SACHIN SHETTY

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EDUCATION

Ph.D. in Modeling and Simulation	Old Dominion University	2007
M.S. in Computer Science	University of Toledo	2002
B.E. in Computer Engineering	Mumbai University	1998

PROFESSIONAL EXPERIENCE

Associate Professor — 2016 - present
Virginia Modeling, Analysis and Simulation Center
Modeling, Simulation and Visualization Engineering Department
Old Dominion University

Associate Professor — 2015 - 2016
Electrical and Computer Engineering Department, Tennessee State University

Engineer — 2015 - 2018
Expeditionary Electronic Warfare Systems Division,
Naval Surface Warfare Center, Crane

Assistant Professor — 2009 - 2015
Electrical and Computer Engineering Department, Tennessee State University

Assistant Professor — 2008 - 2009
Electrical and Computer Engineering Department, Rowan University

Adjunct Professor — 2007 - 2008
Electrical and Computer Engineering Department, Old Dominion University

EXECUTIVE SUMMARY

Research

1. Awarded over $12 M in contracts and grants from Air Force Research Lab (AFRL), Air Force Office of Scientific Research (AFOSR), Boeing, Department of Homeland Security (DHS), Department of Energy (DOE), National Science Foundation (NSF), Naval Surface Warfare Center (NSWC), and Office of Naval Research (ONR).
2. Partnering member in Department of Defense (DoD) Center of Excellence in Cyber security, DHS Center of Excellence in Critical Infrastructure Resilience and Department of Energy (DOE) Cyber Resilient Energy Delivery Consortium.
3. Awarded 3 DHS Scientific Leadership Award (SLA) grants (2010, 2011 and 2014) in the area of cloud security, IP geolocation, smartphone security, cyber security risk assessment, and moving target defense.
4. Founding Director of the Cyber Security Laboratory at the TSU Interdisciplinary Graduate Engineering (TIGER) Institute.
5. Published over 140 articles in journals, conferences, book chapters and books.
6. Hold a secret clearance and a dual appointment as an engineer with the Naval Surface Warfare System (NSWC), Crane Indiana. I am working on projects in the areas of cyber physical system security and exploitation (CPSS/CPSE).
7. Led the development of CRADA between CRANE and ODU to implement projects in CPSS/CPSE.
8. Established two experimental testbeds, private cloud data center and mobile cyber physical system, to support cyber security research at TSU.
9. Awarded summer faculty research appointment in the area of cyber security at Argonne National Lab (2009), Air Force Research Lab, Rome, NY (2010-2013) and Naval Surface Warfare Center, Crane, Indiana (2015).

Education

1. Taught undergraduate and graduate courses at TSU and won College of Engineering Teaching Excellence award
2. Awarded multiple education grants from NSF and ONR to enhance quality of TSU's undergraduate and graduate curriculum
3. NSF funded education software in virtual reality currently used by high school students in Tennessee.
4. Integrated biometrics, cloud security, embedded systems, and mobile security concepts, techniques and laboratory experiences within undergraduate and graduate curriculum
5. Advised 50+ u/g students for capstone/senior-design projects and internship/research experiences.
6. Organized and participated in workshops to train high school teachers and students in cyber security and virtual reality
7. Member of the Stratford High School, Computer Simulation and Game Programming Task Force to help in development of gaming laboratory.

HONORS AND AWARDS

1. 2016 TSU Million Dollar Club
2. 2015 NSWC Summer Faculty Research
3. Three time winner of the TSU Faculty Research Mentorship Award (2013, 2014, 2015)
4. 2012 TBR Research Academy Fellow
5. 2011 Ida McClain Award (College of Engineering, TSU)
6. 2010 NSF/DoE FaST (Faculty Student Team) Fellowship
7. 2011 - 2013 AFRL, Rome Visiting Faculty Fellowship

GRANTS and CONTRACTS

Summary

Total Funding - $12,056,,441
Primary Funding Agencies – AFOSR, AFRL, DHS, DOE, NSF, ONR, NSWC, Boeing,
Amazon, Sentara Healthcare, Commonwealth of Virginia and TBR
Staff Supported – 5 Research Scientists and 3 Visiting Scholars
Graduate Students Supported – 35
Undergraduate Students Supported – 85

Awards

1. **PI, "**Cyber Risk Scoring and Mitigation ", Commonwealth Research Commercialization Fund, $100,000, 7/1/2018 - 6/30/2019.
2. **PI, "**Networked Device Identity Management using Blockchain ", $767,000, Sentara Healthcare, 1/1/2018 - 12/31/2021.
3. **PI**, "Data provenance Assurance in Cloud using Blockchain," AFRL, $900,000, 08/18/2016 - 9/30/2019
4. **Co-PI**, "Towards Community Resilience through Comprehensive Risk Assessment for Business Continuity ", DHS Critical Infrastructure Resilience Infrastructure, $256.505, 7/24/2016 - 6/30/2018.
5. **PI**, "CC*DNI Campus Design: Internet2 Infrastructure to Enable Research in Big Data Science and Engineering at Tennessee State University," NSF, $349,144, 01/01/2016 - 12/31/2017
6. **PI,** "Distributed machine learning for anomaly detection in massive datasets", Boeing Contract, $450,000, 1/1/2016 - 12/31/2018.
7. **PI**, "Defenses and countermeasures of jamming attacks in wireless mesh networks", NEEC Contract, $449,934, 3/14/2016 - 3/13/2019.
8. **PI**, "Analyzing and Supporting the Development of the Cyber-insurance Market as a Market-Based Solution for Cyber Resiliency Project ", DHS Critical Infrastructure Resilience Infrastructure Subcontract, $130,000, 7/1/2015 - 6/30/2017.
9. **Co-PI**, "Cyber Resilient Energy Delivery Consortium", DOE (Oct 2015 – Sep 2020, $930,000, Consortium comprises of 11 universities and national laboratories led by University of Illinois)
10. **PI**, "Embedded Systems Security Education", ONR (August 2015 – July 2018, $599,800)

