



Dr. Md Fazlul Hoque

Curriculum Vitae

Mathematics is the key of innovation

CONTACT INFORMATION

Md Fazlul Hoque, PhD

Associate Professor

Department of Mathematics

Pabna University of Science

and Technology, Pabna, Bangladesh

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RESEARCH INTEREST

My research interests lie in the field of Algebra, Quantum Physics and Mathematical Physics, in particular:

- i. Superintegrable Hamiltonians in classical and quantum mechanics and information
- ii. Quadratic associative and polynomial algebras, their representations and applications
- iii. Centralizing and commuting generalized derivations of prime and semiprime gamma rings
- iv. Fuzzy topology, Fuzzy logic, their extensions, representations and applications

EDUCATION

2014-2018 **Doctor of Philosophy**, *School of Mathematics and Physics*, The University of Queensland, Australia (2018).

Mathematical Physics and Quantum Mechanics

2011 **Master of Philosophy**, *Faculty of Science*, The University of Rajshahi, Bangladesh.
Fuzzy Topology

2006 **Master of Science**, *Department of Mathematics*, The University of Rajshahi, Bangladesh, *First Class First Position*.

Specialized in Mathematics (Thesis Group)

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- 2005 **Bachelor of Science (Honours)**, *Department of Mathematics*, The University of Rajshahi, *First Class Second Position*.
Specialized in Mathematics
- 2000 **Higher Secondary Certificate**, *Lalmonirhat Govt. College*, Rajshahi Board.
Science Group
- 1998 **Secondary School Certificate**, *Rajpur High School*, Rajshahi Board.
Science Group

DOCTOR OF PHILOSOPHY THESIS

- Title *Superintegrable systems, polynomial algebra structures and exact derivations of spectra*
- Supervisors Associate Professor Dr. Yao-Zhong Zhang (Principal) & Dr. Ian Marquette (Associate)
- Description This thesis looks at finite dimensional quantum superintegrable systems with scalar potentials as well as vector potentials with monopole type interactions. We introduce new families of superintegrable Hamiltonians in flat and curved spaces and obtain algebraic derivations of energy spectra for these models using various approaches relying on realizations of differential operators and the connection between wave functions and differential equations and geometry

MASTER OF PHILOSOPHY THESIS

- Title *On supra fuzzy topological spaces*
- Supervisor Professor Dr. Dewan Muslim Ali
- Description This thesis introduced and studied separation axioms of supra fuzzy topological spaces and established some relations among them. We also developed some other properties of these concepts and obtained their several features.

MASTER OF SCIENCE THESIS

- Title *A study on characterizations of general radical classes of rings*
- Supervisor Professor Dr Akhil Chandra Paul
- Description In this thesis we studied characterizations of general radical classes of rings.

EMPLOYMENT HISTORY

- Feb 2017–till now **Associate Professor**, *Department of Mathematics*, Pabna University of Science and Technology, Bangladesh .
- 2014–2018 **Tutor**, *School of Mathematics and Physics*, University of Queensland, Australia.
- Nov 2016–Apr 2017 **Research Assistant**, *School of Economics*, University of Queensland, Australia .
- Nov 2016–Dec 2016 **Visiting Researcher**, *Department of Mathematics*, University of Hawaii, USA .
- Jan 2016–Jun 2017 **Senior Research Associate**, *School of Economics*, University of Queensland, Australia .

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- Nov 2013– Mar 2014 **Chairman**, *Department of Mathematics*, Pabna University of Science and Technology, Bangladesh .
- Mar 2012 – Feb 2017 **Assistant Professor**, *Department of Mathematics*, Pabna University of Science and Technology, Bangladesh .
- Apr 2009 – Mar 2012 **Lecturer**, *Department of Mathematics*, Pabna University of Science and Technology, Bangladesh .
- 2010–2014 **Assistant Proctor**, Pabna University of Science and Technology, Bangladesh .
- 2010–2014 **President**, *PUST Blood Donors Club*, Pabna University of Science and Technology, Bangladesh .
- 2008–2009 **Lecturer**, *Lalmatia Women College*, Dhaka, Bangladesh .
- 2013–present **Editorial Board Member**, *Universal Journal of Computational Mathematics*, USA.
- 2018–present **Lifetime Member**, *Bangladesh Mathematical Society*, Bangladesh.
- 2014–present **Member**, *ANZAMP*, Australian Mathematical Society, Australia.

