# CURRICULUM VITAE

## PERSONAL INFORMATION:


Name: Dr. Mohmad Imran Bhat
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Nationality: Jammu & Kashmir, India


## LANGUAGES:

Read, Write and Speak: English, Urdu, Kashmiri
Read only: Arabic, Persian

## RESEARCH INTEREST:

Algebraic Graph Theory, Spectral Graph Theory, Coding Theory, Algebraic Geometry, Number Theory

## EDUCATION:

- **2016-2021: I. PhD Mathematics**, Department of Mathematics, University of Kashmir, Srinagar.
  **Title of Ph.D. Thesis: "*On Rings and the Graphs associated to their Structures*"**

- **2011-2013: M. Sc Mathematics**, Department of Mathematics, University of Kashmir **(74.2%)**
  **Major Subjects:** Mathematical Analysis, Advanced Abstract Algebra, Complex Analysis, Graph Theory, Differential Geometry, Numerical Analysis, Mathematical Statistics, Partial Differential Equations, Differential Geometry, Mathematical Biology, Functional Analysis, and Operation Research.

- **2008-2010: B. Sc**, Govt. Degree College Baramulla University of Kashmir with **(66.17%)**
  **Major Subjects: :** English, Calculus, Geometry, Real and Complex Analysis, Abstract Algebra, Theory of Equations, Solid State Physics, Modern Physics, Electronics and Communication, Nuclear Physics, C Programming.

- **2006-2007: 11$^{th}$ & 12$^{th}$**, Govt. Higher Secondary School Palhallan, **J**KBOSE with **(78.4%)**
  **Major Subjects:** English, English, Physics, Chemistry, Mathematics.

## Professional Degree:

- **2014-2015: B. Ed**, Department of Education, University of Kashmir with **(72.4%)**

**Major Subjects:** Theory and Principles of Education, Psychology of Learning and Development, Development of Education System in India, Teachings of Mathematics, and English.

## Experience in writing Grants/Projects for funding:

- **Awarded Major Research Project** entitled "Zero-divisor graphs of rings" UGC New-Delhi, India, [F. No. 43-414/2014 (SR), 17-08-2015 W.E.F. July 01, 2015].
- **Organizing Secretary of Minor Project** entitled "Workshop cum National Conference on National Mathematics Day" sponsored by Jammu &Kashmir Science and Technology and Innovation Council, from December, 21 - 23, 2022.
- **Organizing Secretary** entitled "Viksit Bharat @2047 cum National Mathematics Day" sponsored by Central University of Kashmir, 22 December, 2023.

## Teaching/ Professional Experience:

- **April 2024 – Till Date:** Assistant Professor (Contractual), Department of Computer Science and Engineering, University of Kashmir.
  **Subjects Taught and Teaching:** ODE & PDE, Mathematical Statistics, Probability Distribution, Queuing Theory, Graph Theory, Special Functions, Multivariate Calculus.
- **Dec. 2019 – March 2024:** Assistant Professor (Contractual), Department of Mathematics, Central University of Kashmir.
  **Subjects Taught:** Abstract Algebra I, II & III, Linear Algebra, Graph Theory, Spectral Graph Theory, Number Theory I & II, Operation Research, CoV, Plane Geometry.
- **June 2017 – 2018:** Research Scholar, Department of Mathematics University of Kashmir.
  **Subjects Taught:** Number Theory, Linear Algebra and Graph Theory.
- **2017 – 2020:** Resource Person, Directorate of Distance Education, University of Kashmir.
  **Subjects Taught:** Number Theory, Theory of Matrices, Abstract Algebra and Graph Theory.
- **March 2015 – Dec. 2015:** Lecturer (Contractual), Govt. Higher Secondary School Kreeri, Baramulla.

