Abhijit Sarkar

Curriculum Vitae

Virginia Tech Transportation Institute
Contact: 540-231-1528
asarkar@vtti.vt.edu, asarkar1@vt.edu
Senior Research Associate, Lecturer

Education

2017 **Ph.D., Electrical Engineering**, Virginia Tech, Blacksburg, VA, United States
Advisors: Dr. Lynn Abbott & Dr. Zachary Doerzaph, Dissertation Committee: Dr. Devi Parikh, Dr. Jason Xuan, Dr. Daniel Stilwell
Dissertation: Cardiac Signals: Remote Measurement and Applications

2009 **M. Tech, Electrical Engineering**, Indian Institute of Technology Kharagpur, India
Specialization: Control Systems Engineering; *Advisor:* Dr. Amit Patra
Research: Modeling and fault diagnosis of Automotive HVAC system

2006 **Bachelor of Engineering, Electrical Engineering**, Jadavpur University, India

Work Experience

2023 – Now **Team Lead - Computer Vision and Machine Learning**, *Virginia Tech Transportation Institute (VTTI)*, Blacksburg, VA, United States.
Division of Data and Analytics

2023- **Faculty Affiliate**.
Sanghani Center for Artificial Intelligence and Data Analytics, Virginia Tech
Center for Future Work Places and Practices, Virginia Tech
Center for Equitable Advanced Aerial Mobility, Virginia Tech

2024- **Lecturer (Courtesy)**.
Bradley Department of Electrical and Computer Engineering, Virginia Tech

2025- **Faculty Affiliate**.
Department of Computer Science, Virginia Tech

2022 – 2023 **Team Lead - Advanced Analytics in Behavior, Perception, and Safety**, *Virginia Tech Transportation Institute*.
Division of Freight, Transit, and Heavy Vehicles

2022 – Now **Senior Research Associate**, *Virginia Tech Transportation Institute*.

2018 – 2022 **Research Associate**, *Virginia Tech Transportation Institute*.

2016 **Summer Intern**, *Apple Inc.*, Sunnyvale, CA, United States.
Project: Special Project Group

2010 **Summer Intern**, *Delphi*, Kokomo, IN, United States.
Project: Optimal PWM Strategy for Allison Motor

Teaching Experience

Fall 2023, 24, Spring 25 **ECE 4524**, *Artificial Intelligence and Engineering Applications*, Department of Electrical and Computer Engineering, Virginia Tech.

External Funding

As Principal Investigator (PI) and Co-Principal Investigator I have received and managed more than 20 projects that exceed $18 Million of external funding from different agencies including NASA, NSF, FMCSA, FHWA, NHTSA, NCHRP, UTC, NSTSCE, and multiple private enterprises.

CCI **PI**, *Commonwealth Cyber Initiative*, $60,000 (direct), 2025 - 2026.
Project: Data Privacy Landscape for Modern Transportation System While Using Multimodal Data

NASA **Co-PI**, *National Aeronautic Space Association*, $5,999,147, 2024 - 2027.
Project: Safe, Scalable, and Seamless SurfNav4UAS (SurfNav4UAS)

CCI **PI**, *Commonwealth Cyber Initiative*, $50,000 (direct), 2024 - 2025.
Project: Enhancing Cybersecurity, Accessibility and Equity Through Inclusive Biometric Authentication

NHTSA **Co-PI**, *National Highway Traffic Safety Administration*, $445,000, 2023 - 2024.
Project: Part of Indefinite Delivery, Indefinite Quantity (IDIQ)

FHWA **Co-PI**, *Federal Highway Administration*, $732,640, 2023 - 2026.
Project is part of IDIQ

FMCSA **Co-PI**, *Federal Motor Carrier Safety Administration*, $7,399,452, 2022 - 2025.
Project is part of IDIQ

Safe-D UTC **PI**, *Safety through Disruption: University Transportation Center*, $120,000 + $200,000 (In kind from Oracle and MicroTraffic), 2022 - 2023.
Project: Real-Time Risk Prediction at Signalized Intersection Using Graph Neural Network

Industry **PI**, *Industry Sponsor*, $194,000, 2022 - 2024.
Project Topic: Driver health monitoring, Ford Alliance - VT consortium

NSF **Co-PI**, *National Science Foundation*, $187,723, 2021 - 2023.
Project: EAGER: Biometric Authentication using Non-contact Cardiovascular Signals

NHTSA **Co-PI**, *National Highway Traffic Safety Administration*, $1,215,947, 2021 - 2024.
Project is part of IDIQ

NHTSA **Co-PI**, *National Highway Traffic Safety Administration*, $497,052, 2023 - 2024.
Project is part of IDIQ

