NING WENG

I. PROFESSIONAL AFFILIATION AND CONTACT INFORMATION

Department:	School of Electrical, Computer and Biomedical Engineering
	Southern Illinois University, MC 6603, Carbondale, IL 62901-6603, USA
Phone:	+1-618-453-7645
Email:	nweng@siu.edu

II. EDUCATION

Ph.D., Electrical and Computer Engineering, July 2005
University of Massachusetts, Amherst, MA

M.S., Electrical and Computer Engineering, December 2000
University of Central Florida, Orlando, FL

B.E., Electrical Engineering, June 1996
Huazhong University of Science and Technology, Wuhan, China

III. PROFESSIONAL EXPERIENCE

July 2019 - Present
Professor, School of Electrical and Computer, and Biomedical Engineering
Southern Illinois University, Carbondale, IL

August 2011 - June 2019
Associate Professor, Department of Electrical and Computer Engineering
Southern Illinois University, Carbondale, IL

August 2005 - July 2011
Assistant Professor, Department of Electrical and Computer Engineering
Southern Illinois University, Carbondale, IL

January 2001 - July 2005
Graduate Research Assistant, Department of Electrical and Computer Engineering
University of Massachusetts, Amherst, MA

January 1999 - December 2000
Graduate Research Assistant, Department of Electrical and Computer Engineering
University of Central Florida, Orlando, FL

IV. RESEARCH AND CREATIVE ACTIVITY

A. Interests and Specialties:

Network and system security, Machine Learning for Network Security, Network Systems.

B. Current Projects:

- Deep Learning of Intrusion Detection Systems
- Scalable Many-field Packet Classification

C. Grants Received:

1. Online Couse Development Grant for Computer Systems Security
   PI, $5, 000 May 2022 - May 2023, SIU Extended Campus
2. Enhancing SIUC Campus Network to Accelerate Data-Driven Research and Education
   Co-PI, PI: Ning Yang, $399,923, July 2020 - June 2023, National Science Foundation
3. Development of Energy Sustainable Internet of Things Platform
   share equally with Dr. Kang Chen (PI), $49,716, SIU Energy Boost Seed Grant, 7/2019 – 6/2020
4. EDU: Collaborative: Integrating Embedded Systems Security into Computer Engineering and Science Curricula, **Lead-PI**: Ning Weng, Co-PI: Haibo Wang
   Collaborating institutions: University of North Carolina at Charlotte (Harini Ramaprasad), University of Texas at San Antonio (Meng Yu), and Virginia Commonwealth University (Wei Zhang)
   Sponsor: National Science Foundation, Secure and Trustworthy Cyberspace Program
   Amount: $300,000 total, SIUC: $150,000, September 2016 - August 2018.
5. Enhancing Computer Engineering Curriculum through Hands-on-Project using Intel Software Defined Infrastructure
   PI, $15,000, Intel Research, 12/2015 – 11/2016
6. Enhancing Embedded System Curriculum
   PI, $10,000, Intel Research, 06/2014 – 07/2015
7. Integrating Virtualization Technology into Embedded System Curriculum
   PI, $25,000, Intel Research, 07/2013 – 08/2014
8. Trustable Access Mechanisms for Embedded Systems
   share equally with Dr. Spyros Tragoudas (PI), $34,300, NSF Center for Embedded Systems, 7/2012 – 8/2013
9. Curriculum development: Embedded System Design using Atom-based Platforms
   co-PI, PI: Haibo Wang, $25,000, Intel Research, 07/2012 – 08/2013
10. Enhancing Embedded Systems Curriculum using Intel Atom-based Platform
    PI, Co-PIs: Haibo Wang, $30,000, Intel Research, 08/2011 – 08/2012
11. JTAG-Based Device Security for Embedded Systems
    share equally with Dr. Spyros Tragoudas (PI), $50,000, NSF Center for Embedded Systems, 1/2011 – 12/2012
12. NSF Workshop on Trustworthy Computing Travel Grant
    $1,200, Penn State Computer Science & Engineering, October, 2010
13. Pattern Matching Acceleration using Tolapai Platform
    Sole-PI, $25,000, Intel Research, 2008

14. Computation Tech. Enhan. with Low-Cost and High-Performance Linux Cluster
PI, Co-PIs: Ying Chen and etc., $19,778, SIUC Equipment Enhancement Grant, 2008
15. Security Enabled Network Processing Systems
Sole-PI, $3,872, SIUC Seed Grant, 2006

