

JOSHUA OFORI BOATENG

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CAREER OBJECTIVE

- Drive innovation in Open and AI-native RAN systems to deliver affordable, reliable, and scalable next-generation wireless networks for underserved communities and industries.

RESEARCH INTERESTS

Open, Programmable, and NextG Radio Access Networks: Design and implementation of Open RAN architectures, open-source 5G/6G protocol stacks, and virtualization of software-defined radio platforms to enable scalable, cost-efficient, and multi-tenant wireless infrastructures.

Wireless Systems Experimentation, Testbeds, and Measurement: Development and deployment of large-scale experimental wireless testbeds and living labs, including software-defined radio-based infrastructures, real-world network measurements, and reproducible experimentation for evaluating performance, reliability, and scalability of next-generation wireless systems.

Ultra Reliable and Low Latency Communication: Design of predictable and resilient wireless systems supporting URLLC/HURLLC, spectrum sharing, IoT, and rural broadband applications, with emphasis on measurement-driven optimization and real-world deployment.

EDUCATION

- **Doctor of Philosophy (Ph.D.) in Computer Engineering** **May 2021 – May 2026**
Iowa State University *Ames, Iowa, USA*
MAJOR: Computing and Networking Systems CGPA: 3.80/4.00
DISSERTATION: Toward Democratizing 5G: Enabling Open, Reliable and Scalable Wireless Systems for Use and Innovation
SUPERVISOR: [Prof. Hongwei Zhang](#)
- **Bachelor of Science (B.Sc.) in Telecommunication Engineering** **Sep 2015 – Jun 2019**
Kwame Nkrumah University of Science and Technology *Kumasi, Ghana*
PROJECT: Performance analysis of Variable Pulse Position Modulation (VPPM) in Li-Fi Systems CGPA: 3.98/4.00
SUPERVISOR: [Prof. Jerry John Kponyo](#)

EXPERIENCE

- **Center for Wireless, Communities and Innovation (WiCI)** **Jun 2026 – Present**
Research Assistant Professor *Ames, Iowa, USA*
 - Developing open and scalable 5G/6G wireless systems for AI-driven RAN control, hyper-reliable low-latency communication, and real-world deployment
 - Developing deployable wireless platforms and products that translate 5G/6G research into practical solutions for users, industry partners, and research organizations
- **Microsoft Research (MSR)** **Jan 2024 – May 2024**
Research Intern, Networking Research Group *Redmond, Washington, USA*
 - Designed and implemented an end-to-end GEO-based 5G Non-Terrestrial Network (NTN) testbed using the OpenAirInterface 5G stack, RF simulator, and SDRs to evaluate the performance of satellite-integrated 5G connectivity
- **Iowa State University of Science and Technology** **May 2021 – May 2026**
Graduate Research Assistant, Center for Wireless, Communities and Innovation (WiCI) *Ames, Iowa, USA*
 - Lead the design and deployment of the first-of-its-kind end-to-end fully programmable 5G NR testbed infrastructure on the ARA Wireless Living Lab, enabling real-world experimentation and performance evaluation
- **Vodafone** **Sep 2020 – Apr 2021**
Robotic Process Automation (RPA) Developer *Accra, Ghana*
 - Developed and deployed automated workflow systems with RPA, for customer onboarding and data processing, increasing operational efficiency by 50% while coordinating agile development activities as scrum master
- **Kwame Nkrumah University of Science and Technology** **Aug 2019 – Sep 2020**
Teaching & Research Assistant, Department of Telecommunication Engineering *Kumasi, Ghana*
 - Assisted in teaching digital signal processing, and wireless communications while pursuing research on wireless and IoT systems that produced two peer-reviewed journal articles