CHBR **Co-PI**, *Center for Health Behavior Research, Virginia Tech*, $20,000, 2023 - 2024.
Project: Ubiquitous Health Monitoring for Obesity-related Diseases and Disorders

FMCSA **Co-PI**, *Federal Motor Carrier Safety Administration* , $182,400, 2021 - 2022.
Project is part of IDIQ

FHWA **PI**, *Federal Highway Administration*, $813,574, 2019 - 2022.
Project: FHWA EAR: Video Analytics for Automatic Annotation of Driver Behavior and Driving Situations in Naturalistic Driving Data

NCHRP **PI**, *National Cooperative Highway Research Program*, $200,000, 2021 - 2023.
Project: Artificial Intelligence Opportunities for State and Local DOTs – A Research Roadmap

NHTSA **Co-PI**, *National Highway Traffic Safety Administration*, $445,000, 2023 - 2024.
Project is part of IDIQ

Industry **PI**, *Industry Sponsor*, $289,689, 2020 - 2021.
Project: Baseline Truck Analysis

Industry **PI**, *Industry Sponsor*, $18,372, 2025 - 2025.
Project: Rear-end Looming Events

Safe-D UTC **PI**, *Safety Through Disruption: University* , $168,706 , 2019 - 2022.
Project: Development of an Infrastructure Based Data Acquisition System to Naturalistically Collect the Roadway Environment

NSTSCE **PI**, *National Surface Transport Safety Center for Excellence*, $256,000 (Direct), 2018 - 2025.
- Analysis of Car Cut-ins between Trucks Based on Existing Naturalistic Driving Data
- Face De-identification of Drivers from NDS
- CAS Activity Monitoring
- Using Artificial Intelligence/Machine Learning Tools to Analyze CMV Near-Misses and Crashes
- Real time Risk Prediction using Temporal Gaze Pattern and Evidence Accumulation
- Activity and Health Monitoring of Long Haul Truck Drivers through Continuous Measurement of Vital Signs

NHTSA **Tech Lead**, *National Highway Traffic Safety Administration*, $872,664, 2023 - 2024.
Project is part of IDIQ

Publications

I have contributed to 8 peer-reviewed articles in reputable journals, authored a book chapter, and contributed in 25 peer-reviewed conference proceedings. Additionally, I have authored 20 peer reviewed technical reports. (Google Scholar)

Book & Book Chapter

[B1] **Sarkar, A.**, Jain, S., Sudweeks, J., & Perez, M. (2023). Driver Attention Modeling Through Evidence Accumulation and Gaze Fixation. Towards Human-Vehicle Harmonization, 3, 13., in Hansen, J., Takeda, K., Schmidt, G., & Abut, H. (Eds.). (2022). Walter de Gruyter GmbH & Co KG.

Peer-Reviewed Journal

[J8] Thapa, S., **Sarkar, A.** 2024. A deep dive into enhancing sharing of naturalistic driving data through face deidentification. The Visual Computers, 1 - 32

[J7] Yang, G., Ridgeway, C., Miller, A., **Sarkar, A.** 2024. Comprehensive Assessment of Artificial Intelligence Tools for Driver Monitoring and Analyzing Safety Critical Events in Vehicles. Sensors, 24(8), 2478

[J6] Yang, G., Kaskar, O., **Sarkar, A.** 2025. Crash Risk Prediction Based on Temporal Driver Gaze Pattern Using Deep Learning Models. Accident Analysis and Prevention. (Under Review)

[J5] Winkowski, C., Sarkar, A., Hickman, J., Abbott, L., (2023). Residual Network-Based Driver Gaze Classification In Naturalistic Driving Studies . Transportation Research Record (Accepted)

[J4] Sundharam, V., **Sarkar, A.**, Svetovidov, A., Hickman, J. S., Abbott, A. L. (2023). Characterization, detection, and segmentation of work-zone scenes from naturalistic driving data. Transportation research record, 2677(3), 490-504.

[J3] Mabry, J. E., Camden, M., Miller, A., **Sarkar, A.**, Manke, A., Ridgeway, C., Hanowski, R. J. 2022. Unravelling the complexity of irregular shiftwork, fatigue and sleep health for commercial drivers and the associated implications for roadway safety. . International journal of environmental research and public health, 19(22), 14780 DOI:10.3390/ijerph192214780

[J2] Papakis, I., **Sarkar, A.**, Svetovidov, A., Hickman, J. S., Abbott, A. L. (2021). Convolutional neural network-based In-vehicle occupant detection and classification method using second strategic highway research program cabin images. Transportation research record, 2675(8), 443-457.