SCHOLARSHIPS, FELLOWSHIP, GRANTS AND FUNDING

- 2020 Research Project Grant from Pabna University of Science and Technology funded by UGC, Bangladesh, BD TK. 63,000.00
- 2019 Research Project Grant from Pabna University of Science and Technology funded by UGC, Bangladesh, BD TK. 70,000.00
- 2017 Conference grant from Professor Mark Gould and Yao-Zhong Zhang's Discovery project, University of Queensland, Australia, AUD 1200.00
- 2016 Graduate School International Travel Award (GSITA), University of Queensland, Australia, AUD 5000.00
- 2015 Conference grant from School of Mathematics and Physics, University of Queensland, Australia, AUD 3000.00
- 2015 Conference grant from Ian Marquette's ARC Discovery Early Career Researcher Award DE 130101067, University of Queensland, Australia, AUD 6500.00
- 2014 Conference grant from Yao-Zhong Zhang's Discovery project DP 140101492, University of Queensland, Australia, AUD 2200.00
- 2014–2017 International Postgraduate Research Scholarship (IPRS), Australia
- 2014–2017 Australian Postgraduate Award (APA), Australia
- 2013 Research fund from University Grants Commission of Bangladesh
- 2009 Gold Medal from A F Mujibur Rahman Foundation, Bangladesh
- 2010 Gold Medal from Shaheed Suhrawardy Hall, the University of Rajshahi, Bangladesh

PUBLICATIONS

- Journal Papers: 36. Md Fazlul Hoque, Harun-Or-Roshid and Fahad Sameer Alshammari, *Higher-order rogue wave solutions of the Kadomtsev Petviashvili - Benjamin Bona Mahony (KP-BBM) model via the Hirota-bilinear approach*, *Physica Scripta*, 95, 115215, 2020.

35. Md Fazlul Hoque, Harun-Or-Roshid and Fahad Sameer Alshammari, *Dynamical interactions between higher-order rogue waves and various forms of n -solitons of the $(2+1)$ -dimensional ANNV equation*, Chinese Physics B, 29, 114701, 2020.
34. Mst Shekha Khatun, Md Fazlul Hoque and Md Azizur Rahman, *A class of localized soliton and fractal pattern solutions of the $(2+1)$ -dimensional modified dispersive long wave model*, Physica Scripta, 95, 085219, 2020.
33. Md.Fazlul Hoque and Harun-Or-Roshid, *Optical soliton solutions of the Biswas-Arshed model by the expansion approach*, Physica Scripta, 95, 075219 (2020).
32. Md Fazlul Hoque and Akhil Chandra Paul, *Left centralizers on Lie ideals in prime and semiprime gamma rings*, International J. Math. Combin. Vol. 1. 2020, 10-19.
31. S S Miah, M R Amin and Md Fazlul Hoque, *Separation axioms $(T1)$ on fuzzy bitopological spaces in quasi-coincidence sense*, International J. Math. Combin, Vol. 3, 43-53, 2019.
30. Md Fazlul Hoque, Ian Marquette and Yao-Zhong Zhang, *Recurrence approach and higher rank polynomial algebras for superintegrable monopole systems*, Journal of Mathematical Physics 59, 052101 (2018).
29. Md Fazlul Hoque, Ian Marquette, Sarah Post and Yao-Zhong Zhang, *Algebraic calculations for spectrum of superintegrable system from exceptional orthogonal polynomials*, Annals of Physics 391, 203 (2018).
28. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *Quadratic algebra structure in the 5D Kepler system with non-central potentials and Yang-Coulomb monopole interaction*, Annals of Physics, 380, 121 (2017).
27. Mst. Shekha Khatun, Md Fazlul Hoque and Md Azizur Rahman, *Multi-soliton solutions, completely elastic collisions and non-elastic fusion phenomena of two PDEs*, Pramana-Journal of Physics, 88:86 (2017).
26. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *Quadratic algebra for superintegrable monopole system in a Taub-NUT space*, Journal of Mathematical Physics, 57, 092104 (2016).
25. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *Recurrence approach and higher rank cubic algebras for the N -dimensional superintegrable systems*, Journal of Physics A: Mathematical and Theoretical, 49 (2016).
24. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *A new family of N -dimensional superintegrable double singular oscillators and quadratic algebra $Q(3) \oplus so(n) \oplus so(N-n)$* , Journal of Physics A: Mathematical and Theoretical, 48, 445207 (2015).
23. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *Quadratic algebra structure and spectrum of a new superintegrable system in N -dimension*, Journal of Physics A: Mathematical and Theoretical, 48, 185201 (2015).
22. Md Fazlul Hoque and A. C. Paul, *Centralizers on prime and semiprime gamma rings*, Italian Journal of Pure and Applied Mathematics, 35, 575 (2015).