V. PUBLICATIONS

Journals

J-30. Minxiao Wang, Ning Yang and Ning Weng,K-GetNID: Knowledge-Guided Graphs for Early and Transferable Network Intrusion Detection, **IEEE Transactions on Information Forensics and Security.**, vol. 19, pp. 7147–7160, July, 2024

J-29. Minxiao Wang, Ning Yang, Nicolas J Forcade-Perkins and Ning Weng, ProGen: Projection-based Adversarial Attack Generation against Network Intrusion Detection, **IEEE Transactions on Information Forensics and Security.**, vol. 19, pp. 5476–5491, April, 2024

J-28. Hasibul Jamil, Ning Yang and Ning Weng, Deep Reinforcement Learning for Many-field packet classification, *in preparation for submission.*

J-27. Minxiao Wang, Ning Yang, Yanhui Guo and Ning Weng, Learn-IDS: Bridging Gaps between Datasets and Learning-Based Network Intrusion Detection, Special Issue Machine Learning for Cybersecurity: Threat Detection and Mitigation, *Electronics 2024, MDPI.*

J-26. Minxiao Wang, Ning Yang, Gunasinghe and Ning Weng, The Robustness of Machine Learning in Network Security, *invited and adapted, Encyclopedia, https://encyclopedia.pub/entry/51048, 2023, MDPI.*

J-25. Minxiao Wang, Ning Yang, Gunasinghe and Ning Weng, On the Robustness of ML-based Network Intrusion Detection Systems: An Adversarial and Distribution shifts Perspective, 12(10):209, *Computers 2023, MDPI.*

J-24. Minxiao Wang, Ning Yang and Ning Weng, Securing a Smart Home with A Transformer-Based IoT Intrusion Detection System, *Journal of Electronics 2023, MDPI.*

J-23. Hasibul Jamil, Ning Yang and Ning Weng, Many-field packet classification with decomposition and reinforcement learning, **IET Networks**, vol. 11, pp. 112–127, April 2022.

J-22. Cheng-Liang Hsieha and Ning Weng, Scalable Many-Field Packet Classification for Traffic Steering in SDN Switches, **IEEE Transactions on Networks and Management**, Vol. 16, no.1, pp. 348–361, March 2019.

J-21. Claudio G Copello and Ning Weng, Adaptive Scheduling to Enhance Data Security and. Energy Efficiency on Energy Harvesting Platform, **Journal of Microprocessors and Microsystems**, vol 60, pp. 24–37, 2018

J-20. Veeresh E. Dandur and Ning Weng, Networked Embedded System Security: Technologies, Analysis and Implementation , **Recent Advances in Communications and Networking Technology**, vol. 6, 2017.

J-19. Cheng-Liang Hsieha, Lucas Vespa and Ning Weng, A high-throughput DPI engine on GPU via algorithm/implementation co-optimization, **Journal of Parallel and Distributed Computing**, vol. 88, pp. 46–56, 2016.

J-18. Mini Mathew and Ning Weng, Adaptive Sensor Node Sleep Scheduling for Quality-of-Experience Enhancement, **International Journal of Distributed Sensor Networks**, vol. 2016, 11pages, 2016

J-17. Mini Mathew and Ning Weng, Quality of Information and Energy Efficiency Optimization for Sensor Networks via Adaptive Sensing and Transmitting, **IEEE Sensor Journal**, vol. 14, no. 2. pp. 341–348, 2014.

J-16. Yueran Gao, Haibo Wang, Ning Weng and Lucas Vespa, Enhancing Sensor Network Data Quality via Collaborated Circuit and Network Operations, **Journal of Sensor and Actuator Networks**, vol. 2, pp. 196–212, 2013.

J-15. Lucas Vespa, Ritam Chakrovorty and Ning Weng, Lightweight Testbed for Evaluating Worm Containment Systems, **Int. J. Security and Networks**, vol. 7, no.1, pp. 6–16, 2012.

J-14. Ning Weng, I-Hung Li, and Lucas Vespa, Information Quality Model and Optimization for 802.15.4-based Wireless Sensor Networks, **Journal of Network and Computer Applications (JNCA)**, special issue on Control and Optimization over Wireless Networks, vol. 34, issue 6, pp. 1773 – 1883, November 2011.

J-13. Lucas Vespa and Ning Weng, Deterministic Finite Automata Characterization and Optimization for Scalable Pattern Matching, **ACM Transactions on Architecture and Code Optimization**, Vol. 8, No. 1, Article 4, 31 pages, April, 2011.

J-12. Ning Weng, Lucas Vespa, and Benfano Soewito, Deep Packet Pre-filtering and Finite State Encoding for Adaptive Intrusion Detection System, **Computer Networks**, vol. 55, pp. 1648–1661, 2011.