[J1] **Sarkar, A.**, Hickman, J. S., McDonald, A. D., Huang, W., Vogelpohl, T., Markkula, G. (2021). Steering or braking avoidance response in SHRP2 rear-end crashes and near-crashes: A decision tree approach. Accident Analysis & Prevention, 154, 106055

Peer-Reviewed Conference Proceedings

[C27] Jain, S., Han, H., Abbott, L., & **Sarkar, A.** (2025), Proto-FS3G: A Prototypical Feature-Impression Approach for Diffusion-based Few-shot 3D Vehicle Generation, IEEE Intelligent Vehicle Symposium 2026 (Submitted)

[C26] Han, H., Abbott, L., & **Sarkar, A.** (2025), D3VL: Understanding Driving Scenes from 3D Time Series Data and Video with Language Models, IEEE Intelligent Vehicle Symposium 2026 (Submitted)

[C25] Tyler, J., Khan, I., Thapa, S., Abbott, L., & **Sarkar, A.** (2025), Retrieval of Blood Volume Pulse Waveforms using Multispectral Face Video Data, IEEE International Conference on Image Processing Workshop (Accepted)

[C24] Jain, S., Han, H., Abbott, L., & **Sarkar, A.** (2025), Sparse-FS3D: A Sparse-Feature Fusion Approach for Diffusion-Enhanced Few-Shot 3D Object Detection in Outdoor Scenes, IEEE International Conference on Intelligent Transportation Systems (Under Review)

[C23] Kiran, F., Hasan, T., Ganeshan, K., Bhatambarekar, G., **Sarkar, A.**, & Pavdilis, I. (2025), Method of Extraction and Affective Role of Facial Self-Touch Gestures in Knowledge Work, 13th International Conference on Affective Computing and Intelligent Interaction (ACII 2025) (Accepted)

[C22] Christiana, C., **Sarkar, A.**, & Abbott, L. (2025), Noise-Driven AI Sensors: Secure Healthcare Monitoring with PUFs (I)., IEEE International Midwest Symposium on Circuits and Systems (Accepted for special session: Circuits and Systems for Intelligent Health Monitoring Using Machine Learning

[C21] Sonth, A., Abbott, A. L., & **Sarkar, A.** (2025, June). Intersection Safety Modeling Using Semantic Scene Graph and Graph Neural Network, In 2024 IEEE Intelligent Vehicles Symposium (IV), Accepted **Oral - Top 6.5%**

[C20] Bhatambarekar, G., & **Sarkar, A.** (2025, June). Conversational Multimodal System for Nutritional Information Retrieval: A Systematic Evaluation, MetaFood Workshop (abstract) , presented at Computer Vision and Pattern Recognition, Nashville, 2025

[C19] Sandesh, J., Thapa, S., Bharadwaj, S., **Sarkar, A.**, Abbott, L. & Xuan, J. (2024, June). 3D Object Detection and Tracking Refinement with Ensemble Methods and Spatiotemporal Filtering. In Road++ , In European Conference on Computer Vision, ECCV 2024, (pp. 80-96). Springer, Cham

[C18] Sandesh, J., Thapa, S., Chen, K.T., Abbott, L. & **Sarkar, A.** (2024, June). Semantic Understanding of Traffic Scenes with Large Vision Language Models. In 2024 IEEE Intelligent Vehicles Symposium (IV) (pp. 1580-1587). IEEE

[C17] Li, F., Thapa, S., Bhat, S., **Sarkar, A.**, & Abbott. A. L., A Temporal Encoder-Decoder Approach to Extracting Blood Volume Pulse Signal Morphology from Face Videos 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), Vancouver, BC, Canada, 2023, pp. 5965-5974, doi: 10.1109/CVPRW59228.2023.00635

[C16] Deshpande, Y., Thapa, S., **Sarkar, A.**, & Abbott, A. L. (2023). Camera-based Recovery of Cardiovascular Signals from Unconstrained Face Videos Using an Attention Network. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (pp. 5974-5983).

[C15] Sonth, A., **Sarkar, A.**, Bhagat, H., & Abbott, L. (2023, June). Explainable Driver Activity Recognition Using Video Transformer in Highly Automated Vehicle. In 2023 IEEE Intelligent Vehicles Symposium (IV) (pp. 1-8). IEEE

[C14] Thapa, S., **Sarkar, A.** (2023). GAN-based Deidentification of Drivers' Face Videos: An Assessment of Human Factors Implications in NDS Data, 2023 IEEE Intelligent Vehicles Symposium (IV), Anchorage, AK, USA, 2023, pp. 1-6.