RESEARCH PROJECT INVOLVED

1. GRADUATE RESEARCHER, “5G Sidelink Evaluation,” **John Deere**, (*Total Funding: \$112,000*), Nov 2025 – Oct 2026
2. GRADUATE RESEARCHER, “Ara4Rural: ARA Infrastructure and Community Building for Rural Wireless Applications,” **NSF NeTS**, (*Total Funding: \$1,000,000*), Iowa State University, Dec 2024–Nov 2026
3. GRADUATE RESEARCHER, “Acceleration of Compatibility and Commercialization for Open RAN Deployments (ACCoRD),” **NTIA Innovation Fund** *Total Funding: \$42,299,693; ISU Share: \$1,000,000* AT&T, Verizon, University of Texas at Dallas, Northeastern University, Iowa State University, Rutgers University, Virginia Tech, NTT DOCOMO, Reliance Jio, Jan 2024–Dec 2027
4. GRADUATE RESEARCHER, “Open RAN Research, Testing, and Integration for Rural Industries and Communities,” **NSF NeTS and TIP**, (*Total Funding: \$1,400,000*), Iowa State University, May 2023–Apr 2025
5. GRADUATE RESEARCHER, “Collaborative Research: SII-NRDZ: ARA-NRDZ: From Site and Application Investigation to Prototyping and Field Testing,” **NSF NRDZ** program, (*Total Funding: \$500,000*); *ISU Share: \$485,000*, Iowa State University, Stony Brook University, Oct 2022– Sep 2025
6. LEAD 5G & OPEN RAN DEVELOPER, “ARA Wireless Living Lab for Smart and Connected Rural Communities,” **NSF PAWR**, (*Total Funding: \$16,000,000*), Iowa State University, University of California Irvine, Ohio State University, and International Computer Science Institute, Jun 2021–May 2026

AWARDS | SCHOLARSHIPS | CERTIFICATES

1. **11th IEEE International Conference on Network Softwarization** **Jun 2025**
Best Paper Award *Budapest, Hungary*
2. **Midscale Experimental Research Infrastructure Forum** **Sept 2024**
Best Demo Award *Kansas City, MO, USA*
3. **17th ACM Workshop on Wireless Network Testbeds, Experimental evaluation Characterization** **Oct 2023**
Best Paper Award *Madrid, Spain*
4. **Iowa State University of Science and Technology** **May 2021**
Takano Electrical Engineering Scholarship *Ames, IA, USA*
5. **Kwame Nkrumah University of Science and Technology** **Oct 2016 - Oct 2019**
Provost Award for Overall Best Student in Telecommunication Engineering *Kumasi, Ghana*
6. **Kwame Nkrumah University of Science and Technology** **Oct 2016 - Oct 2019**
Provost Award for Excellent Student in Telecommunication Engineering *Kumasi, Ghana*
7. **Kwame Nkrumah University of Science and Technology** **Jun 2019**
Overall Best Graduating Student (Valedictorian) *Kumasi, Ghana*
8. **Vodafone Ghana** **Mar 2019**
Best Graduating Student in Telecommunication Engineering *Kumasi, Ghana*
9. **Huawei ICT Competition in Routing, Switching, and Wireless LANs** **Feb 2019**
First Runner Up *Sandton, South Africa*
10. **Huawei** **Dec 2018**
Huawei Certified Networking Associate (HCNA) *Accra, Ghana*
11. **Kwame Nkrumah University of Science and Technology** **May 2018**
National Union of Ghana Students Award for Overall Best 3rd Year Student *Kumasi, Ghana*

PUBLICATIONS

Journal Articles

1. T. U. Islam, **Joshua Ofori Boateng**, M. Nadim, G. Zu, M. Shahid, X. Li, T. Zhang, S. Reddy, W. Xu, A. Atalar, V. Lee, Y. Chen, E. Gossling, E. Permatasari, C. Somiah, O. Perrin, Z. Meng, R. Afzal, Sarath Babu, M. Soliman, A. Hussain, D. Qiao, M. Zheng, O. Boyraz, Y. Guan, A. Arora, M. Y. Selim, A. Ahmad, M. B. Cohen, M. Luby, R. Chandra, J. Gross, K. Keahey, and H. Zhang, [Design and Implementation of ARA Wireless Living Lab for Rural Broadband and Applications](#), *Elsevier Computer Networks*, Volume 263, 2025, 111188, ISSN 1389-1286.

