# Armstrong Aboah, Ph.D.
## Assistant Professor
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**H-index: 15     i10-index: 20**

## EDUCATION

**University of Missouri**, Columbia, MO, USA
Doctor of Philosophy (Civil Engineering),                    Jan 2020 – Dec 2022
- Concentration in Computer Vision and Machine Learning o Dissertation: *AI-based framework for automatically extracting high-low features from NDS data to understand driver behavior*

**Tennessee Technological University**, Cookeville, USA
Master of Science,                                           Aug 2018 – Dec 2019
- Concentration in Transportation Planning

**Kwame Nkrumah University of S&T**, Kumasi, Ghana
Bachelor of Science,                                         Sep 2013 – July 2017
- Concentration in Structure Engineering

## RESEARCH INTERESTS

- Transportation Planning
- Human Factors and Ergonomics
- Intelligent Transportation Systems
- Autonomous and Connected Vehicles
- Medical Image Analysis
- Digital Twins and Smart Cities
- Big Data Analytics in Transportation
- Travel demand modeling and forecasting
- Transportation and Traffic Safety Research
- Public Transportation
- Congestion Management
- Pavement and Asset Management

## TEACHING INTEREST

- Transportation Planning
- Application of AI in Transportation
- Traffic Safety
- Highway Design
- Travel Demand Modeling
- Pavement Design

## ACADEMIC APPOINTMENTS

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|---|---|---|---|
| • | **Assistant Professor** | North Dakota State University | Feb 2024-Present |
| • | **Assistant Research Professor** | University of Arizona | Aug 2023-Jan 2024 |
| • | **Research Associate** | Northwestern University | Jan 2023-Aug 2023 |

## PROFESSIONAL MEMBERSHIP/ACTIVITIES

| | | | |
|---|---|---|---|
| • | **Member** | TRB Standing Committee on Pavement Asset Mang. | Jun 2025-Present |
| • | **Continuing Edu. Chair** | ASCE – North Dakota Chapter | Jun 2024-Present |
| • | **Member** | Transportation and Development Institute | Jun 2024-Present |
| • | **Member** | American Society of Civil Engineers (ASCE) | May 2024-Present |
| • | **Member** | IEEE | Feb 2024-Present |

## RESEARCH

## REFEREED JOURNAL PUBLICATIONS (* Student Supervised, c Corresponding author, E Equal)

12. Alade O. **, Khan F. N**, & **Aboah, A.**[C] (2025). Enhancing Fisheye Object Detection Using Frequency-Domain Attention and Dual Aggregation Transformer. ***IEEE Access***.

11. Asamoah, K. J.**, Kyem, A. B.**, & **Aboah, A.**[C] (2025). SAAM-ReflectNet: Sign-Aware Attention-Based Multitasking Framework for Integrated Traffic Sign Detection and Retroreflectivity Estimation. ***Expert Systems with Applications***.

10. Kyem, A.B.**, Asamoah, K.J.**, & **Aboah, A.**[C] (2025). Context-CrackNet: A Context-Aware Framework for Precise Segmentation of Tiny Cracks in Pavement images. ***Construction and Building Materials***.

9. Habib, F.M, Motuba, D., Hang, Y., **Aboah, A.** (2025). Exploring contributing factors in single-vehicle truck crashes on rural roads: Accounting for unobserved heterogeneity and role of solar glare. ***Traffic Injury Prevention***.

8. Danyo, A.**, Dontoh, A., **Aboah, A.**[C]. (2025). An Improved Resnet50 Model for Predicting Pavement Condition Index (PCI) Directly from Pavement Images. ***Road Materials and Pavement Design***.

7. Tran, D. Q.[E], **Aboah, A.**[E], Jeon, Y., Do, M., Abdel-Aty, M., Park, M., & Park, S. (2025). Visual Question Answering-based Referring Expression Segmentation for construction safety analysis. ***Automation in Construction***.

6. Zhang, L., Yu, X., **Aboah, A.,** & Adu-Gyamfi, Y. (2025). 3D Object Detection and High-Resolution Traffic Parameters Extraction Using Low-Resolution LiDAR Data. ***ASCE Journal of Transportation Research Part A***.

5. Tran, D. Q., Jeon, Y., **Aboah, A.**, Bak, J., Park, M., & Park, S. (2025). Leveraging Semisupervised Learning for Domain Adaptation: Enhancing Safety at Construction Sites through Long-Tailed Object Detection. ***ASCE Journal of Construction Engineering and Management***, *151*(1), 04024190.

4. Kyem, A. B.**, Asamoah, K. J.**, Huang, Y, & **Aboah, A.**[C] (2024). Weather-Adaptive Synthetic Data Generation for Enhanced Power Line Inspection Using StarGAN. ***IEEE Access***.

3. Arthur, E., **Aboah, A.**[C], & Huang, Y. (2024). A Novel FHWA-Compliant Dataset for Granular Vehicle Detection and Classification. ***IEEE Access***.

2. Duah, J. O.**, **Aboah, A.**[C], & Osafo-Gyamfi, S. (2024). *DivNEDS: Diverse Naturalistic Edge Driving Scene Dataset for Autonomous Vehicle Scene Understanding*. ***IEEE Access***.

1. Owor, N. J., Adu-Gyamfi, Y., **Aboah, A.**, & Amo-Boateng, M. (2024). PaveSAM–segment anything for pavement distress. ***Road Materials and Pavement Design***, 1-25.

