DANIEL ADU WORAE

Ph.D. Candidate, University of Notre Dame, IN, USA

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RESEARCH INTEREST

Internet of Things (IoT), Security, Privacy, Network Systems, RAG, LLMs, AI Agents, Blockchain

EDUCATION

Ph.D. in Computer Science and Engineering 07/2023 - Present
University of Notre Dame Notre Dame, USA

- Advisor: Prof. Nitesh Chawla
- Committee Members: Dr. Spyridon Mastorakis, Dr. Aaron Striegel, Dr. Meng Jiang, Dr. Fanxin Kong, Dr. Susmit Shannigrahi

M.S. in Computer Science and Engineering 08/2023 - 01/2026
University of Notre Dame Notre Dame, USA

- Advisor: Prof. Spyridon Mastorakis

M.E. in Computer Science and Technology 09/2021 - 07/2024
University of Electronic Science and Technology of China (UESTC) Chengdu, China

- Advisor: Prof. Qi Xia
- Honor: UESTC 2021 Academic Achievement Award, Master's Category, First Prize

B.S. in Computer Engineering 10/2016 - 08/2020
Kwame Nkrumah University of Science and Technology Kumasi, Ghana

PUBLICATIONS

Conference Papers:

[c.2] **Adaptive Traffic Camouflage: Causal and Resource-Aware Defense Against IoT Fingerprinting**
Daniel Adu Worae, Spyridon Mastorakis, Nuno Moniz, Nitesh V. Chawla
In submission, arXiv:2609.25787 (preprint)

[c.1] **Hiding in Plain Sight: An IoT Traffic Camouflage Framework for Enhanced Privacy**
Daniel Adu Worae, Spyridon Mastorakis
arXiv:2501.15395 (preprint)

Journal Papers:

[j.5] **NEXUS-MI: Communication-Aware Federated Personalization for Gateway-Coordinated Motor-Imagery Brain-Computer Interfaces**
Daniel Adu Worae, Aarthy Nagarajan
In submission, arXiv:2609.09786 (preprint)

[J.4] **An LLM-Powered AI Agent Framework for Holistic IoT Traffic Interpretation**
Daniel Adu Worae, Spyridon Mastorakis
In submission, arXiv:2510.13925 (preprint)

[J.3] **A Unified Framework for Context-Aware IoT Management and State-of-the-art IoT Traffic Anomaly Detection**
Daniel Adu Worae, Athar Sheikh, Spyridon Mastorakis
In submission, arXiv:2412.19830 (preprint)

[j.2] **Blockchain-Based EV Constant Function Pricer and Oraclized State of Charge Estimator**
Jun Zhong, Jianbin Gao, Hu Xia, Bonsu Adjei-Arthur, **Daniel Adu Worae**, Hairong Lv, Qi Xia
IEEE Transactions on Intelligent Transportation Systems, 2024

[j.1] **Bridging the Gap: Predictive Contracts in Blockchain-Achieving Recalibration for Industrial Networks**
Bonsu Adjei-Arthur, Sophyani Banaamwini Yussif, Sandra Chukwudumebi Obiora, **Daniel Adu Worae**, Olusola Bamisile
Journal of Industrial Information Integration, 2024

Books:

[b.1] **Attribute-based Encryption (ABE): Foundations and Applications within Blockchain and Cloud Environments**
Qi Xia, Jianbin Gao, Isaac Amankona Obiri, Kwame Omono Asamoah, **Daniel Adu Worae**
Wiley–IEEE Press (John Wiley & Sons), 2023.
ISBN: 978-1-119-98937-0
Publisher link

*A comprehensive **14-chapter volume** exploring theoretical foundations and practical applications of attribute-based encryption (ABE) within blockchain and cloud environments.*

PROFESSIONAL EXPERIENCE

Graduate Research Assistant 07/2023 – Present
University of Notre Dame, Department of Computer Science and Engineering

- Conducting research on secure, interpretable, and resilient IoT ecosystems, with a focus on privacy-preserving communication, network traffic analysis, threat detection, and large language model–augmented operational intelligence.