[C13] Bhagat, H., Jain, S., Abbott, L., Sonth, A., & **Sarkar, A.** (2023, June). Driver gaze fixation and pattern analysis in safety critical events. In 2023 IEEE Intelligent Vehicles Symposium (IV) (pp. 1-8). IEEE

[C12] Thapa, S., Cook, J., & **Sarkar, A.** (2022, September). Deidentification of Drivers' Face Videos: Scope and Challenges in Human Factors Research. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 66, No. 1, pp. 1509-1513). Sage CA: Los Angeles, CA: SAGE Publications.

[C11] **Sarkar, A.**, (2022). Visual Dictionary of Human Action in Vehicular Environment Using Computer Vision. In 13th International Conference on Applied Human Factors and Ergonomics

[C10] **Sarkar, A.** (2022). A Comprehensive Safety Analysis for Gaze Fixation of Drivers to Outside Scene. In 13th International Conference on Applied Human Factors and Ergonomics

[C9] Xu, H., **Sarkar, A.** (2022). Color invariant skin segmentation. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (pp. 2906-2915), CVPRW

[C8] Papakis, I., **Sarkar, A.**, Karpatne, A. (2021), A Graph Convolutional Neural Network Based Approach for Object Tracking Using Augmented Detections With Optical Flow, 24th IEEE International Conference on Intelligent Transportation Systems.

[C7] **Sarkar, A.**, Alambeigi, H., McDonald, A., Markkula, G., Hickman, J., (2021), Role of Peripheral Vision in Brake Reaction Time During Safety Critical Events, In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 65, No. 1, pp. 695-699). Sage CA: Los Angeles, CA: SAGE Publications

[C6] **Sarkar, A.**, A. Krum, Hanowski, R.,, Hickman, J. (2021). Responsibility Sensitive Safety Analysis of Truck Following in US Highway. In International Conference on Applied Human Factors and Ergonomics (pp. 119-126). Springer, Cham.

[C5] **Sarkar, A.**, Abbott, L., and Doerzaph, Z.. "Universal Skin Detection Without Color Information". In Applications of Computer Vision (WACV), 2017 IEEE Winter Conference on (pp. 20-28). IEEE

[C4] **Sarkar, A.**, Abbott, L., and Doerzaph, Z., Biometric Authentication Using Photoplethysmography Signals, In 2016 IEEE 8th International Conference on Biometrics Theory, Applications and Systems (BTAS) (pp. 1-7). IEEE, **(Best Poster)**

[C3] **Sarkar, A.**, Abbott, L., Doerzaph, Z., and Kayla Sykes, Evaluation of Video Magnification for Nonintrusive Heart Rate Measurement, In 2016 IEEE First International Conference on Control, Measurement and Instrumentation (CMI) (pp. 494-498). IEEE

[C2] **Sarkar, A.**, Abbott, L., and Doerzaph, Z., ECG Biometric Authentication Using a Dynamical Model, In 2015 IEEE 7th international conference on biometrics theory, applications and systems (BTAS) (pp. 1-6). IEEE

[C1] **Sarkar, A.**, Abbott, L., and Doerzaph, Z., Assessment of Psychophysiological Characteristics Using Heart Rate from Naturalistic Face Video Data, In IEEE International Joint Conference on Biometrics (pp. 1-6). IEEE

Peer-Reviewed Technical Reports

[R20] Guo, F., Thorn, E., **Sarkar, A.**, Shi, L., Terry, T., Qin, X., Gupta, A., Yang, G., Kallepalli, P., Gennip , V. G., (202x, Month)). Synthesis of artificial intelligence training and validation methods (Report No. DOT HS xxx xxx) Technical Report, National Highway Traffic Safety Administration, (Under Review)

[R19] Stowe, L., Cowan, J., **Sarkar, A.**, Yang, G., Mott, R., Thapa, S., Rojas, J., Bhat, S., Guo, F., Shi, L., (202x, Month) Perception Refinement (Report No. DOT HS xxx xxx) Technical Report, National Highway Traffic Safety Administration, (Under Review)

[R18] Thapa, S., **Sarkar, A.** (2025) Effectiveness of Wearable Devices to Study Driving Stress of Long-haul Truck Drivers in Naturalistic Driving Systems Technical Report, NSTSCE, Link.

