Curriculum Vitae of Dr. E. Ampoma Affum

Emmanuel Ampoma Affum, PhD

Senior Lecturer, Dept. of Telecommunication Engineering, Kwame Nkrumah University of Science and Technology, P. O. Box PMB, Kumasi-Ashanti Region-Ghana

Emails: eaffum.coe@knust,edu,gh: ampoma.uest@yahoo.com: eaffume@gmail.com

(Scopus Author ID: 57209930777, AD Scientific Index ID: 4531981, Web of Science Researcher ID: W-8652-2019, ORCID ID: 0000-0001-6498-4000)

(Google: https://scholar.google.com/citations?user=YxOELcsAAAAJ&hl=en, **LinkedIn:**

https://www.linkedin.com/in/dr-emmanuel-ampoma-affum-33908334/, **AD Scientific:**

https://adscientificindex.com/scientist/emmanuel-ampoma-affum/4531981), Ph**: +233(0)547926136**

Professional Work Experience

- Aug. 2022 -till date **Senior Lecturer, Dept. of Telecommunication Engineering, KNUST-Kumasi, Ghana**
- Sept. 2014-2016 **Graduate Research Assistant**, Center for RFIC and System Technology, UESTC, China
- Jun. 2010- 2012 **Lecturer**, **Dept, of Electrical Engineering, Koforidua Technical University, Koforidua, Ghana**
- May 2009- 2010 Lecturer, Dept of Electronics and Communication Eng., All Nations University **Koforidua, Ghana**

Academic Qualifications

- **Ph.D.**-*University of Electronics Science and Technology of China (UESTC), Sept. 2018.* Thesis titled "***Study on Key Technologies of MIMO Antenna Based on Spatial Correlation and Mutual Coupling Effect***" -The Maximum Power of Arrival (MAP) model, also known as the Total Power of Arrival model, was proposed to standardize the three-dimensional (3D) spatial correlation (SC) of antenna arrays with distinct angle-of-arrival distributions relative to the steering vector. In non-isotropic electromagnetic diffusion environments, the angle of arrival cannot be assumed to be uniform and can be characterized using an appropriate probability distribution function, such as the Gaussian, Laplacian, von Mises, or Student's t-distribution. This approach has led to the generation of different spatial correlations for antenna arrays based on discrete angle-of-arrival distributions. With advancements in MIMO systems, the procedure for characterizing the spatial correlation of antenna arrays should be sufficiently straightforward and should limit computational challenges in producing correlation coefficients. The proposed model provides a standard guideline for evaluating the 3D spatial correlation of uniform rectangular arrays (URAs) under various angular distributions and reduces the need to derive separate expressions for specific angular distributions. For verification purposes, the model

was tested using correlated and geometric models and was extended to offset distributions in the azimuth and zenith domains.

Research Interests

- Array Signal Processing, Chanel modelling for 5G &beyond, Multiuser Detection, Coding and Statistical Theory of Communications

