Nirnimesh Ghose Assistant Professor

CONTACT INFORMATION

Department:	School of Computing
University:	University of Nebraska–Lincoln
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CAREER HIGHLIGHTS

- ◇ Secured two NSF awards as a Principal Investigator (PI) totaling $1.8 million and two internal grants amounting to $157K.
- ◇ Published impactful research in top-tier conferences and high-impact journals.
- ◇ Graduated two Master's students; currently mentoring six Ph.D. students, with one Ph.D. candidate graduating Summer 2025.
- ◇ Taught a broad range of courses, from introductory undergraduate to core graduate-level classes.
- ◇ Actively serve the research and academic community as an editor, reviewer, conference organizer, and committee chair within the unit.

RESEARCH INTERESTS

Network security and privacy with applications to emerging wireless networks, cyber-physical systems, Internet-of-things, Agricultural Internet-of-things, aviation and transportation networks, bio-social inspired dynamic spectrum access and the interaction between cybersecurity and social networks.

EDUCATION

- **The University of Arizona, Tucson, Arizona**

  Ph.D. in Electrical and Computing Engineering, May 2019
  - Dissertation Title: *"Authentication and Message Integrity Verification without secrets"*
  - Advisor: Dr. Loukas Lazos
  - GPA: 4.00/4.00

- **Illinois Institute of Technology, Chicago, Illinois**

  Master of Science in Electrical Engineering, May 2012
  - Thesis Title: *"Congestion control and packet reordering for multipath transmission control protocol"*
  - Advisor: Dr. Tricha Anjali
  - GPA: 3.52/4.00

- **Uttar Pradesh Technical University (UPTU), Lucknow, U.P., India**

  Bachelor of Technology in Electronics and Communication Engineering, June 2010
  - Undergrad Project: *"Cell phone controlled home appliances using microcontroller AT89S 8253"*
  - GPA: 74.5/100

ACADEMIC EXPERIENCE

- **University of Nebraska - Lincoln, Nebraska** August 2019 - Present

  Assistant Professor

- **The University of Arizona, Tucson, Arizona** May 2019 - July 2019

  Research Specialist, Principal, Advisor: Dr. Loukas Lazos

- **The University of Arizona, Tucson, Arizona** January 2014 - May 2019

  Research Assistant, Advisor: Dr. Loukas Lazos

- **Illinois Institute of Technology, Chicago, Illinois** January 2011 - May 2012

Research Assistant, Advisor: Dr. Tricha Anjali

• **Illinois Institute of Technology, Chicago, Illinois** June 2011 - November 2011

Research Assistant, Advisor: Dr. Kenneth Zdunek

• **Indian Institute of Technology, BHU, Varanasi, U.P. India** May 2009 - August 2009

Undergrad Research Assistant, Advisor: Dr. P. Chakravarty

INDUSTRY EXPERIENCE

• **Fidelity, Covington, Kentucky** August 2012 - December 2013

Application Developer

PUBLICATIONS

Underlined are the students under my supervision.

Manuscripts under Review/Preparation

1. Anderson, Malcolm I.; Duong, Truc T.; Oguchi, Ebuka; Wisniewska, Anna; **Ghose, Nirnimesh**t, "Systematization of Knowledge for Security in Molecular and Nano-communications," in Preparation for *IEEE Transactions on Molecular, Biological, and Multi-Scale Communications (TMBMC)*, pp. 117, 2025. [impact factor: 2.4]. (Contribution: 40%–Mentored my Ph.D. student through the work and assisted in writing)
2. Oguchi, Ebuka; **Ghose, Nirnimesh**; Vuran, Mehmet Can, "Soil assisted trust-establishment for underground internet-of-things," Under Review at *IEEE Wireless Communication (TWC)*, pp. 113, 2025. [impact factor: 10.4]. (Contribution: 40%–Mentored my Ph.D. student through the work and assisted in writing)