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21. Md Fazlul Hoque, A. S. Alshammari and A. C. Paul, *Left centralizers of semiprime gamma rings with involution*, Applied Mathematical Sciences, 8(95), 4713 (2014).
20. Md Fazlul Hoque and A. C. Paul, *Generalized derivations on semiprime gamma rings with involution*, Palestine Journal of Mathematics, 3(2), 235 (2014).
19. Md Fazlul Hoque and Nizhum Rahman, *The Jordan θ -centralizers of semiprime gamma rings with involution*, International Journal of Mathematical Combinatorics, 4, 16 (2013).
18. Md Fazlul Hoque, H. O. Roshid and A. C. Paul, *The θ -centralizers of semiprime gamma rings*, Research Journal of Applied Sciences, Engineering and Technology, 6(22), 4129 (2013).
17. Md Fazlul Hoque and A. C. Paul, *Centralizers of semiprime gamma rings*, Italian Journal of Pure and Applied Mathematics, 30, 289 (2013).
16. Md Fazlul Hoque and A. C. Paul, *Prime gamma rings with centralizing and commuting generalized derivations*, International Journal of Algebra, 7(13), 645 (2013).
15. Md Fazlul Hoque and A. C. Paul, *An equation related to centralizers in semiprime gamma rings*, Annals of Pure and Applied Mathematics, 1(1), 84 (2012).
14. Md Fazlul Hoque, H.O. Roshid and A. C. Paul, *An equation related to θ -centralizers in semiprime gamma rings*, International Journal of Mathematical combinatorics, 4, 17 (2012).
13. Md Fazlul Hoque and A. C. Paul, *On centralizers of semiprime gamma rings*, International Mathematical Forum, 6(13), 627 (2011).
12. Md Fazlul Hoque, M. S. Hossain and D. M. Ali, *Some features of $\alpha - T_0$ spaces in supra fuzzy topology*, Journal of Bangladesh Academy of Sciences, 36(1), 61 (2012).
11. Md Fazlul Hoque, M. S. Hossain and D. M. Ali, *Some features of regular spaces in supra fuzzy topology*, Journal of Scientific Research, 4(2), 372 (2012).
10. Md Fazlul Hoque, M. S. Hossain and D. M. Ali, *Some features of $\alpha - T_1$ spaces in supra fuzzy topology*, Journal of Mechanics of Continua and Mathematical Sciences, 6(2), (2012).
9. Md Fazlul Hoque, R. C. Bhowmik, M. R. Kabir and D. M. Ali, *Some features of $\alpha - R_0$ spaces in supra fuzzy topology*, Journal of Mechanics of Continua and Mathematical Sciences, 7(1), 931 (2012).
8. Md Fazlul Hoque, R. C. Bhowmik, M. R. Kabir and D. M. Ali, *Some features of $\alpha - R_1$ spaces in supra fuzzy topology*, International Journal of Engineering and Technology, 8(4), 847 (2011).
7. Md Fazlul Hoque, Ruhul Amin and H. O. Roshid, *Some features of $\alpha - T_2$ spaces in supra fuzzy topology*, International Journal of Engineering and Technology, 7(4), 728 (2010).

