

# Atia Afroz, Ph.D.

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## CONTACT INFORMATION

Assistant Professor  
Department of Mathematics & Physics  
North South University  
Plot # 15, Block # B, Bashundhara  
Dhaka 1229, Bangladesh  
Cell: +8801316101713  
Email: atia.afroz@northsouth.edu  
aafroz09@gmail.com



## RESEARCH INTERESTS

My research interests are **Bifurcation Analysis in Singularity Theory and its applications to Differential Geometry, Real Algebraic Geometry**, etc. My teaching interests are in **Pure and Applied Mathematics** as well, including *Calculus, Linear Algebra, Differential Equations, Dynamical Systems, Functional Analysis, Catastrophe Theory, Singularity Theory, Numerical Analysis, and Model Order Reduction*, etc.

## EDUCATION

**Ph.D. in Mathematics, Electronics and Informatics**, September 2019

Department of Mathematics  
Graduate School of Science and Engineering  
Saitama University, Japan

- Thesis title: *Bifurcation Analysis of Euler Buckling Problem from the viewpoint of Singularity Theory*
- Advisor: Toshizumi Fukui, Ph.D.

**M.Sc. in Pure Mathematics**, July 2015

Dipartimento di Matematica  
Università Degli Studi di Milano, Milan, Italy

- Thesis title: *On Graphs related with Character Degrees*
- Advisor: Mariagrazia Bianchi, Ph.D.
- Result: Awarded.

**M.Phil. in Mathematics**, June 2013

Department of Mathematics  
Jahangirnagar University, Dhaka, Bangladesh

- Thesis title: *Numerical Simulation of a Dimensionless Form of Multi-Lane Traffic Flow Model*
- Advisor: Laek Sazzad Andallah, Ph.D.
- Result: Awarded.

**M.Sc. in Mathematics**, June 2006

Department of Mathematics  
Jahangirnagar University, Dhaka, Bangladesh

- Thesis title: *Matrix Computation of a System of Linear Equations by Identifying the type of Coefficient Matrix*
- Advisor: Md. Sharif Uddin, Ph.D.
- Result: **First** class with **Third** position.

**B.Sc. Honours in Mathematics**, June 2005

Department of Mathematics  
Jahangirnagar University, Dhaka, Bangladesh

- Result: **First** class with **Third** position.

**H.S.C.**, Science, 2001

Ideal School & College, Dhaka, Bangladesh

- Result: First division

**S.S.C.**, Science, 1999

Motijheel Model High School, Dhaka, Bangladesh

- Result: First division

**PROFESSIONAL  
POSITIONS**

**Assistant Professor**

October 2020 to date

Department of Mathematics & Physics  
North South University  
Bashundhara, Dhaka-1229, Bangladesh

**Lecturer**

August 2015 to August 2016

Department of Mathematics & Physics  
North South University  
Bashundhara, Dhaka-1229, Bangladesh

**Assistant Professor**

October 2013 to July 2015

Department of Mathematics & Statistics  
Bangladesh University of Business and Technology (BUBT)  
Mirpur-2, Dhaka 1216, Bangladesh

**Lecturer**

February 2011 to September 2013

Department of Mathematics & Statistics  
Bangladesh University of Business and Technology (BUBT)  
Mirpur-2, Dhaka 1216, Bangladesh

**Lecturer**

December 2008 to January 2011

Department of Quantitative Sciences  
International University of Business Agriculture and Technology (IUBAT)  
Uttara, Dhaka 1230, Bangladesh

**RESEARCH  
EXPERIENCE**

**Ph.D. Fellow**

October 2016 to September 2019

Department of Mathematics  
Graduate School of Science and Engineering  
Saitama University, Japan  
Supervisor: Toshizumi Fukui, Ph.D.

**Erasmus Mundus Fellow**

October 2013 to July 2015

Dipartimento di Matematica  
Università Degli Studi di Milano  
Milan 20133, Italy  
Supervisor: Mariagrazia Bianchi, Ph.D.

**COMPUTER  
SKILLS**

**Operating Systems**

Microsoft Windows, Unix, Linux

**Programming Languages**

C, C++, Python, MATLAB, Maple, Mathematica

**Productivity Programs**

Microsoft Office, MATLAB, Latex

**JOURNAL AND  
CONFERENCE  
PUBLICATIONS**

1. Mohammad Sahadet Hossain, **Atia Afroz**, Musannan Hossain, "Algorithms for model order reduction of structured periodic control system and simulations of results", *2022 International Conference on Innovations in Science, Engineering and Technology (ICISSET)*, 2022, pp. 245-250, doi: 10.1109/ICISSET54810.2022.9775882. Published in *IEEE Xplore*