Journal Papers

1. Bourke, Chris M.; **Ghose, Nirnimesh**, "Improving Student Success Through Parachuting," in *The Journal of Computing Sciences in Colleges*, vol. 40, no. 6, pp. 29 - 38, 2025 [impact factor: 1.0]. (Contribution: 40%–Data collection and writing).
2. **Ghose, Nirnimesh**; Gupta, Kaustubh; Lazos, Loukas; Li, Ming; Xu, Ziqi; Li, Jingcheng, "ZITA: Zero-Interaction Two-Factor Authentication using Contact Traces and In-band Proximity Verification," *IEEE Transactions on Mobile Computing*, Vol. 23, No. 5, pp. 6318 - 6333, May, 2024. [impact factor: 7.9]. (Contribution: 80%–Major contribution in developing the protocol, security analysis and mentoring my M.S. student to undertake experimentation)
3. **Ghose, Nirnimesh**; Lazos, Loukas; Li, Ming; "In-band Secret-Free Pairing Protocol for COTS Wireless Devices," *IEEE Transactions on Mobile Computing (TMC)*, Vol. 21, No. 2, pp. 612 - 628, February 2022. [impact factor: 7.9]. (Contribution: 90%–Major contribution in developing the protocol, security analysis and experimentation)

..... Before joining UNL .....

4. **Ghose, Nirnimesh**; Hu, Bocan; Zhang Yan; Lazos, Loukas, "Secure Physical Layer Voting," *IEEE Transactions on Mobile Computing*, Vol. 17, No. 3, pp. 688 - 702, March 2018.[impact factor: 7.9].

Peer-Reviewed Conference Proceedings

1. Ninan, Mabon; Evans, Ryan; Reichling, Logan; **Ghose, Nirnimesh**; Wang, Boyang, "TinyRadio: Tiny Neural Networks for Fingerprinting Radio Frequency Signals," in *Proc. of IEEE National Aerospace Electronics Conference (NAECON), Dayton, OH*, pp. 1 - 8, Jul. 28 to 31, 2025. (Contribution: 20%–Data collection and developing the empirical model for simulation).
2. Abualia, Sayed Khalil Ibrahim; Wisniewska, Anna; **Ghose, Nirnimesh**, "Gradient Boost enhanced Artificial Immune System algorithm for adaptive DDoS attack detection in IoT," in *Proc. of IEEE International Conference on Communications (IEEE ICC): Communication and Information System Security Symposium, Montreal, Canada*, pp. 1 - 6, Jun. 8 to 12, 2025. (Contribution: 20%–Data collection and developing the empirical model for simulation).