J-11. Lucas Vespa, Ning Weng, and Ramaswamy Ramaswamy, MS-DFA: Multiple-Stride Pattern Matching for Scalable Deep Packet Inspection, **The Computer Journal**, vol. 54, no.2, pp. 285 – 303, Oxford University Press, 2011.

J-10. Benfano Soewito, Lucas Vespa, Ning Weng, and Haibo Wang. Hybrid Pattern Matching for Trusted Intrusion Detection, Wiley **Security and Communication Networks**, vol. 4, no.1, pp. 33 – 43, 2011.

J-9. C. Oliver Yang, Max Yen and Ning Weng. The Development of an On-line Structural Health Monitoring System based on Wireless Sensor Networks, Journal of Structural Engineering, special issue on Sensor Network for Building and Environmental Monitoring: Theory and Application, pp. 45–54, 2010.

J-8. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Analysis of Network Processing Workloads, Elsevier **Journal of Systems Architecture**, vol. 55, no. 10, pp. 421–433, 2009.

J-7. Lucas Vespa, Ning Weng, and Benfano Soewito. Optimized Memory Based Accelerator for Scalable Pattern Matching, Elsevier **Microprocessors and Microsystems**, vol. 33, no. 7/8, pp. 469–482, October, 2009.

J-6. Benfano Soewito, Atul Mahajan, Ning Weng and Haibo Wang. High Speed String Matching for Network Intrusion Detection, International Journal of Communication Networks and Distributed Systems(IJCNDS), vol. 3, no. 4, pp. 319–339, 2009.

J-5. Benfano Soewito and Ning Weng. Concurrent Workload Mapping for Multicore Security Systems, **Concurrency and Computation: Practice and Experience**, vol. 21, no. 10, pp. 1281–1306, July 2009.

J-4. Ning Weng and Tilman Wolf. Analytic modeling of heterogeneous network processors for parallel workload mapping, **ACM Transactions on Embedded Systems**, vol. 8, issue 3, article no 18, 29 pages, April, 2009.

J-3. Benfano Soewito, Lucas Vespa, Atul Mahajan, Ning Weng and Haibo Wang. Self Addressable Memory-based FSM (SAM-FSM): A Scalable Intrusion Detection Engine, **IEEE Network**, special issue on Recent Developments in Network Intrusion Detection, vol. 23, no. 1, pp. 14 – 21, January, 2009 (acceptance ratio: 6/44 = 14%).

J-2. Ning Weng and Benfano Soewito. Evaluating DNA Sequence Searching Algorithms on Multicore, International Journal Computational Biology and Drug Design, vol.1, no. 3, pp. 313 – 327, 2008.

J-1. Tilman Wolf, Ning Weng, and Chia-Hui Tai. Run-Time Support for Multi-Core Packet Processing Systems, **IEEE Network**, vol. 21, no. 4, pp. 29 – 37, July 2007

Book Chapters

BC-5. Prashant Baral, Ning Yang, Ning Weng. IoT Device Identification using Device Fingerprint and Deep Learning, *In Deep Learning and Reinforcement Learning, IntechOpen, May, 2023.*

BC-4. Lucas Vespa and Ning Weng. Deterministic Finite Automata Characterization for Memory-Based Pattern Matching, Information and Communications Security, ICICS 2009, Springer, Lecture Notes in Computer Science, vol. 5927, pp. 268–282, 2009.

BC-3. Lucas Vespa, Mini Mathew, Ning Weng. Predictive Pattern Matching for Scalable Network Intrusion Detection, Information and Communications Security, ICICS 2009, Springer, Lecture Notes in Computer Science, vol. 5927, pp. 254–267, 2009.

BC-2. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. A Network Processor Based Passive Measurement Node, Passive and Active Network Measurement, Lecture Notes in Computer Science, Springer, vol. 3431, pages 337–340, 2005.

BC-1. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Application Analysis and Resource Mapping for Heterogeneous Network Processor Architectures. In *Network Processor Design: Issues and Practices*, Volume 3, chapter 13, pp. 279 – 308. Morgan Kaufmann Publishers, 2005.

Conferences

C-37. Minxiao Wang, Ning Yang and Ning Weng, Exploring the Impact of Early Detection on DL-Based NIDSs Models, *2023 IEEE 14th Annual Ubiquitous Computing, Electronics Mobile Communication Conference, October 2023.*

C-36. Cheng-Liang Hsieh, Ning Yang and Ning Weng, Network Function-enabled Switch for Scalable Network Service Function Chaining, *Proc. of 2023 IEEE World AIIoT Congress(AIIoT)*, pages 167–176, June 2023

C-35. Hasibul Jamil, Ning Yang and Ning Weng, Securing Home IoT Network with Machine Learning Based Classifiers, *Proc. of IEEE 7th World Forum on Internet of Things*, pp. 289–294, June 2021, New Orleans, Louisiana.

