Dr. Mohebujjaman

Contact Information

Address	Department of Mathematics McBryde Hall 422, Virginia Tech Blacksburg, VA 24061	Email	jaman@vt.edu
		Website	https://goo.gl/DJAK4Z
		Google Scholar profile	https://goo.gl/9r8D9h
Phone	(864) 643 8928		

Education

Degree Ph.D. in ***Applied and Computational Mathematics,*** August 2017
Dissertation: *Efficient Numerical Methods for Magnetohydrodynamics Flow*
Concentration: Computational and Applied Mathematics
Advisor: Dr. Leo G. Rebholz, Professor,
Co-advisor: Dr. Timo Heister, Assistant Professor, Mathematical Sciences
Clemson University, Clemson, SC, USA

Degree M.S. in ***Applied Mathematics,*** August 2015
Project: *Linear Solvers for Saddle Point Problems Arising in Navier-Stokes Simulations.*
Advisor: Dr. Leo G. Rebholz, Professor, Mathematical Sciences
Clemson University, Clemson, SC, USA

Degree M.S. in ***Applied Mathematics,*** March 2009, *First class (ranked 1st out of 11 students)*
Thesis: *MHD Heat and Mass Transfer Flow Along a Stretching Sheet with Heat Generation/Absorption.*
Advisor: Dr. Abdus Samad, Professor, Applied Mathematics
University of Dhaka, Dhaka, Bangladesh

Degree B.S. (Honors) in ***Mathematics,*** December 2006, *First class (ranked 1st out of 64 students)*
Project: *Perturbation Methods in Aero Fluid Dynamics*
Minor: Statistics and Computer Science
Advisor: Dr. Abdus Samad, Associate Professor, Mathematics
University of Dhaka, Dhaka, Bangladesh

Reviewer

1. Journal of Discrete and Continuous Dynamical Systems, Series B
2. Numerical Methods for Partial Differential Equations Journal

Research Interests

Mathematical pedagogy, large scale simulation of fluid flow problems including Newtonian Navier-Stokes equations, Magnetohydrodynamics, Uncertainty Quantification, fast algorithms, reduced order modeling (ROM), large scale parallel implementation of fluid flow problem using deal.II (massively parallel).

Refereed Journal Publications and Ongoing Works

1. Implementation of Physical Constraints on Data-Driven Filtered Reduced Order Modeling of Fluid Flows, in preparation.
2. Dufor and Soret effects on Magnetohydrodynamic Non-Newtonian flows along a moving stretching sheet, in preparation.

3. Higher order accurate algorithm for MHD flow ensembles simulation, in preparation.

4. Data-Driven Filtered Reduced Order Modeling Of Fluid Flows, X. Xie, M. Mohebujjaman, L.G. Rebholz, and T. Iliescu, SIAM Journal on Scientific Computing, accepted. https://goo.gl/PGFEP2

5. Energy Balance and Mass Conservation in Reduced Order Models of Fluid Flows, M. Mohebujjaman, L.G. Rebholz, X. Xie, and T. Iliescu, Journal of Computational Physics, 321, 128-142, 2017.

6. High order algebraic splitting for magnetohydrodynamics simulation, M. Akbas, M. Mohebujjaman, L. Rebholz, and M. Xiao, Journal of Computational and Applied Mathematics, 321, 128-142, 2017.

7. Decoupled, unconditionally stable, higher order discretizations for MHD flow simulation, T. Heister, M. Mohebujjaman and Leo G. Rebholz, Journal of Scientific Computing, 71(1), 21-43, 2017.

8. An efficient algorithm for computation of MHD flow ensembles, M. Mohebujjaman and Leo G. Rebholz, Computational Methods in Applied Mathematics, 17(1), 121-137, 2017.

9. Analysis of a family of optimally accurate regularization methods for Navier-Stokes equations, N. Jiang, M. Mohebujjaman, L. Rebholz and C. Trenchea, Computer Methods in Applied Mechanics and Engineering, Vol: 310, p 388-405, 2016.