3. Afrin, Fahmida; Wang, Boyang; **Ghose, Nirnimesh**, "SARP: Spatial Agnostic Radio Fingerprinting with Pseudo-Labeling," in *Proc. of IEEE Consumer Communications & Networking Conference (IEEE CCNC), Las Vegas, NV*, pp. 1 - 5, Jan. 10 to 13, 2025. (Contribution: 60%–Mentored my Ph.D. student through the work and assisted in writing).
4. Afrin, Fahmida; Karanam, Venkat Sai Suman Lamba; Ramamurthy, Byrav; **Ghose, Nirnimesh**, "Poster: Securing Smart Meter Communication with an Ensemble Fingerprinting Framework," in *Proc. of IEEE Consumer Communications & Networking Conference (IEEE CCNC), Las Vegas, NV*, pp. 1 - 2, Jan. 10 to 13, 2025. (Contribution: 60%–Mentored my Ph.D. student through the work and assisted in writing).
5. Duong, Truc T.; Wisniewska, Anna; **Ghose, Nirnimesh**, "Poster: Reciprocal Altruism as a Rogue Node Detection Mechanism in Dynamic Spectrum Access Networks," in *Proc. of IEEE Consumer Communications & Networking Conference (IEEE CCNC), Las Vegas, NV*, pp. 1 - 2, Jan. 06 to 09, 2024. (Contribution: 20%–Data collection and developing the empirical model for simulation).
6. Karanam, Venkat Sai Suman Lamba; Afrin, Fahmida; Ramamurthy, Byrav; **Ghose, Nirnimesh**, "Poster: Cross-layer Device Identification for Smart Grid Substation Networks," in *Proc. of IEEE Conference on Communications and Network Security (IEEE CNS), Orlando, FL*, pp. 1 - 2, Oct. 02 to 05, 2023. (Contribution: 30%–Mentored my M.S. student through the work and assisted in writing).
7. Oguchi, Ebuka; **Ghose, Nirnimesh**, "VET: Autonomous Vehicular Credential Verification using Trajectory and Motion Vectors," *Proc. of EAI International Conference on Security and Privacy in Communication Networks (EAI SecureComm 2023), Hong Kong SAR, Hong Kong*, pp. 1 - 23, Oct. 19 to 21, 2023. (Acceptance rate: **30.3%**) (Contribution: 50%–Mentored my Ph.D. student through the work and assisted in writing).
8. Gupta, Kaustubh; **Ghose, Nirnimesh**; Wang, Boyang, "RADTEC: Re-authentication of IoT Devices with Machine Learning," in *Proc. of IEEE Consumer Communications & Networking Conference (CCNC), Las Vegas, NV*, pp. 817 - 822, Jan. 08 to 12, 2023. (Contribution: 60%–Mentored my M.S. student through the work and assisted in writing).
9. Duong, Truc T; Wisniewska, Anna; **Ghose, Nirnimesh**, "Decentralized Rogue Node Detection in Fair Bio-Inspired Dynamic Spectrum Access Networks," in *Proc. of IEEE International Conference on Computational Intelligence and Communication Networks (CICN), Al-Khobar, KSA*, pp. 743 - 747, Dec. 04 to 06, 2022. (Contribution: 20%–Data collection and developing the empirical model for simulation).
10. Li, Haipeng; Gupta, Kaustubh; Wang, Chenggang; **Ghose, Nirnimesh**; Wang, Boyang, "RadioNet: Robust Deep-Learning Based Radio Fingerprinting," in *Proc. of IEEE Conference on Communications and Network Security (IEEE CNS), Austin, TX*, pp. 190 - 198, Oct. 03 to 05, 2022. (Acceptance rate: **19.4%**) (Contribution: 50%–Mentored my M.S. student through the work and assisted in writing).
11. Oguchi, Ebuka; **Ghose, Nirnimesh**; Vuran, Mehmet Can, "STUN: Secret-Free Trust- Establishment For Underground Wireless Networks," *Proc. of IEEE INFOCOM Wkshp WirelessSec: 5G & Beyond Wireless Security, Virtual Event*, pp. 1 - 6, May 02 to 05, 2022. (Contribution: 60%–Mentored my Ph.D. student through the work and assisted in writing).
12. Xu, Ziqi; Li, Jingcheng; Pan, Yanjun; Lazos, Loukas; Li, Ming; **Ghose, Nirnimesh**, "PoF: Proof-of-Following for Vehicle Platoons."in *Proc. of Network and Distributed System Security Symposium (NDSS 2022), San Diego, CA (Hybrid Event)*, Apr. 24 to 28, 2022. (Acceptance rate: **16.2%**) (Contribution: 20%–Mentored the student in developing the protocol and data collection).
13. Wisniewska, Anna; **Ghose, Nirnimesh**; Khan, Bilal, "Evaluation of a Bio-Socially Inspired Secure DSA Scheme Using Testbed-Calibrated Hybrid Simulations," in *Proc. of IEEE Information Technology, Electronics and Mobile Communication Conference, Virtual Event*, pp.

0934 - 0939, Oct. 27 to 30, 2021. (***Best in-session Presentation***). (Contribution: 20%–Data collection and developing the empirical model for simulation).

14. Li, Haipeng; Wang, Chenggang; **Ghose, Nirnimesh**; Wang, Boyang, "Robust Deep-learning-based Radio Fingerprinting with Fine-Tuning," in *Proc. of 14th ACM Conference on Security and Privacy in Wireless and Mobile Networks (ACM WiSec 2021), Virtual Event*, pp. 395 - 397, June 28 to July 2, 2021. (Contribution: 40%–Mentored the student in developing the protocol and data collection).

..... Before joining UNL .....