[R17] Miller, A. M., Hubbard, S., Chen, K.T., **Sarkar, A.**, Yang, G., Kefauver, K., Petersen, A. B., and Lastauthor, A. (202x, Month) ADS on-road evaluation methods for heavy trucks (Report No. DOT HS xxx xxx) Technical Report, National Highway Traffic Safety Administration, (Under Review)

[R16] Yang, G., **Sarkar, A.**, Camden, M., Ridgeway, C., Thapa, S., Jain, S., & Miller, A.. (2024) Using Artificial Intelligence/Machine Learning Tools to Analyze Safety, Road Scene, Near-Misses and Crashes Technical Report, NSTSCE, Link.

[R15] **Sarkar, A.**, Manke, A., Camden, M., Thapa, S., Trimble, T., Medina, A.,. (2024) Final Report: Artificial Intelligence Opportunities for State and Local DOTs – A Research Roadmap. Technical Report, NCHRP 23-12, https://doi.org/10.17226/27865.

[R14] Krum, A., Mabry, J. E., Hanowski, R. J., Stojanovski, O., Manke, A., Adebisi, A., ... **Sarkar, A.**, ... Thapa, S.,. (2024) Final Report: Trucking Fleet Concept of Operations for Automated Driving System-equipped Commercial Motor Vehicles Technical Report, Webpage.

[R13] Thapa, S., Cook, J., & **Sarkar, A.** (2023). Face De-identification of Drivers from NDS Data and Its Effectiveness in Human Factors. Technical Report, National Surface Transport Safety Center for Excellence.

[R12] Guo, F., **Sarkar, A.**, Thorn, E., Terry, T, Trimble, T., Kaskar, O., Kefauver, K., & Hatchett, A. (Under agency review). Introductory research into artificial intelligence uses in ADAS and ADS technologies (Report No. DOT HS xxx xxx). National Highway Traffic Safety Administration (Under Review)

[R11] Sonth, A., **Sarkar, A.**, Jain, S., Bhagat, H., & Doerzaph, Z. R. (2023). Real-time Risk Prediction at Signalized Intersections Using a Graph Neural Network., Technical Report, Safety through Disruption University Transportation Center (Safe-D UTC), Contract No: 69A3551747115/Project 06-012

[R10] **Sarkar, A.**, Papakis, I., Herbers, E., & Viray, R., (2023). Development of an Infrastructure Based Data Acquisition System to Naturalistically Collect the Roadway Environment, Technical Report, Safety through Disruption University Transportation Center (Safe-D UTC), Contract No: 69A3551747115/Project 04-121

[R9] **Sarkar, A.**, Sundharam, V., Grove, K., Manke, A., (2022). Camera Based Feature Identification for Easy Mile Operation, Technical Report, National Surface Transport Safety Center for Excellence

[R8] **Sarkar, A.**, Engstrom, J., Hanowski, R., (2022). Analysis of Car Cut-ins Between Trucks Based on Existing Naturalistic Driving Data, Technical Report, National Surface Transport Safety Center for Excellence.

[R7] Miller, A., Datta, D., Sundharam, V., **Sarkar, A.**, Rooney, G., Lobb, C., (Submitted 2021) AI and Decision Support Systems for Crash Preventability PAR Processing. (Contract No. 693JJ420D000005 / 693JJ420F000057). Washington, D.C.: Federal Motor Carrier Safety Administration, USDOT. 2022 (Under Review)

[R6] McDonald, A. D., **Sarkar, A.**, Hickman, J., Alambeigi, H., Vogelpohl, T., & Markkula, G. (2021). Modeling Driver Behavior During Automated Vehicle Platooning Failures., Technical Report, Safety through Disruption University Transportation Center (Safe-D UTC), Contract No: 69A3551747115/Project 03-036

[R5] Krum, A.J., Miller, A., S**arkar, A.**, Soccolich, S., Engstrom, J., Hanowski, R., Grove, K., & Hickman, J., Naturalistic Driving Data Baseline for Highly Automated Commercial Motor Vehicle On-Highway Applications. (Contract No. DTMC7517F00058; TO DTMC7517F00058). Washington, D.C.: Federal Motor Carrier Safety Administration, USDOT

[R4] Stowe, L., Petersen, A., Krothapalli, U., Krum, A., Mott, R., Petersen, J., **Sarkar, A**. (2017)Heavy Vehicle V2V Basic Safety Message and Implementation Issues for Deployment, Volume II: Final Report - Trailer Identification for BSM Implementation Final report, National Highway Traffic Safety Administration, Washington, DC (Contract No: DTNH2214D00328L/0002), Under review

[R3] **Sarkar, A.**, Doerzaph, Z. R., & Abbott, A. L. (2017). Video magnification to detect heart rate for drivers., Technical Report, National Surface Transport Safety Center for Excellence, Report no: 17-UT-058.