Publications– Journal

1. **Affum EA**, Futa O, Oppong MA, Biney DO (2026) Residual-aided CSI-free end-to-end learning for multiuser MIMO. PLoS One 21(4): e0344696. April 2026 https://doi.org/10.1371/journal.pone.0344696
2. **E. A. Affum**, S. Tweneboah-Koduah, O. A. Antwi, B. A. Weyori, and W. Ofosu, "Large-scale MIMO Transmitters for CR-NOMA in Fixed Physical Space: The Effect of Realistic System Impairments Using Stochastic Geometry," in *IEEE Open Journal of Vehicular Technology*, Vol. 5, 2024 doi: 10.1109/OJVT.2024.3425061. **ISSN:** 2644-1330, https://ieeexplore.ieee.org/document/10591394
3. **Affum, E.A**., Addo, E.O.K., Tweneboah-Koduah, S. et al. Maximizing intelligent reflecting surface (IRS) positioning in 5G wireless communication and beyond using genetic algorithms for enhanced spectral efficiency. *Annals of Telecommunications*. (2025). https://doi.org/10.1007/s12243-025-01140-x
4. **Ampoma Affum E**, Tweneboah-Koduah S, Kubi Appiah M, et al. Maximization of sum rate for Wireless Powered Communication Network with Intelligent Reflecting Surface and NOMA in the nonappearance of uplink and downlink beamforming matrix, subject to transmit power and time. *International Journal of Communication Syst.* 2024; e5911. doi:10.1002/dac.5911, ISSN:1074-5351, https://doi.org/10.1002/dac.5911
5. Tweneboah-Koduah, S., **Affum, E.A**., Ansere, J.A., Gyamfi, E., Opare, K.A.-B., Ajagbe, S.A., Adigun, M.O.: Stochastic geometry modeling and analysis for cooperative NOMA with large transmit antennas for 5G applications and beyond. *IET Communications*. 00, 1– 11 (2023). ISSN:1751-8636 https://doi.org/10.1049/cmu2.12648
6. Antwi, O.A., **Affum, E.A.**, Tweneboah-Koduah, S. et al. IRS-Assisted Communication in Three-Dimensional Stochastic Geometry Channel Utilising Uniform Rectangular Array Transmitters with Hardware Defects. *Wireless Pers Commun* (2025). https://doi.org/10.1007/s11277-024-11735-7
7. Tweneboah-Koduah, Samuel, **Emmanuel Ampoma Affum**, Kwame Agyemang Prempeh Agyekum, Sunday Adeola Ajagbe, and Matthew O. Adigun. 2022. "Performance of Cooperative Relay NOMA with Large Antenna Transmitters" *Electronics* 11 MDPI, no. 21: 3482. October 2022, ISSN: **2079-9292** https://doi.org/10.3390/electronics11213482
8. Ngala, D.K., Opare, K.AB., **Affum, E.A**. *et al.* "A greedy algorithm for pilot contamination mitigation using LAP". *Journal of Engineering and Applied Science* **70**, 67 (2023). ISSN: 2536-9512, https://doi.org/10.1186/s44147-023-00239-z
9. Kwaku Kwarteng, Kwame O. Gyasi, Justice O. Agyemang, Kwame Agyekum, Kingsford Kwakye, Ellis M. Sani, **Emmanuel A. Ampoma**, Kusi A. Bonsu "Cat Swarm Optimization with Lévy Flight for Link Load Balancing in SDN", Journalof Telecommunication and Information Technology, vol. 99, no. 1, pp. 10–20, Mar. 2025, doi: 10.26636/jtit.2025.1.1773 https://jtit.pl/jtit/article/view/1773

10. A. O. Agyeman, **A. E. Ampoma**, T.-K. Samuel, K. A.-B. Opare, K. S. O. Kwakye, and W. Ofosu, " IRS-Assisted Communication in 3D Stochastic Geometry Utilizing Large Antenna Transmitters with Hardware Impairments." *IET Communications* 19, no. 1 (2025): 19, e70079. https://doi.org/10.1049/cmu2.70079