15. **Ghose, Nirnimesh**; Lazos, Loukas; Rozenblit, Jerzy; Breiger, Ronald; "Multimodal Graph Analysis of Cyber Attacks," in *Proc. of 2019 Spring Simulation Conference (SpringSim19), Tucson, AZ*, pp. 1 - 12, Apr. 29 - May 2, 2019.
16. **Ghose, Nirnimesh**; Lazos, Loukas; Li, Ming, "Secure Device Bootstrapping without Secrets Resistant to Signal Manipulation Attacks," in *Proc. of 39th IEEE Symposium on Security & Privacy (Oakland) 2018 (S&P 2018), San Francisco, CA*, pp. 819 - 835, May 21-23, 2018. (Acceptance rate: **11.48%**).
17. **Ghose, Nirnimesh**; Lazos, Loukas; Li, Ming, "SFIRE: Secret-Free In-band Trust Establishment for COTS Wireless Devices," in *Proc. of 37th IEEE International Conference on Computer Communication (IEEE INFOCOM 2018), Honolulu, HI*, pp. 1529 - 1537, Apr. 15-19, 2018. (Acceptance rate: **19.2%**). (***Best in-session Presentation***).
18. **Ghose, Nirnimesh**; Lazos, Loukas; Li, Ming, "HELP: Helper-Enabled In-Band Device Pairing Resistant Against Signal Cancellation," in *Proc. of 26th USENIX Security Symposium (USENIX Security'17), Vancouver, BC, Canada*, pp. 433 - 450, Aug. 16-18, 2017. (Acceptance rate: **16.1%**).
19. **Ghose, Nirnimesh**; Lazos, Loukas, "Verifying ADS-B navigation information through Doppler shift measurements," in *Proc. of 34th IEEE/AIAA Digital Avionics Systems Conference (DASC)*, pp.4A2-1 - 4A2-11, Sept. 13-17, 2015. (***2nd Best Graduate Student Paper***).

Thesis

1. **Ghose, Nirnimesh**, "Congestion control and packet reordering for multipath transmission control protocol," MS thes., Illinois Institute of Technology, 2012.
2. **Ghose, Nirnimesh**, "Authentication and Message Integrity Verification without Secrets," Diss. The University of Arizona, 2019.

Funded Grants

External Grants

◇ SaTC: CORE: Medium: SATTVA: Soil-Assisted Things Trust Verification for Ag-IoT (CNS:2331191) from NSF, PI Dr. Nirnimesh Ghose, Co-PI Dr. Mehmet Can Vuran, Senior Personal Dr. Yufeng Ge duration 07/2024–06/2028 for $1,198,575.00 (60%).

◇ Collaborative Research: SaTC: CORE: Small: Towards Robust, Scalable, and Resilient Radio Fingerprinting (CNS:2225161) from NSF, UNL PI Dr. Nirnimesh Ghose, Lead PI Dr. Boyang Wang (University of Cincinnati) duration 02/2023–01/2026 for $602,681 (UNL Share: $299,997) (50%).

Internal Grants

◇ Zero-Effect Eye-Tracking Based Two Factor Authentication from Jane Robertson Layman Fund, PI Dr. Nirnimesh Ghose, Co-PI Dr. Bonita Sharif duration 08/2025–07/2026 for $10,000.00 (50%).

◇ Smart Grid cybersecurity enhancement using smart authentication and intelligent threat detection from NCESR, PI Dr. Byrav Ramamurthy, Co-PI Dr. Nirnimesh Ghose duration 01/2023–05/2025 for $170,000.00 (50%).

◇ Machine Learning, Data Mining and Wireless PHY-layer for a secure IoT System from NU system, PI Dr. Jacques Bou Abdo (UNK), Co-PI Dr. Nirnimesh Ghose (UNL), and Co-PI Dr. Basheer Qolomany (UNK) duration 07/2021–06/2022 for $7,100.00 (33%).

MENTORED STUDENTS

Current Students

Graduate

◇ Mr. Hakim Lado - Ph.D., Expected May 2027.
◇ Mr. Bikash Banjara - Ph.D., Expected May 2028 (Co-Advised with Dr. Mehmet Can Vuran).
◇ Ms. Tahere Rafiei - Ph.D., Expected May 2028 (Co-Advised with Dr. Mehmet Can Vuran).