10. Numerical analysis and testing of a fully discrete, decoupled penalty-projection algorithm for MHD in Elsässer variable, M. Akbas, S. Kaya, M.Mohebujjaman and Leo G. Rebholz, International Journal of Numerical Analysis and Modeling, 13(1), 90-113, 2016.

11. Heat and Mass Transfer of an MHD Forced Convection Flow Along a Stretching Sheet with Chemical Reaction, Radiation and Heat Generation in Presence of Magnetic Field, M.S. Hossain, M.A. Samad and M. Mohebujjaman, International Journal of Physics and Research, Vol 1(1), pp: 30-58, 2011.

12. Informative Motif Detection Using Data Mining, F.A.Hoque, M.Mohebujjaman and N.Noman, Research Journal of Information Technology, Vol. 3(1), pp: 26-32, 2011.

13. MHD Heat and Mass Transfer Free Convection Flow Along a Stretching Sheet with Suction when Buoyancy Opposes the Flow, M.Mohebujjaman and M.A.Samad, GANIT: Journal of Bangladesh Mathematical Society. Vol. 30 pp: 76-88, 2010.

14. MHD Heat Transfer Mixed Convection Flow Along a Vertical Stretching Sheet in Presence of Magnetic Field With Heat Generation, M.Mohebujjaman, Tania S. Khaleque and M.A. Samad, International Journals of Basic and Applied Sciences IJBAS-IJENS Vol: 10(2) pp: 133-142, 2010.

15. Magnetohydrodynamic Heat and Mass Transfer Forced Convection Flow Along a Stretching Sheet with Heat Generation/ Absorption. M.A. Samad, M. Mohebujjaman, M.Mustak Mia and M.A.Rahman, Dhaka Univ. J. Sci. 58(1): 91-96, 2010.

16. Numerical Study of Magnetohydrodynamic Forced Convective Flow of a Micropolar Fluid past a Nonlinear Stretching Sheet with Variable Viscosity. M.A. Rahman, M.A. Samad, M.M. Rahman and M. Mohebujjaman, Dhaka Univ. J. Sci. Vol. 57(2): 243-248, 2009.

17. MHD Heat and Mass Transfer Free Convection Flow along a Vertical Stretching Sheet in Presence of Magnetic Field with Heat Generation. M.A. Samad and M. Mohebujjaman, Research Journal of Applied Science, Engineering and Technology Vol.1(3): 98-106, 2009.

Projects

1. Modeling Filter Compression, Fluid Generation and Parallelizing the Potts Model, GORE, Mathematical Problems to Industry (MPI) 2016, Duke University, Durham, NC. Link: https://goo.gl/pdY32U

2. C++ parallel implementation of incompressible viscous time-dependent NSE simulation using projection method in Dealii, HPC class 2015, Clemson University. Link: https://goo.gl/UMIAt5

3. Water Accumulation in Plant Cells During Fruit Growth, GSMMC 2016 at Rensselaer Polytechnic Institute, Troy, NY. Link: https://goo.gl/rdiQkG
4. Linear Solvers for Saddle Point Problems Arising in Navier-Stokes Simulations. MS project at Clemson University, 2015.
5. Efficiency of Different Algorithms over Sparse Matrices, Advanced Numerical Analysis class, Clemson University, 2012. Link: https://goo.gl/hSffwE
6. Word problem and Automatic groups, Data Structure class, Clemson University, 2012.
7. Perturbation Methods in Aero Fluid Dynamics. Hours Project, University of Dhaka, 2006.

