Pavinder Singh

CONTACT INFORMATION

Department of Mathematics
Central University of Jammu
Rahya-Suchani(Bagla)
Samba-181143, (J&K), INDIA

Mob.: +91 9419254867
E-mail: pavinders@gmail.com
Web: www.cujammu.ac.in

RESEARCH INTERESTS

Numerical invariants encoded in minimal graded free resolution of homogenous ideals in a polynomial ring, namely, Hilbet Function, Graded Betti numbers, projective dimension, regularity, etc.

EDUCATION

University of Jammu, Jammu, INDIA
Department of Mathematics

Ph.D., Mathematics (submitted in June, 2008), September 2009.

- Thesis title: " Homological Methods in Commutative Algebra"
- Advisor: Chanchal Kumar

M.Phil Mathematics, August 2003

M.Sc. Mathematics, January 2001

Govt. MAM College, Jammu, J & K, INDIA

B.Sc., July, 1998

CURRENT POSITION

- Assistant Professor, Department of Mathematics, Central University of Jammu, Jammu, India from July 01, 2013 – till date.

ACADEMIC EXPERIENCE

- Assistant Professor(on contract), Department of Mathematics, Central University of Jammu, Jammu, India from October 10, 2011 – June 30, 2013.
- **Visiting faculty** at **Indian Institute of Science Education and Research Bhopal** (a premier Research and Teaching Institute) in India from September 16, 2010 - October 07, 2011.
- **Postdoctral fellow** at **Harish-Chandra Research Institute, Allahabad, India**(a premier Research Institute) from September 01, 2008 - September 15, 2010.

HONORS, AWARDS AND FELLOWSHIPS

- **NBHM Postdoctoral Fellowship**, Department of Atomic Energy, Govt. of India, 2010.
- **Research Associate Fellowship**, Indian Institute of Science Education and Research Mohali, 2010.
- Foreign Travel Grant, Harish-Chandra Research Institute, Allahabad to attend the **International School on Combinatorics** at **University of Sevilla, Spain**.
- **Postdoctoral Fellow, Harish-Chandra Research Institute, Allahabad**.
- ICTP Travel Grant, May, 2004 from **The Abdus Salam International Centre for Theoretical Physics, Italy**.

- **CSIR Senior Research Fellowship**, Govt. of India, 2005-08,(during Ph. D)
- **CSIR Junior Research Fellowship**,Govt. of India, 2003-05,(during Ph. D)
- Qualified **CSIR-UGC JRF-NET examination** conducted by CSIR (**among the top 20% JRF awardees on the basis of merit**)
- University Merit Research Fellowship, 2001. (during M.Phil).

Research Articles in Journals

- Graded Betti Numbers of some Split Hypergraphs, *Rocky Mountain Journal of Mathematics* (accepted) (jointly with Sonica Anand and Richa Vats)
- On some homological invariants of edge ideals of Mongolian tent graphs, *Algebra Colloquium*(accepted)(jointly with Sonica Anand and Richa Vats)
- Some Homological properties of edge rings of Diamong Snake graphs, *Indian Journal of Pure and Applied Mathematics*, 2023 (10 pages) https://doi.org/10.1007/s13226-023-00479-y (jointly with Richa Vats and Rohit Verma)
- Certain Homological invariants of Bipartite Kneser graphs, *Journal of Algebra and its Applications*, **21**(10), 2022 (18 pages) https://doi.org/10.1142/S0219498822502061 (jointly with A. Kumar and R. Verma)
- On Graded Betti numbers of edge rings of deficient complete bipartite graphs, *Communications in Algebra*, **49**(3), 1186-1194, 2021. DOI: 10.1080/00927872.2020.1831004 (jointly with S. A. Rather and R. Verma)
- On Betti numbers in the linear strand and regularity of triangular graphs, *Proc. Indian. Acad. Sci.*(*Math. Sci.*), **130**(1), 2020. DOI: 10.1007/s12044-020-00567-7 (jointly with S. A. Rather and R. Verma)
- Betti numbers of edge ideals of some split graphs, *Communications in Algebra*, **48**(12), 5026-5037, 2020. DOI:10.1080/00927872.2020.1777559 (jointly with R. Verma).
- On minimal free resolution of edge ideals of multipartite crown graphs, *Communications in Algebra*, **48**(3), 1314-1326, 2020. DOI: 10.1080/00927872.2019.1684505 (jointly with S. A. Rather).
- Graded Betti numbers of crown edge ideals, *Communications in Algebra*, **47**(4), 1690-1698, 2019. (jointly with S. A. Rather)
- On Betti numbers of edge ideals of crown graphs, *Beitrage Zur Algebra und Geometrie/ Contributions to Algebra and Geometry*, **60**(1), 123-136, 2019. (jointly with S. A. Rather)
- Composition Operators in Bloch Spaces of Slice Hperholomorphic functions, *Advances in Applied Clifford Algebras*, **27**(2),1459-1477, 2017. (jointly with Sanjay Kumar & Khalid Manzoor)
- Deficiently Extremal Gorenstein algebras, *Proc. Indian. Acad. Sci.*(*Math. Sci.*), **121**(3), 259-265, 2011.
- Counting formula for 3×3 generalized magic squares, *Resonance - Jounal of Science Education*, **15**(8), 733-736, 2010. (jointly with C. Kumar & A. Kumar).
- Deficiently Extremal Cohen-Macaulay algebras, *Proc. Indian. Acad. Sci.* (*Math. Sci.*), **120**(2), 163-168, 2010. (jointly with C. Kumar).

