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| **SUMMARY** | I consider myself as a Structural Engineer, a Researcher, and an Educator with an entrepreneurial bent. I have special interests in structural design and modeling, structural health monitoring, reliability, and life-cycle cost-benefit analysis of civil engineering infrastructure systems. Furthermore, I am passionate about utilizing the skills I have acquired in both academia and industry to solve engineering problems and train the next generation of engineers. |
| **TECHNICAL SKILLS & EXPERTISE** | * Nondestructive evaluation of concrete structures using synthetic aperture radar * Experimental design * Reliability analysis of critical civil infrastructures * Engineering analysis and modeling software: Staad.Pro, Beamax, Abaqus FE, GT STUDL * Engineering drafting tools: AutoCAD 2019, Civil 3D * Other software: Microsoft Office 360, Excel, MATLAB, Mathcad, Minitab * Bridge design codes: AASHTO LRFD Bridge Design Specifications, AISC Manual, ACI 318-14, ASCE 7-16, ACI SP-017(14), ACI 314R-16, ASTM, IBC-2015 * Construction Quality Assurance and Quality Control * OS and Virtualization: Windows, Mac, VMware Horizon * Technical writing and professional presentation |
| **EDUCATION**  December 2019 | **Ph.D. in Civil Engineering (Structures) | University of Massachusetts Lowell, USA**  **Dissertation title:**  Reliability-Based Condition Assessment of Reinforced Concrete Structures Using Synthetic Aperture Radar Imaging Technique  **Advisor**: Prof. Paul DeStefano |
| May 2013 | **MS. Civil Engineering (Structures) | Southern Illinois University Carbondale, USA**  **Thesis title**: Prediction of 28-day compressive strength of concrete using relevance vector machines  **Advisor**: Prof. Jale Tezcan |
| June 2008 | **BS. Civil Engineering | Kwame Nkrumah University of Science and Technology, Ghana**  **Thesis title**: The Strength of Reinforced Concrete Beam Externally Bonded with FRP  **Advisor**: Prof. Mark Adom-Asamoah |
| **RESEARCH EXPERIENCE**  Sept. 2013 ~ Dec. 2017 | **Research Assistant –** *The University of Massachusetts Lowell, Lowell, Massachusetts*   * Condition assessment of concrete specimens and structures using SAR imaging technique * Corrosion monitoring and detection using half-cell potential sensors * Finite element numerical simulation for damage detection and quantification * Contributed to the preparation of research project reports and attended research meetings * Contributed to the publication of research and conference papers * Presentation of research findings at international conferences * Experimental design and training undergraduate researchers on how to use various sensors |
| **RESEARCH PROJECTS (RESEARCH ASSISTANT)**  **PUBLICATIONS** | * + - 1. **Project title**: Quantitative Sensing of Bridges, Railways, and Tunnels with Autonomous Unmanned Aerial Vehicles (PI: Prof. Tzuyang Yu)- **US DOT, 2014~2016**   **Year of involvement:** 2015 ~ 2016   * + - 1. **Project name**: Distributed Active Acoustic Sensing using a Single Optical Fiber for Interfacial Structural Health Monitoring of Reinforced Concrete Structures, (PI: Prof. Xingwei Wang, Dept. of Electrical Engineering, UML, CO-PI: Prof. Tzuyang Yu, **NSF, 2014~2017**   **Years of involvement:** 2014 ~ 2017   * + - 1. **Project title**: VOTERS (Vehicle Onboard Traffic Embedded Roaming Sensors) Project (PI: Prof. M.L. Wang, North Eastern University, Co-PI: Prof. Tzuyang Yu), **NIST, 2009~2014**   **Year of involvement**: 2013 ~ 2014 |
| 1. **Owusu Twumasi**, J., DeStefano, P., & Christian, J. T. (2020). The application of synthetic aperture radar imaging technique to measure the moisture content of concrete structures. *Measurement*, 152, 107335. 2. **Owusu Twumasi, J.**, DeStefano, P., & Christian, J. T. (2020). A Reliability-Based Condition Assessment of Structural Concrete Using Synthetic Aperture Radar Imaging Techniques. *Research in Nondestructive Evaluation*, 1-20. (Published Online: April 6, 2020) 3. Yu, T., **Owusu Twumasi, J**., Le, V., Tang, Q., & D’Amico, N. (2017). Surface and subsurface remote sensing of concrete structures using synthetic aperture radar imaging. *Journal of Structural Engineering*, *143*(10), 04017143 4. Du, C., **Owusu Twumasi, J**., Tang, Q., Guo, X., Zhou, J., Yu, T., & Wang, X. (2018). All-Optical Photoacoustic Sensors for Steel Rebar Corrosion Monitoring. *Sensors*, *18*(5), 1353 5. Tang, Q., **Owusu Twumasi, J**., Hu, J., Wang, X., & Yu, T. (2018, March). Finite element simulation of photoacoustic fiber optic sensors for surface corrosion detection on a steel rod. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, Civil Infrastructure, and Transportation XII* (Vol. 10599, p. 105991N). International Society for Optics and Photonics. 