11. Natasha Nigar, Abdul Jaleel, Shahid Islam, Muhammad Kashif Shahzad, **Emmanuel Ampoma Affum**, "IoMT Meets Machine Learning: From Edge to Cloud Chronic Diseases Diagnosis System", *Journal of Healthcare Engineering*, vol. 2023, Article ID 9995292, 13 pages,2023. ISSN:2040-2309 DOI: 10.1155/7158 https://doi.org/10.1155/2023/9995292
12. Samuel Tweneboah-Koduah, **Emmanuel Ampoma Affum,** Kingsford Sarkodie Obeng Kwakye, and Owusu Agyeman Antwi, "Decode and Forward Coding Scheme for Cooperative Relay NOMA System with Cylindrical Array Transmitter" *International Journal of Advanced Computer Science and Applications (IJACSA*), 13(10), 2022. ISSN : 2156-5570, http://dx.doi.org/10.14569/IJACSA.2022.0131090
13. Awal Halifa, **Emmanuel Affum Ampoma**, Kwame Oteng Gyasi, Kwame Opuni-Boachie Obour Agyekum, Kingsford Sarkodie Obeng Kwakye, Piyush Kumar Shukla "A Comparative Analysis of Machine Learning Ensemble Methods for Accurate Path Loss Prediction" Journal of Electrical Systems, Vol. 20, No.11s 2024, ISSN 1112-5209, DOI: https://doi.org/10.52783/jes.8467 https://journal.esrgroups.org/jes/article/view/8467
14. **E. A. Affum,** O. Futa, O. F. Darteh, B. Addo-Mensah and A. Cosmos, "Optimizing Channel Feedback Using Lloyd Algorithm-Based AoD-Adaptive Subspace Codebook for 5G FDD Massive MIMO," *2025 2nd Beyond Technology Summit on Informatics International Conference (BTS-I2C)*, Jember, East Java, Indonesia, 2025, pp. 795-800, doi: 10.1109/BTS-I2C67944.2025.11399378
15. Awal Halifa, Kwame Oteng Gyasi, **Emmanuel Affum Ampoma**, Kwame Opuni-Boachie Obour Agyekum, Kingsford Sarkodie Obeng Kwakye, Justice Owusu Agyeman, Mubarak Sani Ellis, Piyush Kumar Shukla " Enhanced Path Loss Prediction Using Machine Learning and Modified COST-Hata Model for High-Frequency Wireless Networks" *Journal of Electrical Systems*, Vol. 20, No.11s 2024, ISSN 1112-5209, DOI: https://doi.org/10.52783/jes.8642, https://journal.esrgroups.org/jes/article/view/8642
16. Oppong, M. A., **Affum, E. A**., & Ntiamoah-Sarpong, K. (2025). Analyzing 5G Heterogeneous Cellular Networks: An Inclusive Examination of Throughput and Energy Efficiency. Computer Networks and Communications, 3(2), 164–181. https://doi.org/10.37256/cnc.3220256898
17. **Emmanuel Ampoma Affum**, Edward DansoAnsong, Kwame Oteng Gyassi, Maxwell Afriyie Oppong, Isaac Kweku Boakye, Francois Sekyere, Louis Owusu Annan "A Stochastic Geometry Analysis on The Uplink Performance of Cell-Free Massive MIMO Systems with Hardware Impairments" Journal of Electronics and Electrical Engineering, Volume 4 Issue 2|2025| 659, DOI: https://doi.org/10.37256/jeee.4220257189 Part of DOI: 10.37256/jeee.422025, Part of ISSN: 2972-3280 https://ojs.wiserpub.com/index.php/JEEE/article/view/7189
18. **Emmanuel Ampoma Affum**, Kwame Agyeman-Prempeh Agyekum, Christian Adumatta Gyampomah and Kwadwo Ntiamoah-Sarpong, "Smart Home Energy Management System based on the Internet of Things (IoT)" *International Journal of Advanced Computer Science and Applications (IJACSA),* 12(2), 2021. http://dx.doi.org/10.14569/IJACSA.2021.0120290
19. Ayman Abdulhadi Althuwayb, Fazirulhisyam Hashim, Jiun Terng Liew, Imran Khan, Jeong Woo Lee, **Emmanuel Ampoma Affum**, Abdeldjalil Ouahabi, and Sébastien Jacques "A Highly Efficient Algorithm for Phased-Array mmWave Massive MIMO Beamforming" Computers, Materials & Continua, vol. 69, no.1, pp. 679–694, 2021 https://doi.org/10.32604/cmc.2021.015421