C-34. Hasibul Jamil and Ning Weng, Multibit Tries Packet Classification with Deep Reinforcement Learning, *IEEE 21st International Conference on High Performance Switching and Routing (HPSR), 2020.*

C-33. Cheng-Liang Hsieh and Ning Weng, NF-Switch: VNFs-enabled SDN Switches for High Performance Service Function Chaining, *Proc. of 12th IEEE ICNP 2017 Workshop PVE-SDN*, October 2017.

C-32. Cheng-Liang Hsieh and Ning Weng, Many-Field Packet Classification for Software-Defined Networking Switches, *Proc. of 12th ACM/IEEE Symposium on Architectures for Networking and Communication Systems(ANCS)*, pages 13–24, March 2016.

C-31. Cheng-Liang Hsieh and Ning Weng, Virtual Network Functions Instantiation on SDN Switches for Policy-Aware Traffic Steering, *Proc. of 12th ACM/IEEE Symposium on Architectures for Networking and Communication Systems(ANCS)*, pages 119-120, March 2016.

C-30. Cheng-Liang Hsieh and Ning Weng, Scalable Many-Field Packet Classification Using Multidimensional-Cutting Via Selective Bit-Concatenation, *Proc. of 11th ACM/IEEE Symposium on Architectures for Networking and Communication Systems(ANCS)*, pages 187–188, May 2015.

C-29. Cheng-Liang Hsieh and Ning Weng, High Performance Multi-field Packet Classification Using Bucket Filtering and GPU Processing, *Proc. of ACM/IEEE Symposium on Architectures for Networking and Communication Systems(ANCS)*, pages 233 – 234, Los Angeles, CA, Oct. 2014.

C-28. Mini Mathew, Ning Weng and Lucas Vespa, Quality-of-Information Modeling and Adapting for Delay-Sensitive Sensor Network Applications, *Proc. of the the 31st IEEE. International Performance Computing and Communications Conference*, pages, 471–477, 2012.

C-27. Lucas Vespa and Ning Weng, SWM: Simplified Wu-Manber for GPU-based Deep Packet Inspection, in *Proc. of The 2009 International Conference on Security and Management (SAM)*, 6 pages, Las Vegas, Nevada, July 2012.

C-26. Lucas Vespa and Ning Weng, GPEP: Graphics Processing Enhanced Pattern-Matching for High-Performance Deep Packet Inspection, *Proc. of the 2011 IEEE International Conference on Internet of Things (iThings)*, pages 74 – 81, 2011.

C-25. Lucas Vespa and Ning Weng, Quality-aware Scheduling Metrics for Adaptive Sensor Networks, *Proc. of the 35th Annual IEEE Conference on Local Computer Networks (LCN)*, pages, 528 – 535, Denver, Colorado, October 2010.

C-24. Ritam Chakrovort, Lucas Vespa and Ning Weng, Testbed for Evaluating Worm Containing Systems, *Proc. of ACM/IEEE Symposium on Architectures for Networking and Communication Systems(ANCS)*, pages 175 – 176, Princeton, NJ, Oct. 2009.

C-23. Lucas Vespa and Ning Weng, Theoretic Analysis of Finite Automata for Memory-based Pattern Matching, *Proc. of ACM/IEEE Symposium on Architectures for Networking and Communication Systems(ANCS)*, pages 82 – 83, Princeton, NJ, Oct. 2009.

C-22. Ning Weng, Lucas Vespa, and Benfano Soewito. Multicore-based Self-adapting Pattern Detection Engine, *Proc. of International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, pages 790 – 796, Las Vegas, Nevada, July 2009.

C-21. Lucas Vespa, Ning Weng and Benfano Soewito, Reconfigurable String Matching Engine for Network Intrusion Detection, *Proc. of International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, pages 756 – 762, Las Vegas, Nevada, July 2009.

C-20. Lucas Vespa, Mini Mathew, and Ning Weng. P3FSM: Portable Predictive Pattern Matching Finite State Machine, in *20th IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP)*, pages 219 – 222, Boston, MA, July 2009.

C-19. Lucas Vespa and Ning Weng, Split-DFA (SDFA) for Scalable Pattern Matching in Network Security, in *Proc. of The 2009 International Conference on Security and Management (SAM)*, pages 469 – 474, Las Vegas, Nevada, July 2009.