- Nearly Extremal Cohen-Macaulay and Gorenstein algebras, *Bull. Austral. Math. Soc.*, **75**(2), 211-220, 2007. (jointly with C. Kumar & A. Kumar).

Books Published

- Lectures on Symmetries, Narosa Publishing House, New Delhi, 2020. (jointly with Ajay Kumar)

Referee/ Reviewer

- Reviewer of Mathematical Reviews Database(MathSciNet), A division of American Mathematical Society.

Schools/ Workshops/ attended

- *School and Workshop on Hyperplane arrangements and related topics*, **University of Pau, France**, 11-15 June, 2011.
- *International School on Combinatorics*, **University of Sevilla, Spain**, 25-30 January 2010.
- *School on Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics*, **The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy**, 24 May-11 June, 2004.
- Discussion meeting on *Finite Fields and Coding Theory*, **Harish-Chandra Research Institute, Allahabad**, 2-14 November, 2009
- ATM Workshop in *Commutative Algebra and Algebraic Geometry*, **IIT Madras** funded by National Board for Higher Mathematics, DAE, Govt. of India, 10-23 June 2007.
- ATM *Workshop in Algebraic Topology*, **Institute of Mathematical Sciences, Chennai** funded by National Board for Higher Mathematics, DAE, Govt. of India, 4-9 June 2007.
- **ATM Advanced Instructional School in Differential Geometry and Lie Groups**, Bhaskaracharya Pratishthana and University of Pune, Pune, funded by **National Board for Higher Mathematics, DAE, Govt. of India**, 1-28 December, 2006.
- ATM Advanced *Instructional School in Commutative Algebra and Algebraic Geometry*, **IIT Bombay** funded by National Board for Higher Mathematics, DAE, Govt. of India, 4-30 July 2005.
- ATM *Annual Foundation School* II, **Harish-Chandra Research Institute, Allahabad** funded by National Board for Higher Mathematics, DAE, Govt. of India, 3-30 December, 2004.
- International workshop on *Computational Algebraic Geometry*, **Harish-Chandra Research Institute, Allahabad**, 8-13 December, 2003.
- Workshop on *Computational Aspects of Commutative Algebra and Algebraic Geometry*, **Harish-Chandra Research Institute, Allahabad**, January 2003.

Workshops Organised

- Workshop in Computational Mathematics on "SageMath - An Open Source Mathematics Software" held in the Department of Mathematics, Central University of Jammu during March 25-26, 2016.
- Science Academies' Lecture Workshop on "Algebra and Geometry" held in Department of Mathematics, Central University of Jammu during March 24-25, 2017 and funded by IASc. Bangalore, INSA New Delhi, NASI Allahabad.

Orientation/ Refresher Courses attended

- Attended a Refresher Course in Mathematical Sciences organised by UGC Human Resource Development Centre, University of Jammu from January 04 - 17, 2021.
- Attended a Refresher Course in Mathematical Sciences organised by UGC Human Resource Development Centre, University of Jammu from 8 - 29 December, 2015.
- Attended a General Orientation Course organised by UGC Academic Staff College, University of Jammu from 17 June - 14 July, 2014.

Paper presented/ Invited Talks

- Delivered an invited talk "Deficiently extremal Gorestein algebras" in 24th Annual Conference of Jammu Mathematical Society and A national Seminar On Topological Algebraic Analysis, 14-16 March, 2015 at Department of Mathematics, University of Jammu, Jammu.
- Delivered an invited talk "On minimal graded free resolutions of Gorestein algebras" in 2nd National Conference in Mathematics on Recent Trends in Algebra and Analysis, 25-26 March, 2015 at Govt. Gandhi Memorial Science College, Jammu.
- Delivered a series of invited talks in an **Instructional School on Group Theory and Linear Algebra** Funded by **National Board for Higher Mathematics, DAE, Govt. of India** at Central University of Jharkhand, Dec. 23, 2013 - Jan. 06,2014.
- Betti numbers and multiplicity of homogeneous Gorenstein algebras; Seminar, 22th Annual conference of Jammu Mathematical Society, 26-28 February, 2012.
- Betti numbers and multiplicity of nearly extremal Cohen-Macaulay and Gorenstein algebras; Seminar, **IIT Gandhinagar**, September 15-16, 2011.
- Nearly Extremal Cohen-Macaulay and Gorenstein algebras; Seminar, **Indian Institute of Science Education and Research Bhopal**, July 28, 2010.
- Deficiently Extremal Cohen-Macaulay algebras; 20th Annual conference of Jammu Mathematical Society, 26-28 February, 2010.
- Nearly Extremal Cohen-Macaulay and Gorenstein algebras; Seminars and Colloquia, **Harish-Chandra Research Institute, Allahabad**, December, 2009.