## Project Students Supervised:

**Project Title:** Properties of Graphs associated with Commutative Rings
[$9^{th}$ and $10^{th}$ Sem., Batch 2016] (Awarded in March 2022)

1. Ms. Syed Mohsina Geelani (Currently Govt. employee as Accounts Assistant)
2. Ms. Iffat Ashraf (Currently Lecturer at Higher Secondary Shopian)
3. Mr. Shahid Nazir Magray

**Project Title:** Structural Properties of Graphs, their Applications and associated with Group Action
[$9^{th}$ and $10^{th}$ Sem. Batch 2018] (Awarded in January 2024)

1. Ms. Hujjat Ul Haq
2. Ms. Insha Chowdary
3. Mr. Maajid Ahmad Kumar
4. Mr. Zahid Ahmad Sheergojri

**Project Title:** Groups and Graphs (Supervising) [$9^{th}$ and $10^{th}$ Sem. Batch 2019]

1. Ms. Mehak Shafi
2. Ms. Munaza Manzoor
3. Ms. Nadiya Yousuf

4. Ms. Nausheen Shafia

**Project Title:** Algebraic Number Theory (**Supervising currently**) [M.Sc 3rd Sem. Batch 2022]

1. Mr. Aarif Gulzar
2. Ms. Aasiya Ruksar
3. Ms. Gulshan Bano
4. Mr. M. Ramzan

## Research Schools /Invitations/Conferences/Participations/Workshops/Contributed Talks:

### International:

i. Research School on Finite Geometry and Coding Theory, **Sangaredy, IIT Hyderabad, India** from 20/11 -1/12, 2023.
ii. Research School on Recent Advances in Combinatorics and its Application, **COMSATS, Lahore Pakistan** from 1st -11th Nov, 2022.
iii. Research School on Graph Theory and Interactions at **Beirut (Lebanon),** from June 6 - 15, 2022.
iv. Research School on Algebraic and Combinatorial Methods in Geometry at **LUMS** Lahore, **Pakistan** from 1-12 March, 2022.
v. Lebanese-International Conference on Mathematics and Applications, **LICMA'19, Beirut, Lebanon** from 15-18 April, 2019.
vi. Research School on "Combinatorial Commutative Algebra" at **COMSATS** Lahore**, Pakistan** from 5 -14 March, 2018.
vii. Research School on "Topics in Ring Theory" at **Muizenberg (South Africa)** from 16-28 July, 2018.
viii. Research School on "Commutative Algebra with Applications to Statistics and Coding Theory" at **Zacatecas Mexico** from June 25 – 06 July, 2018.
ix. Research School on "Quasi-Cyclic and Related Algebraic Codes" at **Ankara Turkey** from Aug. 27 – 07 Sept., 2018.
x. Participation and Presentation in the **First Research School** on Algebra, Combinatorics and Geometry of Monomial Ideals at IASBS **Zanjan Iran** from 5 – 17th Aug. 2017.

### National Level:

i. **Pedagogical Training Programme for Mathematics Teachers (PTMT)** organized under the aegis of MTTS Trust in Collaboration with Higher Education Deptt. **JKIMS,** J&K, 17-18, Aug. 23
ii. **Contributed Talk** in National Conference at Central University of Kashmir, 23 Dec. 2022.
iii. **International Conference** on Mathematics and its Applications at Baba Ghulam Shah Badshah University, Jammu India, 30 – 31 March, 2022.
iv. National Mathematics **Ramanajun Day** at University of Kashmir, Srinagar India, 23 Dec., 2021.
v. **National Mathematics Day** at Central University of Kashmir, India, 22 December, 2021.
vi. Best presentation award in **International Conference** in Applied Sciences, National Institute of Technology, Srinagar India**,** June 22-23, 2019.
vii. **3-day National Level Workshop** on Algebra and Analysis at Central University of Kashmir, India from 18 - 20 June, 2019.
viii. Presentation in 13th Session **J&K Science Congress** at University of Kashmir, 2nd - 4th April, 2018.
ix. **2-Day National Level Workshop** on "Geometrical Interpretation of Mathematical Concepts" by Kashmir Mathematical Society (KMS) at University of Kashmir, 28 – 29th Aug, 2018.
x. Presentation in **International Conference** on Mechanical Engineering and Allied sciences at Mata Vishnu Devi University, Jammu India from 14 – 15th Sep, 2018.
xi. Presentation in Instructional School for Teachers, **ATM School** ( **TIFR** and **IIT Bombay**) on **Algebraic Graph Theory** at Banasthali Vidyapith, Rajasthan from 22 Oct – 3rd Nov, 2018.
xii. 3-day workshop on **Research methodology** at University of Kashmir, Srinagar, June 2017.
xiii. Presentation in **National Conference** on "Recent Trends in Pure and Applied Mathematics, at Department of Mathematics, University of Kashmir and KMS, 19 Dec. 2019.