C-18. Lucas Vespa and Ning Weng, Scalable Regular Expression Matching for Network Intrusion Detection Systems, in *Proc. of International Conference on Embedded Systems and Applications (ESA)*, pages 39 – 46, Las Vegas, Nevada, July 2009.

C-17. Atul Mahajan, Benfano Soewito, Sai K. Parsi, Ning Weng and Haibo Wang. Implementing High-speed String Matching Hardware for Network Intrusion Detection Systems, in *Proc. of International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, pages 157 – 164, Las Vegas, Nevada, July 2008.

C-16. Satish Dechu, Ning Weng, and Benfano Soewito. Mapping Parallel Workload onto Network Processors Usingg Simulated Annealing, in *Proc. of International Conference on Embedded Systems and Applications (ESA)*, pages 62 – 68, Las Vegas, Nevada, July 2008.

C-15. Benfano Soewito and Ning Weng, Approximate Packet Pre-filtering to Accelerate Pattern Matching, in *Proc. of The 2008 International Conference on Security and Management (SAM)*, pages 203 – 209, Las Vegas, Nevada, July 2008.

C-14. Benfano Soewito, Lucas Vespa, and Ning Weng, Characterize Power Consumption of Encryption/Decryption in Portable Devices, in *Proc. of IEEE Region 5 Conference(PBASICS2)*, pages 1 – 6, Kansas City, MO, April 2008.

C-13. Lucas Vespa, Keqian Mei, Rapeepan Maitree, and Ning Weng. Signal Strength Analysis for Optimal Routing in Wireless Sensor Networks, in *Proc. of IEEE Region 5 Conference(PBASICS2)*, pages 1 – 5, Kansas City, MO, April 2008.

C-12. Benfano Soewito and Ning Weng. Methodology for Evaluating String Matching Algorithms on Multiprocessor, in *Proc. of 6th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA)*, pages 20 – 27, Doha, Qatar, March 2008.

C-11. Ning Weng, Nandeesh Kumar, Satish Dechu and Benfano Soewito. Mapping Task Graphs onto Network Processors Using Genetic Algorithm, in *Proc. of 6th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA)*, pages 481 – 488, Doha, Qatar, March 2008.

C-10. Benfano Soewito and Ning Weng. Methodology for Evaluating DNA Pattern Searching Algorithms on Multiprocessor, in *Proc. of IEEE 7th International Symposium on BioInformatics and BioEngineering (BIBE)*, pages 570 – 577, Boston, MA, October 2007.

C-9. Tilman Wolf, Ning Weng, and Chia-Hui Tai. Design considerations for network processor operating systems, in *Proc. of ACM/IEEE Symposium on Architectures for Networking and Communication Systems (ANCS)*, pages 71 – 80, Princeton, NJ, October 2005.

C-8. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Analysis of Network Processing Workloads, in *Proc. of IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, pages 226 – 235, Austin, TX, March 2005.

C-7. Ning Weng and Tilman Wolf. Profiling and Mapping of Parallel Workloads on Network Processors, in *Proc. of The 20th Annual ACM Symposium on Applied Computing (SAC)*, pages 890 – 896, Santa Fe, NM, March 2005.

C-6. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Characterizing Network Processing Delay, in *Proc. of IEEE Global Communications Conference (GLOBECOM)*, pages 1629 – 1634, Dallas, TX, November 2004.

C-5. Ning Weng and Tilman Wolf. Pipelining vs. Multiprocessors - Choosing the Right Network Processor System Topology, in *Proc. of Advanced Networking and Communications Hardware Workshop (ANCHOR 2004) in conjunction with The 31st Annual International Symposium on Computer Architecture (ISCA 2004)*, 1 – 12, Munich, Germany, June 2004.

C-4. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Application Analysis and Resource Mapping for Heterogeneous Network Processor Architectures, in *Proc. of Third Network Processor Workshop in conjunction with Tenth International Symposium on High Performance Computer Architecture (HPCA-10)*, pages 103 – 119, Madrid, Spain, February 2004.

C-3. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Considering Processing Cost in Network Simulations, in *Proc. of Workshop on Models, Methods and Tools for Reproducible Network Research (MoMeTools) in conjunction with ACM SIGCOMM*, pages 47 – 56, Karlsruhe, Germany, August 2003.

C-2. Andrew Laffely, Jian Liang, Prashant Jain, Ning Weng, Wayne Burleson, and Russell Tessier. Adaptive Systems on a Chip (aSoC) for Low-Power Signal Processing, in *Proc. of the 35th Asilomar Conference on Signals, Systems, and Computers*, pages 1217 – 1221, Monterey, CA, November 2001.