11. **Co-PI**, "Center of Excellence in Cyber Security", AFRL (April 2015 – March 2020, $4, 984,352)
12. **Co-PI**, "Center of Excellence in Critical Infrastructure Resiliency", DHS (July 2015 – June 2020, Multi-university Center of Excellence funded by Department of Homeland Security and headed by University of Illinois.)
13. **Co-PI**, "Blue-Shirt Program: Engineering Clinic-Based Curriculum", NSF (July 2015 – June 2019, $1,724,880).
14. **Co-PI**, "Data Analytics for Securing Critical Infrastructure", DHS (October 2014 - September 2020, $1,000,000)
15. **PI**, "Collaborative Research: II-NEW: ROAR- A Research Infrastructure for Real-time Opportunistic Spectrum Access in Cloud based Cognitive Radio Networks", NSF CNS (August 2014- July 2017, $88,119)
16. **PI,** "Adaptive Access control for Smartphone Cloud," AFRL/Clarkson, (Oct 2012 – Sep 2018, $700,000)
17. **PI,** "Collaborative Project: Building An Innovative Smartphone Virtual Laboratory Environment for Cyber-security Education and Training," NSF, (August 2013 – July 2016, $93,093)
18. **PI**, "Development of an agile and resilient security architecture to protect embedded systems from emerging cyber threats," Boeing, (Oct 2012 – Oct 2015, $422,290).
19. **Co-PI**, "Heterogeneous VM Replication: A New Approach to Intrusion Detection, Active Response, and Recovery in Cloud Data Centers," AFOSR, (Feb 2012 – Jan 2015, $616,278).
20. **PI**, "Amazon Web Services Grant," Amazon, (Feb 2012 – Jan 2013, $1200).
21. **PI,** "Scholarships for Preparing the Global Engineer for Tomorrow's Workforce," NSF, (July 2013 – June 2014, $600,000)
22. **PI**, "Collaborative Cyber Attack Data Capturing, Sharing and Analysis for Cloud Security," AFOSR, (Oct 2011 – Sep 2012, $19,717 (subcontracted from UTSA)).
23. **PI**, "Secure Measurement-Based IP Geolocation for Cloud Auditing," NSF, (Aug 2011 – July 2015, $238,835).
24. **PI**, "2011 DHS Scientific Leadership Award," DHS, (Aug 2011 – Jul 2016, $500,000).
25. **PI**, "Collaborative Research: TUES: Vertical Integration of Concepts and Laboratory Experiences in Biometrics Across the Four Year Electrical and Computer Engineering Curriculum," NSF, (Oct 2011 – Sep 2015, $131,080).
26. **Co-PI**, "Cyber Security Education and Research Training for ECE and CS programs," NSF, (Aug 2011 – July 2014, $299,805).
27. **PI**, "2010 DHS Scientific Leadership Award," DHS, (Feb 2011 – Jan 2016, $301,659).
28. **Co-PI**, "Development of a Virtual and Augmented Reality Laboratory for Research and Education at Tennessee State University," NSF, (Aug 2010 – July 2013, $299,577).
29. **Co-PI**, "CI-TEAM Demonstration: Interactive and Collaborative Learning Environment using Virtual Reality Games Promoting Metacognition for Science and Engineering Design in Context," NSF, (Sep 2010 – Aug 2013, $250,000).
30. **Co-PI**, "Tennessee Rising Stars," TBR, (Jul 2010 – Jun 2013, $125,000).
31. **Co-PI**, "Empowering Students with Engineering Literacy and Systematic Problem Solving through Interactive and Cost-Effective Games," NSF, (Sep 2009 – Aug 2009, $200,000).
32. **Co-PI**, "Intuitive Flowmeter Sizing Software," Siemens, (August 2008 – Jul 2009, $30,000)

PUBLICATIONS (2009-2018)

Book

1. Sachin Shetty, Charles Kamhoua, Laurent Njilla, "Blockchain for Distributed Systems Security", Wiley-IEEE Computer Scoeity, 1 edition, March 2019
2. Sachin Shetty, Xuebiao Yuchi and Min Song, "Moving Target Defense for Distributed Systems," Springer, ISBN 978-3-319-31031-2, April 2016
3. D. B. Rawat, M. Song, and Sachin Shetty, ""Dynamic Spectrum Access for Wireless Networks," SpringerBriefs of Electrical and Computer Engineering, ISBN 978-3-319-15298-1 Springer Verlag, 2015

Journal

1. Xueping Liang, Sachin Shetty, Deepak Tosh, Peter Foytik, Lingchen Zhang, "A Reliable Data Provenance and Privacy Preservation Architecture for Business-Driven Cyber-Physical Systems Using Blockchain", International Journal of Information Security and Privacy, 2018 (Accepted)
2. Xueping Liang, Sachin Shetty, Deepak Tosh, Peter Foytik, Lingchen Zhang, "Leveraging Intel SGX to Enable Trusted and Privacy Preserving Membership Service in Distributed Ledgers", International Journal of Information and Computer Security, 2018 (Accepted)
3. Hellen Maziku, Sachin Shetty, David Nicol, "Security Risk Assessment for SDN-enabled Smart Grids", Computer Communications, 2018 (Accepted)
4. Sachin Shetty, Michael McShane, Linfeng Zhang, Jay Kesan, Charles A. Kamhoua, Kevin Kwiat, Laurent Njilla, "Reducing Informational Disadvantages to Improve Cyber Risk Management", Geneva Risk and Insurance Review, Feb 2018
5. Sai Kiran Mukkavilli, Sachin Shetty and Liang Hong, "Generation of Labelled Datasets to Quantify the Impact of Security Threats to Cloud Data Centers", Journal of Information Security, 2016.
6. Ashraf Al Sharah, Taiwo Oyedare, and Sachin Shetty, "Detecting and Mitigating Smart Insider Jamming Attacks in MANETs Using Reputation-Based Coalition Game," Journal of Computer Networks and Communications, vol. 2016, Article ID 4289176, 13 pages, 2016. doi:10.1155/2016/4289176
7. L. J. Rodriguez, N. H. Tran, T. Q. Duong, T. Le-Ngoc, M. Elkashlan, and Sachin Shetty, "Physical Layer Security in Wireless Cooperative Relay Networks: State-Of-The-Art and Beyond," *IEEE Commun. Magazine*, vol. 53, pp.32-39, December 2015.
8. A. D. Le, S. Herath, N. H. Tran, T. Q. Duong, and S. Shetty, "Achievable Rates and Outage Probability of Cognitive Radio with Dynamic Frequency Hopping Under Imperfect Spectrum Sensing", *IET Commun.*, vol. 9, pp. 2160-2167, November 2015.
9. Biswajit Biswal, Sachin Shetty, and Tamara Rogers " Enhanced Learning Classifier to Locate Data in Cloud Datacenters", International Journal of Metaheuristics
10. Danda Rawat, Sachin Shetty and Chunsheng Xin , "Stackelberg Game based Dynamic Spectrum Access in Heterogeneous Wireless Systems," IEEE Systems Journal, 2014.
11. Danda Rawat, Sachin Shetty and Khurram Raza, "Geolocation-aware Resource Management in Cloud Computing Based Cognitive Radio Networks", Special Issue on Information Assurance and System Security in Cloud Computing, International Journal of Cloud Computing, 2013