2. J. J. Kponyo, J. O. Agyemang, G. S. Klogo, **Joshua Ofori Boateng**, [Lightweight and host-based denial of service \(DoS\) detection and defense mechanism for resource-constrained IoT devices](#), *Elsevier Internet of Things*, Volume 12, 2020, 100319, ISSN 2542-6605.
3. J. O. Agyemang, J. J. Kponyo, G. S. Klogo, **Joshua Ofori Boateng**, [Lightweight rogue access point detection algorithm for WiFi-enabled Internet of Things\(IoT\) devices](#), *Elsevier Internet of Things*, Volume 11, 2020, 100200, ISSN 2542-6605.

Conference Papers

1. **Joshua Ofori Boateng**, V. S. Advani, S. Babu, H. Zhang, M. Y. Selim, and D. Qiao, [FlexRU: Transparent and Deterministic RU Sharing for Open-Source 5G on Commodity SDRs](#), Submitted to the 24th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2027).
2. G. Zu, **Joshua Ofori Boateng**, V. S. Advani, T. U. Islam, V. Lee, Sarath Babu, M. Nadim, D. Qiao, M. Y. Selim, and H. Zhang, [Real world integration and evaluation of open-source 5G core with commercial RAN](#), in *Proceedings of the IEEE Military Communications Conference (IEEE MILCOM)*, Los Angeles, CA, USA, Oct. 2025, pp. 1296–1301.
3. **Joshua Ofori Boateng**, T. Zhang, G. Zu, T. U. Islam, S. Babu, F. Kaltenberger, R. Schmidt, H. Zhang, D. Qiao, [AraRACH: Enhancing NextG Random Access Reliability in Programmable Wireless Living Labs](#), in *Proceedings of the 11th IEEE International Conference on Network Softwarization (IEEE NetSoft)*, Jun. 2025, pp. 362–370 [**Best Paper Award**].
4. **Joshua Ofori Boateng**, T. Zhang, G. Zu, T. U. Islam, S. Babu, H. Zhang, D. Qiao, [AraSDR: End-to-End, Fully-Programmable Living Lab for 5G and Beyond](#), in *Proceedings of the IEEE International Conference on Communication (IEEE ICC)*, Jun. 2024, pp. 1758–1763.
5. T. Zhang, **Joshua Ofori Boateng**, T. U. Islam, A. Ahmad, H. Zhang, D. Qiao, [Ara-o-ran: End-to-end programmable o-ran living lab for agriculture and rural communities](#), in *Proceedings of the IEEE INFOCOM 2024-IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, May 2024, pp. 1-6.
6. T. U. Islam, T. Zhang, **Joshua Ofori Boateng**, E. Gosling, G. Zu, S. Babu, H. Zhang, D. Qiao, [AraMIMO: Programmable TVWS mMIMO Living Lab for Rural Wireless](#), in *Proceedings of the 17th ACM Workshop on Wireless Network Testbeds, Experimental evaluation Characterization (ACM WiNTECH)*, Oct. 2023, pp. 9–16 [**Best Paper Award**].
7. M. Shahid, S. Babu, H. Zhang, D. Qiao, Y. Guan, **Joshua Ofori Boateng**, T. U. Islam, G. Zu, A. Kamal, and M. Zheng. 2022. [Wireless guard for trustworthy spectrum management](#), in *Proceedings of the 16th ACM Workshop on Wireless Network Testbeds, Experimental evaluation Characterization (ACM WiNTECH)*, Oct. 2022, pp. 32–39.