## REFEREED CONFERENCE PROCEEDING (* Student Supervised, [c] Corresponding author, [E] Equal)

10. Kyem, B. A.**, Owor, N. J.**, Danyo, A.**, Asamoah, J. K, Denteh, E., Muturi, T.W., Dontoh, A., Adu-Gyamfi, Y., **Aboah, A.**[C]. (2025). Task-Specific Dual-Model Framework for Comprehensive Traffic Safety Video Description and Analysis. ***Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) W.***

9. Muturi, T.W.**, Kyem, B. A.**, Asamoah, J. K.**, Owor, N. J., Dyzinela, R., Danyo, A., Adu-Gyamfi, Y., **Aboah, A.**[C]. (2025). Prompt-Guided Spatial Understanding with RGB-D Transformers for Fine-Grained Object Relation Reasoning. ***Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) W.***

8. Owor, N. J.**, Asamoah, J. K.**, Muturi, T.W., Owor, A. J., Kyem, B. A., Danyo, A., Adu-Gyamfi, Y., **Aboah, A.**[C]. (2025). A Unified Detection Pipeline for Robust Object Detection in Fisheye-Based Traffic Surveillance. ***Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) W.***

7.  Kyem, B. A.**\***, Asamoah, J. K., Addai, T., Denteh, E. K. O., Danyo, A., **Aboah, A.**[C]. (2025). Foundation Model for Pavement Defect Detection: A Big Data-Driven Approach to Robust Road Condition Monitoring. ***10th International Conference of Big Data Analytics (ICBDA 2025).***

6.  Denteh, E. K. O.**\***, Danyo, A., Kyem, B. A., Asamoah, J. K., Addai, T., **Aboah, A.**[C]. (2025). Integrating Travel Behavior Forecasting and Generative Modeling for Predicting Future Urban Mobility and Spatial Transformations. ***10th International Conference of Big Data Analytics (ICBDA 2025).***

5.  Kyem, B. A.**\***, Denteh, E. K. O., Asamoah, J. K., **Aboah, A.**[C]. (2025). PaveCap: The First Multimodal Framework for Comprehensive Pavement Condition Assessment with Dense Captioning and PCI Estimation. ***104th Annual Meeting of the Transportation Research Board (TRB).***

4.  Asamoah, J. K.**\***, Kyem, B. A., Ansarinejad, K., **Aboah, A.**[C]. (2025). A Novel Methodological Framework for Assessing Traffic Sign Retroreflectivity Using Lidar Data. ***104th Annual Meeting of the Transportation Research Board (TRB)***.

3.  Kwakye, K., Seong, Y., Yi, S., & **Aboah, A**. (2024). All you need is data: A multimodal approach in understanding driver behavior. **In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*** (Vol. 68, No. 1, pp. 1298-1304). Sage CA: Los Angeles, CA: SAGE Publications.

2.  Tran, D. Q.[E], **Aboah, A.**[E], Jeon, Y., Shoman, M., Park, M., & Park, S. (2024). Low-Light Image Enhancement Framework for Improved Object Detection in Fisheye Lens Datasets. ***In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition***.

1.  Tran, D. Q.[E], **Aboah, A.**[E], Jeon, Y., Shoman, M., Park, M., & Park, S. (2024). Low-Light Image Enhancement Framework for Improved Object Detection in Fisheye Lens Datasets. ***In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition***.

## PRESENTATIONS AND INVITED TALKS

### Invited Talks

2.  Invited as a guest speaker at the **10th International Conference of Big Data Analytics (ICBDA 2025).**
1.  Invited as a guest speaker at **the International Conference on signal and Data Processing (4th ICSDP-2024)**.

### Conference & Annual Meeting Presentation

([+]presenter(s), **\***Student, [S]Supervisor)

5.  Asamoah, J. K.[+,]**\***, **Aboah, A.**[S,+]. (2025). A Novel Methodological Framework for Assessing Traffic Sign Retroreflectivity Using Lidar Data. *104th Annual Meeting of the Transportation Research Board (**TRB**).*

4.  Denteh, E. K. O.[+,]**\***, **Aboah, A.**[S,+]. (2025). Integrating Travel Behavior Forecasting and Generative Modeling for Predicting Future Urban Mobility and Spatial Transformations. *10th International Conference of Big Data Analytics (**ICBDA 2025**).*

3.  Denteh, E. K. O.[+,]**\***, **Aboah, A.**[S,+]. (2025). Foundation Model for Pavement Defect Detection: A Big Data-Driven Approach to Robust Road Condition Monitoring. *10th International Conference of Big Data Analytics (**ICBDA 2025**).*

2.  Kyem, B. A.[+,]**\***, **Aboah, A.**[S,+]. (2025). PaveCap: The First Multimodal Framework for Comprehensive Pavement Condition Assessment with Dense Captioning and PCI Estimation. *104th Annual Meeting of the Transportation Research Board (**TRB**).*

1. Tran, D. Q. [+], **Aboah, A. [+],** (2024). Low-Light Image Enhancement Framework for Improved Object Detection in Fisheye Lens Datasets. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*

## Internal Seminars & Guest Lectures

([+]presenter(s), **\***Student, [s]Supervisor)

4. **Aboah, A.[+]**. (2025). Gave a guest lecture in CE 111 class on "***Transportation Engineering***".

3. **Aboah, A.[+]**. (2025). Gave a guest lecture in CE 111 class on "***Application of AI in Civil Engineering***"

2. **Aboah, A.[+],** (2025). Presented on the topic "***A double-edged sword: the dilemma of the dangers of AI***" at Graduate Seminar

1. **Aboah, A.[+]**. (2024). Gave a guest lecture in CE 418 class on the topic "***Rethinking the future of transportation***".