

A M ISHTIAQUE MAHBUB

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EDUCATION

University of Delaware, USA

September 2017 - Present

PhD in Mechanical Engineering

Concentration: Optimal Control, Connected Automated Vehicle, Intelligent Transportation Systems

University of Stuttgart, Germany

2013-2016

M.Sc. in Computational Mechanics of Materials and Structures (COMMAS)

Thesis: 3D Dynamic Simulation of Concrete Hammer Drilling for SDSmax Using FEM

Bangladesh University of Engineering and Technology, Bangladesh

2008-2013

B.Sc. in Mechanical Engineering

Thesis: Design Optimization of a Horizontal Axis Micro Wind Turbine Through Development of a CFD Model and Experimentation

RESEARCH INTERESTS

Optimal Control of Vehicle Dynamics, Powertrain optimization, Plugin Hybrid Electric Vehicles, Connected and Automated Vehicles, Intelligent Transportation Systems, V2X Communication Framework

RELEVANT COURSES

PhD	Network Optimization, Optimal Control, Convex Optimization, Probability and random processes, Decentralized Control, Nonlinear Control, Nonlinear Programming, Advanced Engineering Mathematics Linear Systems
M.Sc.	Numerical Programming, Optimization of Mechanical Systems, Software Development C++, Discretization Methods, Numerical Methods for Differential Equations, Advanced Finite Element Methods

SOFTWARE SKILLS

Programming Languages	C/C++, C# (Console and Webform), MATLAB/Simulink, MATLAB GUI, Python, MySQL
C++ Libraries	Eigen, Armadillo, Boost
Editor & Compiler	Visual Studio, Eclipse, devc++, Notepad++,
Traffic Simulation & Tools	PTV VISSIM 7-11, PreScan 7.6,
CAE Tools	ABAQUS 6.13, ANSYS Workbench, DIGIMAT
CAD Software	SolidWorks, CATIA, AutoCAD
Miscellaneous	LaTeX, MS Office Packages, Maple MQTT, UDP & TCP-IP Protocol

PUBLICATIONS

Journal Article:

- **Mahbub, A M**; Malikopoulos, A A; *State and Control Constraint Coordination of Connected and Automated Vehicles*, IEEE Transactions on Control Systems Technology (IEEE-TCST) (In Preparation)
- **Mahbub, A M**; Malikopoulos, A A; Zhao, L; *A Decentralized Optimal Control Framework of Connected and Automated Vehicles in a Corridor*, Automatica (In Review)
- Beaver, LE; Chalaki, B; **Mahbub, A M**; Zhao, L; Zayas, R; Malikopoulos, A A; *Demonstration of a Time-Efficient Mobility System Using a Scaled Smart City*, *Vehicle System Dynamics*, arXiv:1903.01632 (To Appear).

Conference Paper:

- **Mahbub, A M**; Malikopoulos, A A; *Concurrent Optimization of Vehicle Dynamics and Powertrain Operation Using Connectivity and Automation*, SAE WCX 2020, arXiv:1911.03475 (In Review)
- **Mahbub, A M**; Karri, Vasanthi; Parikh, Darshil; Jade, Shyam; Malikopoulos, A A; *A Decentralized Time- and Energy-Optimal Control Framework for Connected Automated Vehicles: From Simulation to Field Test*, SAE WCX 2020, arXiv:1911.01380 (In Review)
- **Mahbub, A M**; Malikopoulos, A A; *Conditions for State and Control Constraint Activation in Coordination of Connected and Automated Vehicles*, arXiv:1903.11189 (In Review).
- **Mahbub, A M**; Zhao, L; Assanis, D; Malikopoulos, A A; *Energy-Optimal Coordination of Connected and Automated Vehicles at Multiple Intersections*, Proceeding of 2019 IEEE American Control Conference, pp. 26642669, 2019.
- Zhao, L; **Mahbub, A M**; Malikopoulos, A A; *Optimal Vehicle Dynamics and Powertrain Control for Connected and Automated Vehicles*, Proceedings of 2019 IEEE Conference on Control Technology and Applications, pp. 33-38, 2019.
- **Mahbub A M**; Z Mawa; *A numerical approach to drying process of hygroscopic polymeric granulates with different drying configurations and parameter comparison*, AIP Conference Proceedings, Vol. 1851, Num. 1, pp. 020060, 2017.
- Abrar, M A; **Mahbub, A M**; Mamun, M; *Design optimization of a horizontal axis micro wind turbine through development of CFD model and experimentation*, Procedia Engineering, Vol. 90, pp. 333-338, 2014.

HONORS AND AWARDS

UD Collection-Based Research Grant, University of Delaware	September 2019
Professional Development Award, University of Delaware	July 2019
Graduate Travel Grant, 2019 Learning for Dynamic Control Conference, MIT, USA	May 2019
Outstanding Presentation Award, 8th Annual Graduate Students' Forum, University of Delaware, USA	10 May, 2019
Graduate Research Fellow, University of Delaware	February 2018
Departmental Teaching Fellow, University of Delaware	July 2017
Dean's List for Academic Excellence, BUET	2012-2013
Award Winner (3rd Place) at Mechanical Engineering Project Show, BUET	2010
Government Merit Scholarship, Bangladesh	2005-2007

EXPERIENCE

Graduate Research Assistant

February 2018 - Present

ARPA-e NEXTCAR Project (Award Number: DE-AR0000796)