Demos | Posters

1. **Joshua Ofori Boateng**, and H. Zhang, Multi-cell srsRAN in ARA wireless living lab: Exploring distance effects, interference coordination and system-level tuning, in *srsRAN Project Fall Workshop*, Arlington, VA, USA, Nov. 2025.
2. T. Zhang, **Joshua Ofori Boateng**, and H. Zhang, Real-world experiments with predictable URLLC using OAI and ARA wireless living lab, in *First OpenAirInterface Foundation U.S. Hands-on Workshop*, Austin, TX, USA, Nov. 2025.
3. G. Zu, **Joshua Ofori Boateng**, V. S. Advani, T. U. Islam, V. Lee, Sarath Babu, M. Nadim, D. Qiao, M. Y. Selim, and H. Zhang, [Demo: Real-world integration and evaluation of open-source 5G core with commercial RAN](#), in *Proceedings of the IEEE Military Communications Conference (IEEE MILCOM)*, Los Angeles, CA, USA, Oct. 2025, pp. 881–882
4. T. U. Islam, **Joshua Ofori Boateng**, M. Nadim, G. Zu, M. Shahid, X. Li, T. Zhang, S. Reddy, W. Xu, A. Atalar, V. Lee, Y. F. Chen, E. Gosling, E. Permatasari, Z. Meng, Sarath Babu, M. Soliman, A. Hussain, D. Qiao, M. Zheng, O. Boyraz, Y. Guan, A. Arora, M. Selim, A. Ahmad, M. B. Cohen, and H. Zhang, [Demo: ARA PAWR wireless living lab for smart and connected rural communities](#), in *32nd IEEE International Conference on Network Protocols (IEEE ICNP 2024)*, Charleroi, Belgium, Oct. 2024, pp. 1–3.
5. **Joshua Ofori Boateng**, T. Zhang, S. Babu, and H. Zhang, ARA-enabled end-to-end 5G and Open RAN prototyping using srsRAN and FlexRIC, in *srsRAN Project Fall Workshop*, Arlington, VA, USA, Oct. 2024.
6. T. U. Islam, M. Nadim, G. Zu, V. Lee, O. J. Perrin, **Joshua Ofori Boateng**, M. Shahid, T. Zhang, E. K. A. Permatasari, Z. Meng, Sarath Babu, D. Qiao, and H. Zhang, ARA PAWR: Enabling wireless experiments with programmable COTS RAN and x-Haul platforms, in *Midscale Experimental Research Infrastructure Forum (MERIF '24)*, Kansas City, MO, USA, Sep. 2024 [**Best Demo Award**].
7. T. Zhang, Z. Meng, E. Permatasari, **Joshua Ofori Boateng**, T. U. Islam, M. Nadim, V. Lee, S. Babu, H. Zhang, and D. Qiao, ARA-enabled end-to-end open-source prototyping of 5G/O-RAN solutions for predictable low-latency communications, in *Midscale Experimental Research Infrastructure Forum (MERIF '24)*, Kansas City, MO, USA, Sep. 2024.
8. **Joshua Ofori Boateng**, T. Zhang, Z. Meng, H. Zhang, and D. Qiao, End-to-End 5G and O-RAN Prototyping in ARA, in *OpenAirInterface 10th Anniversary Workshop*, Biot, France, Sept. 2024.

9. T. U. Islam, **Joshua Ofori Boateng**, G. Zu, M. Shahid, M. Nadim, W. Xu, T. Zhang, S. Reddy, X. Li, A. Atalar, Y. Chen, S. Babu, H. Zhang, D. Qiao, M. Zheng, Y. Guan, O. Boyraz, A. Arora, M. Selim, M. B. Cohen, [ARA PAWR: Wireless Living Lab for Smart and Connected Rural Communities](#), in *Proceedings of the 29th Annual International Conference On Mobile Computing And Networking (ACM MobiCom)*, ACM, Article 98, Madrid, Spain, Oct. 2023, pp. 1–3.
10. **Joshua Ofori Boateng**, T. Zhang, H. Zhang, and D. Qiao, ARA wireless living lab and end-to-end open-source 5G experiment with srsRAN, in *srsRAN Project Fall Workshop*, Arlington, VA, USA, Oct. 2023.
11. **Joshua Ofori Boateng**, T. Zhang, Sarath Babu, T. U. Islam, M. Shahid, and H. Zhang, ARA rural wireless living lab and end-to-end OTA containerized OAI 5G-NR support, in *Fall 2022 OpenAirInterface North American Workshop*, San Diego, CA, USA, Nov. 2022.