[R2] Viray, R., **Sarkar, A.**, Doerzaph, Z., (2016) Virginia Connected Vehicle Test Bed System Performance (V2I System Performance), Technical Report, Connected Vehicle/Infrastructure University Transportation Center (CVI-UTC)

[R1] Sudweeks, J., **Sarkar, A.**, Plummer, J. P., (2014) Mask Validation, Final report for SHRP2 Transportation research board of the national academies, Feb 2014.

Other Reports and Manuscripts

[M2] Sundharam, V., **Sarkar, A.**, & Abbott, A. L. (2024). Re-evaluation of Face Anti-spoofing Algorithm in Post COVID-19 Era Using Mask Based Occlusion Attack. arXiv preprint arXiv:2408.13251.

[M1] Papakis, I., **Sarkar, A.**, & Karpatne, A. (2020). GCNNMatch: Graph convolutional neural networks for multi-object tracking via sinkhorn normalization. arXiv preprint arXiv:2010.00067.

Other Conference Presentations

Note Other than the conferences with proceedings, several of my work have been presented in other venues

TRB 2024 (1), IV 2023 - NDDA (1), TRB 2023 (1) TRB 2022 (2), Fast-Zero 2019 (2), SAE-WCX 2018 (1), TAC 2018(1), NDRS 2018 (1), NDRS 2016 (2)

Public Dataset

[D4] Sonth, Akash; Xu, Yanchao; Wang, Hong; **Sarkar, Abhijit**, 2023, Real-Time Risk Prediction at Signalized Intersection Using Graph Neural Network (06-012), https://doi.org/10.15787/VTT1/BBJGFE, VTTI, V1.

[D3] **Sarkar, Abhijit**; Papakis, Ioannis; Herbers, Eillen; Viray, Reginald, 2024, Development of an Infrastructure Based Data Acquisition System to Naturalistically Collect the Roadway Environment (04-121), https://doi.org/10.15787/VTT1/FN5TWT, VTTI, V1

[D2] **Sarkar, A.**, Papakis, I., Svedovidov, Andrei; Hickman, Jeffrey S.; Abbott, A. Lynn, 2020, Annotation of Blurred Cabin Imagery for Passenger Detection in SHRP2 NDS Data, https://doi.org/10.15787/VTT1/WS8ORW, VTTI, V1

[D1] Sudweeks, J., **Sarkar, A.**, Plummer, J.P.; McClafferty, Julie; Perez, Miguel A.; Hankey, Jonathan, 2016, Mask Head Pose Validation Study Dataset, https://doi.org/10.15787/VTT1/DAFUH5, VTTI, V4

MEDIA COVERAGE

[M1] AI can make transportation safer and more efficient, researchers say in new report

[M2] Virginia Tech tackles navigation solutions for safe, uncrewed aircraft surface operations

[M3] NASA funded Research at VA Tech Paves Way for Safe Autonomous Aircraft Operations

Awards and Honors

Winner (Top 3), Faculty Nutshell Talk , 2025, Virginia Tech

Outstanding student award, Center for Embedded Systems for Critical Applications (CESCA), 2017, Virginia Tech

Best poster award at IEEE BTAS, 2016

Doctoral Consortium at IEEE BTAS 2016, BTAS 2017, IEEE WACV 2017

Bronze Award at Virginia Tech Annual GSA Symposium for oral presentation

Ministry of Human Resource Development (MHRD) scholarship for Masters study, Aug 2007 – May 2009

Keynotes, Invited Talks, Lectures, and Panel

ICIP Keynote at the ICIP workshop: Optimizing Deep Learning Architectures for Advanced Hyperspectral Data and Spectral Analysis **Host**: Emannuela Marasco, The Emerging Role of Multispectral Sensing: From Remote Health Monitoring to Road Safety, Sept 2025.

TAM AASHTO Transportation Asset Management Portal, Seminar Series, **Host**: Abigail Butterick, Artificial Intelligence Opportunities for State and Local DOTs – A Research Roadmap, Aug 2025.

ASCE Pioneering Transportation Innovation with Generative AI, **Host**: Lily Du, Generative AI for Transportation Safety and Data Privacy, Apr 2025.

RES Rochester Engineering Society, Seminar Series, **Host**: Howard Ressel, The Role of AI for Transportation Safety in the Modern World, Nov 2024.

ERODE Fleet Owner Webinar Series, **Host**: Mindy Long, Role of AI in Modern World Freight Operation , Oct 2024.

HUD U.S. Department of Housing and Urban Development, Seminar Series**Host**: Daniel Williams, Digital Accesibility and Biometrics, Oct 2024.