12. Bhed Bahadur Bista, Danda Rawat, Sachin Shetty and Gongjun Yan, "Waiting Probability Analysis for Opportunistic Spectrum Access", International Journal of Adaptive and Innovative Systems, 2013.
13. Sachin Shetty, Meena Thanu, Ravi Ramachandran, "Cognitive Radio: Primary User Emulation Attacks and Remedies", Journal of Recent Patents on Computer Science, Special Issue on Recent Advances in Cognitive Radio Communications, Bentham Science Publishers Ltd., Vol. 5, No 2, 2012
14. Ying Tang, David Carbonetta, Sachin Shetty, "Development of an Integrated Network Visualization and Graph Analysis Tool for Biological Networks", Int. J. Computational Biology and Drug Design, June 2012
15. Gayathri Shivaraj, Min Song and Sachin S. Shetty, "Using Hidden Markov Models to detect Rogue Access Points", *Security and Communication Networks*, Volume 3, Issue 5, pages 394–407, October 2010.
16. Sachin S. Shetty, Ying Tang and William Collani, "A Cross-Layer Packet Loss Identification Scheme to Improve TCP Veno Performance", *International Journal of Computer Networks*, Volume 1, Issue 1, pages 36-45, November 2009
17. Sachin Shetty, Min Song, Youjun Yang, and Mary Mathews, "Learning Bayesian Network over Distributed Databases Using Majority-based Method", *Journal of Computational Methods in Science and engineering* , Volume 9 Issue 1,Pages 53-68, April 2009.

Book Chapter

Sachin Shetty and Danda Rawat, "Cloud Computing based Cognitive Radio Networking", Cognitive Radio Technology Applications for Wireless and Mobile Ad hoc Networks, Book Chapter, IGI, 2013.

Conference

1. Md Ariful Haque, Gael Kamdem De Teyou, **Sachin Shetty**, Bheshaj Krishnappa, "Cyber Resilience Framework for Industrial Control Systems: Concepts, Metrics, and Insights", IEEE Intelligence and Security Informatics (ISI), Miami FL, November 8 - 10, 2018
2. Sharif Ullah, Sachin Shetty, Amin Hassanzadeh, "Towards Modeling Attacker's Opportunity for Improving Cyber Resilience in Energy Delivery Systems", Resilience Week, Denver August 2018.
3. Asmah Muallem, Sachin Shetty, Liang Hong, Jan Wei Pan, "TDDEHT: Threat Detection Using Distributed Ensembles of Hoeffding Trees on Streaming Cyber Datasets", Milcom, Los Angeles, October 2018.
4. Deepak Tosh, Sachin Shetty, Peter Foytik, Laurent Njilla, Charles Kamhoua, "Blockchain Empowered Secure Internet-of-Battlefield Things (IoBT) Architecture", Milcom, Los Angeles, October 2018.
5. Kamrul Hasan, Sachin Shetty, Amin Hassanzadeh, Malek Ben Salem, Jay Chen, "Self-Healing Cyber Resilient Framework for Software Defined Networking-enabled Energy

Delivery System", IEEE Conference on Control Technology and Applications (CCTA), Copenhagen, Denmark, August 2018 (Invited Paper).

6. Kamrul Hasan, Sachin Shetty, Amin Hassanzadeh, Malek Ben Salem and Jay Chen "Modeling Cost of Countermeasures in Software Defined Networking-enabled Energy Delivery System," IEEE Conference on Communications and Network Security (CNS) 30 May-1 June 2018, Beijing China

7. Marco Gamarra, Sachin Shetty, Oscar Gonzalez, David Nicol, Charles A. Kamhoua, Laurent Njilla, "Analysis of Stepping Stone Attacks in Dynamic Vulnerability Graphs," IEEE International Conference on Communications (ICC) 20-24 May 2018, Kansas City, MO, USA

8. Deepak Tosh, Sachin Shetty, Peter Foytik, Charles Kamhoua, Laurent Njilla, "CloudPoS: A Proof-of-Stake Consensus Design for Blockchain Integrated Cloud", IEEE International Conference on Cloud Computing (Cloud 2018), July 2-7, 2018, San Francisco, CA, USA, August 2018 (Acceptance ratio: 15 %)

9. Xueping Liang, Sachin Shetty, Deepak Tosh, Yafei Ji, Danyi Li, "Towards a Reliable and Accountable Cyber Supply Chain in Energy Delivery System using Blockchain", 14th EAI International Conference on Security and Privacy in Communication Networks (SecureComm), August 2018 (Acceptance ratio: 30.5%=33/108)

10. Hellen Maziku, Sachin Shetty, Dong Jin, Charles A. Kamhoua, Laurent Njilla, Kevin Kwiat, "Diversity Modeling to Evaluate Security of Multiple SDN Controllers," 2018 International Conference on Computing, Networking and Communications (ICNC): Communications and Information Security Symposium - Communications and Information Security, Maui, Hawaii, March 5-8, 2018

11. Xueping Liang, Sachin Shetty, Juan Zhao, Daniel Bowden, Danyi Li and Jihong Liu, "Towards Decentralized Accountability and Self-Sovereignty in Healthcare Systems," The 19th International Conference on Information and Communications Security (ICICS 2017), Beijing, China, Dec 2017