xiv. **1-Day Workshop** at Kashmir Institute of Mathematical Sciences by KMS on 22nd Dec. 2017.
xv. **International Conference** on Algebra,Differential Geometry and Analysis at Jamia Millia Islamia University, India from 15 – 17th Nov, 2016.

## Online webinars/ Workshops/E-Conferences:

i. TechSaksham Faculty Development Program on ***AI Evolution: From Foundations to Generative AI,*** Jan 22 – 27, 2024 by Edunet Foundation.
ii. Workshop on***,*** *Advances in Ring Theory and Applications 2023* ***(ARTA23), Beijing Insitute of Technology, Beijing, China, 25 – 26 October, 2023.***
iii. *Algebra Seminar*, Algebra Research Group institute Tecknologi **Bandung**, 11-12 Aug. 2021.
iv. Workshop on "*Art of Being an Effective Researcher*", **National Institute of Technology** (NIT) **Srinagar, India**, March 2021.
v. International E-conference on "*Mathematics and its Applications*", **Bangladesh**, April 2021.
vi. Guest Lecture on "*Infinite-Dimensional Geometry with symmetry*" at **LUMS Lahore Pakistan,** March 2021.
vii. *J. Conway Spirited Seminar series* on "a prelude to commutative Algebra and its applications, **LUMS Lahore Pakistan**,March 2021.
viii. Ahmad Erfanian Lectures on "Group *Theory and its applications in Graph Theory and Probability***, UTM Iran**, Jan 2021.
ix. *Mathematica development programme*", **University of Delhi, India,** Aug. 2020.
x. *Discussion with Dr. Kumar Krishen about Serving NASA* for 54 years**, AIAA Houston USA,** April 2020.

## Ph.D Research Work:

My research focuses on the study of algebraic properties within the domains of commutative rings, semigroups, group action, number theory and the graphs associated to their structures which belong to the theory of algebraic combinatorics. A significant portion of research work is dedicated to investigating the structural properties and algebraic attributes of the zero-divisor graph determined by annihilator ideals of commutative rings as well as pre-existing zero-divisor graph associated with commutative rings. Our efforts focused on characterizing various aspects of these graph structures, leading to the development of a combinatorial and geometric description. We established that, under some conditions, a family of these graphs can be classified as zero-divisor graph of semigroups. Additionally, we worked on regular group action in rings, addressing a pivotal question posed by J. Han in 2010 regarding the orbit and annihilator of an element under regular action.
Later in the research area of spectral graph theory, our exploration extended to the study of Laplacian eigenvalues of commuting graphs of dihedral and dicyclic groups, and studied Randi'c spectrum of zero-divisor graphs of commutative rings. Most recently, our focus has shifted to the power graphs of finite groups. We characterized specific power graphs and established a fundamental decomposition theorem for graphs of finite fields, yielding many interesting results. We focused on the density and planarity of a power graph, and gave an open problem which is about the relationship between density of the multiplicative graph and the density of the additive graph in which extensively number theory is used.
In addition to these research pursuits, my active participation in research schools and collaborations has encouraged me to broaden the scope of my research in the field of algebraic geometry and coding theory. These two research areas have motivated me to explore connections and insights to advance my research objectives.