Undergraduate

◇ Mr. Will Adair, Senior, B.S. (Co-Advised with Dr. Bonita Sharif).
◇ Ms. Sakshi Pande, Junior, B.S.

Past Students

Graduate

◇ Mr. Ebuka Philip Oguchi - Ph.D. (Dissertation: Authentication and Message Integrity Verification for Emerging Wireless Networks) - Summer 2025; Initial Employment: Exploring academic job market.
◇ Ms. Fahmida Afrin - M.S. (Thesis: Spatial & Temporal Agnostic Deep-Learning based Radio Fingerprinting) - Summer 2023; Initial Employment: Ph.D. Student - School of Computing, University of Nebraska–Lincoln.
◇ Mr. Kaustubh Gupta - M.S. (Thesis: Machine Learning Based Device Type Classification For IoT Device Re- and Continuous Authentication) - Spring 2022; Initial Employment: Security Analyst - Cloud Response at Amazon.

Undergraduate

◇ Ms. Megan E Chaffey, Sophomore, B.S., 2019–20.
◇ Ms. Arielle Monson, Senior, B.S., Fall 2022–Spring 2023 (Co-Advised with Dr. Brittany Duncan).
◇ Mr. Rochak Rijal, Junior, B.S., Spring 2022.
◇ Mr. Pierre Raoof Louis Mansour, Senior, B.S. - Fall 2024

TEACHING: COURSES TAUGHT

Fall 2019
CSCE 496/896 Special Topics: Mobile and Wireless Security (Enrollment: Undergraduate: 6, Graduate: 0).

Spring 2020
CSCE 465/865 Wireless Communication Networks (Enrollment: Undergraduate: 11, Graduate: 3).

Fall 2020
CSCE 477/877 Cryptography & Security (Enrollment: Undergraduate: 17, Graduate: 0).

Spring 2021
CSCE 465/865 Wireless Communication Networks (Enrollment: Undergraduate: 13, Graduate: 1).

Fall 2021
CSCE 477/877 Cryptography & Security (Enrollment: Undergraduate: 21, Graduate: 3).

Spring 2022
CSCE 465/865 Wireless Communication Networks (Enrollment: Undergraduate: 7, Graduate: 13).

Fall 2022
CSCE 477/877 Cryptography & Security (Enrollment: Undergraduate: 21, Graduate: 3).

Spring 2023
CSCE 465/865 Wireless Communication Networks (Enrollment: Undergraduate: 8, Graduate: 6).

Fall 2023
CSCE 155A Computer Science I (Enrollment: Undergraduate: 132).

CSCE 477/877 Cryptography & Security (Enrollment: Undergraduate: 32, Graduate: 4).

Spring 2024
CSCE 155A Computer Science I (Enrollment: Undergraduate: 84).

Fall 2024
CSCE 155A Computer Science I (Enrollment: Undergraduate: 85).

CSCE 477/877 Cryptography & Security (Enrollment: Undergraduate: 15, Graduate: 4).

Spring 2025
CSCE 155A Computer Science I (Enrollment: Undergraduate: 54).

Honors and Awards

◇ UNL CoE's Research Excellence Award, 2023-24
◇ Best-in-Session Presentation Award at 12th IEEE IEMCON, 2021
◇ Travel grant for 39th IEEE Security and Privacy Symposium (funded by IEEE), 2018
◇ Best-in-Session Presentation Award at 37th IEEE INFOCOM, 2018
◇ Travel grant award for 37th IEEE INFOCOM (funded by IEEE ComSoc), 2018
◇ Travel grant award for 26th USENIX Security Symposium (funded by Google), 2017
◇ 2nd Best Graduate Student Paper at 34th Digital Avionics Systems Conference, 2015
◇ Travel grant award for 34th DASC (funded by GPSC, University of Arizona), 2015
◇ Byron Innovation Project Award for developing Wireless sensor Network prototype, 2011
◇ Prestigious KVPY (Young Scientist) Fellowship of DST Govt. of India, 2003

Professional Services and Activities

Editorial Board
Digital Agriculture Journal, with Pivot Science Publications 2024–present.

