

Shantanu Rane

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About

I lead a research group dedicated to improving the security and privacy of cyber-physical systems. My expertise is in the areas of applied cryptography and signal processing.

Professional Experience

2014 –	Palo Alto Research Center (PARC)
2017 –	Research Area Manager
2014 – 17	Senior Member Research Staff
2007 – 14	Mitsubishi Electric Research Labs (MERL)
2010 – 14	Principal Research Scientist
2007 – 10	Research Scientist

Education

2007	Ph.D., Electrical Engineering Stanford University, GPA 3.72
2001	M.S., Electrical Engineering University of Minnesota, GPA 3.93
1999	B. E., Instrumentation Engineering University of Pune, India, Rank 1/360

Publication Record

# papers	78
# patents	42
# cites	> 5000 (as of June 2020)
h-index	31
i10-index	60

Grants

2017 – 22	\$3,500,000, DARPA Configuration Security Project: Secure Configurations for the IoT Based on Optimization and Reasoning on Graphs. (Co-PI)
2019 – 21	\$1,000,000, DARPA QED for RML, Project: Ikebana: Robust Arrangements of Classifiers in Version Space. (PI)
2017 – 19	\$200,000, DHS, Project in collaboration with Rutgers University: Differentially Private Anomaly Detection (DPAD) Phase II and III. (Subcontract PI)

Key Projects

2019 – PARC	Machine Learning Security: Research on understanding the role of adversarial examples against neural networks, and crafting defenses against them. 2019 PARC Excellence Award.
2018 – PARC	Distributed System Security: Developing approaches to optimize the security and functionality of large composed systems, using multilayer graphs and Satisfiability Modulo Theory (SMT) solvers.
2017 – 19 PARC	Differential Privacy: Research on privacy-aware training of active machine learning algorithms, and the associated tradeoffs among privacy, accuracy, speed, scalability.
2014 – 16 PARC	Privacy-preserving analytics: Use of homomorphic encryption and secure multiparty computation for aggregate analytics on encrypted data. 2015 PARC Exceptional Achievement Award.
2009 – 14 MERL	Secure computation: Research on using approaches from signal processing and cryptography for nearest neighbor computations over sensitive data. 2010 MERL Directors Award.
2008 – 14 MERL	Secure Biometrics: Fundamental and applied research on biometric template

protection. US National Body delegate in the ISO/IEC JTC1 SC37 Biometrics Subcommittee. Editor of working draft of international standard for evaluation of template protection schemes.

2009 – 12
MERL **SAR Compression:** Developed a SAR raw data compression scheme for a successful Mitsubishi Electric contract for onboard compression module of Advanced Land Observations Satellite (ALOS-2), launched by JAXA in 2014.

2001 – 07
Stanford **Error-resilient video transmission:** Thesis work on Systematic Lossy Error Protection (SLEP) based on distributed source coding. Included theoretical analysis, video modeling, H.264/AVC implementation.

Professional Activities

2018 –
2012 – 15 Associate Editor, IEEE Transactions on Information Forensics and Security.

2012 – 14 Associate Editor, IEEE Signal Processing Letters.

2014 Technical Co-Chair, IEEE Workshop in Information Forensics and Security.

2009 – 20 Technical program committee member and area chair for several conferences.

2011 – 13 Elected member of IEEE Information Forensics and Security Technical Committee.

2012 Elevated to Senior Member IEEE.

Selected Publications

2005 B. Girod, A. Aaron, S. Rane, and D. Rebollo-Monedero, Distributed Video Coding, Proceedings of the IEEE.

2010 M. Pathak, S. Rane, and B. Raj, Multiparty Differential Privacy via Aggregation of Locally Trained Classifiers, Neural Information Processing Conference.

2013 S. Rane and P. Boufounos, Privacy-Preserving Nearest Neighbors, IEEE Signal Processing Magazine.

2017 P. Boufounos, S. Rane and H. Mansour, Representation and Coding of Signal Geometry, Information and Inference.

2020 H. Soroush, M. Albanese, M. A. Mehrabadi, I. Iganibo, M. Mosko, J. Gao, D. Fritz, S. Rane and E. Bier, SCIBORG: Secure Configurations for the IoT Based on Optimization and Reasoning on Graphs, IEEE Conference on Networking and Security.

2020
accepted D. Bittner, A. Brito, M. Ghassemi, S. Rane, A. Sarwate and R. Wright, Understanding Privacy-Utility Tradeoffs in Differentially Private Online Active Learning, Journal of Privacy and Confidentiality.

Selected Talks

2018 **Keynote:** A Cyber-Physical Systems Perspective on Biometric Security and Privacy, IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS), Los Angeles, CA.

2015 **Tutorial:** Privacy-Aware Data Analytics, IEEE International Workshop on Information Forensics and Security, Rome, Italy.

2015 **Keynote:** Building Privacy-Aware Computing Systems, High Confidence Software Systems Conference, Annapolis, MD.

2013 **Tutorial:** Secure Biometrics: Concepts, Architectures and Challenges, IAPR International Conference on Biometrics, Madrid, Spain.