20. K. Ntiamoah-Sarpong, Z. Huang, G. Wen, and **Affum. E. Ampoma**, "Performance of non-orthogonal multiple access: analysis using compute-and-forward cooperative relaying in 5G networks," *IET Communications*, vol. 14, no. 17, pp. 3058–3064, 2020, doi: 10.1049/iet-com.2019.0868.(SCI, IF 1.408). http://dx.doi.org/10.1049/iet-com.2019.0868
21. J.D. Gadze, R. Akwafo, **E.A. Affum** "Analysis of 75 GHz Millimeter Wave Radio over Fiber-Based Fronthaul System for Future Networks" *International Journal of Advanced Research in Computer and Communication Engineering*, Vol 9, Issue 3, 2020. ISSN: 2319-5940, DOI 10.17148/IJARCCE.2020.9415. http://dx.doi.org/10.17148/IJARCCE.2020.9415
22. James D. Gadze, Kwame A. Agyekum, Stephen J. Nuagahand **E.A. Affum "**Improved propagation models for lte path loss prediction in urban & suburban Ghana**"** "*International Journal of Wireless & Mobile Networks (IJWMN)*" Vol. 11, No. 6, December 2019. ISSN:0975-3834 https://doi.org/10.48550/arXiv.2001.05227
23. Parfait I. Tebe, Guangjun Wen, Jian Li, Yongjun Huang, **Affum E. Ampoma**, and Kwame O. Gyasi " Massive MIMO with Transceiver Hardware Impairments: Performance Analysis and Phase Noise Error Minimization", *KSII Transaction on Internet and Information Systems*, Vol 13, No 5, May 2019 (SCIE, IF 0.611). https://www.thefreelibrary.com/Massive+MIMO+with+Transceiver+Hardware+Impairments%3A+Performance...-a0590449716
24. **Affum. E. Ampoma**, Wen Guangjun, Yongjun Huang, Kwame Oteng Gyasi, Parfait I. Tebe, and Kwadwo Ntiamoah-Sarpong "Spatial Correlation Models of Large-Scale Antenna Topologies using Maximum Power of Offset Distribution and its Application", *IEEE Access*, vol. 6, pp. 36295 – 36304, 2018. DOI: 10.1109/ACCESS.2018.2846260 (SCI, IF 3.557) https://doi.org/10.1109/ACCESS.2018.2846260
25. O. G. Kwame, Guangjun Wen, Daniele Inserra, **Affum E. Ampoma**, Yongjun Huang, Jian Li, Muhammad Abdul Basit, and Haobin Zhang., "A Compact Broadband Circularly Polarized Slot Antenna with Two Linked Rectangular Slots and an Inverted-F Feed Line," *IEEE Transactions on Antennas and Propagation*, vol: 66, Issue: 12, pp: 7374-7377, December 2018 (SCI IF 2.957). http://dx.doi.org/10.1109/TAP.2018.2867020
26. O. G. Kwame, Guangjun Wen, Daniele Inserra, **Affum E. Ampoma**, Yongjun Huang, Jian Li, Muhammad Abdul Basit, and Haobin Zhang. "Tri-band Planar Monopole Antenna with Two Circularly Polarized Bandwidths for WiMAX Applications," *IET Microwave, Antennas and Propagation*, 2018. DOI: 10.1049/iet-map.2018.5323, Print ISSN 1751-8725, Online ISSN 1751-8733 (SCI IF 1.739) http://dx.doi.org/10.1049/iet-map.2018.5323
27. **Affum. E. Ampoma**, H. Zhang, Y. Huang, G. Wen and O. G. Kwame, "Three-Dimensional Spatial Fading Correlation of Uniform Rectangular Array Using Total Power of Angular Distribution," in *IEEE Antennas and Wireless Propagation* Letters, vol. 16, no. , pp. 2134-2137, 2017. DOI:10.1109/LAWP.2017.2700041 (SCI, IF 2.533) https://doi.org/10.1109/LAWP.2017.2700041
28. Kwame Oteng Gyasi, Guang Jun Wen, Daniele Inserra, Yong Jun Huang, Jian Li, **A. E. Ampoma** and Hao Bin Zhang, "A Compact Broadband Cross-Shaped Circularly Polarized Planar Monopole Antenna with a Ground Plane Extension", *IEEE Antennas and Wireless Propagation Letters*, vol. 17, Issue 2, 2018. DOI: 10.1109/LAWP.2018.2789430. (SCI, IF 2.533) https://doi.org/10.1109/LAWP.2018.2789430
29. Parfait I. Tebe, Yujun Kuang, **Affum E. Ampoma,** Kwasi A. Opare "Mitigating Pilot Contamination in Massive MIMO Using Cell Size Reduction" *IEICE TRANSACTIONS on Communications*, vol. E101-B No.5 pp.1280-1290 DOI: 10.1587/transcom.2017 EBP3189 (SCI, IF 1.533) http://dx.doi.org/10.1587/transcom.2017EBP3189
30. O. G. Kwame, W. Guangjun, Y. Huang, **A. E. Ampoma** and W. Hu, "Broadband circularly polarized cross-shaped slot antenna with improved feedline," *Progress in Electromagnetics Research C (PIER C), Vol. 74, pp. 141–149, 2017.* https://doi.org/10.2528/pierc17020501