12. Xueping Liang, Sachin Shetty, Deepak Tosh, Peter Foytik and Lingchen Zhang, "Towards a Trusted and Privacy Preserving Membership Service in Distributed Ledger using Intel Software Guard Extensions," The 19th International Conference on Information and Communications Security (ICICS 2017), Beijing, China, Dec 2017

13. Deepak Tosh, Sachin Shetty, Xueping Liang, Charles A. Kamhoua, Laurent Njilla, "Consensus Protocols for Blockchain-based Data Provenance: Challenges and Opportunities," 2017 IEEE 8th Annual Ubiquitous Computing, Electronics and Mobile Communication Conference (UEMCON) (Short Paper), NY, October 19-21, 2017

14. Deepak Tosh, Iman Vakilinia, Sachin Shetty, Shamik Sengupta, Charles A. Kamhoua, Laurent Njilla, Kevin Kwiat , "Three Layer Game Theoretic Decision Framework for Cyber-Investment and Cyber-Insurance," GameSec 2017, 8th Conference on Decision and Game Theory for Security, Vienna, Austria, October 23-25, 2017

15. Xueping Liang, Juan Zhao, Sachin Shetty, Jihong Liu, Danyi Li, "Integrating Blockchain for Data Sharing and Collaboration in Mobile Healthcare Applications," IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, 08-13 October 2017, Montreal, QC, Canada

16. Xueping Liang, Juan Zhao, Sachin Shetty, Danyi Li, "Towards Data Assurance and Resilience in IoT Using Distributed Ledger," IEEE Milcom, October 23-25, 2017, Baltimore, MD, USA

17. Juan Zhao, Sachin Shetty, Jan Wei Pan, "Feature-Based Transfer Learning for Network Security," IEEE Milcom, October 23-25, 2017, Baltimore, MD, USA
18. Laila Almutairi and Sachin Shetty, "Generalized Stochastic Petri Net Model Based Security Risk Assessment of Software Defined Networks," IEEE Milcom, October 23-25, 2017, Baltimore, MD, USA
19. Xueping Liang, Sachin Shetty, Lingchen Zhang, Charles Kamhoua, Kevin Kwiat, "Man in the Cloud (MITC) Defender: SGX-based User Credential Protection for Synchronization applications in Cloud Computing Platform," IEEE Cloud, June 25 - June 30, 2017, Honolulu, Hawaii, USA
20. Uttam Ghosh, Pushpita Chatterjee, Deepak Tosh, Sachin Shetty, Kaiqi Xiong, Charles Kamhoua, "A SDN based Framework for Guaranteeing Security and Performance in Information Centric Cloud Networks", IEEE Cloud (short paper), June 25 - June 30, 2017, Honolulu, Hawaii, USA
21. Uttam Ghosh , Pushpita Chatterjee and Sachin Shetty, " A Security Framework for SDN Enabled Power Grid", IEEE International workshop on Communication, Computing, and Networking in Cyber Physical Systems, In association with IEEE the 37th International Conference on Distributed Computing Systems (IEEE ICDCS 2017), June 5 - 8, 2017, Atlanta, GA, USA
22. Xueping Liang, Sachin Shetty,Deepak Tosh, Charles Kamhoua, Kevin Kwiat, Laurent Njilla, "ProvChain: A Blockchain-based Data Provenance Architecture in Cloud Environment with Enhanced Privacy and Availability", The 17th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID), May 14-17 2017.
23. Deepak Tosh Sachin Shetty, Xueping Liang, Charles Kamhoua, Kevin Kwiat, Laurent Njilla, "Security Implications of Blockchain Cloud with Analysis of Block Withholding Attack", 17th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID), May 14-17 2017.
24. Sachin Shetty, Val Red, David Satterfield, Charles Kamhoua, Kevin Kwiat and Laurent Njilla, "Data Provenance Assurance in Cloud Using Blockchain", SPIE Defense + Security Conference, Anhaeim CA, April 9-13, 2017.
25. Hellen Maziku and Sachin Shetty, "Software Defined Networking enabled Resilience for IEC 61850-based Substation Communication Systems", Workshop on Computing, Networking and Communications (CNC), January 2017 , Silicon Valley, USA.
26. Kamrul Hasan, Sachin Shetty, and Taiwo Oyedare, "Cross Layer Attacks on Mobile Networks Using Software Defined Radios", 14th Annual IEEE Consumer Communications & Networking Conference (CCNC 2017), January, 2017, Las Vegas, USA.
27. Deepak Tosh, Sachin Shetty, Shamik Sengupta, Jay Kesan and Charles Kamhoua, "Risk Management using Cyber-Threat Information Sharing and Cyber-Insurance ", GameNets 2017(Invited Paper)
28. Abdullah Alghamdi and Sachin Shetty, "Survey: Toward A Smart Campus Using the Internet of Things", 4th International Conference on Future Internet of Things and Cloud (FiCloud-2016), August 2016, Vienna, Austria.
29. Robert W. Mudrowsky, Ravi Ramachandran, Umashanger Thayasivam, and Sachin S. Shetty, "Robust Speaker Recognition in the Presence of Speech Coding Distortion for Remote Access Application", 12th International Conference on Data Mining, July 2016,