Workshop

1. SAS Visual Analytics training workshop 2017, SAS and Clemson University, Clemson, SC
2. NVIDIA GPU Programming and Deep Learning workshops 2017, NVIDIA and Clemson University
3. Big Data Analytics with Hadoop MapReduce and Python 2017, Clemson University, SC
4. Introduction to Hadoop MapReduce with Python, 2017, Clemson University, SC
5. Introduction to R for Data Science on Super Computer, 2017, Clemson University, SC
6. High Performance Computing with Spatial Data using R 2016, Clemson University, SC
7. *Mathematical Problems to Industry (MPI) 2016, Duke University, Durham, NC
8. *Graduate Student Mathematical Modeling Camp (GSMMC) 2016, Rensselaer Polytechnic Institute, Troy
9. COMSOL Multi-physics & Application Builder Workshop Clemson, 2015, Clemson University, SC
10. Intel Xeon Phi Training Workshop on Stampede supercomputer, 2014, Clemson University, SC
11. Teacher's Appreciation Workshop, 2011, Bangladesh University of Engineering and Technology, Dhaka

(* = received travel support)

Service and Volunteering

Description	The Department of Mathematical Sciences, Clemson University sponsor annual 'Clemson Calculus Challenge'. The Clemson Calculus Challenge invites high school calculus students from South Carolina, Northeast Georgia, Western North Carolina, and Eastern Alabama to compete in a one-day event. The students take an individual test in the morning and participate in a team competition in the afternoon. Responsibilities include morning setup, morning proctoring, afternoon setup, afternoon runners, exam grading. https://goo.gl/V0NXyp
Description	'Bangladesh Association Clemson' a graduate student orgranization
Position	President (Fall 2014 - Fall 2015)

Research Position

2014	Research Assistant, Clemson University, Clemson, SC, Funded by National Science Foundation (NSF)

Conferences/Seminars Presentations

03-01-2017 **Talk**, SIAM CSE 2017, Atlanta, GA

01-07-2017 **Talk**, *Joint Mathematics Meetings, Atlanta, GA

12-13-2016 **Invited Talk**, *Paul J. Atzberger's Research Group, University of California, Santa Barbara (UCSB), CA

11-13-2016 **Invited Talk**, *AMS Sectional Meeting Program, North Carolina State University, Raleigh, NC

11-11-2016 **Talk**, Computational Math Seminar at Department of Mathematical Sciences, Clemson University, Clemson, SC, USA

12-03-2016 **Talk**, *40th SIAM Southeastern Atlantic Section Conference (SIAM-SEAS), University of Georgia, Athens, GA, USA

06-02-2016 **Talk**, 8th Annual JohnFest / SIAM Student Conference, Clemson University, Clemson, SC, USA

09-02-2015 **Talk**, Mathematical Sciences Department, Clemson University, Clemson, SC, USA

03-21-2015 **Talk**, *39th Society for Industrial and Applied Mathematics Southeastern Atlantic Section Conference (SIAM-SEAS), The University of Alabama, Birmingham, AL, USA

03-24-2015 **Talk**, Computational Math Seminar at Department of Mathematical Sciences, Clemson University, Clemson, SC, USA

11-20-2012 **Talk**, Computational Math Seminar at Department of Mathematical Sciences, Clemson University, Clemson, SC, USA

(* = received travel support)

Learned Programming Languages/Software Packages

Mathematics	Large scale implementation of deal.ii library using C++ with MPI, FreeFem++, Matlab, Mathematica, Maple, Sage, R, SAS, IPython Notebook, Lindo, LaTeX, VisIt, Paraview, TechPlot
General	C, C++ with Multithreading and MPI, Python, Fortran, Java, MySQL, Perl, CUDA, COMSOL, GraphLab
Platforms	Mac, Linux/Unix (Simulation Experience on Palmetto Super Computer), Ubuntu and Windows

Teaching Experience/Employment

2017 - present ***Visiting Assistant Professor, Virginia Tech**, Blacksburg, VA, USA*

Class Teaching MATH2204: *Introduction to Multivariable Calculus* (68 students, Fall 2017)

Duties Responsible for all course duties (teaching, holding office hours, preparing lecture notes, preparing weekly group/individual home works, in class quizzes, exams, proctoring, grading exams and quizzes, meeting with TA, maintaining webassign and canvas).

Technologies Projector, *Mathematica* coding, *Canvas* and *WebAssign*.