UoH Graduate Seminar lecture at University of Houston, Department of Computer Science, **Host**: Ioannis Pavlidis, Transportation Safety in the Modern World, Fall 2024.

ITSC 2025 Invited Lecture at NDDA Workshop on NMHD 4.0: Naturalistic Health and Mobility Data Powered by Industry 4.0, **Host**: Anuj Sharma, The Role of Naturalistic Driving Studies in modern-day Transportation Safety, IEEE ITSC 2024.

ECE 4524 Guest lecture at Virginia Tech, **Host**: Lynn Abbott, Artificial Intelligence in Transportation Research: Current State in Automation and Safety, Spring 2024.

TRB 2024 Washington DC, USA, Jan 2024, **Host**: Kendra Levin, Unraveling the Complexity and Dependency Between Transportation Research and Artificial Intelligence Using Large Language Models, Part of discussion panel "*Applications of Large Language Models for Information and Knowledge Management*" organized by AJE45, and AED50.

IndoML IIT Bombay, India, Dec 2023, **Host:** Abhijit Maji, Artificial Intelligence in Transportation: Paving the Way for the Future of Mobility

BMSE 5984 Guest lecture at Virginia Tech, USA, **Host:** Zachary Doerzaph, Computer Vision and Machine Learning for Autonomous Vehicle, Lectures given in Fall 2018, Fall 2020, Fall 2023

Safe-D UTC Safe-D webinar, virtual, Oct 2023, **Host:** Laurel Glenn, Real-Time Risk Prediction at Signalized Intersection Using Graph Neural Network , with Akash Sonth,

Honda Honda Research Institute, California, USA Jul 2023, **Host:** Kevin Zheng, Advanced Analytics in Behavior, Perception, and Safety for Transportation Research

TMC 2023 Orlando, Florida, USA, Apr 2023, **Host:** John Ademi, Use of Biometric Data: Opportunities and Obstacles, presentation at the panel discussion *Healthy Cab, Healthy Driver: Technologies That Can improve the Future of Cab Environments*.

TRB 2023 Washington DC, USA, Jan 2023, **Host**: Kendra Levin, Unraveling the Complexity and Dependency Between Transportation Research and Artificial Intelligence Using Large Language Models, Part of discussion panel "*Applications of Large Language Models for Information and Knowledge Management*" organized by AJE45, and AED50.

ORNL Oak Ridge National Laboratory, USA, Nov 2022, **Host**: Thomas Karnowski, Advanced Analytics in Behavior, Perception, and Safety

Safe-D UTC Safe-D UTC Webinar, Virtual, 2021, **Host:** Sue Chrysler, Modeling Driver Behavior During Automated Vehicle Platooning Failures, With Tony McDonald,

Kalyani Kalyani University, Kalyani, India, Oct 2019, Host: Anirban Mukhopadhyay, Role of Computer Vision in Transportation Research and Autonomous Vehicle

Services

Associate Editor IEEE Intelligent Vehicle Symposium, 2026

Committee Service 1st International Workshop on Software Engineering for Autonomous Driving Systems (SE4ADS 2025), part of ICSC 2025. Link

TRB Data Privacy Subcommittee, part of Artificial Intelligence and Advanced Computing Applications Committee (AED50) 2023-

SAE, AI Data Task Force 2022-

Academic Advisory Council: Partners for Automated Vehicle Education , 2021 -

Session Chair IEEE ITSC, 2021; HFES 2021; CTRG 2023

Editor Guest Editor: Special Issue in *Applied Science*. Computer Vision and Pattern Recognition: Advanced Techniques and Applications

Tutorials (5) **Sarkar, A.**, Abbott, L., Remote Measurement of Vital Signs Using AI for Health Monitoring and Cognition, 13th, and 14th International conference on Applied Human Factors and Ergonomics, *July 2022, New York, USA*, *July 2023, San Francisco, USA July 2024, Nice, France*, *July 2025, Orlando, USA*, and *Dec 2025, Hawaii, USA*

Workshop Multimodal Data Driven Intelligent Transportation System: Recent Advancement, Challenges, and Scope, 8 th Conference of Transportation Research Group of India (CTRG-2025), *Dec 2025, Guwahati, India*

SPADE - Secure, Privacy-Aware Naturalistic Driving Data for Future Mobility: Insights from Structured and Unstructured Environments, In 2025 IEEE Intelligent Vehicles Symposium (IV), *June 2025, Cluj-Napoca, Romania*

2nd Workshop on Secure Connected Vehicles: Digital Twin, UAVs, and Smart Transportation), In 2025 IEEE Intelligent Vehicles Symposium (IV), *June 2025, Cluj-Napoca, Romania*