Las Vegas, USA
30. Esther Amullen, Sachin Shetty, L.H. Keel ,"Secured Formation Control for Multi-agent Systems Under DoS Attacks", IEEE International Symposium on Technologies for Homeland Security, May 2016, Waltham. MA
31. Esther Amullen, Sachin Shetty, L.H. Keel, "Model-based resilient control for a multi-agent system against Denial of Service attacks", IEEE World Automation Congress, July 2016, Puerto Rico
32. Xuebiao Yuchi and Sachin Shetty, "Towards Network-topology aware Virtual Machine Placement in Cloud Datacenters", IEEE Cloud, June 2016, San Francisco, CA
33. Xuebiao Yuchi and Sachin Shetty, "Hierarchical Random Graph based Network Diversity Modeling for the Cloud", IEEE Cloud, June 2016, San Francisco, CA
34. Wei Chen, Liang Hong and Sachin Shetty, "Cross-layered Security Approach with Compromised Nodes Detection in Cooperative Sensor Networks", 18th Workshop on Advances in Parallel and Distributed Computational Models, May 2016
35. Paul Mcneil, Sachin Shetty, Divya Guntu and Gauree Barve, "SCREDENT: Scalable Real-time Anomalies Detection and Notification of Targeted Malware in Mobile Devices", 7th International Conference on Ambient Systems, Networks and Technologies (ANT-2016)- International Workshop on Mobile Cloud Computing systems, Management, and Security, May 2016.
36. Taiwo Oyedare, Ashraf Al Sharah and Sachin Shetty, "'A Reputation-Based Coalition Game to Prevent Smart Insider Jamming Attacks in MANETs", 14th International Conference on Wired & Wireless Internet Communications (WWIC 2016), May 2016.
37. Ashraf Al Sharah and Sachin Shetty, Accumulative Feedback Adaptation Transmission Rate In Mobile Ad-hoc Network, IEEE International Conference and Workshop on Computing and Communication (IEMCON), October 2015.
38. Paul McNeil, Sachin Shetty, Divya Guntu and Gauree Barve " Scredent—Scalable Real-time Anomalies Detection and Notification of Targeted Malware in Smartphones", 24th Usenix Security Symposium (Poster), August 2015, Washington, D.C..
39. Depeng Li and Sachin Shetty, " Toward Energy-Wasting Misbehavior Detection Platform with Privacy Preservation in Building Energy Use", ACM CCS (Poster), October 2015, Denver, Co.
40. Xuebiao Yuchi and Sachin Shetty " Enabling Security-Aware Virtual Machine Placement in IaaS Clouds", Milcom, October 2015, Tampa FL.
41. Kimberly Gold, Sachin Shetty, and Tamara Rogers " A Testbed for modeling and detecting attacks on NFC enabled mobile devices", Milcom, October 2015, Tampa FL.
42. Vasanth Iyer and Sachin Shetty, "Virtual sensor tracking using byzantine fault tolerance and predictive outlier model for complex tasks recognition", SPIE DSS, April 2015, Baltimore, MD.
43. Vasanth Iyer and Sachin Shetty, "Statistical Methods in AI: Rare Event Learning using Associative Rules and Higher-Order Statistics" AI Matters ACM: Volume 1 Issue 3, March 2015.
44. Sachin Shetty, Husam Adas and Waled Tayib, "Scalable Detection of Web Malware on Smart phones," 2015 International Conference on Information and Communication Technology Research (ICTRC2015), May 2015,Dubai, UAE.
45. Sai Kiran Mukkavilli, Sachin Shetty, Liang Hong, "Generation of Realistic Datasets to Evaluate Impact of Attacks on Cloud Data Center," 2015 International Conference on

Next Generation Computing and Communication Technologies, April 2015, Dubai UAE

46. Biswajit Biswal, Sachin Shetty and Tamara Rogers, "Enhanced Learning Classifier to Locate Data in Cloud Datacenters", IEEE CloudNet, October 2014, Luxembourg

47. Hellen Maziku and Sachin Shetty, "Towards a Network Aware VM Migration: Evaluating the Cost of VM Migration in Cloud Data Center", IEEE CloudNet, October 2014, Luxembourg

48. Lingchen Zhang, Sachin Shetty, Peng Liu and Jiwu Jing "RootkitDet: Practical End-to-End Defense against Kernel Rootkits in a Cloud Environment", European Symposium on Research in Computer Security, Wroclaw, Poland, September 2014 .

49. Sachin Shetty, Tayo Adedokun, L.H. Keel, "CyberPhySecLab: A testbed for modeling, detecting and responding to security attacks on Cyber Physical Systems", ASE Cyber Security Conference, Stanford, CA, May 2014.

50. Pan Gao, Henrique Momm and Sachin Shetty, "Exploration of optimal parameters of the genetic algorithm applied in feature extraction from remote sensed imagery," Pecora Memorial Remote Sensing Symosium, Nov 2014, Denver

51. D. A. Le, N. H. Tran, Sachin Shetty, and Shivakumar Sastry, , ""Achievable Rate and Outage Probability of Cognitive Radio with Finite-Alphabet Inputs Under Imperfect Spectrum Sensing," in Proc. IEEE Veh. Tech. Conf. (VTC), Glasgow, Scotland, May 2015.

52. Cuong Dang, Leonardo Jiimenez Rodriguez, Nghi Tran, Sachin Shetty, and Shivakumar Sastry, , ""Secrecy Capacity of the Full-Duplex AF Relay Wire-Tap Channel under Residual Self-Interference," IEEE Wireless Communications and Networking Conference (WCNC), March 2015, New Orleans

53. Danda Rawat, Swetha Reddy, Nimish Sharma, Bhed Bahadur Bista, and Sachin Shetty , "Cloud-assisted GPS-driven Dynamic Spectrum Access in Cognitive Radio Vehicular Networks for Transportation Cyber Physical Systems," IEEE Wireless Communications and Networking Conference (WCNC), March 2015, New Orleans

54. Sachin Shetty and Danda Rawat, , ""ROAR- Real-time Opportunistic Spectrum Access in Cloud based Cognitive Radio Networks," NSF Cloud Workshop, Dec 2014, Washington D.C.

55. Danda Rawat, Swetha Reddy, Nimish Sharma, and Sachin Shetty , ""Cloud-assisted Dynamic Spectrum Access for VANET in Transportation Cyber-Physical Systems," Proc. of IEEE 33rd International Performance Computing and Communications Conference (IEEE IPCCC 2014), December 5-7, 2014, Austin Texas, USA

56. Laila Almutairi, Sachin Shetty and Henrique Momm, "Scalable evolutionary computation for efficient information extraction from remote sensed imagery," Pecora Memorial Remote Sensing Symosium, Nov 2014, Denver

57. Biswajit Biswal, Sachin Shetty, Tamara Rogers, "Classification Based IP Geolocation Approach to Locate Data in the Cloud Datacenters", ASE Cyber Security Conference, Stanford, CA, May 2014.

