EBUKA PHILIP OGUCHI

Department: School of Computing,
School: University of Nebraska - Lincoln
Address: 114c Schorr Center, 1100 T St, Lincoln, Nebraska 68588-0150
Phone: (531) 229-7046
Emails: oguchiebuka919@gmail.com, eoguchi2@huskers.unl.edu
Website: ebukaoguchi.github.io
LinkedIn: LinkedIn Profile
GitHub: Oguchi4

About Me

I am a 4th-year Ph.D. candidate in Computer Science and Engineering at the University of Nebraska, Lincoln. My research focuses on physical layer aspects of cybersecurity across agricultural, vehicular, machine learning, and molecular security. I specialize in ensuring message integrity and authentication for commercial off-the-shelf (COTS) wireless devices, utilizing expertise in machine learning, cryptography, and security protocols for secure communication.

Education

- **Ph.D. in Computer Science and Engineering** **(2021 – 2025)**
  University of Nebraska, Lincoln
  CGPA: 4.0/4.0
  Research Project: Message Integrity and Authentication for COTS wireless devices
- **Masters in Computer Applied Technology** **(2018 - 2020)**
  Changchun University of Science and Technology, China
  CGPA: 3.87/4.0
  Research Project: Smoke Recognition Algorithm Based on ResNet and GoogleNet Networks
- **Bachelor of Engineering, Electronic and Computer Engineering (2011 - 2016)**
  Nnamdi Azikiwe University, Awka, Nigeria
  Final Project: Biometric Course Register Using Fingerprint Authentication

Research & Publications

- "STUN: Secret-Free Trust-Establishment for Underground Wireless Networks," IEEE INFOCOM Workshop on Wireless-Sec: 5G & Beyond Wireless Security, Virtual Event, May 2022.

- "VET: Autonomous Vehicular Credential Verification using Trajectory and Motion Vectors," EAI SecureComm 2023, Hong Kong, October 2023.
- "Soil Assisted Trust-Establishment For Underground Internet-of-Things," under review to ACM Internet of Things Journal, February 2024.
- Poster: "STUN: Secret-Free Trust-Establishment for Underground Wireless Networks," Nebraska Research Days, March 2023.

Projects

- **Agricultural IoT Security:** Developing trust frameworks for agricultural IoT applications, funded by NSF SaTC: CORE: Medium.
- **Autonomous Vehicle Security:** Enhancing message integrity and authentication using navigational and Doppler data, supported by the Nebraska Center for Energy Sciences Research (NCESR).
- **Radio Frequency Fingerprinting:** Focusing on underground network integrity checks and authentication using Machine Learning, funded by NSF: CORE: Small.

Experience

- **Teaching Assistant, Cryptography & Security, CSCE 477/877: ` Fall 2022**
  Organized experiments, graded homework and labs, and supported students in mastering complex topics. Enrollment: Undergraduate: 21, Graduate: 3
- **Internship at Electronic Development Institute, Awka: Oct. 2015**
  Engaged in developing projects for remote control of home appliances using infrared sensors.

Mentorship

- **Mentorship Programs:**
  - Google CS Research Mentorship Program (CSRMP)
  - The Institute for African American Mentoring in Computing Sciences (iAAMCS)
- **Mentees at the University of Nebraska Lincoln:**
  - Graduate Student: Mr. Hakim Lado - Ph.D. **Fall 2023**
  - Undergraduate Student: Ms. Arielle Monson, Senior **Fall 2022**

Awards and Honors

- **Mary E. and Elmer H. Dohrmann Fellowship: Fall 2023**
  - 1 out of 6 recipients for academic/leadership excellence
- **Chinese Government Scholarship: Oct. 2020**
  - 1 out of 500 recipients around the globe each year.