1st Workshop on UAV Supported Road Traffic Safety and ADS Deployment (UAV-W), In 2024 IEEE Intelligent Vehicles Symposium (IV), *June 2024, Jeju Island, South Korea*

Reviewer 2025: ECCV, CVPR

2024: IEEE ITS, IEEE IV, ECCV

2023: Nature, TRB, IEEE WACV, IEEE ITS, Inf. Fus

2022: IEEE IV, SAE JCAV, ESV 2022, SAE STEEP, MDPI Sensors, TRB, IEEE WACV, IEEE ITS

2021: Eurasip, HFES, SAE JA, SAE JCAV, SAE JTS, MDPI Sensors, TRB, IEEE WACV, Information Fusion

2020: SAE JCAV, SAE JTS, TRB, IEEE WACV, Information Fusion

2019: Eurasip, SAE JCAV, SAE JTS, TRB, Information Fusion

2018: SAE JCAV, Information Fusion

2017: Information Fusion

Departmental Service

2022- Mentoring as Team Leader at VTTI

Current members:
- Surendra Bikram Thapa

Past members:
- Aditi Manke
- Han Xu
- Gary Yang

2023- 25 Leading the International Support Group as part of , Road to Inclusion, Diversity, and Equity (RIDE) at VTTI

Skills

Programing Python , Matlab

Packages	PyTorch, TensorFlow, Docker, Git, SQL
Language	Bengali (native), and English (fluent), Hindi (Fluent)

Student Supervision

Note Over the last six years, I had the opportunity to work with more than 25 Graduate (PhD and Masters) and Undergraduate students in different capacities. This includes serving as Co-chair, committee members, M. Eng. advisor, and supervisor

Co-Chair

2022- Sandesh Jain, PhD, ECE, VT (with Dr. Lynn Abbott, ECE)

2025- Jin Woo Baik, PhD, ECE, VT (with Dr. Lynn Abbott, ECE)

2025- Joe Bekarinov, MS, ECE, VT (with Dr. Lynn Abbott, ECE)

2024-2025 Gayatri Bhatambarekar , MS, CS, VT (with Dr. Na Meng, CS)

2021-23 Akash Sonth, MS, ECE, VT (with Dr. Lynn Abbott, ECE)

2021-23 Surendra Bikram Thapa, MS, CS, VT (with Dr. Anuj Karpatne, CS)

2019-21 Ioannis Papakis, MS, ECE, VT (with Dr. Anuj Karpatne, CS)– ***Awarded best Masters Thesis***

2021-23 Sandesh Jain, MS, ECE, VT (with Dr. Lynn Abbott, ECE)

2023- Heesang Han, MS, ECE, VT (with Dr. Lynn Abbott, ECE)

2021-22 Han Xu, MS, ECE, VT (with Dr. Lynn Abbott, ECE)

Committee

2023-2025 Jonathan Tyler, MS, ECE, VT

2025- Christopher Pham, PhD, ECE, VT

2023- Mehrab Khatir, PhD, ECE, VT

2023 Hirva Bhagat, MS, ECE, VT

2023 Fulan Li, MS, ECE, VT

2023 Yogesh Deshpande, MS, ECE, VT

2023 Radhika Lakhar, MS, ECE, VT

Other Advising

2021 Shreyas Bhat, MEngg, ECE, VT

2022 Debanjan Datta, PhD, ECE, VT

2022 Vaibhav Sundharam, MEngg, ECE, VT

2021 Shagun Johari, MEngg, ECE, VT

2021 Hsin Han Hsieh, MEngg, ECE, VT

2021 Liang Shi, PhD, Stat, VT

2021 Jingbin Xu, PhD, Stat, VT

2020 Yu Guo, PhD, ISE, VT

2019 Calvin Wincowski, BS, Math, VT

2018 Wenyan Huang, PhD, ISE, VT

2023-2025 Ishtiaue Ahmed Khan, PhD, CS, VT

2025-25 Ayush Sadekar, BE, ECE, VT

References

- **A. Lynn Abbott**, *Professor, Bradley Department of Electrical and Computer Engineering, Virginia Tech, USA*, abbott@vt.edu, +1 (540) 231-4472
- **Ioannis Thomas Pavlidis**, *Eckhard-Pfeiffer Distinguished Professor, Department of Computer Science, University of Houston, USA*, ipavlidi@Central.UH.EDU, +1 (713) 743-0101
- **Rahul Mangharam**, *Professor of Electrical Engineering and Computer Science, University of Pennsylvania, USA*, rahulm@seas.upenn.edu, +1 (217) 573-3636