C-1. Ning Weng, Jiann Yuan, Ronald Demara, and D. Ferguson. Glitch Power Reduction For Low Power IC Design, in *Proceedings of the Ninth Annual NASA Symposium on VLSI Design*, pages 751 – 757, Albuquerque, NM, November 2000.

Abstracts

A-5. Lucas Vespa, Mini Mathew, and Ning Weng. Tolapai-based Pattern Matching Acceleration, in *Proc. of Intel Embedded and Communications Education Summit*, Chandler, AR, February 2009.

A-4. Atul Mahajan, Benfano Soewito, Sai K. Parsi, Ning Weng and Haibo Wang. Implementing High-speed String Matching Hardware for Network Intrusion Detection Systems, in *Proc. of Sixteenth ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (FPGA)*, Monterey, CA, February 2008.

A-3. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. Workload Analysis for Network Processor Design, in *Proc. of Boston Area Computer Architecture Workshop (BARC2004)*, Boston, MA, January 2004.

A-2. Ramaswamy Ramaswamy, Ning Weng, and Tilman Wolf. An IXA-based Network Measurement Node, in *Proc. of Intel IXA University Summit*, Hudson, MA, September 2004.

A-1. Ning Weng, Ramaswamy Ramaswamy, and Tilman Wolf. Network Processors - Flexibility and Performance for Next-Generation Networks. Presented at *Network Processors Conference 2003 East*, Danvers, MA, July 2003.

VI. TEACHING EXPERIENCE

A. Teaching Interests and Specialties:

Digital circuit, computer architecture, computer networks, network processing systems and computer security

B. Award:

One of six faculty members of the 2023 cohort of the L.E.A.D. SIU Carbondale Initiative

Outstanding Teacher Award, Department of Electrical and Computer Engineering, College of Engineering, SIUC, 2007, 2010 and 2013.

Honorable Mention of the Cornell Cup Competition presented by Intel, in the role of faculty advisor for SIUC ECE team (Hot Dawgs), Orlando, FL, May 2012.

Honorable Mention of the Cornell Cup Competition presented by Intel, in the role of faculty advisor for SIUC ECE team (Salty Dawgs), Orlando, FL, May 2013.

One of Finalist of the Cornell Cup Competition presented by Intel, in the role of faculty advisor for SIUC ECE team, Orlando, FL, May 2014.

C. Course Development

- ECE 434/504 Computer Systems Security
- ECE 433/502 Internet Systems Security
- ECE 519 Advanced Computer Systems Security with Machine Learning
- ECE 329 Computer Organization and Design
- ECE 526 Network Processing Systems Design
- ECE 553 Advanced Data Communication
- ECE 424/514 Design of Embedded Systems
- ECE 422 Computer Network System Architecture

D. Doctoral Students

1. Minxiao Wang "On the Generalization and Robustness of ML-based Network Intrusion Detection Systems", August, 2024, co-advising with Dr. Ning Yang. First position: PostDoc, Center of Data Science, Emory University, Atlanta, GA.
2. Cheng-Liang Hsieh, "Design and Implementation of Scalable High-Performance Network Functions", August 2017
3. Ashish Anil Chourdhari, "Adaptive Scheduling in a Distributed Cyber-Physical System: A case study on Future Power Grids", October 2015, co-advisor with Dr. Harini Ramaprasad. First position: Senior Engineer, A10 Networks, San Jose, CA.
4. Mini Mathew, Ph.D., "Modeling and Scheduling for Sensor Network Quality-of-Experience Enhancement", May 2015. First position: Visiting Assistant Professor, Dept. of Computer Science, University of Illinois at Springfield.
5. Lucas J. Vespa, Ph.D., "Pattern Encoding Algorithms and Information Modeling Metrics for Network Quality of Service", May 2011. First position: Assistant Professor, Dept. of Computer Science, University of Illinois at Springfield.
6. Benfano Soewito, Ph.D., "Adaptive Security in Computer Networks", June 2009. First position: Assistant Professor and Head of Information Technology Study Program, Universitas Bakrie, Indonesia.