31. **E. A. Ampoma,** Paul Oswald Kwasi Anane, Kwame Opuni-Boachie Obour Agyekum, Maxwell Oppong Afriyie. "Analysis of Compensation Network in a Correlated-based Channel using Angle of Arrivals," *Journal of Advanced Computer Science and Applications*, vol 7, no. 9, pg. 297-303, 2016 http://dx.doi.org/10.14569/IJACSA.2016.070942
32. Kwame Opuni-Boachie Obour Agyekum, Maxwell Oppong Afriyie, Paul Oswald Kwasi Anane, **Affum Emmanuel Ampoma,** MIMO Performance and Decoupling Network: "Analysis of Uniform Rectangular Array using Correlated- based Stochastic Models," *Journal of Advances in Science Technology and Engineering Systems*, vol. 2, no. 1, pg.192-196, 2017 https://www.astesj.com/v02/i01/p23/
33. Maxwell Oppong Afriyie, Kwame Opuni-Boachie Obour Agyekum and **Affum Emmanuel Ampoma**. "Channel Inversion Schemes with Compensation Network for Two-Element Compact Array in Multi-User MIMO". *Journal Advances in Science, Technology and Engineering Systems*, vol. 2, no. 4, pg. 26-31, 2017 http://dx.doi.org/10.25046/aj020404
34. **Affum. E. Ampoma** and Addo Emmanuel "On Comparison Analysis of Multiple Interference MIMO system with Un-correlated Rician Fading Channels",*International Journal of Computer Application*, Volume 76 No.17, August 23, 2013, ISBN: 973-93-80877-47-5, DOI:10.5120/13336-0291 http://dx.doi.org/10.5120/13336-0291
35. **Affum. E. Ampoma**, E.T. Tchao, K. Diawuo and K. Agykum "Wideband Parameters Analysis and Validation for Indoor radio Channel at 60/70/80GHz for Gigabit Wireless Communication employing Isotropic, Horn and Omni directional Antenna" *International Journal of Advanced Computer Science and Applications (IJACSA).* Volume 4 No. 6, June 2013 edition ISSN: 2156- 5570 (EI Index: 14404689) http://dx.doi.org/10.14569/IJACSA.2013.040638
36. Kwame A. P Agyekum, Eric T. Tchao, **Affum. E. Ampoma**, "Quality of Service Evaluation of a Deployed 3G Data Network for a Campus wide e-Learning Platform" *International Journal of Computer Application (IJCA),* Volume 91 No. 16, April 18, 2014, ISBN: 973-93-80881-16-7, DOI: 10.5120/15964-5263 http://dx.doi.org/10.5120/15964-5263
20 **Affum. E. Ampoma**, Shaddrack Y. Nusenu, Addo Emmanuel and Agyekum Kwame A. P "A Study of the readiness of the African Telecommunication industry to upgrade all GSM base stations LTE. Case Study – Ghana*," Journal of Telecommunications*, Volume 22, Issue 1, October 2013. ISSN 2042-8839 https://idoc.pub/documents/a-study-of-the-readiness-of-the-african-telecommunication-industry-to-upgrade-all-gsm-base-stations-to-ltecase-study-ghana-gen5g6zmz14o
37. E.T. Tchao, K. Diawuo and W.K. Ofosu and **Affum Emmanuel Ampoma "**Analysis of MIMO Systems used in planning a 4GWiMAX Network in Ghana", *International Journal of Advanced Computer Science and Applications (IJACSA).* Volume 4 No. 7, July 2013. ISSN: 2156-5570 https://dx.doi.org/10.14569/IJACSA.2013.040728
38. Kwame A. P. Agyekum, Eric T. Tchao, **Affum Emmanuel Ampoma** "Customer Experience with Mobile Number Portability Implementation in Ghana" *International Journal of Emerging Technology and Advanced Engineering*, Volume3, Issue 10, October 2013. ISSN 2250-2459, https://www.researchgate.net/publication/259338735_Customer_Experience_with_Mobile_Number_Portability_Implementation_in_Ghana
39. Kwame A.P. Agyekum, Eric T. Tchao, **Emmanuel Affum**: "Evaluation of Mobile Number Portability in Ghana" *International Journal of Computer Science and Telecommunications* (IJCST), 4(10) October 2013. Pages 30-33 https://www.researchgate.net/publication/258949086_Evaluation_of_Mobile_Number_Portability_Implementation_in_Ghana
40. E. Tutu Tchao, W. K. Ofosu, K. Diawuo**, Affum E. Ampoma,** and K. Agyekum "Interference Simulation and Measurement for a Deployed 4G-WIMAX Network in an Urban Sub-Saharan African Environment" *International Conference on Wireless* Networks, *International Journal of Computer Application,* Volume 71 No. 13, June 26, 2013, ISBN: 973-93-80875-44-0 http://dx.doi.org/10.5120/12424-8973
41. Kwame A. P Agyekum, Eric T. Tchao, **Emmanuel Affum**," Performance Evaluation and Measurement of 3G Mobile Communication Networks, A Case Study" *World Journal of Engineering and Technology (WJET)*, 3 November 2015. Pages 176-184