2015-2017 ***Graduate Teacher of Record,* Clemson University,** Clemson, SC, USA

Class Teaching MATH 2060: *Calculus of Several Variables* (37 students, Spring 2017)

Duties Responsible for all course duties (teaching, holding office hours, preparing lecture notes, distribute lecture notes at the beginning of each class, preparing weekly group home works and in class quizzes, exams, proctoring, grading home works, quizzes and exams, maintaining webassign and blackboard, preparing webassign home works).

Technologies Projector, *Mathematica* coding, *Blackboard* and *WebAssign*.

Class Taught MATH 1060: *Calculus of One Variable I* (48 students, Fall 2016)

Duties Responsible for all course duties (taught, held office hours, prepared printed lecture notes including learning activities, distributed lecture notes at the beginning of each class, prepared weekly group home works and in class quizzes, proctoring, grading (home works, learning activities, quizzes), maintaining webassign and blackboard, led old exams problem solving session before exams).

Technologies Big screen Tvs, *Smart Podium Interactive Pen Display*, *Blackboard* and *WebAssign*.

Class Taught MATH 1080: *Calculus of One Variable II* (29 students, Spring 2016)

Duties Responsible for all course duties (taught, held office hours, weekly meeting with course coordinator, observed other instructor's class teaching and made comments and suggestions, prepared printed lecture notes including learning activities, distributed lecture notes at the beginning of each class, prepared weekly group home works and in class quizzes, proctoring, grading (quizzes and exams), maintaining webassign and blackboard, led old exams problem solving session before exams, weekly meeting with teaching assistant and supplementary instructor leader, attended teaching professional development class).

Technologies Projector, *Smart Podium Interactive Pen Display*, *Blackboard* and *WebAssign*.

Class Taught MATH 1040: *Pre-Calculus and Introductory Differential Calculus* (35 students, Fall 2015)

Duties Responsible for all course duties (taught, held office hours, weekly meeting with course coordinator, prepared printed lecture notes including learning activities, distributed lecture notes at the beginning of each class, prepared weekly home works, exams, proctoring, grading (home works, learning activities and exams), maintaining webassign and blackboard, led old exams problem solving session before exams).

Teaching Experience

Technologies — Projector, *Smart Podium Interactive Pen Display*, *Blackboard* and *WebAssign*.

2012-2016 — ***Teaching Assistant,* Clemson University,** Clemson, SC, USA

Co-taught — MATH 3110: *Linear Algebra* (Summer 2016, 2017). Went to the class for 15 minutes every day, led learning activity and problem solving sessions. In summer 2016, the professor had a surgery and could not come to the class. I taught seven full classes as her substitute. In 2017, the professor went to Korea for conference, I taught two full classes as her substitute. Graded home works and learning activities, proctored the final exam.

Course — MATH 2080: *Introduction to Ordinary Differential Equations* (Summer 2016). It was an online course. Graded home works and exams on blackboard.

Course — MATH 3650: *Numerical Methods for Engineers* (Summer 2015). Graded home works, held office hours and helped students in *Matlab* coding.

Course — MATH 2060: *Calculus of Several Variables* (Summer 2015). Graded home works, exams and proctored.

Course — MATH 3650: *Numerical Methods for Engineers* (Spring 2015). Graded home works, exams and proctored.

Course — MATH 8530: *Matrix Analysis* (Fall 2012 & 2014). Graded home works.

Course — MATH 4340: *Advanced Engineering Mathematics* (Summer 2014). Graded traditional written home works as well as online home works using *canvas*, held office hours.

Course — MATH 6530: *Advanced Calculus* (Fall & Summer 2013). Graded home works, prepared home work keys, uploaded grades and keys on blackboard, taught in problem solving class once a week.

Course — MATH 4190: *Discrete Mathematical Structures* (Spring 2013). Graded home works and uploaded grades on blackboard.

Course — MATH 1070: *Differential and Integral Calculus* (Fall 2012). Graded home works and learning activities. Sat in class, answered questions of the students in learning activity sessions, proctored exams.

Course — MATH 2080: *Introduction to Ordinary Differential Equations* (Summer & Spring 2012), Graded home works, exams and proctored.