## PUBLICATIONS/COMMUNICATIONS

1. **M. Imran Bhat** and H. R Bhapkar, Zero-divisor graph of semigroups and exact compact graphs, *Communicated.*
2. **M. Imran Bhat** and H. R Bhapkar, A New Algorithm for Minimal Spanning Trees, *Communicated.*
3. **M. Imran Bhat** and A. Erfanian, On power graph associated with additive group and multiplicative group of a finite field, *Communicated.*
4. Eman S. Almotairi, **M. Imran Bhat**,and Ahmad M. Alghamdi, Group action on the set of non-units in rings, *Journal of Mathematics, 2023, https://doi.org/10.1155/2023/9711759.*
5. **M. Imran Bhat,** N. Hosseinzadeh and Ahmad M. Alghamdi, Some properties of zero-divisor graph of annihilators of a commutative ring, *Rendicontidel Seminario Matematico, 80 - 2 (2022), 5-12.*
6. **M. Imran Bhat** and S. Pirzada, On graphs associated to ring of Gaussian integers and ring of integers modulo n, Acta Univ. Sapientiae Informatica 14,1 (2022) 75 – 83.
7. S. Pirzada, Bilal A. Rather, R. Shaban and **M. Imran Bhat**, On distance Laplacian(signless) eigenvalues of commutating graphs of dihedral and dicyclic groups. *Book Chapter in* Algebra and Related Topics with Applications, *Springer 2022.*
8. Bilal A. Rather, S. Pirzada and **M. Imran Bhat,** On Randi'c spectrum of zero divisor graphs of Commutative ring Zn, *Communications in Combinatorics and Optimization, 2021.*
9. S. Pirzada, M. Aijaz and **M. Imran Bhat,** On zero-divisor graphs of the rings $Z_n$, *Afrika Matematika* 31(2) 2020, 1-11.
10. **M. Imran Bhat,** S.Pirzada and Ahmad M. Alghamdi**,** On planarity of compressed zero-divisor graphs associated to commutative rings, *Creat. Math. Inform.* 29(2) (2020), 131-136.
11. **M. Imran Bhat** and S. Pirzada**,** On strong metric dimension of zero-divisor graphs of rings, *Korean J. Math.* 27(3) 2019, pp. 563-580.
12. S. Pirzada and **M. Imran Bhat,** Computing metric dimension of compressed zero-divisor graphs associated to rings, *Acta Univ. Sapientiae Mathematica,* 10(2) 2018, 298-318.

## Books Published:

1. **Matrix Algebra**: M. Imran Bhat and Khalid Nazir, New Delhi Publishers, (2021) ISBN**:** 978-93-92513-00-8
2. **Theory of Matrices**: B. A Zargar and M. Imran Bhat, Manuscript Distance Education University of Kashmir.

## Reviewer of Articles:

1. Korean Journal of Mathematics.
2. Communications in Algebra.
3. Bulletin of Malaysian Mathematical Society.
4. Graphs and Combinatorics.

## Membership:

1. Indian Mathematical Society.
2. Ramanajun Mathematical Society.
3. Kashmir Mathematical Society.

## Computer Proficiency:

- **Operating Systems:** WINDOWS XP, 7, 8 & 10.
- **Software Packages:** LaTeX (WinEdt, Texstudio, Texword), and Microsoft Office

## List of referees:

1. Dr. S. Pirzada

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Former Dean School of Physical and Mathematical Sciences
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2. Dr. Ahmad Erfanian

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3. Dr. Ahmad M. Alghamdi

Professor Department of Mathematical Sciences
Umm Al-Qura University
Makkah Saudi Arabia
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4. Dr. Sudhir Ghorpade

Professor Department of Mathematics,
IIT Bombay, Mumbai, India
Email: srg@math.iit.ac.in

5. Dr. Imran Anwar

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SBA School of Science and Engineering
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