http://dx.doi.org/10.4236/wjet.2015.34018

42. Edward Danso Ansong**, Affum Emmanuel Ampoma,** Dr. James Ben Hayfron-Acquah**,** "The Challenges of Young ICT Entrepreneur in Developing Countries: Case Study – Ghana" *International Journal of Computer Application,* Volume 45 No. 21, May 2012, ISBN: 973-93-80868-66-2, DOI: 10.5120/7070-9206 https://www.semanticscholar.org/paper/The-Challenges-of-Young-I.C.T-Entrepreneur-in-Case-Affum Ansong/4f91f1dbf88ee53bcdf345f2a92e719c08476ea8
43. **Affum Emmanuel Ampoma and** Edward Danso Ansong, "Propagation Assessment of MB- OFDM Ultrawide Band (UWB) MIMO Based Communication in Fading Channels" *International Journal of Computer Engineering Science (IJCES),* volume 1, Issue 2, pages 82-99, Nov 2011, ISSN:2250-3439 https://www.semanticscholar.org/paper/Propagation-Assessment-of-MB-OFDM-Ultrawide-Band-in-Affum-Ansong/239e356f4857398ef13c0c2dd171a580fd152969
44. **E. Ampoma** and Edward Danso Ansong**,** "Load Factor Assessment and Evaluation on the Performance MIMO WCDMA Rayleigh Interference Channel" *International Journal of Computer Application,* Volume 52 No. 7, August 30,2012, ISBN: 973-93-80870-10-8, DOI: 10.5120/8213-1631 https://www.researchgate.net/publication/258652253_Load_Factor_Assessment_and_Evaluation_on_the_Performance_MIMO_WCDMA_Rayleigh_Interference_Channel
45. Edward Danso Ansong, **Affum Emmanuel Ampoma**, and James Ben Hayfron-Acquah "The Challenges of ICT Graduate Un-employment in Developing Economies in Africa: Case Study– Ghana*" International Journal of Computer Science and Networking*, Volume 1, Issue 3, June 2012. ISSN 227-5420 https://www.semanticscholar.org/paper/The-Challenges-of-ICT-Graduate-Un-Employment-in-in-Affum-Ansong/ddbda2d30184f6f787465b48f13baed98615392d
46. **Affum Emmanuel Ampoama** and Edward Danso Ansong, "Propagation Assessment of MB- OFDM Ultrawide Band (UWB) MIMO Based Communication in Fading Channels" *International Journal of Computer* **Engineering** *Science (IJCES)*, volume 1 Issue 2, pages 82- 99, Nov 2011. ISSN: 2250-3439 https://www.semanticscholar.org/paper/Propagation-Assessment-of-MB-OFDM-Ultrawide-Band-in-Affum-Ansong/239e356f4857398ef13c0c2dd171a580fd152969
47. K. Agyeman-Prempeh Agyekum, **Affum Emmanuel Ampoma**, Edward D. Ansong, Henry Abu Diawuo "Evaluate the Quality of Service of Airtel Mobile Network on Knust Campus" *Asian Journal of Current Eng. And Maths* (AJCEM), vol. 3, Number 1, 2014. http://innovativejournal.in/index.php/ajcem/article/view/567

Publications– Conferences

48. **E. A. Affum**, S. A. Ajagbe, K. A. Boateng, M. O. Adigun, and E. Addo, "Response Analysis of Varied Q-Power Values of Cosine Distribution in Spatial Correlation," *2022 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (AP-S/URSI)*, 2022, pp. 2070-2071, doi: 10.1109/AP-S/USNC-URSI47032.2022.9887202. https://doi.org/10.1109/AP-S/USNC-URSI47032.2022.9887202
49. **E. Ampoma**, H. Zhang, Y. Huang, J. Wen and K. Oteng Gyasi "On Massive MIMO Antenna Topologies Using Total Power in the Azimuth and Zenith Domains" *IEEE International Symposium on Antennas and Propagation and USNCURSI Radio Science Meeting (APS/URSI2017)*, 9 - 14, San Diego, California, USA, 2017 (EI Index 20180804824315) DOI:10.1109/APUSNCURSINRSM.2017 https://doi.org/10.1109/APUSNCURSINRSM.2017.8072227
50. D. K. Ngala, K. A. -B. Opare and **E. A. Affum**, "Performance Analysis of SISO and MIMO Communication Systems using Multiple Point Scatter Model," *International Conference on Mechatronics, Remote Sensing, Information Systems and Industrial Information Technologies (ICMRSISIIT)*, 2019, pp. 1-5, doi: 10.1109/ICMRSISIIT46373.2020.9405822. http://dx.doi.org/10.1109/ICMRSISIIT46373.2020.9405822
51. Kwame Oteng Gyasi, Guangjun Wen, Daniele Inserra, Jian Li, **A. E. Ampoma**, Yongjun Huang" Compact and Wideband CP Slot Antenna with Rectangular Slots and Inverted-F Feedline ", *IEEE International Symposium on Antennas and Propagation and USNCURSI Radio Science Meeting (APS/URSI)*, 8-13 July, Boston, Massachusetts, 2018
52. **E. Ampoma**, H. Zhang, Y. Huang, J. Wen and K. Oteng Gyasi "On Massive MIMO Antenna Topologies Using Total Power in the Azimuth and Zenith Domains" *IEEE International Symposium on Antennas and*

Propagation and USNCURSI Radio Science Meeting (APS/URSI2017), 9 - 14, San Diego, California, USA, 2017 (EI Index 20180804824315) DOI:10.1109/APUSNCURSINRSM.2017
https://doi.org/10.1109/APUSNCURSINRSM.2017.8072227