arXiv Preprints

1. **Joshua Ofori Boateng**, T. Zhang, G. Zu, T. U. Islam, S. Babu, F. Kaltenberger, R. Schmidt, H. Zhang, D. Qiao, [AraRACH: Enhancing NextG Random Access Reliability in Programmable Wireless Living Labs](#), arXiv preprint arXiv:2503.18218.
2. T. U. Islam, **Joshua Ofori Boateng**, M. Nadim, G. Zu, M. Shahid, X. Li, T. Zhang, S. Reddy, W. Xu, A. Atalar, V. Lee, Y. Chen, E. Gosling, E. Permatasari, C. Somiah, Z. Meng, S. Babu, M. Soliman, A. Hussain, D. Qiao, M. Zheng, O. Boyraz, Y. Guan, A. Arora, M. Selim, A. Ahmad, M. B. Cohen, M. Luby, R. Chandra, J. Gross, H. Zhang, [Design and Implementation of ARA Wireless Living Lab for Rural Broadband and Applications](#), arXiv preprint arXiv:2408.00913.

Frameworks Developed

1. **FlexRU: Transparent and Deterministic RU Sharing for Open-Source 5G on Commodity SDRs**

OBJECTIVE: Design a transparent RU sharing framework that enables scalable, programmable 5G experimentation on commodity SDRs, lowering barriers to innovation in next-generation open-source RAN stacks (e.g., OpenAirInterface (OAI) and Open CU and DU (OCUDU)). *(Source code to be released after publication)*

PROFESSIONAL SERVICES | AFFILIATIONS

Journal and Conference Reviews

- IEEE Transactions on Wireless Communications (IEEE TWC) 2023, 2024, 2025, 2026
- IEEE Conference on Computer Communications (IEEE INFOCOM) 2022, 2023, 2024, 2025
- IEEE Military Communications Conference (IEEE MILCOM) 2025

Memberships

- IEEE Communications Society (ComSoc) 2024, 2025, 2026

TEACHING | MENTORING

Iowa State University of Science and Technology

- Graduate Student Mentor–NSF Research Experiences for Undergraduates (REU) 2024, 2025

Kwame Nkrumah University of Science and Technology

- EE 472–Digital Signal Processing Aug 2019 –Sep 2020
- TE 461–Computer Application and Project Design Aug 2019 –Sep 2020
- COE 475–Computer Networking Aug 2019 –Sep 2020

WORKSHOPS | TALKS

- srsRAN Project Fall Workshop, *Arlington, VA, USA* Nov 2025
- First OAI Foundation U.S Hands-on Workshop, *Austin, TX, USA* Nov 2025
- srsRAN Project Fall Workshop, *Arlington, VA, USA* Oct 2024
- OpenAirInterface 10th Anniversary Workshop, *Biot, France* Sep 2024
- Joint OSC/OSFG-OAI Workshop: End-to-End Reference Designs for O-RAN, *Burlington, MA, USA* Nov 2023
- Fall 2023 srsRAN project Workshop, *Arlington, VA, USA* Oct 2023
- Fall 2022 OpenAirInterface North American Workshop, *San Diego, CA, USA* [Talk] Nov 2022
- Applications, and Network Measurements for Software Defined Radio on CHI@Edge, *Online* [Talk] Oct 2021

TECHNICAL SKILLS

Programming and Scripting: Python, C, C++, MATLAB, Bash Shell Scripting

5G/6G and Software-Defined Radio Platforms: USRPs (X410, X310, N320 and B210), OpenAirInterface5g, srsRAN Project (OCUDU), Open5GS, GNURadio, SD-Core, SD-RAN

Data Collection, Monitoring, and Visualization: Grafana, InfluxdB, GNUplot

Systems, Virtualization, and Cloud: Linux, Windows, Docker, Kubernetes (K8s), Kernel-based Virtual Machines (KVM)

Networking and Experimentation Tooling: Git, Telegraf

Documentation and Editors: \LaTeX , Sphinx, VSCode, Nano

Engineering and Prototyping Tools: Autodesk Fusion 360, Ultimaker Cura (3D Modeling and Printing)