58. Hellen Maziku and Sachin Shetty, "Network Aware VM Migration in Cloud Data Centers", Global Environment for Network Innovations (GENI) Research and Educational Experiment Workshop, March 19-20, 2014, Atlanta, GA

59. Danda Rawat, Sachin Shetty, Khurram Raza, "Game Theoretic Dynamic Spectrum Access in Cloud-based Cognitive Radio Networks," IEEE International Workshop on Software Defined Systems, 2014

60. Md. Monzurul Alam, Sudeep Bhattarai, Liang Hong and Sachin Shetty, "'Robust Beamforming for Cognitive Radio Based Vehicular Communication", International Conference on Connected Vehicles and Expo, Dec 2013.
61. Danda Rawat and Sachin Shetty , "Game Theoretic Approach to Dynamic Spectrum Access with Multi-radio and QoS Requirements ", IEEE GlobalSIP, Dec 3-5, 2013.
62. Sudeep Bhattarai, Liang Hong, Sachin Shetty, "Optimum Transmit Beamforming Scheme for Underlay Cognitive Radio Networks", International Symposium on Wireless Personal Multimedia Communications, Atlantic City, New Jersey, June 24 - 27, 2013.
63. Robert Nix, Murat Kantarcioglu, Sachin Shetty, "Real-time tools for cloud auditing", IEEE Workshop on Cloud Security Auditing, June 27, 2013, Santa Clara, CA.
64. Sachin Shetty, "Auditing and Analysis of Network Traffic in Cloud Environment", IEEE Workshop on Cloud Security Auditing, June 27, 2013, Santa Clara, CA.
65. Swetha Reddy Lenkala, Sachin Shetty, and Kaiqi Xiong, "'Security Risk Assessment of Cloud Carrier", IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), May 13-16, 2013, Delft, Netherlands.
66. Husam Adas, Sachin Shetty, and S. K. Hargrove, "Virtual and Augmented Reality Based Assembly Design System for Personalized Learning", IEEE Science and Information Conference, October 7 - 9, 2013, London, United Kingdom.
67. Asmah Muallem, Sachin Shetty, and S. K. Hargrove, "Visualizing Geolocation of Spam Email", IEEE Computing, Communications and Applications Conference (ComComAp), April 1-5, 2013, Hong Kong.
68. Kalpesh Raval, Ravi P. Ramachandran, Sachin Shetty, and Brett Smolenski,"Feature and Signal Enhancement for Robust Speaker Identification of G.729 Decoded Speech", 19th International Conference on Neural Information Processing (ICONIP2012), Doha, Qatar, November 2012.
69. Bhed Bahadur Bista, Danda B. Rawat, Gongjun Yan, Sachin Shetty, " Waiting Probability Analysis for Dynamic Spectrum Access in Cognitive Radio Networks", The 7th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2013) July 3rd - July 5th, 2013, Taichung, Taiwan
70. Danda Rawat, Sachin Shetty, Khurram Raza, "Secure Radio Resource Management in Cloud Computing Based Cognitive Radio Networks", 4th International Workshop on Security in Cloud Computing, Pittsburgh, PA, September 2012.
71. Umashanger Thayasivam, Sachin Shetty, Chinthaka Kuruwita, Ravi Ramachandran, "Detection of Anomalies in Network Traffic Using L2E for Accurate Speaker Recognition", 55th Int'l Midwest Symposium on Circuits & Systems, Boise, August 2012.
72. Hellen Maziku, Sachin Shetty, Keesook Han, Tamara Rogers, "Enhancing the Classification Accuracy of IP Geolocation", Proc. of Military Communications Conference, Orlando, Florida, Nov 2012.
73. Nicholas Luna, Sachin Shetty, Tamara Rogers, Kaiqi Xiong, "Assessment of Router Vulnerabilities on PlanetLab Infrastructure for Secure Cloud Computing", First GENI Research and Educational Experiment Workshop, March 15-16, 2012, Los Angeles
74. Hellen Maziku, Sachin Shetty, Tamara Rogers, "Measurement-based IP geolocation of Routers on PlanetLab Infrastructure", First GENI Research and Educational Experiment Workshop, March 15-16, 2012, Los Angeles

75. Sachin Shetty, Nicholas Luna, Kaiqi Xiong, "'Assessing Network Path Vulnerabilities for Secure Cloud Computing", IEEE ICC Workshop on Clouds, Networks and Data Centers, June 10-15, 2012, Ottawa, Canada.

76. Ying Tang, David Carbonetta, Sachin Shetty, "Development of an Integrated Network Visualization and Graph Analysis Tool for Biological Networks", International Conference on Intelligent Biology and Medicine (ICIBM), April 2012

77. R. P. Ramachandran, R. Polikar, K. D. Dahm and Sachin Shetty, "Open-Ended Design and Performance Evaluation of a Biometric Speaker Identification System", IEEE International Symposium on Circuits and Systems, Seoul, South Korea, May 20-23,2012.

78. Sachin Shetty, Kodzo Agbedanu, Ravi Ramachandran, "Opportunistic Spectrum Access in Multi-User Multi-Channel Cognitive Radio Networks," IEEE EUSIPCO, August 29 - Sep 2, 2011, Barcelona, Spain,

79. Y. Tang, Sachin Shetty, "Adaptive Virtual Reality Game System for Personalized Problem Based Learning," 2011 IEEE International Conference on Networking, Sensing and Control, April 11-13, 2011, Delft, Netherlands.

80. McKenzie McNeal III, Wei Chen, Sachin Shetty, Stanley Aungst, "Security-Oriented Robust Networking Architecture and Key Management for Heterogeneous Wireless Sensor Networks", 2011 International Conference on Wireless Networks,July 18-21, 2011, Las Vegas, USA

81. Y. Tang, Sachin Shetty, J. Kauser, S.K.Hargrove, and J. Henry, "Virtual Reality Games in Promoting Metacognition for Science and Engineering Design in Context," ASEE Annual Conference, June 26-29, 2011, Vancouver, BC, Canada

82. Saleh Zein-Sabatto, Abduliqadir Khoshnaw, Sachin Shetty, Mohan Malkani, Atindra K. Mitra, "Cross layers decision fusion model in layered sensing systems," Proc. of SPIE, Apr 2011

83. Tang, Y., Sachin Shetty, and Chen, X. F, "Empowering Students with Engineering Literacy and Problem-solving through Interactive Virtual Reality Games," 2nd International IEEE Consumer Electronics Society Games Innovation Conference, Hong Kong, Dec. 21-23, 2010.

84. Sachin Shetty, Ying Tang, William Collani, "TCP Venoplus - A cross-layer approach to improve TCP Performance in wired-cum-wireless networks using signal strength", Proc. of IEEE Networking, Sensing and Control, June 2010.

