CLEMENT HEANAMPONG

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Research Interest

- **Computer and System Security**
- **Reverse Engineering and IoT Security.**
- **Mobile and Wireless Security.**
- **Blockchain Technology and Applied ML/AI**

Education

Bachelor of Science, Telecommunication Engineering, First Class ((Distinction) Conferred
Jan 2021 – Aug 2024

Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Relevant Courses: Data Communication Networks, Computer Networking, Wireless Data Communication Network, Mobile and Satellite Communication, Analog and Digital Communication Systems, Information Theory, Micro-Processors, Signals and Systems, Electromagnetic Fields, Microwave Engineering, Antenna Design and Propagation

Research Experience

- **Research Assistant, Communications, Networking, and Signal Processing Lab, KNUST.** October 2024 - Present
  - **Ongoing Research:** Reconfigurable Intelligence Surface Signal Watermarking in 5G/6G Communication Systems.
    - Exploring Reconfigurable Intelligent Surfaces (RIS) for signal watermarking in 5G/6G communication systems to enhance security against physical-layer attacks.
  - **Anomaly detection in a 5G-IOT Environment using Federated Learning.** Advancing my undergraduate research for publication.
  - **Currently assisting a professor in supervising undergraduate research groups on channel modeling and signal propagation in LEO satellite networks and on deep learning approaches for object detection and tracking.**
- **Anomaly detection in a 5G-IOT Environment using Federated Learning. Codes** **Undergraduate research**
  - Used flower federated, TensorFlow, and Python to evaluate the performance and did a comparative analysis of a classical FNN and federated learning model using IID and non-IID CIC-IOT 2023.
  - The findings of this research utilized decentralized data processing, enabling the model to learn from data across multiple devices without compromising privacy. This approach not only enhances the accuracy of anomaly detection but also protects sensitive information, aligning with the pressing need for secure IoT frameworks.
- **Provided technical support to peers in executing undergraduate research projects while conducting personal research.**

  collaborating on analyses such as QUIC's resilience to DoS and IP spoofing attacks, assisting with machine learning applications in adaptive demodulation for cognitive networks, and facilitating data generation and cleaning for a study on detecting low-rate DDoS attacks using machine learning in an SDN-based architecture.

Work Experience

- **Research Assistant, Communications, Networking, and Signal Processing Lab, KNUST.** October 2024 - Present
- **Teaching Assistant, Department of Telecommunication Engineering, KNUST.** October 2024 - Present
  - Circuit Theory (EE 287), Optical Communication (TE 381), Data Communication Network (TE 382), Mobile and Satellite Communication (TE 474)
- **Ethical Hacking Instructor, KNUST Cybersecurity Club.** Prepares materials covering the concepts, principles, and practices of cybersecurity. August 2024 - Present
- **Co-Founder and Cybersecurity Instructor at TheHub Digital Learning Academy.** August 2024 - Present
- **Co-cybersecurity Instructor at Virtual InfoSec Africa Training Center, KNUST** Present
- **Cybersecurity Intern, Ideation Axis: Wep application penetration testing.** September 2024 - November 2024
- **Cybersecurity Intern, Virtual infoSec Africa Limited.** Gained experience in networking using Cisco Packet Tracer and completed CompTIA Network+ training. October 2023 - November 2023
- **Technology Intern, Telecel Ghana, Headquarters.** September 2023

Awards and Honors

- **Four consecutive times excellence student award winner** 2021, 2022, 2023, 2024
- **Certificate of Participation, Regional qualification, National Science and Math Quiz.** 2020
- **I received a bronze medal and certificate of participation in the Ghana Science Olympiad, awarded to students ranked 30th to 60th out of 432 participants from 231 schools.** 2019
- **Best BECE Result. Achieved the best BECE results in my school.** 2017

Technical Skills

- **Programming Languages:** Python | Bash | C/C++ | Solidity | Assembly | Git
- **Tools:** LaTeX | MATLAB | Cisco Packet Tracer | NS3 | ADS | ANSYS HFSS
- **Data Visualization:** Matplotlib | Origin | Seaborn
- **Cybersecurity tools:**
  WepApp Assessment: Burp Suite | OWASP ZAP | WPScan | Nikto
  Information Gathering: Nmap | Shodan | Maltego | TheHarvester | Recon-NG | Amass | Censys | OSINT Framework ...
  Password Cracking: John the Ripper | Hydra | Medusa | Cain and Abel | Hashcat
  Vulnerability Scanning: Nessus | OpenVAS | Nexpose
  Social Engineering: GoPhish | HiddenEye | Evilginx
  Exploitation: Metasploit | SQL Map | ExploitDB
  Reverse engineering: Ghidra | GDB
- **Frameworks:** TensorFlow | Pandas | Keras | Flower-federated | TensorFlow Federated | Foundry
- **Soft Skills:** Teamwork | Problem-Solving | Critical Thinking | System Thinking | Adaptability
- **Operating Systems:** Linux | Windows
- **Blockchain:** Remix | Solidity | Metamask | Sepolia | ZkSync | Etheruem | Alchemy | Anvil | Foundry.

Technical Certification

- **DeepLearning.AI:** Machine Learning Specialization
- **CISCO:** Cyber Threat Management
- **Google:** Google Professional Cybersecurity
- **TCM-Security:** Practical Wep Application Penetration Testing
- **Virtual InfoSec Africa:** Ethical Hacking Essentials
- **CISCO:** Network Defense
- **Cyfrin Updraft:** Blockchain Technology (Ongoing)
- **DeepLearning.AI:** Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

Projects

- **Implemented a K-means clustering algorithm to group retail store customers based on their purchase history** GitHub Repo
- **Implemented a K-means clustering algorithm to estimate the different lithologies that are present in a given borehole based on the borehole's characteristics.** GitHub Repo
- **Created a Python program that can encrypt and decrypt text using the Caesar Cipher algorithm.** It allows users to input a message and a shift value to perform encryption and decryption. GitHub Repo
- **Created a Python-based keylogger program that can take snapshots, log all operating system information, capture keystrokes, encrypt them, and send them back to me via email.**
- **Developed three smart contracts:** SimpleStorage for storing and retrieving numbers on the blockchain, StorageFactory for managing multiple SimpleStorage instances, and FundMe for crowdfunding, enabling users to contribute cryptocurrency and allowing the owner to withdraw funds. SimpleStorage FundMe

Leadership Experience and Volunteering

- Cybersecurity Instructor, KNUST Cybersecurity Club and VIA Training Center - KNUST. 2024 - Present
- Undergraduate research team lead 2024
- Peer mentoring and tutoring 2017 - Present
- Team lead National Math and Science Quiz. 2017 - 2020
- School President, Nkwantanan D/A Junior High School. 2017 - 2020

Languages

- Languages: English (Full Proficiency) | Akan (Native)

Referees

Prof. James Dzisi Gadze Associate Professor: Telecommunication Engineering Dept. KNUST, Ghana. jdgadze.coe@knust.edu.gh

Dr. Kwame Opuni-Boachie Obour Agyekum Lecturer: Telecommunication Engineering Dept. KNUST, Ghana. kooagyekum@knust.edu.gh

Dr. Emmanuel Ampoma Affum Senior Lecturer: Telecommunication Engineering Dept. KNUST, Ghana. eaffum.coe@knust.edu.gh

Dr. Justice Owusu Agyemang Lecturer: Telecommunication Engineering Dept. KNUST, Ghana jay@knust.edu.gh