell MU-MIMO systems”.

- Sai S. Thootla, Rakesh Mundlamuri, Chandra R Murthy, **Christo Kurisummoottil Thomas**, Sameera Bharadwaj H, Marios Kountouris, Third Prize for our team “Learned Chester”, ML5G-PHY [channel estimation] challenge, which is part of the ITU Artificial Intelligence/Machine Learning in 5G Challenge, NCSU, United States, October 2020.
- Travel Grants for attending the conferences IEEE SPAWC 2018 and IEEE Data Science Workshop 2018.
- Postdoc travel award for attending and delivering a tutorial at IEEE EUSIPCO 2023.
- All India Rank 26 (out of 6,00,000 students) - Graduate Aptitude Test in Engineering (GATE), Year 2010.
- Kerala State Rank 15 (out of 4,50,000 students) - High School (10th Grade) exam (SSLC), Year 2004

PATENTS

Devarakonda, Murti, Rainer Strobel, Christo Thomas, and Puneet Bhatia. “Efficient extension to viterbi decoder for tcm encoded and non-linear precoded inputs.” U.S. Patent number US11038623B2, Publication on Jun., 2021.

COLLABORATIONS in RESEARCH

- Prof. Walid Saad, Virginia Tech, USA.
- Prof. Dirk Slock, EURECOM, France.
- Prof. Marios Kountouris, EURECOM, France.
- Prof. Bruno Clerckx, Imperial College, London, UK.
- Prof. Luca Sanguinetti, University of Pisa, Italy.
- Prof. Henk Wymeersch, Chalmers University, Sweden.
- Prof. Chandra R Murthy, IISc, Bangalore, India.
- Dr. Emilios Calvanese Strinati, CEA Leti, France.
- Prof. Yingbin Liang, Ohio State University, USA.
- Dr. Rajeev Gangula, Northeastern University, Boston, USA.
- Prof. Yong Xiao, Huazhong University of Science and Technology, Wuhan, China.
- Prof. Mérouane Debbah, Technology Innovation Institute, Abu Dhabi, UAE.
- Prof. Naren Ramakrishnan, Virginia Tech, USA.
- Dr. Nikhil Muralidhar, Stevens Institute of Technology, USA.
- Prof. Florian Kaltenberger, EURECOM, France.
- Prof. Koduvayur Subbalakshmi, Stevens Institute of Technology, USA.
- Prof. Kamesh Namuduri, University of North Texas, USA.
- Dr. Neda Moghim, Old Dominion University, USA.