Leadership Positions in Organizations
IEEE Nebraska Section Communications Technical Chapter Vice Chair 2024–present.

Memberships in Professional Organizations

◇ IEEE Member 2019-Present.
◇ IEEE Student Member 2015-2019.

Conference Organizing Committee

◇ IEEE ICC 2025 (Session Chair).
◇ IEEE CNS 2018 (Web Chair).

Journal Reviewers (direct reviews only)

◇ IEEE Transactions on Information Forensics & Security (TIFS) (1 review 2025, 2 reviews 2024).

◇ EEE Transactions on Reliability (TR) (1 review 2025).
◇ IEEE Open Journal of the Communications Society (OJ-COMS) (1 review 2025, 1 review 2024).
◇ IEEE Internet of Things Journal (IoTJ) (3 reviews 2024).
◇ IEEE Transactions on Vehicular Technology (TVT) (1 review in 2024, 1 review in 2019).
◇ ACM Transactions on Intelligent Systems and Technology (TIST) (1 review 2023).
◇ IEEE Transactions on Machine Learning in Communications and Networking (1 review 2022).
◇ IEEE Transactions on Mobile Computing (TMC) (4 reviews in 2022, 1 review in 2021, 1 review in 2020, 1 review in 2018).
◇ IEEE Transactions on Dependable and Secure Computing (TDSC) (1 review in 2022, 1 review in 2021, 2 reviews in 2020 and 1 review in 2019).
◇ IET Wireless Sensor Systems (2 reviews 2021).
◇ IEEE/ACM Transactions on Networking (TNET) (2 reviews in 2020 and 1 review in 2015).
◇ IEEE Transactions on Network Science and Engineering (TNSE) (1 review in 2020).
◇ IEEE Transactions on Wireless Communications (TWC) (1 review in 2019).
◇ IEEE Transactions on Knowledge and Data Engineering (TKDE) (1 review in 2019).
◇ IEEE Transactions on Industrial Informatics (TII) (1 review in 2024, 1 review in 2019).
◇ Future Generation Computer Systems (Elsevier) (1 review in 2018).
◇ Digital Signal Processing (Elsevier) (1 review in 2018).

Conference Reviewers (direct reviews and sub-reviews)
ACNS 2026; MILCOM 2025; ICNC 2025, 2024; IEEE CCNC 2025, 2024, 2023, 2022, 2021, 2020; IEEE CNS 2025, 2024, 2023, 2022, 2020, 2018; EAI SecureComm 2024; ACM CCS 2024, 2023; ACM WiSec 2024, 2023, 2018; IEEE CICN 2022; IEEE INFOCOM (Wireless-Sec Wkshp) 2023, 2022; IEEE INFOCOM 2019; ESORICS 2018; IEEE WCNC 2016.

Panel Reviewers
NSF NeTS Summer 2024; NSF SaTC Summer 2023, 2021.

Unit Services

◇ Graduate recruitment committee, chair 2024-2025.
◇ Colloquium committee, co-chair 2022-2023.
◇ SoC Advisory Committee, member 2023-2026.
◇ Graduate admissions committee, member 2019-2025.
◇ Graduate computer engineering subcommittee, member 2019-2025.
◇ DEI (cSAB, LC), member 2023-2024.
◇ Ph.D. qualifying examination committee, member 2022-2023.
◇ Search committee, member 2019-2022.

Other Service Accomplishments

◇ OREDs Research Development Fellow Program 2019-2020.
◇ OREDs CAREER Club 2019-2020, 2021-2022.

Technology Skills

USRP National Instruments USRP 2921, Ettus USRP 2, LabView.
Network Simulation tools Network Simulator-2 and Network Simulator-3.
Technology CAD Device level and process level simulation tools - ATLAS (Device), ATHENA.
Mathematical Modeling Tools Mathworks MATLAB.
Computer Programming python, Java, Spring, Hibernate, C, C++, OTcl.