2010-2012 — ***Lecturer,* Bangladesh University of Engineering and Technology (BUET),** Dhaka, Bangladesh

Class Taught — MATH 193: *Vector Calculus* (30 students, Fall 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, proctored, held office hours, mentored). The course was designed for *Industrial Production Engineering students*.

Teaching Experience

Class Taught — MATH-291: *Introduction to Ordinary Differential Equations* (Fall 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, proctored, held office hours and mentored). I taught this course for the *EEE, Civil Engineering, Urban Planning and Design* departments students.

Class Taught — MATH-221: *Laplace Transformation* (40 students, Fall 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, proctored, held office hours and mentored). This course was designed for *Chemical Engineering students.*

Class Taught — MATH 163: *Calculus of One Variable I* (60 students, Fall 2010 and Spring 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, proctored and held office hours). I taught this course for *Mechanical Engineering* and *Naval Architecture* students.

Class Taught — MATH 153: *Calculus of One Variable I* (35 students, Spring 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, proctored, held office hours). The syllabus for this course was designed for the students of *Materials & Metallurgical Engineering* departments.

Service — Weekly meeting with department head and other faculty members, class distribution to the faculty members, contributed to writing grant proposal for development of the department facilities, service to university.

2011 — ***Adjunct Lecturer,*** **Manarat International University**, Dhaka, Bangladesh

Class Taught — MATH-102: *Mathematics for Business* (30 students, Fall 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded and proctored).

2011 — ***Adjunct Lecturer,*** **United International University,** Dhaka, Bangladesh

Class Taught — BMT-1103: *Business Mathematics I* (25 students, Spring 2011). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, held office hours and proctored).

2009-2010 — ***Lecturer,*** **Southeast University,** Dhaka, Bangladesh

Classes Taught — MATH 1011: *College Algebra*, (30 students, Spring, Summer and Fall 2009, Spring and Summer 2010), MATH 1023: *Business Calculus* (30 students, Spring, Summer and Fall 2009, Spring and Summer 2010), MATH-135: *Introduction to Ordinary Differential Equations* (35 students, Spring 2010). Responsible for all course duties (taught, prepared lecture notes, quizzes, exams, graded, held office hours, proctored and services to the department and university).

2008-2009 — ***Lecturer,*** **University of Information Technology and Sciences,** Dhaka, Bangladesh, (Fall 2008)

Classes Taught — MAT-161: *College Algebra* (25 students), MAT-163: *Calculus of One Variable I*, (30 students) MAT-165: *Introduction to Ordinary Differential Equations* (30 students), MAT-265: *Complex Variables* (25 students).

Teaching Experience

Duties Responsible for all course duties (taught in regular as well as evening classes, prepared lecture notes, quizzes, exams, graded, held office hours and proctored), prepared class schedule, distributed classes to the faculty members, services to the department and university, assisted in undergraduate admission.

Practicum Experience

Fall 2015 Completed Teaching Professional Development Course, Clemson University, SC, USA. Responsibilities included weekly meetings with the professor and several sessions of observed teaching. Professor also observed my teaching and informed me about the shortcomings.

2011 Attended three days long 'Teacher's Appreciation Workshop'. Observed teaching techniques from several professors, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh.

2010 Attended a day long 'Teachers training workshop', organized by Southeast University, Dhaka, Bangladesh.

Private Tutoring

2013-Present Provided scheduled individual tutoring sessions for Clemson University courses ranging from basic algebra to linear algebra

2002-2008 Provided scheduled individual tutoring sessions for students in Dhaka City courses ranging from high school math to first year university math courses.

Key Courses

Statistics Basic Statistics, Probability, Data Analysis, Principle of Statistics, Mathematical Statistics, Machine Learning, Statistical Methods, SAS Lab.

Operations Research Mathematical Programming, Advanced Linear Programming, Network Flow Programming, Stochastic Processes.