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6. Ruhul Amin and Md Fazlul Hoque, *Properties of fuzzy supra topological spaces and $s-\alpha$ continuous functions*, International Journal of Engineering and Technology, 7(4), 723 (2010).
 5. Harun-Or-Roshid, Md Nur Alam, Md Fazlul Hoque and M. Ali Akbar, *A new extended (G'/G) -expansion method to find exact traveling wave solutions of nonlinear evolution equations*, Mathematics and Statistics, 1(3), 162 (2013).
 4. Harun-Or-Roshid, M. Ali Akbar, Md Nur Alam, Md Fazlul Hoque and Nizhum Rahman, *New extended (G'/G) -expansion method to solve nonlinear evolution equations: the $(3+1)$ -dimensional potential YTSF equation*, Springer Plus, 3, 22 (2014).
 3. Md Nur Alam, M. Ali Akbar and Md Fazlul Hoque, *Exact travelling wave solutions of the $(3+1)$ -dimensional mKdV-ZK equation and the $(1+1)$ -dimensional compound KdVB equation using the new approach of generalized (G'/G) -expansion method*, Pramana, 83(3), 317 (2014).
 2. Harun-Or-Roshid, Md Fazlul Hoque, Md Nur Alam and M. Ali Akbar, *New extended (G'/G) -expansion method and its application in the $(3+1)$ -dimensional equation to find new exact traveling wave solutions*, Universal Journal of Computational Mathematics, 2(2), 32 (2014).
 1. Md Fazlul Hoque, Harun-Or-Roshid and M. Ali Akbar, *New extended (G'/G) -expansion method for traveling wave solutions of nonlinear partial differential equations (NPDEs) in mathematical physics*, Italian Journal of Pure and Applied Mathematics, 33, 175 (2014).
- Conference Papers:
1. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *Family of N -dimensional superintegrable systems and quadratic algebra structures*, Journal of Physics: Conference Series 670 (2016) 012024.
 2. Md Fazlul Hoque, I. Marquette and Yao-Zhong Zhang, *On superintegrable monopole systems*, Journal of Physics: Conference Series, 965, 012018 (2018).
- Books:
1. Md Fazlul Hoque and D. M. Ali, *Supra fuzzy topological spaces*, LAP LAMBERT Academic Publishing, GmbH & Co. KG, Germany, 2012.
 2. Md Fazlul Hoque, *A lecture note on radical classes of rings*, arXiv. 3114276, March, 2020.
 3. Md Fazlul Hoque, *Superintegrable systems, polynomial algebra structures and exact derivations of spectra*, arXiv:1802.08410, doi.10.14264/uql.2018.140, 2020.

CONFERENCE, SEMINAR AND TALK

- 2019 17. *Lie algebra in quantum mechanics*, 21st International Mathematics Conference of Bangladesh Mathematical Society, University of Dhaka, Bangladesh, December 06-08, 2019.
16. *Algebraic calculation on superintegrable monopole systems*, 85th Annual Conference of Indian Mathematical Society- An International Meet (IMS 2019), IIT Kharagpur, India, November 22-25, 2019.
- 2018 15. *Algebra structures of superintegrable monopole systems*, AFMR-BMS National Mathematics Conference, University of Dhaka, Bangladesh, 21-22 December 2018.
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- 2017 14. *On superintegrable monopole systems*, The XXVth International Conference on Integrable Systems and Quantum Symmetries, Prague, Czech Republic, 6-10 June, 2017.
- 2016 13. *Science Communication for RHD students' workshop*, School of Mathematics and Physics, The University of Queensland, 2016.
- 2015 12. *Direct and constructive approaches on N -dimensional superintegrable system*, The Australian and New Zealand Association of Mathematical Physics, Newcastle, Australia, 10 December, 2015.
11. *Family of N -dimensional superintegrable systems and quadratic algebra structures*, The XXIIIth International Conference on Integrable Systems and Quantum Symmetries, Prague, Czech Republic, 23-27 June, 2015.
10. *Quantum Field Theory, Seminar-2*, School of Mathematics and Physics, The University of Queensland, Australia, 2015.
9. *Algebraic structures and spectrum of N -dimensional superintegrable systems*, Department of Mathematics, Pabna University of Science and Technology, Bangladesh, 2015.
8. *Quadratic algebra structures and spectrum of higher dimensional superintegrable systems*, Annual poster day, The University of Queensland, Australia, 2015.
6. *Aspects of superintegrability, special functions and orthogonal polynomials*, PhD Confirmation, The University of Queensland, Australia, 9 April, 2015.
- 2014 7. *Quadratic algebra structure and spectrum of a new superintegrable system*, 8th Australia New Zealand Mathematics Convention, Australian Mathematical Society, Melbourne, Australia, 8-12 December 2014.
6. *Early Career Workshop*, Australian Mathematical Society, Melbourne, Australia, 6-7 December 2014.
5. *Quantum Field Theory, Seminar-1*, School of Mathematics and Physics, The University of Queensland, Australia, 2014.
- 2012 4. *Some separation properties of supra fuzzy topological spaces*, National Seminar on Mathematics and Applications, The University of Burdwan, India, March 2012.
3. *Centralizers of semiprime gamma rings*, International conference on statistical data mining for econometrics, health, agriculture and environment, The University of Rajshahi, Bangladesh, 21-24 December 2012.
- 2011 2. *Centralizers of semiprime gamma rings*, 17th Mathematics Conference, Bangladesh Mathematical Society, Jahangirnagar University, Bangladesh, 22-24 December 2011.
1. *Some features of supra fuzzy topological spaces*, Department of Mathematics, The University of Rajshahi, Bangladesh, 2011.