53. O. G. Kwame, Y. J. Huang, W. Guangjun, **Affum E. Ampoma**, W. Hu, "Tri-Band Planar Monopole Antenna WwithDual Band Circular Polarization", *2017 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting AP-S/URSI*, San Diego, California, pp: 2533 - 2534, USA 2017. DOI: 10.1109/APUSNCURSINRSM.2017
https://doi.org/10.1109/APUSNCURSINRSM.2017.8073309
54. **Affum E. Ampoma**, Guangjun Wen, Haobin Zhang, Yongjun Huang, Oteng K. Gyasi, and Parfait I. Tebe, "3D Correlation Function of a Uniform Circular Array Using Maximum Power in the Direction of Arrival*" Progress in Electromagnetics Research Symposium* 19-22 November, Pp:2996 – 3003, Singapore 2017, DOI:10.1109/PIERS- FALL.2017
https://doi.org/10.1109/PIERS-FALL.2017.8293648
55. E. O. Aboagye, G. Jianbin and **Affum E. Ampoma**, "Efficient parallelization for big data Collaborative recommendation decisions," *IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC)*, Las Vegas 8-10 Jan., NV, pp. 268-274,2018,
https://doi.org/10.1109/CCWC.2018.8301706
56. O. G. Kwame, Y. J. Huang, W. Guangjun; J. Li, **Affum E. Ampoma**, W. Hu, "Broadband circularly polarized square slot antenna with a G-Shaped feedline", *2017 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting AP-S/URSI,* San Diego, California, pp: 117 – 118, USA 2017. DOI: 10.1109/APUSNCURSINRSM.2017
https://doi.org/10.1109/APUSNCURSINRSM.2017.8072101
57. A. Isaac, C. Yongsheng, C. Fushen and **A. E. Ampoma**, "Performance of 40, 80 and 112 Gb/s PDM-DQPSK optical label switching system with spectral amplitude code labels," *IEEE Asia- Pacific Conference on Communications (APCC)*, pp. 161-166, Yogyakarta, 2016 (EI Index No:20164603010353) DOI: 10.1109/APCC. 2016.7581520
https://doi.org/10.1109/APCC.2016.7581520
58. **E. Ampoma** and Guangjun Wen, "Antenna selection with decoupling network for small receiving monopole array in a correlated MIMO system," *IEEE International Conference on Ubiquitous and Future Networks (ICUFN),* pp. 359-364, Vienna, 2016 (EI Index No: 20163502740027), DOI:10.1109/ICUFN.2016.75370
https://doi.org/10.1109/ICUFN.2016.7537049
59. **E. Ampoma**, Wen Guangjun and K. Oteng Gyasi "Evaluation of Small Receiving Monopole Array with Decoupling Networks in Massive", *International Conference of Wireless Networks, World Congress on Engineering (WCE 2016*), pp. 577-582, July, 2016 (EI, Index No. 20164603010159), ISSN: 20780958
http://www.iaeng.org/publication/WCE2016/WCE2016_pp577-582.pdf
60. **Affum Emmanuel Ampoma**, T.R. Rao and Dr. V. A. Labay "Capacity and performance analysis of a MIMO based MB-OFDM Ultra-wide band Communication System", *IEEE International Conference of Adaptive Science and Technology (ICAST)* pp 432-439 Ghana, December, 2009.ISSN:0855-8906, ISBN:978-1-4244-3522-7
https://doi.org/10.1109/ICASTECH.2009.5409688
61. A. Kirubaraj and ***Affum Emmanuel Ampoma***, "Model Design of MTJ based SRAM Non- Volatile Memory" *IEEE International Conference of Adaptive Science and Technology (ICAST)*, pp. 68-72, Ghana, ,December 2009. ISSN: 0855-8906, ISBN: 978-1-4244-3522-7
https://doi.org/10.1109/ICASTECH.2009.5409743
62. **Affum. E. Ampoma** and Edward Ansong "Cell load and Capacity Analysis of WCDMA MIMO Rayleigh Interference Channel" *International Conference on Cloud Computing & Services (ICCCS),* pages 14-16, Thandalam, Chennai, Tamil Nadu, India, Dec. 2011. ISBN: 978-81-907494-6-6
http://dx.doi.org/10.5120/8213-1631
63. Edward Danso Ansong, **Affum E. Ampoma** and Dr. James Ben Hayfron-Acquah, "An Enhanced Conceptualization of a Scientific Programming Language for Advanced Research" *International Conference on Cloud Computing & Services (ICCCS 2011),* Conference proceedings pages 72-78, Saveetha Engineering College, Thandalam, Chennai, Tamil Nadu, India Dec. 2011. ISBN: 978-81-907494-6-6
64. **Affum E. Ampoma**, Dr. Reynolds Okai and Dr. Dtanley Moffat "Uplink Performance Analysis in Multiple MIMO Rayleigh Interference Channel for WCDMA", *International Conference on Wireless Networks,*

