Mohammad Niaz Murshed

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Current Position

Lecturer, since May 2018

Teaching

- Physics 1 – Mechanics
- Physics 2 – Electricity and Magnetism

Department of Math and Physics

North South University

Dhaka, Bangladesh

Education

M.S.E. Aerospace Engineering, University of Michigan, (CGPA: 3.47/4.0), Sep 2016-Dec 2017

Directed Study: On Koopman Eigenfunction applicable to attracting and asymptotic dynamics in flow past a circular cylinder for slightly post-critical Reynolds number

Advisor: Karthik Duraisamy

B.S.E. Aerospace Engineering, Virginia Tech, (CGPA: 3.4/4.0), Final Major Rank: 35/93, Aug 2012-May 2016

Project: Aerodynamic Analysis for Distributed Electric Propulsion Aircraft

Advisor: Pradeep Raj

Research Interest

CFD, Galerkin Method, Turbulence modeling, Data Acquisition, Data-Driven Modeling of complex systems

Academic Appointments

> Undergraduate-Level Research

Research Assistant at Non-linear Systems Lab, Virginia Tech, Summer 2014

- Worked on an UAV to compute contaminant concentration using Bayesian statistics
- Read manual to implement coding on TurbSim and verified results with the analytical solution

Lab Assistant at Multi-Disciplinary Design Optimization Lab, Virginia Tech, Fall 2015

- Designed RAE-2822 using CATIA v5 and observed the pressure contour to analyze drag
- Ran SU-2 for the 'bump in a channel problem' to realize concepts of norms and residuals

Research Assistant at Virginia Center for Autonomous Systems, Virginia Tech, Fall 2015

- Tested the pitch dynamics of Boeing 747 using both the LQR and PID controller
- Concluded that LQR outperforms PID in terms of overshoot and settling time

> Graduate-Level Research

Gas Dynamics Lab, May 2017-Dec 2017

- Applied mathematical formalism (KMD,DMD) on the canonical problem of flow past a cylinder
- Identified non-linear system dynamics through sparse regression

Design of Riemann Solver with Prof. Philip Roe, Summer 2017

- Understood entropy function associated with conservation laws
- Constructed upstream difference scheme in terms of nearby states and Jacobian projection

> Visiting Student at Stanford University, Summer 2015

Took a grad class on Computational Mechanics, Grade:'A'

- Grasped the analysis methods- Galerkin Form approximation
- Developed a MATLAB program to solve a planar truss system problem in the course project

> Gradership

Grader-University of Michigan; **Course: AE 523–Computational Fluid Dynamics, Fall 2017**

- Graded homework for a class of around 50 students

Internship

Bengal Carbon and Fluoropolymer Technology–Summer 2013

- Designed mechanical seal in terms of friction of the shaft and power used by the pump.
- Studied how leakage can result based on fluid pressure and contact stress of the O-ring.

Software Fluency

- MATLAB, Mathematica, Python, LaTeX, Linux, CAD-Autodesk INVENTOR.

Awards

- Dean's List: Fall'12, Spring'14, Fall'14, Spring'15; Graduated with Distinction from VT
- **Second best paper for the US University Design Challenge, NASA: DEP Aircraft, 2016**

Grants

- Rackham Conference Grant ($ 700) for *APS DFD Annual Meeting 2017*
- *Identification of modes from numerical data.* (PI). North South University. Tk 155,000. 2019-2020.

Conference Paper

- Murshed, Mohammad and Uddin, M. Monir. *Time delay coordinate based Dynamic Mode Decomposition of a compressible signal.* International Conference on Communication and Information Technology: Dec 19, 2019. To appear on IEEE Xplore.

Journal Paper

- Murshed, Mohammad and Uddin, M. Monir. *Projection assisted Dynamic Mode Decomposition of large-scale data*. Under preparation.

Presentation

- Murshed, Mohammad. *Modal Structures in flow past a cylinder*. APS Division of Fluid Dynamics 70th Annual Meeting: Nov 19, 2017.
- Murshed, Mohammad and Uddin, M. Monir. *Time delay coordinate based Dynamic Mode Decomposition of a compressible signal*. International Conference on Communication and Information Technology: Dec 19, 2019.

GitHub: https://github.com/mohammadmurshed/DG

- Created a repository to implement nodal DG-FEM for 1D linear problems. Available are a python code (L2 projection and Hilbert matrix) and a MATlab code (orthogonality of Jacobi Polynomial)

Extra-Curricular Activities

- Taught orphans elementary mathematics at *Balika Bidyaloy* in Chittagong
- Attended the Culture and Language Program at Alliance Francaise de Chittagong
- Maintained database as a registry clerk at the VT University Bookstore, Dec 2014- Jan 2015
- Served in the Big Event program to foster life in the Blacksburg Community

Reference (in alphabetical order)

Robert Canfield
Professor
Virginia Tech
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North South University
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