E. Masters Students

1. Sukeerthi Sri Ram, "Hybrid Transformers and Classifiers For Malicious URL Detection", May 2025.
2. Hasibul Jamil, "Machine Learning based Algorithmic Approaches for Network Traffic Classification", July 2021. Current position: Ph.D student, University at Buffalo
3. Prashant Baral, "IoT Device Identification using Device Fingerprint and Deep Learning", May 2021. Current position: Engineer, AMD, Austin, TX
4. Claudio G Copello, "Enhancing Data Security and Energy Efficiency on Battery-Free Programmable Platform via Adaptive Scheduling", August 2016. Current position: Engineer, Northrop Grumman
5. Yijing Zhang, "An Efficient and Secure Transmission Method Using Data Partitioning for AMI in Smart Grids", July 2014.
6. Henry I. Hung Li, M.S., "Phase and Rate Control for Improving Information Quality in 802.15.4 Wireless Sensor Networks", August 2010. First position: Ph.D. student at SIUC
7. Theo Phillips, M.S., "Improved Mobile Ip Based Foreign Agent Selection Method", October 2009. Current position: Configuration Manager, AT&T.
8. Ritam Chakrovort, M.S., "Lightweight Testbed for Evaluating Worm Containing Systems". First position: Network Engineer, Amazon, October 2009.
9. Mini Mathew, M.S., "Novel State Coding for Scalable Pattern Matching", May 2009. first position: Ph.D student in ECE of SIUC
10. Lucas John Vespa, M.S., "Memory-Efficient Pattern Matching for Network Intrusion Detection", August 2008. Current position: Ph.D student in ECE of SIUC
11. Sai Kumar Parsi, M.S., "Implementing Network Intrusion Detection Systems on a Multi-Threading FSM", December 2007. Current position: Cognos Report BI Lead, Lennar.
12. Satish Dechu, M.S., "Mapping Task Graphs onto Network Processors by Simulated Annealing", May 2007. Current position: Principle Software Engineer, Cadence Design Systems.
13. Nandeesh Muttangi, M.S., "Automated Task Allocation for Network Processors Using Genetic Algorithm", December 2006. Current position: Data Management Manager, MedAssets, Inc.

F. Undergraduate Students

1. Nicolas Forcade-Perkins, undergraduate research assistant, "The robustness of Machine Learning and Their applications on Network Security", April to July 2023.
2. Mohanad Ajina, University Honors Program Saluki Scholars Research Opportunity Undergraduate Assistantship, "Chargeable Implantable Cardioverter Defibrillator via Wireless Remote", 2013-2014.
3. Faculty advisor for SIUC ECE team for the Cornell Cup Competition presented by Intel, 2012, 2013, 2014, 2015 and 2016, Orlando, FL.
4. Faculty advisor for Boeing Senior Design Teams F14-83-BOE1 and F14-83-BOE2, 2014–2015.
5. Faculty advisor for Senior Design Team Power Line Hot Spot Detection, 2015–2016.

G. Visiting Scholars

Dr. Wei Wei, School of Mathematics and Systems Science, Beihang University, Beijing, China, Sep. 2015– Sep. 2016.

VII. UNIVERSITY EXPERIENCE

A. Department/School Committees:

- Faculty Search Committee, 2023.
- Graduate Committee, 2020 - present.
- Undergraduate Committee, 2013 - 2020.
- ABET Review Committee, 2013 - 2020.
- Faculty Advisor for SIUC IEEE Student Chapter, 2013 - 1/2016.
- Graduate Committee, 2012 - 2013.
- Chair Search Committee, 2012.
- Ph.D. Committee, 2007 - 2011.
- Course Coordinator for ECE 327, ECE 424, ECE 526, and ECE 553, 2006 - present.
- Faculty Searching Committee, 2008, 2012, 2013, 2014, 2022.
- Chair Review Committee, 2008.
- Number of Masters and Ph.D. committees on which have served: more than 40 (including 19 times as committee chair).

B. College Committees:

- Chair of College Promotion/Tenure Committee, College of Engineering, SIUC, 2023.
- College Student Affairs, College of Engineering, SIUC, 2020 - present.
- Instructor of Summer Bridge Program, College of Engineering, SIUC, 2008.
- Commencement Ceremonies Usher (2006 and 2010) and Marshals (2007), College of Engineering, SIUC.

C. University Committees:

- Saluki Success Instructor, 2020 – present.
- Member of Chancellor L.E.A.D. SIU Carbondale initiative, August 2023 – May 2024.
- Faculty Seed Grant Review Committee, Southern Illinois University Carbondale, 2011.
- SIUC Signage Committee, Southern Illinois University Carbondale, 2008 - present.
- Judge for Illinois Junior Academy of Science, March, 2009.

VIII. PROFESSIONAL SERVICE

A. Membership in Professional Associations:

Senior Member IEEE (Institute of Electrical and Electronics Engineers) elected in Oct. 2012.