85. Sachin Shetty and Ravi Ramachandran, "Blind Channel Estimation Based Robust Physical Layer Key Generation in MIMO Networks", *IEEE Int. Symp. On Circuits and Systems*, Paris, France, June 2010.

86. Chunsheng Xin, Min Song, Liangping Ma, Sachin Shetty, and C.C. Shen, "Control-Free Dynamic Spectrum Access for Cognitive Radio Networks," *Proc. of IEEE ICC*, May 2010.

87. Gang Zhou, Sachin Shetty, George Simms, Min Song, "PLL Based Time Synchronization in Wireless Sensor Networks", IEEE International Conference on Embedded and Real- Time Computing Systems and Applications (RTCSA) (short paper), Beijing, China, August 2009

88. Sachin Shetty, Min Song, Chunsheng Xin, "A Learning-based Multiuser Opportunistic Spectrum Access Approach in Unslotted Primary Networks", IEEE INFOCOM, April 2009

Educational Research Publications

1. Husam Adas, Sachin Shetty, and S. K. Hargrove, "Virtual and Augmented Reality Based Assembly Design System for Personalized Learning", IEEE Science and Information Conference, October 7 - 9, 2013, London, United Kingdom.
2. R. P. Ramachandran, R. Polikar, K. D. Dahm and Sachin Shetty, "Open-Ended Design and Performance Evaluation of a Biometric Speaker Identification System", IEEE International Symposium on Circuits and Systems, Seoul, South Korea, May 20-23,2012.
3. R. P. Ramachandran, L. Hong, S. S. Shetty, K. D. Dahm, R. J. Kozick, R. M. Nickel, R. Polikar, Y. Tang and S. H. Chin, "Design and Performance Evaluation of a Biometric Iris Verification System", ASEE Annual Conference and Exposition, Seattle, Washington, 2015
4. R. P. Ramachandran, K. D. Dahm, R. Nickel, R. Kozick, S. S. Shetty, L. Hong, S. H. Chin, R. Polikar and Y. Tang, "Vertical Integration of Biometrics Across the Curriculum: Case Study of Speaker, Face and Iris Recognition," IEEE Circuits and Systems Magazine, *2014*
5. Ying Tang, Sachin Shetty, Talbot Bielefeldt, Kauser Jahan, John Henry, and S. Keith Hargrove, "Sustain City - A Cyberinfrastructure-Enabled Game System for Science and Engineering Design", Journal of Computational Science Education, Vol 3. Issue 1, pages 57-65, May 2012
   Y. Tang, Sachin Shetty, "Adaptive Virtual Reality Game System for Personalized Problem Based Learning," 2011 IEEE International Conference on Networking, Sensing and Control, April 11-13, 2011, Delft, Netherlands.
6. Ying Tang, Sachin Shetty, J. Kauser, S.K. Hargrove, and J. Henry, "Virtual Reality Games in Promoting Metacognition for Science and Engineering Design in Context," ASEE Annual Conference, June 26-29, 2011, Vancouver, BC, Canada
7. Tang, Y., Sachin Shetty, and Chen, X. F, "Empowering Students with Engineering Literacy and Problem-solving through Interactive Virtual Reality Games," 2nd International IEEE Consumer Electronics Society Games Innovation Conference, Hong Kong, Dec. 21-23, 2010.
8. Ying Tang, Sachin Shetty, John Henry, Kauser Jahan, and Samuel Hargrove (2013). Game Effectiveness of Power Ville in Promoting Science and Engineering Design. ASEE Annual Conference. Atlanta, GA.
9. Ying Tang, Sachin Shetty, John Henry, Kauser Jahan, and Samuel Hargrove, "Interactive and Collaborative Games Promoting Metacognition for Science and Engineering Design", Proceedings of International Conference on Computer Science and Education, July 9-10, 2011, Qingdao, China

Invited Talks
1. "Blockchain for Healthcare Security", Healthcare Informatics, January 2018
2. "Blockchain empowered cyber threat sharing platform", US Transacom, December 2017
3. "Provchain- A blockchain based data provenance for cloud computing", MITRE, November 2017
4. "Blockchain and Data Provenance", CERDEC, November 2017
5. "Blockchain based Trusted Information Sharing", NATO Workshop, October 2017

6. "Networked Identity Management of Internet of Things using Blockchain", AFPM Cyber security seminar, September 2017
7. "Blockchain in Healthcare- A Marriage of Hype and Promise", Healthcare Security Forum, HIMMS, Sep 2017
8. "Data Provenance Assurance using Blockchain in Cloud Environment", UTRC, March 2017
9. "Blockchain for Cloud Security", Air Force Space Command, January 2017.
10. "Towards Network Aware VM Migration – Evaluating the Cost of VM Migration in SDN-based Cloud Computing Network", Workshop on Science of Security through Software-Defined Networking, Illinois Institute of Technology, Chicago, IL, June 2016
11. "Moving Target Defense to protect Cloud DataCenters", University of Toledo, October 2015.
12. "Moving Target Defense", Derbycon, September 2015.
13. "Moving Target Defense", Summer School, COINS Research Lab, Greece, August 2015
14. "Moving Target Defense for Distributed Systems", Distinguished Lecture Series, Naval Surface Warfare Center, November 2014
15. "RootKitDet: Practical End-to-End Defense Against Kernel RootKits in Cloud Data Centers", CyberBat/VFRP Presentation, AFRL, Rome, NY, July, 2014
16. "Scalable Machine Learning System in Cloud to Protect Smartphones from Malicious URLs", NIST The Intersection of Cloud and Mobility Cloud Enhancing Mobility Applications, National Institute of Standards and Technology, Gaithersburg MD , March 26, 2014
17. "IP Geolocation for locating data in Cloud", CyberBat/VFRP Presentation, AFRL, Rome, NY, July, 2013
18. "Massive IP/DNS analysis using data mining in Hadoop", Cloud Assumption Buster Workshop, NIST, Gaithersburg, MD, Oct 21, 2011
19. "Challenges and Success Stories in Homeland Security Education", Panel Member, DHS Center of Excellence Annual Meeting, Purdue University, West Lafayette, IN, Sep 13, 2011
20. "Massive Cloud Auditing using Data Mining in Hadoop", Assured Cloud Workshop, Information Institute, AFRL, Rome, NY, July 7, 2011
21. "Opportunistic Networking via Dynamic Spectrum Access", LANS Informal Seminar, Argonne National Laboratory, Jul 7 2010.
22. "Opportunistic Access in Cognitive Radio Networks", Department of Electrical and Computer Engineering, Old Dominion University, Oct 3, 2008.