Certifications

- **Machine Learning Summer School**, University of Oxford **Aug. 2022**
- **CS 50AI**, Harvard University via edX **Jan. 2021**
- **Microsoft Azure ML Scholar**, Microsoft **Sept 2020**
- **Stanford Code-in-Place (CS 106A)**, Stanford University **May 2020**
- **Biomedical Responsible Conduct of Research**, CITI Program **Sept. 2023**
- **Verified International Academic Qualifications** **Sept 2020**
- **Machine Learning Summer School MLSS-Indo 2020**, Indonesia **Aug. 2020**
- **AWS Machine Learning Foundations**, Udacity **July 2020**

Conferences and Summits Attended

- **IEEE Conference on Communications and Network Security (CNS)**: October 2–5, 2023, Orlando, FL, USA
- **IEEE International Conference on Computer Communications (INFOCOM)**: May 2-5, 2022, Virtual Conference
- **EAI SecureComm 2023 - 19th EAI International Conference on Security and Privacy in Communication Networks (SecureComm)**: October 19-21, 2023, Hong Kong
- **NSF Cybersecurity Summit**: October 7-10, 2024, Carnegie Mellon University, Pittsburgh, PA
- **Nebraska Summer Research Program (SRP)**: August 6, 2024, Lincoln, Nebraska
- **Nebraska Engineering Pitch Competition**: April 2, 2024, Kiewit Hall, Room A549, Nebraska
- **NUtech Ventures Inclusive Innovation**: November 30, 2022, UNL's City Campus Nebraska Union, Regency Room B+C
- **NUtech Ventures Startup Workshop**: July 19 + 21, 2022, NIC Conference Center Breakout Rooms B1-B2
- **IAAMCS Fellowship Writing Workshop:** August 14, 2024, Virtual Event

Professional Services and Activities

- **Conference Reviewer:**
    - EAI International Conference on Security and Privacy in Communication Networks (EAI SecureComm) 2024
- **Poster Judge:**
    - Nebraska Summer Research Program (2 reviews in 2024)

Skills:

- **Technical Proficiency:**
    - **Machine Learning/Artificial Intelligence:** Proficient in utilizing TensorFlow and designing and implementing machine learning models for cybersecurity and data integrity applications.
    - **Software Development:** Advanced proficiency in Python for machine learning, C programming for system development, and MATLAB for data analysis and algorithm development.
    - **Security Protocols:** Deep understanding of cryptography and network security practices and developing secure communication protocols using Proverif for protocol verification.
- **Tools and Technologies:**
    - **Software Defined Radios (SDR):** Skilled in using Gnu-radio and USRP 2922/ B210 mini for complex wireless communications and signal processing projects.
    - **Data Analysis and Visualization:** Experienced in using advanced data analytics tools and methodologies to interpret and present data effectively.
    - **Cloud Technologies:** Proficient with Microsoft Azure and AWS Machine Learning Foundations, capable of deploying scalable and secure cloud-based applications.
- **Hardware and Networking:**
    - **Embedded Systems:** Design and implement microcontroller-based projects, including sensor data gathering systems and automation prototypes.
    - **Network Configuration and Security:** Practical experience in setting up and securing wireless networks, including detailed knowledge of WEP and WPA2 security protocols.
    - **Hardware Design and Diagnostics:** Competent in circuit design, soldering, and hardware diagnostics essential for creating and testing electronic devices.
- **Communication and Teaching:**
    - **Mentorship and Leadership:** Active in mentoring roles within academic and project settings, guiding undergraduate and graduate students in their academic and research pursuits.
    - **Public Speaking and Presentation:** Proficient in delivering clear and effective presentations on complex technical topics in academic and professional settings.
- **Additional Competencies:**
    - **Entrepreneurial Initiatives:** Demonstrated leadership in project management and operational improvements, contributing to advanced research projects and technological innovation.

- **Collaborative Projects:** Experienced in working collaboratively in high-stakes environments, ensuring robust design and implementation of technology solutions.

Courses at the University of Nebraska, Lincoln

- **Advanced Wireless Communications and Networks** (CSCE 954)
- **Communication Networks** (CSCE 862)
- **Cryptography and Security** (CSCE 877)
- **Data and Network Security** (CSCE 863)
- **Digital Communications Systems** (CSCE 892)
- **Graph Algorithms** (CSCE 924)
- **Information Theory** (CSCE 896)
- **Internet of Things** (CSCE 838)
- **Introduction to Machine Learning** (CSCE 478)
- **Numerical Analysis** (CSCE 849)
- **Operating Systems Principles** (CSCE 851)
- **Wireless Communications and Networks** (CSCE 865)