6. Hu, J., Tang, Q., **Owusu Twumasi, J**., & Yu, T. (2018, March). Characterization of steel rebar spacing using synthetic aperture radar imaging. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, Civil Infrastructure, and Transportation XII* (Vol. 10599, p. 1059915). International Society for Optics and Photonics. 7. Du, C., **Owusu Twumasi, J.**, Tang, Q., Wu, N., Yu, T., & Wang, X. (2018, March). Real-time corrosion detection of rebar using an embeddable fiber-optic ultrasound sensor. In *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2018* (Vol. 10598, p. 1059833). International Society for Optics and Photonics. 8. Ingemi, C. M., **Owusu Twumasi, J.**, & Yu, T. (2018, March). Electromagnetic characterization of white spruce at different moisture contents using synthetic aperture radar imaging. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, Civil Infrastructure, and Transportation XII* (Vol. 10599, p. 1059917). International Society for Optics and Photonics. 9. Ingemi, C. M., **Owusu Twumasi, J**., Litt, S., & Yu, T. (2017, April). Condition assessment of corroded steel rebar in free space using synthetic aperture radar images. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2017* (Vol. 10169, p. 101691F). International Society for Optics and Photonics. 10. **Owusu Twumasi, J**., & Yu, T. (2017, June). Corrosion current level estimation of rust samples using inverse dielectric spectroscopy. In *2017 IEEE Electrical Insulation Conference (EIC)* (pp. 404-407). IEEE. 11. **Owusu Twumasi, J**., Le, V., Tang, Q., & Yu, T. (2016, April). Quantitative sensing of corroded steel rebar embedded in cement mortar specimens using ultrasonic testing. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2016* (Vol. 9804, p. 98040P). International Society for Optics and Photonics. 12. Le, V., Yu, T., **Owusu Twumasi, J**., & Tang, Q. (2016, April). Sizing and ranging criteria for SAR images of steel and wood specimens. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2016* (Vol. 9804, p. 980404). International Society for Optics and Photonics. 13. Bi, S., Wu, N., Zhou, J., Tang, Q., **Owusu Twumasi, J.**, Yu, T., & Wang, X. (2016, April). Ultrasonic transmission from fiber-optic generators on a steel plate. In *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2016* (Vol. 9804, p. 98040Q). International Society for Optics and Photonics. 14. Qin, Y., **Owusu Twumasi, J**., Le, V. Q., Ren, Y. J., Lai, C. P., & Yu, T. (2016, May). Roadside IED detection using subsurface imaging radar and rotary UAV. In *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXI* (Vol. 9823, p. 982317). International Society for Optics and Photonics. 15. **Owusu Twumasi, J.**, & Yu, T. (2015, April). Forward and inverse dielectric modeling of oven-dried cement paste specimens in the frequency range of 1.02 GHz to 4.50 GHz. In *Structural Health Monitoring and Inspection of Advanced Materials, Aerospace, and Civil Infrastructure 2015* (Vol. 9437, p. 943724). International Society for Optics and Photonics. |
| **LIST OF CONFERENCE**  **/SYMPOSIUM PRESENTATIONS** | * + - 1. **Conference name**: IEEE Electrical Insulation Conference (EIC) at Baltimore, MD - 2017   ***Title of presentation***: Corrosion current level estimation of rust samples using inverse dielectric spectroscopy   * + - 1. **Conference name**: The 29th Annual Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP) at Denver, CO - 2016   ***Title of presentation***: Surface and Subsurface Sensing of Bridges using Unmanned Aerial Vehicle with Radar and Image Sensors   * + - 1. **Conference name**: The 7th Advances in Cement-Based Materials (Cements 2016), Edwardsville, IL - 2016   ***Title of presentation***: Electromagnetic Imaging of Concrete Specimen with Various Moisture Contents   * + - 1. **Conference name**: The International Society for Optics (SPIE) Conference at San Diego, CA - 2015   ***Title of presentation***: Forward and inverse dielectric modeling of oven-dried cement paste specimens in the frequency range of 1.02 GHz to 4.50 GHz   * + - 1. **Symposium name**: University of Massachusetts Student Symposium at UMass Conference & Inn – 2014   ***Poster presentation title***: Dielectric Modeling of Cementitious Materials – An Aid to Nondestructive Evaluation (NDE) of Concrete Structures using Radar NDE |
| **SCHOLARSHIPS & PROFESSIONAL AFFILIATIONS** | * Student Member of the American Society of Civil Engineers (ASCE), (2013-2019) * Student Member, IEEE (2015 ~ 2019) * Student Member, SPIE (2013 – 2016) * Graduate Research/Teaching Assistant Award, UMass Lowell (2013-2017) * Graduate Teaching Assistant Award, SIUC (2012-2013) * 2017 Electrical Insulation Conference (EIC) at Baltimore, MD – IEEE Student Grant |
| **VOLUNTARY WORK** | * Open House Presentations, Department of Civil & Environmental Engineering, UMass Lowell (2013 ~ 2017) |