Member of Academic Bodies

- Board of Studies, Department of Mathematics, Central Unversity of Jammu
- School Board, School of Basic and Applied Sciences, Central University of Jammu
- Academic Council, Central University of Jammu

Conferences attended

- **International Congress of Mathematicians 2010**, Hyderabad, August 19-27, 2010.
- Harish-Chandra Research Institute International Conference of Mathematics (HRI-ICM), March 7-8 and 16-20, 2009.

Institutions visited for academic works

- Harish-Chandra Research Institute, Allahabad in June 2002 for a period of two weeks.
- Tata Institute of Fundamental Research, Mumbai in October 2003 for a period of one month.
- Harish-Chandra Research Institute, Allahabad in August 2004 for a period of three weeks.

Teaching

Teaching Philosophy

My teaching philosophy is strongly influenced by the good teachers I have learnt from. During lecture I feel the environment should be friendly and questions should be encouraged. Every lecture should begin with the motivation for the results to be discussed by means of an example and then the formal proof should be presented with all the details. The lecture should end with a brief summary. Every lecture should be complimented with a set of exercises to enhance the understanding. I feel that from a course every student should take back something and most of them should be interested to know more. I feel that the lectures should be enjoyable to the teacher and students.

Apart from my formal training, I have learnt good amount of Mathematics from the Advanced Training Schools and Workshops in Mathematics funded by NBHM and various other Schools/Workshops which I have attended. I am very passionate about teaching. I would like to teach a variety of courses in Mathematics at both undergraduate and post graduate level like Linear Algebra, Group Theory, Commutative Algebra, Homological Algebra, Real Analysis, Complex Analysis, Topology, Calculus, Graph Theory, Combinatorics, etc.

Teaching at Department of Mathematics, University of Jammu, Jammu

- "Homological Algebra" to the students of M.Sc 3rd Semester.
- "Point Set Topology" to the students of M.Sc 2nd Semester.

Courses taught at Indian Institute of Science Education and Research, Bhopal:

- MTH-308 Combinatorics and Graph theory
- MTH-102 Linear Algebra
- MTH-101 Calculus of one variable

Teaching at ATM Schools, funded by National Board for Higher Mathematics, Department of Atomic Energy, Govt. of India

I have an opportunity to work as a **Teaching Associate** in:

- **ATM Advanced Instructional School in Commutative Algebra**, May 14-June 3, 2009 held at IIT Bombay funded by National Board for Higher Mathematics, DAE, Govt. of India.
- **ATM Annual Foundation School** II, June 8-July 4, 2009 held at Bhaskaracharya Pratishthana, Pune funded by National Board for Higher Mathematics, DAE, Govt. of India.

Courses taught at Department of Mathematics, Central University of Jammu, Jammu

- Discrete Mathematics
- Ordinary differential equations with applications
- Real Analysis
- Topology
- Moderen Algebra with applications
- Finite Fields and Coding theory
- Linear Algebra
- Galois Theory
- Cryptography
- Commutative Algebra
- Algebraic Topology

Administrative Experience

- Proctor(I/c), Central University of Jammu(28-08-2022 - till date).
- Co-ordinator, Department of Mathematics, Central University of Jammu, 10 August, 2017-
- Dean Student's Welfare, Central University of Jammu(03-08-2015 to 02-08-2016).
- Coordinator Students Affairs, 17 April, 2015 to 02 August, 2015.
- Assistant Proctor, Central University of Jammu

References

Prof. Jugal K. Verma
Department of Mathematics
IIT Bombay, Mumbai - 400 076, India
e-mail: jkv@math.iitb.ac.in
Tel: 91 22 2576 7478
Fax: 91 22 2572 3480

Dr. Chanchal Kumar
Department of Mathematics
IISER Mohali, Knowledge City
Sector 81, SAS Nagar, Manauli
Chandigarh - 140 306
e-mail: chanchal@iisermohali.ac.in
Tel: 0172 2790188
Fax: +91-172-2790188

Prof. B. Ramakrishnan
Harish-Chandra Research Institute
Chhatnag Road, Jhunsi
Allahabad-211 019, India
e-mail: ramki@mri.ernet.in
Tel: 0532-2274319, Fax: 0532-2567748

Prof. Manoj Kumar Keshari
Department of Mathematics
IIT Bombay, Mumbai- 400 076, India
e-mail: keshari@math.iitb.ac.in
Tel: 91 22 2576 7469
Fax: 91 22 2572 3480