Computational Mathematics Introduction to Scientific Computing, Advanced Numerical Analysis, Data Structures, Finite Element Method, Numerical Methods for Fluids Flow, Fluid Dynamics, Numerical Methods for Differential Equations, Grad-div stabilization methods in computational fluid dynamics, Sparse Matrix Algorithms and Advanced Topics in FEM, Numerical Partial Differential Equations.

Applied Analysis Linear Analysis, Dynamical Systems, Measure and Integration, Functional Analysis, Ordinary and Partial Differential Equations, Topology, Complex Analysis.

Algebra Matrix Analysis, Theory of Graphs, Number Theory, Abstract Algebra, Linear Algebra, Discrete Mathematics.

Applied Mathematics and Others Mathematical Hydrology, Aerodynamics, Mathematical Modeling in Biology, Fuzzy Mathematics, Astronomy, Hydrodynamics, Methods of Applied Mathematics, History of Mathematics, Tensor Analysis, Differential Geometry, Mechanics, Electricity and Magnetism, Mechanics and Waves, Analytic and Vector Geometry, Computer Fundamentals, Programming Methodology.

Honors and Awards

1. Travel support for SIAM-CSE, Atlanta, GA, 2017, Clemson University.
2. Travel support for Joint Mathematics Meetings, Atlanta, GA, 2017, Clemson University.
3. AMS Sectional Meeting at North Carolina State University at Raleigh, Raleigh, NC, Travel Support Award, 2016.
4. SIAM Student Chapter Representative at AN16 Expenses Support, 2016.
5. Travel Award for SIAM-SEAS conference 2016. Department of Mathematical Sciences, Clemson University.
6. Travel Award for SIAM-SEAS conference 2015. Department of Mathematical Sciences, Clemson University.
7. Graduate Student Teaching Assistantship Award, 2012-present. Department of Mathematical Sciences, Clemson University.
8. Dhaka to USA, One way travel award, 2013. Ministry of Finance, People's Republic of Bangladesh.
9. A.F. Mujibur Rahman Foundation Gold Medal and Cash Award 2009. Department of Mathematics, University of Dhaka. Awarded to the student of the Department of Mathematics with best result in MS.
10. University Grants Commission Merit Scholarship, 2008. Ministry of Education, Bangladesh.
11. A.F. Mujibur Rahman Foundation Gold Medal and Cash Award 2008. Department of Mathematics, University of Dhaka. Awarded to the student of the Department of Mathematics with best result in BS.
12. Mitra Yushuf Trust Fund Scholarship, 2006, University of Dhaka. For achieving the highest grade (mark) in third year offered by the Department of Mathematics.
13. Hasina Shiddki Trust Fund Scholarship, 2005, University of Dhaka. For achieving the highest grade (mark) in second year offered by the Department of Mathematics.

Professional Memberships

AMS : American Mathematical Society,
SIAM : Society for Industrial and Applied Mathematics,
BMS : Bangladesh Mathematical Society

References

1. Dr. Leo G. Rebholz, Professor and Thesis Advisor, Department of Mathematical Sciences, Clemson University, Long Hall 208, Clemson, SC, 29634, Phone: (864) 656-1840, Email: rebholz@clemson.edu
2. Dr. Taufiquar Khan, Professor, Department of Mathematical Sciences, Martin O-201, Clemson University, Clemson, SC, 29634, Phone: (864) 656-3257, Email: khan@clemson.edu
3. Dr. Qingshan Chen, Assistant Professor and Dissertation Committee Member, Department of Mathematical Sciences, Clemson University, Martin O-210, Clemson, SC, 29634, Phone: (864) 656-4565, Email: qsc@clemson.edu
4. Dr. Chris Cox, Interim Department Chair and Professor at Clemson University in Mathematical Sciences, Martin O-224, Clemson, SC, 29634, Phone: (864) 656-1517, Email: clcox@clemson.edu
5. Dr. Timo Heister, Assistant Professor of Mathematical Sciences and Developer of dealII, Dissertation Committee Member, Martin O-14, Clemson University, Clemson, SC, 29634, Phone: (864) 656-0411, Email: heister@clemson.edu