WORLDCOMP'11 (ICWN'11), Conference Proceedings pages 16-21, July 2011, Las Vegas, Nevada, USA. ISBN=1-60132-187-2
http://worldcomp-proceedings.com/proc/p2011/ICW4505.pdf

65. **Affum E. Ampoma**, Dr. T.R. Rao and Dr. V. A. Labay "MB-OFDM Based UWB Communications System Performance and Capacity Analysis", International *Conference on Electrical Energy System & Power Electronics in Emerging Economics (ICEESPEEE),* Conference Proceedings pages 278-283, SRM University, Kattankulathur, Chennai, Tamil Nadu, India, April, 2009. ISBN: 978-93-80043-15-9.
66. **Affum E. Ampoma,** Dr. T.R. Rao "Capacity and Performance issues in MB-OFDM based Communication System" *National Conference on Microelectronics and Communication,* SRM University, Kattankulathur, Chennai, Tamil Nadu, India, April 2009

Book Chapters

- **E. A. Affum** *et al* "Unlocking THz Gains with Beam-Split: A Framework for IRS-Enabled Cylindrical Arrays", submitted to Open Access book, "*Cellular Communication System - The Evolution from 1G to 6G*", **IntechOpen**, London, 27th April, 2026, **Editor**, Prof. A.F.M. Shahen Shah
- **Affum, E.A**., Adigun, M.O., Boateng, K.A., Ajagbe, S.A., Addo, E. (2022). Enhancing UAV Communication Performance: Analysis Using Interference Based Geometry Stochastic Model and Successive Interference Cancellation. *In: Gervasi, O., Murgante, B., Hendrix, E.M.T., Taniar, D., Apduhan, B.O. (eds) Computational Science and Its Applications – ICCSA 2022. ICCSA 2022*. Lecture Notes in Computer Science, vol 13375. Springer, Cham.
https://doi.org/10.1007/978-3-031-10522-7_17

Professional Membership

- Member, Ghana Electrical Contractor, Eastern Region
- Member, Institute of Electrical Electronic Engineering (IEEE)
- Member –International Association of Engineers (IAENG)
- Member- WWRF: Wireless World Research Forum

New Degree Programs That I Have Led Teams to Design

- MSc Communication Systems and Network Engineering, Department of Telecommunication, Institute of Distance Learning (IDL), Kwame Nkrumah University of Science and Technology, 2022

Statement of Purpose

Everything I do comes back to one question: how can engineering make life better? Over my career in Communication Engineering, I have focused on Signal Processing, Large Antenna Systems, Channel Modeling, Statistical Communications Theory, Network Optimization, and AI to find answers. I developed a spatial correlation model for antenna arrays grounded in the maximum power of arrival principle, published my findings in respected journals like *IEEE Transactions on Antennas and Propagation*, and regularly review work for international publications.

Teaching has been at the heart of my journey for over twenty years. Across Ghanaian universities, I have taught digital communications, signal detection and estimation, and wireless network architecture, while helping build curricula and strengthen quality assurance. I also bring this expertise to industry and government clients, including GCTU, WAEC,

GES, and the National Council for Curriculum and Assessment. Whether supervising graduate students, mentoring young researchers, or exploring new frontiers in Massive MIMO, NOMA, intelligent reflecting surfaces, and millimeter-wave communications, I remain committed to advancing the technologies that will define 5G and whatever comes next.

Future Research:

- **Intelligent and Adaptive Wireless Systems for Beyond-5G and 6G Networks: Integrating AI-Driven Signal Processing, Reconfigurable Surfaces, and Sustainable IoT Connectivity-** This research focuses on intelligent and adaptive wireless systems for beyond-5G and 6G networks, integrating AI-driven signal processing, reconfigurable intelligent surfaces (RIS), and sustainable IoT connectivity. AI algorithms will dynamically optimize network performance under changing conditions, while low-cost RIS solutions will extend coverage to rural and underserved areas in Ghana and sub-Saharan Africa. Wireless-powered communication networks will enable battery-free IoT devices for agriculture, smart cities, and environmental monitoring. Deep learning will enhance channel modeling for dynamic environments such as vehicular and drone communications, and integrated sensing and communications (ISAC) will allow radar-like sensing to share spectrum with data transmission. Theoretical models will be translated into experimental prototypes through industry partnerships, supported by cross-layer optimization frameworks for ultra-dense networks. This research aims to position Ghana as a hub for wireless innovation, contributing to global 6G standards and improving quality of life through sustainable connectivity