Graduate Teaching Assistant 08/2023 – 12/2024
University of Notre Dame, Department of Computer Science and Engineering

- Assisted in instruction for *Special Topics in Advanced and Secure Networks (Fall 2024)*, *Computer Networks (Spring 2024)*, and *Systems Programming (Fall 2023)*.
- Held regular office hours to support student learning, provided one-on-one advising on coursework and projects, and evaluated assignments, exams, and programming submissions.
- Collaborated with faculty to design grading rubrics, clarify course materials, and ensure consistency in assessment and feedback.

Graduate Teaching Assistant 03/2022 - 01/2023
University of Electronic Science and Technology of China, School of Computer Science and Engineering

- Led tutorial and discussion sessions for *Foundations of Cryptography (Spring 2021–2022 and Spring 2022–2023)* and *Multimedia Technology and Applications (Fall 2022–2023)* to reinforce key course concepts, guide problem-solving, and help students apply theoretical knowledge to practical exercises.
- Assisted in grading assignments, projects, and examinations while supporting students during office hours to clarify challenging topics and provide constructive feedback.

Teaching and Research Assistant 09/2020 - 08/2021
Kwame Nkrumah University of Science and Technology (KNUST), Department of Computer Engineering

- Conducted tutorial and laboratory sessions to reinforce course materials, guide students through hands-on programming exercises, and clarify theoretical concepts in computer engineering.
- Researched on distributed denial of service attacks on networks.

Course Instructor 09/2020 – 09/2021
Huawei Certified ICT Associate (HCIA)

- Delivered instructor-led training for HCIA modules, guiding learners through core topics in networking, routing, and switching.
- Led students through Huawei's official training materials and laboratory exercises to strengthen practical competency and prepare candidates for HCIA certification.

Intern 06/2019 - 08/2019
Ghana Police Service

- Collaborated with senior software engineers on system development and project coordination, gaining hands-on experience in requirement analysis and implementation planning.

- Assembled and tested electrical and hardware components, integrating embedded systems and peripheral devices for departmental projects.
- Assisted in diagnosing and resolving network performance issues, applying foundational principles of computer networking and security to maintain operational efficiency.

ACHIEVEMENTS & AWARDS

Summer Research Fellowship, University of Notre Dame ($3,000) 2023
Full University Scholarship, UESTC 2021-2023
UESTC Academic Achievement Award, Master's category, First Prize 2021

LANGUAGES & SKILLS

Programming Languages: Python, C, C++, JavaScript, MATLAB
Web Technologies: CSS, HTML
Machine Learning: PyTorch, Keras, Sklearn, Pandas
Networking Tools: Wireshark, eNSP, Scapy, Zeek
Database: MySql, SQL
Languages: English – Fluent, Twi – Native

SERVICE

Leadership and Professional Service:

Graduate Student Board, University of Notre Dame August 2023 – Present

Community Service:

Volunteer, Shuyuan Community, Chengdu, China February 2023

Reviewer for Conferences:

IEEE International Conference on Data Mining (ICDM 2025) — Demo Track, Program Committee Member
34th International Symposium on High-Performance Parallel and Distributed Computing (HPDC 2025 Posters)
IEEE International Conference on Advanced Networks and Telecommunications Systems (IEEE ANTS 2024)
IEEE International Conference on Communications (ICC 2024) — MetaNCS Workshop, Technical Program Committee Reviewer

Reviewer for Journals:

IEEE Internet of Things Journal
IEEE Transactions on Mobile Computing
IEEE Transactions on Intelligent Transportation Systems
IEEE Transactions on Dependable and Secure Computing

CERTIFICATIONS

Managing Cybersecurity (Specialization Certificate), Kennesaw State University
Routing and Switching Certification (HCIA), Huawei
5G Certification (HCIA), Huawei
Blockchain (Specialization Certificate), State University of New York
Programming for Everybody (Specialization Certificate), University of Michigan
Machine Learning, Stanford University
Google IT Support, Google