Education: Mentoring Graduate Students

I have graduated 6 PhD and 19 MS students. I have received the TSU's Research Mentorship awards during 2013, 2014 and 2015. Below is a list of graduate students whom I serve as thesis advisor, along with their major accomplishments organized by year.

PhD Graduates

1. **Ashraf Al Sharah** – PhD, May 2016
   Integrated Game Theoretic and Network Integrity Scheme to Detect and Mitigate Insider Threats in MANETS and Colluding Jamming Attack
2. **Biswajit Biswal** – PhD, May 2016
   Secure Measurement based Geolocation to Locate Data in the Cloud Datacenters
3. **Sai Kiran Mukkavilli** – PhD, August 2016
   Network Traffic Anomaly Detection for IAAS Clouds
4. **Kimberly Gold** – PhD, August 2016
   Multi-sensor fusion for secure mobile proximity detection
5. **Hellen Maziku** – PhD, December 2016
   Towards Infrastructure Based Software Defined Security
6. **Paul McNeil** – PhD, August 2016
   SCREDENT: Scalable Real-time Anomalies Detection and Notification of Targeted Malware in Smartphones

M.S. Graduates
1. **Kodanda Ram Reddy Tippy Reddy** – MS CISE, August 2016
   Network-Aware Bandwidth Provisioning for Service Level Agreement Assurance
2. **Kamrul Hasan** – MS CISE, August 2016
   Cross-Layer Attack on GSM Mobile Networks Using Software Defined Radios
3. **Taiwo Oyedare** – MS CISE, August 2016
   A Reputation-Based Coalition Game to Detect and Prevent Insider Smart Jamming Attacks in Mobile Ad Hoc Networks
4. **James Savage** – MS CISE, May 2016
   Detection of Co-Resident Virtual Machines using Network Traffic Patterns
5. **Prasanthi Yughandhar** – MS CISE, May 2016
   Dynamic Analysis of mobile botnet
6. **Priya Chaurasia** – MS CISE, December 2015
   Dynamic Analysis of Android Malware using Droidbox
7. **Ayodeji Borode** - MS CISE, December 2015
   Implementing Cloud Based Opportunistic Spectrum Access For Cognitive Radio Networks
8. **Sabah Alzharani** – MS CISE, May 2015
   Scalable Network Traffic Analysis On Cloud Computing Platform
9. **Manu Misra** - MS CISE, May 2014
   Network Bandwidth Provisioning for Ensuring Service Level Agreement (SLA)-based Service Guarantees
10. **Pan Gao** - MS CISE, May 2014
    Evolutionary Computation for Feature Extraction from Remotely Sensed Imagery
11. **Prachi Mandil** - MS CISE, May 2014
    Cloud-based Intrusion Detection and Response Tool for Android Smartphone Devices
12. **Laila Almutairi** - MS CISE, May 2014

Scalable evolutionary computation for efficient information extraction from remote sensed imagery

13. **Khurram Raza** - MS CISE, May 2014
    Secure Radio Resource Management In Cloud Computing Based Cognitive Radio Networks
14. **Husam Adas** - MS CISE, May 2013
    Cloud Computing Based Detection Of Malicious URL Attacks On Android Smart Phones
15. **Asmah Muallem** - MS CISE, May 2012
    Visualizing Geolocation of Spam Email

16. **Swetha Lenkala** - MS CISE, May 2012
    Risk Assessment of Cloud Carrier
17. **Hellen Maziku**- MS CISE, May 2012
    Enhancing the classification accuracy of IP Geolocation
18. **Ermias Tedla** - MS CISE, May 2011
    Intercepting Filter Approach to Detect and Prevent SQL Injection Attacks on Vulnerable SQL Codes
19. **Kodzo Agbedanu** - MS CISE, May 2010
    Spectrum Access in Multi User Multi Channel Environment Using the Hungarian and Greedy Algorithms in a Cognitive Radio Network

PROFESSIONAL MEMBERSHIPS
1. Member, the Institute of Electrical and Electronics Engineers (IEEE).

UNIVERSITY/COLLEGE/DEPARTMENT SERVICES

1. Serving as a member of the Tennessee State University Faculty Senate, 2014- 2017
2. Serving as a member of the Tennessee State University Faculty Senate Research Committee, 2013- 2016
3. Served on the search committee for the Associate Vice President of Research Position, 2013-2014
4. Served on the faculty search committee for the Computer Science Department, 2012-2013
5. Served as the proctor for IEEE Xtreme 4.0 Programming Competition, Oct 2010
6. Served on the faculty professional development team for the NSF HBCU-UP Project, 2009-2011
7. Served as the organizer of gaming and simulation workshop for students from Stratford Magnet High School, March 2013
8. Served on the organizing committee for the Science Olympiad, February 2013
9. Served as the Department Representative during the TSU Tiger High School Junior Jumpstart recruiting event, April 2013
10. Served as Demonstrator for high school students in Engineering Week, April 2013

PUBLIC SERVICES

1. ACM CCS Poster Co-Chair
2. Serving as the Associate Editor for International Journal of Computer Networks, 2009-present
3. Served as reviewer for several papers in IEEE conferences such as, ACM CCS, ICDCN, ICC, CNS, ICCCN, INFOCOM, LCN, WCNC, GlobeCom, Milcom, VisionNet, IAIE, IMPETUS, and HPSR
4. Served as a reviewer for several articles in IEEE Transactions Journals, such as, Transactions on Networking, Transactions on Parallel and Distributed Systems, Transactions on Wireless Communications, Transactions on Vehicular Technology.
5. Served on the program committee for conferences such as, CCS, ICDCN, ICCCN, ICA3PP, CRiSIS and CloudFusion
6. Served on the panel for NSF CNS, NSF DUE and NSF HRD programs