B. Editorial Board Member:

- Co-editor for Special Issue AI for Assistant Technology, Frontiers in Computer Science, 2023
- IEEE Access from 2018 to 2019.
- International Journal of Security and Networks (IJSN) from 2011 to 2015.

C. Evaluation of Manuscripts for Journals

- IEEE Journal on Selected Areas in Communications
- IEEE/ACM Transactions on Networking
- IEEE Transactions on Computers
- IEEE Transaction on Design Automation of Electronic System
- IEEE Micro.
- ACM Transactions on Autonomous and Adaptive Systems
- ACM Transactions on Embedded Computing Systems
- Journal of Circuits, Systems and Computers
- Integration the VLSI Journal
- Journal of Systems and Software.

D. Technical Program Committee:

- **Member**: IEEE INFOCOM 2019 - IEEE Conference on Computer Communications.
- **Member**: 9th IEEE Annual Ubiquitous Computing, Electronics, and Mobile Communication Conference, IEEE UEMCON 2018.
- **Member**: 39th IEEE Sarnoff Symposium, 2018.
- **Member**: 33th ACM Symposium on Applied Computing (SAC-2018), Embedded System Track.
- **Publicity Chair**: The 27th International Conference on Computer Communications and Networks (ICCCN 2018) .
- **Member**: 38th IEEE Sarnoff Symposium, 2017.
- **Member**: 32th ACM Symposium on Applied Computing (SAC-2017), Embedded System Track.
- **Member**: 37th IEEE Sarnoff Symposium, 2016.
- **Member**: International Workshop on Systems and Algorithms for Distributed Embedded Intelligence (SADEI-2016).
- **Member**: 15th IEEE Computer Society Annual Symposium on VLSI (ISVLSI-2016).

- **Member**: 31th ACM Symposium on Applied Computing (SAC-2016), Embedded System Track.
- **Lead Guest Editor**: Special Issue on Quality of Information in Distributed Sensor Networks International Journal of Distributed Sensor Networks November 2015 .
- **Member**: 30th ACM Symposium on Applied Computing (SAC-2015), Embedded System Track.
- **Travel Grant Chair**: ACM/IEEE Architectures for Networking and Communications Systems (ANCS-2016) .
- **Member**: 14th IEEE Computer Society Annual Symposium on VLSI (ISVLSI-2015).
- **Member**: International Workshop on Systems and Algorithms for Distributed Embedded Intelligence (SADEI-2015).
- **Member**: The 43rd International Conference on Parallel Processing (ICPP-2014).
- **Member**: 29th ACM Symposium on Applied Computing (SAC-2014), Embedded System Track.
- **Member**: 28th ACM Symposium on Applied Computing (SAC-2013), Embedded System Track.
- **Member**: 7th Workshop on Embedded Systems Security (WESS-2012).
- **Member**: The 2012 IEEE International Conference on Internet of Things.
- **Member**: 27th ACM Symposium on Applied Computing (SAC-2012), Embedded System Track.
- **Member**: 6th Workshop on Embedded Systems Security (WESS-2011).
- **Session Chair**: The 2011 IEEE International Conference on Internet of Things.
- **Publicity Co-Chair**: ACM/IEEE Architectures for Networking and Communications Systems (ANCS-2011) .
- **Member**: IEEE International Conference of Computer Design (ICCD-2011) .
- **Member**: International Workshop on Federated Wireless Sensor Systems (FedSenS-2011).
- **Member**: 9th IEEE International Symposium on Parallel and Distributed Processing with Applications (ISPA-2011) .
- **Member**: 26th ACM Symposium on Applied Computing (SAC-2011), Embedded System Track.
- **Member of Student Travel Grant selection committee** for 19th IEEE International Conference on Computer Communications and Networks (ICCCN 2010).
- **Member**: 12th IEEE International Conference on High Performance Computing and Communications (HPCC-2010).
- **Member**: 5th Workshop on Embedded Systems Security (WESS-2010).
- **Member**: 25th ACM Symposium on Applied Computing (SAC-2010), Embedded System Track.
- **Member**: 4th Workshop on Embedded Systems Security (WESS-2009).
- **Member**: The First Workshop on Performance Evaluation of Next-Generation Networks (NetEval-2009).
- **Member**: The International Conference on Security and Management (SAM-2009).

- **Member**: IEEE International Conference on High Performance Computing and Communications (HPCC-09).
- **Member**: The International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA-2009).
- **Member**: IEEE 7th International Conference on BioInformatics & BioEngineering (BIBE-2007).

E. National Science Foundation Review Panel: 2015, 2017, 2018, 2019 and 2020.

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