SUPERVISION OF STUDENTS

- 2019 M.Phil supervisor of two students; Project title:
- 2017 M.Sc. Thesis supervisor of 4 students
- 2013-till now Honours project supervisor of 10 students

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COMPUTER SKILLS

Advanced FORTRAN, C/C++, MATLAB, MATHEMATICA, MAPLE, Adobe Illustrator
HTML, L^AT_EX, OpenOffice, Microsoft Windows
Computer Hardware and Support

COMMUNICATION SKILLS

2011-present Seventeen Oral Presentation at the national and international Conference.
2015 Poster at the Annual poster day in the University of Queensland, Australia.

SUBJECTS STUDY

PhD Program Classical and Quantum mechanics, integrability, superintegrability, quadratic and polynomial algebras, deformed oscillators, Algebraic methods of mathematical physics.

M.Phil Fuzzy topology

M.Sc. Advance analysis, Functional analysis, Rings and radicals, Homological algebra, Commutative algebra, Fuzzy Mathematics.

B.Sc. Real and complex analysis, Ring and group theory, Number theory, Topology, Operation research, Differential and integral equations, Algebra, Geometry and Calculus.

TEACHING INTEREST

Undergraduate Algebra, Calculus, Geometry, Real and Complex analysis, Differential equations, Abstract algebra, Astronomy, Numerical analysis and others

Graduate Lie algebras and representations, Algebraic methods of mathematical physics, Group and ring theory, Commutative algebra, Number theory, Topology, Functional analysis, Fuzzy mathematics

LANGUAGES

Bengali **Mother tongue**

English **Intermediate** *Con conversationally fluent*

Hindi **Basic** *Basic words and phrases only*

INTERESTS

- Soccer - Playing Card
- Reading - Movie watching

PERSONAL PROFILE

1. Name: Md Fazlul Hoque
2. Father's Name: Md Abul Hossain 3. Mother's Name: Most Samina Khatun
4. Date of Birth: 4 February 1982 5. Sex: Male

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6. Marital status: Married
7. Nationality: Bangladeshi
8. Permanent address:- Vill: West Guriadha, P.O.: Kurshamari, Thana and District: Lalmonirhat, Country: Bangladesh.
9. Present address: Department of Mathematics, Pabna University of Science and Technology, Bangladesh

REFERENCES

These persons are familiar with my professional qualifications:

Professor Dr. Akhil Chandra Paul

Department of Mathematics Phone: 088 01915 813138
The University of Rajshahi Email: acpaulrubd_math@yahoo.com
Rajshahi-5500, Bangladesh

Associate Professor Dr. Yao-Zhong Zhang

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Dr. Ian Marquette

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Dr. Sarah Post

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Associate Professor Dr. Jon Link

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