- Powertrain optimization and simulation of plugin hybrid electric vehicles (PHEVs)
- Vehicle dynamics optimization and simulation of connected automated vehicles (CAVs) in a traffic corridor with highway on-ramp merging, roundabout, speed reduction zone etc.
- Vehicle dynamics and powertrain controller integration
- Vehicle dynamics under partial penetration

PhD Intern

June 2019 - August, 2019

Robert Bosch LLC, USA

- Vehicle dynamics (VD) controller development and testing for Audi A3-etrone
- Establishing V2X communication between Audi A3-etrone and the UMTRI framework
- Design, setup and conduct vehicle testing in Mcity with augmented reality

Graduate Teaching Assistant

August 2017 - February 2018

Dept. of Mechanical Engineering, University of Delaware

- Vibration and Controls Lab (MEEG 312)

Instructor

July 2016 - July, 2017

Military Institute of Science and Technology (MIST), Bangladesh

- Theoretical courses taught and laboratory sessions taken

M.Sc. Thesis Internship

June 2015 - November, 2015

Robert Bosch GmbH, Power Tools Division, Germany

- Creation of Abaqus explicit CAE model and implementation of material routine
- Experimental data collection, post-processing and validation
- Reverse engineering of competitor products, investigation and comparison
- Material parameter identification and design optimization

Student Research Assistant

June 2014 - March, 2015

Institute of Polymer Technology (IKT), University of Stuttgart, Germany

- Effect of injection molding parameters on fiber-glass composite characteristics
- Modeling and experimental study of hygroscopic polymer drying kinetics using FDM Formulation

Mechanical Engineering Intern

September 2014 - February, 2015

Fraunhofer Institute of Manufacturing Engineering and Automation (IPA), Stuttgart, Germany

- Multi-scale simulation of electrical properties of CNT-based composites
- Analysis of percolation threshold and conductivity
- Microstructure modelling and numerical simulation

Intern

June 2013 - August 2013

Engineering Resources International, Dhaka

- Transformation of FCK brick manufacturing kilns into modern Zig- Zag kilns by developing and designing an efficient and environment friendly exhaust system and combustion chamber.

ACADEMIC & PROFESSIONAL ACTIVITIES

Conference Attended

2019 American Control Conference, Philadelphia, USA	<i>10-12 July, 2019</i>
2019 Learning for Dynamic Control Conference (L4DC), MIT, USA	<i>30-31 May, 2019</i>
7th BSME International Conference on Thermal Engineering 2016, BUET (Session Co-Chair)	<i>22-24 December, 2016</i>

Training Completed

PLC Programming with Logo and Siemens, IAT, Bangladesh	<i>Dhaka 2017</i>
Short Training on Computational Fluid Dynamics-ANSYS, MIST	<i>Dhaka 2017</i>
Industrial Training on HVAC, Novartis Limited, Dhaka	<i>Dhaka 2012</i>

Seminar/Conference Presentation

2019 American Control Conference, Philadelphia, USA	<i>10-12 July, 2019</i>
8th Annual Graduate Students' Forum, University of Delaware, USA	<i>10 May, 2019</i>
Fracture Mechanics and Crack Propagation in Woods, Uni. Stuttgart	<i>February 2016</i>

Reviewer of Scholarly Articles

22nd IEEE International Conference on Intelligent Transportation Systems	<i>2019</i>
58th IEEE Conference on Decision and Control	<i>2019</i>
2019 American Control Conference, Philadelphia, USA	<i>2019</i>
IEEE Transaction on Intelligent Transportation System	<i>2019</i>
IEEE Transaction on Intelligent Transportation System	<i>2018</i>
IEEE Transaction on Intelligent Vehicles	<i>2018</i>
21st IEEE International Conference on Intelligent Transportation Systems	<i>2018</i>

Organizational Affiliation

Secretary, Mechanical Engineering Graduate Association, UD	<i>2019 - present</i>
General Secretary, Bangladesh Student Association, UD	<i>2019 - present</i>
Student Member, Society of Automotive Engineers (SAE)	<i>2019 - present</i>
Student Member, Institute of Electrical and Electronics Engineers (IEEE)	<i>2018 - present</i>
Student Member, IEEE Young Professionals	<i>2018 - present</i>
Student Member, Society for Industrial and Applied Mathematics (SIAM)	<i>2018 - present</i>
UD Student Chapter: Society for Industrial and Applied Mathematics (SIAM)	<i>2018 - present</i>

Theoretical Courses Taught

Engineering Mechanics	<i>Spring, 2017</i>
Instrumentation and Measurement	<i>Spring, 2017</i>
Engineering Thermodynamics	<i>Spring, 2017</i>
Computer Programming Language (C/C++)	<i>Fall, 2016</i>
Numerical Analysis	<i>Fall, 2016</i>

Laboratory Courses Taught

Vibration and Controls Lab	<i>Fall, 2017</i>
Mechanics of Machinery Sessional	<i>Spring, 2017</i>
Engineering Thermodynamics Sessional	<i>Spring, 2017</i>
Engineering Mechanics Sessional	<i>Spring, 2017</i>
Mechanical Engineering Drawing II (SolidWorks)	<i>Fall, 2016</i>
Numerical Analysis Sessional (MATLAB)	<i>Fall, 2016</i>
Computer Programming and Applications Sessional	<i>Fall, 2016</i>
Computer Programming Language Sessional	<i>Fall, 2016</i>
Workshop Technology Sessional II	<i>Fall, 2016</i>
Machine Shop Sessional	<i>Fall, 2016</i>