2. **Atia Afroz**, Mohammad Sahadet Hossain, Musannan Hossain, Mashrur Wasek, “Iterative approach for reduction of index 2 periodic models using generalized inverse procedure”, *In Proceedings of Seventh International Congress on Information and Communication Technology: ICICT 2022, London, Volume 1. Published in Lecture Notes in Networks and Systems- Springer Nature 2022*
3. Mohammad Sahadet Hossain, **Atia Afroz**, Oshin Muntaha and Musannan Hossain, “A novel ADI based method for model reduction of discrete-time index 2 control systems”, in proceedings MIET, 2022. Will Appear in Lecture Notes in Networks and Systems- Springer Nature
4. Mohammad Sahadet Hossain, **Atia Afroz**, Mashrur Wasek, and Musannan Hossain, “Iterative system reduction of the PLTV index 2 model using the generalized inverse procedure”, *22nd International Mathematics Conference 2021, 10 – 11 December 2021*
5. **Atia Afroz** and Toshizumi Fukui, “Bifurcation of Euler buckling problem, revisited”, *Hokkaido Mathematical Journal*, Vol. 50 (2021) p.111-150, IF: 0.56.
6. **Atia Afroz** and L. S. Andallah, “Numerical Simulation of a Dimensionless Form of Two Lane Traffic Flow Model.” *International Journal of Theoretical & Applied Sciences*, 5(1):145-153, 2013.
7. M. H. Kabir, **A. Afroz** , and L. S. Andallah, “A Finite Difference Scheme for a Macroscopic Traffic Flow Model based on a Nonlinear Density-Velocity Relationship.” *Bangladesh J. Sci. Ind. Res.*, 47(3):339–346, 2012.
8. M. H. Kabir, **A. Afroz**, M. M. Hossain and M. O. Gani “A Finite Difference Scheme for One Dimensional Heat Equation.” *ULAB Journal of Science and Engineering*, 1(1):54–60, 2010.

CONFERENCE  
TALKS

1. A bifurcation model for static solutions of modified Fisher’s equation, Hyper JARCS Conference, University of Tokyo, Japan, December 2019
2. Bifurcation and hysteresis sets of Euler buckling problem, Annual Meeting of the Mathematical Society of Japan, 2019, Tokyo Institute of Technology, Japan, March 2019.
3. Bifurcation of Euler buckling problem, revisited, Joint meeting of Mathematical Society of Japan, MEXT, JSIAM, IMI (Kyushu U.), AiMap, FMSP (U. Tokyo), MIMS (Meiji U.), and Keidanren., Meiji University, Japan, November 2018.
4. Revisit Euler buckling problem, Real Algebraic Geometry and Singularity Theory Symposium 2018, Hyogo University of Teacher Education, Kobe, Japan, September 2018.
5. Bifurcation analysis of Euler beam problem, The 7th Kobe Singularity Group Meeting, Hyogo University of Teacher Education, Kobe, Japan, March 2018.
6. Numerical Study on a Scaled Fluid Dynamic Traffic Flow Model with Dimensionless Quantities, 17th Mathematics Conference, Jahangirnagar University, Bangladesh, December 2011.
7. Matrix Computation of a Linear System of Equations by Identifying the type of Coefficient Matrix, International Conference on Statistical Sciences, North South University, Bangladesh, December 2008.

RESEARCH  
GRANTS

1. An Assessment for Implementing Computer Algebra System (CAS) in Secondary Mathematics Teaching, Funded by: British Council, Fiscal Year 2022
2. Bifurcation Analysis of the Euler Beam Problem in Finite Dimension, NSU funded project, Fiscal Year 2022-23

ACADEMIC  
AWARDS

**JASSO, Monbukagakusho Honors Scholarship 2016**

Awarded by Japanese Government for Doctoral program  
Saitama University, Japan

**Takase Scholarship 2018**

Awarded by Takase Scholarship Foundation, Japan for Doctoral program  
Saitama University, Japan

**Erasmus Mundus Europe Asia (EMEA) Scholarship 2013**

Awarded by European Commission for Master's program  
Università Degli Studi di Milano, Milan, Italy

PROFESSIONAL  
AFFILIATION

- Life Member, Bangladesh Mathematical Society
- Member, Mathematical Society of Japan (MSJ)
- Member, Association for Women in Mathematics (AWM)
- Member, Organization for Women in Science for the Developing World (OWSD)

PERSONAL  
DETAILS

- Date of Birth: January 08, 1985
- Place of Birth: Narsingdi, Bangladesh
- Nationality: Bangladeshi by birth
- Marital Status: Married with two daughters

REFERENCES

Toshizumi Fukui, Ph.D.

Professor  
Department of Mathematics  
Saitama University  
255 Shimo-Okubo, Sakura-Ku  
Saitama 338-8570, Japan

Phone: +81-48-858-3592  
E-mail:  
tfukui@rimath.saitama-u.ac.jp

Mariagrazia Bianchi, Ph.D.

Associate Professor  
Dipartimento di Matematica  
Università Degli Studi di Milano  
Via C. Saldini 50  
Milan 20133, Italy

Phone: +39 0250316161  
E-mail:  
mariagrazia.bianchi@unimi.it

Mohammad Sahadet Hossain, Ph.D.

Professor & Chair  
Department of Mathematics & Physics  
North South University  
Plot # 15, Block # B, Bashundhara  
Dhaka 1229, Bangladesh

Phone: +880-1964278433  
E-mail:  
mohammad.hossain@northsouth.edu

Atia Afroz, PhD  
December 15, 2022