

# Dharm Veer

## Curriculum Vitae

### Basic Information

Name Dharm Veer  
Occupation AARMS Post-Doctoral Fellow  
Institution Dalhousie University, Halifax, Canada  
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Homepage <https://cmidharm.github.io/>

### Research Interest

Commutative Algebra, and Combinatorics.

### Academic Positions

May 3, 2024 – **AARMS Postdoctoral fellow**, *Dalhousie University*, Halifax, Canada.  
till date  
November 25, **Postdoctoral fellow**, *Indian Institute of Technology Gandhinagar*, Gandhinagar, India.  
2022 – April,  
2024

### Education

2016 – 2023 **Ph.D. in Mathematics**, *Chennai Mathematical Institute*, Chennai, India,  
Thesis title : Homological Invariants of Hibi Rings and Polyominoes.  
Thesis advisor : Prof. Manoj Kummini.  
2014 – 2016 **Master of Science in Mathematics**, *Chennai Mathematical Institute*, Chennai, India.  
2011 – 2014 **Bachelor of Science (Honours) in Mathematics**, *Motilal Nehru College, University of Delhi*,  
New Delhi, India.  
2011 **12th CBSE Board Examination**, Jawahar Navodaya Vidyalaya, Faridabad, India.

### Publications/Pre-prints

#### Publications

- [1] Rizwan Jahangir and Dharm Veer. "On Cohen-Macaulay posets of dimension two and permutation graphs". *Bull. Malays. Math. Sci. Soc.* 48.4 (2025), Paper No. 133, 10.
- [2] Dharm Veer. "Green-Lazarsfeld property  $N_p$  for Segre product of Hibi rings". *To appear in Indian j. pure appl. math.* (2024).
- [3] P. V. Cheri, Deblina Dey, Akhil K, Nirmal Kotal, and Dharm Veer. "Cohen-Macaulay permutation graphs". *Math. Scand.* 130.3 (2024), pp. 419–431.
- [4] Carmelo Cisto, Francesco Navarra, and Dharm Veer. "Polyocollection ideals and primary decomposition of polyomino ideals". *J. Algebra* 641 (2024), pp. 498–529.

- [5] Dharm Veer. “On the linearity of the syzygies of Hibi rings”. *J. Algebra Appl.* 23.12 (2024), p. 2450208.
- [6] Manoj Kummini and Dharm Veer. “The  $h$ -polynomial and the rook polynomial of some polyominoes”. *Electron. J. Combin.* 30.2 (2023), P2.6.
- [7] Manoj Kummini and Dharm Veer. “The Charney-Davis conjecture for simple thin polyominoes”. *Commun. Algebra* 51.4 (2023), pp. 1654–1662.

## Submitted

- [1] Mitra Koley, Nirmal Kotal, and Dharm Veer. “Polyominoes and Knutson ideals”. *arXiv preprint arXiv:2411.16364* (2024).
- [2] Louis Bu, Sara Faridi, Iresha Madduwe Hewalage, Thiago Holleben, Hasan Mahmood, Dharm Veer, Kyle Wang, and Scott Wesley. “When are Morse resolutions polyhedral?”: *arXiv preprint arXiv:2505.08580* (2025).
- [3] Francesco Navarra, Ayesha Asloob Qureshi, and Dharm Veer. “ $t$ -Young complexes and squarefree powers of  $t$ -path ideals”. *arXiv preprint arXiv:2511.13477* (2025).

## In Preparation

- [1] Takayuki Hibi and Dharm Veer. “Polyomino algebras and Hibi rings”. (2025).
- [2] Dharm Veer. “Quadratic binomial ideals associated to certain combinatorial objects”. (2025).

## Research Talks and seminar presentations

- Free resolution of squarefree powers of simplicial trees, *SLMath Special Session on Combinatorial Aspects in Commutative Algebra*, Joint Mathematics Meetings (JMM) 2026, Washington, D.C, USA. January 2026.
- Binomial ideals associated to polycubes, *Commutative Algebra Session*, CMS Winter Meeting 2025, Toronto, Canada. December 2025.
- Delivered two lectures on *Characteristic-dependent Betti numbers of monomial ideals and their powers*, Commutative Algebra Seminar, Dalhousie University, Halifax. October, 2024.
- Delivered two lectures on *Characteristic-dependent Betti numbers of monomial ideals and their powers*, Commutative Algebra Seminar, Dalhousie University, Halifax. October, 2024.
- Delivered two lectures on *Grothendieck Quot Scheme and Dimension estimates*, Graduate Seminar series on Moduli space of sheaves, IIT Gandhinagar, Gandhinagar. August-September, 2023.
- On EL-shellable posets, *Workshop on Cohen Macaulay simplicial complexes in graph theory*, Chennai Mathematical Institute, Chennai, India. July, 2023.
- On Cohen-Macaulay posets of dimension 2 and permutation graphs, GANIT Seminar, IIT Gandhinagar, India. March 2023.
- On Cohen-Macaulay posets of dimension 2 and permutation graphs, Conference on Commutative Algebra and Algebraic Geometry, IIT Hyderabad, India. February 2023.
- Polyominoes and polyomino ideals, Graduate Seminar, IIT Gandhinagar, India. January 2023.
- On the  $h$ -polynomial and the rook polynomial of some polyominoes, EMS Summer School on Combinatorial Commutative Algebra, Gebze Technical University, Istanbul, Turkey. August 2022.
- On Green-Lazarsfeld property  $N_p$  for Hibi rings, Virtual Commutative Algebra Seminars, IIT Bombay, Mumbai. March 2022. Video. Notes.
- On Green-Lazarsfeld property  $N_p$  for Hibi rings, National symposium on mathematics and applications, IIT Madras, Chennai. December 2021.
- On Green-Lazarsfeld property  $N_p$  for Hibi rings, 4<sup>th</sup> BRICS Mathematics Conference, IISER Tiruvananthapuram, Kerala. December 2021. Video.

- On Green-Lazarsfeld property  $N_p$  for Hibi rings, Research Seminar, CMI, Chennai. September, 2021.
- On  $h$ -Polynomials of Hibi rings, online talk in webinar Series: CATGT. August 2020. Video.
- Delivered three lectures on *Positive Characteristic Commutative Algebra*, Commutative Algebra Seminar, CMI, Chennai. January, 2020.
- Delivered two lectures on *Tate resolutions*, Commutative Algebra Seminar, CMI, Chennai. November, 2019.
- On  $h$ -Polynomials of Hibi rings, Research Seminar, CMI, Chennai. September, 2019.
- Delivered three lectures on *Homological Invariants of Modules*, Commutative Algebra Seminar, CMI, Chennai. April, 2019. Based on Prof. Srikanth Iyengar's lectures.
- Absolute Integral Closure In Positive Characteristic, Mates PhD Research Seminar, CMI, Chennai. March, 2017.

## Teaching

- MATH 2505: Introductory Real Analysis. Dalhousie University, Canada. January-April, 2025.

## Teaching Assistantships

- MA104: Ordinary Differential Equations. IIT Gandhinagar, India. January-February, 2024.  
Course Instructor : Prof. Jagmohan Tyagi.
- MA103: Calculus of Single Variable and Linear Algebra. IIT Gandhinagar, India. August-November, 2023.  
Course Instructor : Prof. Projesh Nath Choudhury.
- Computational Commutative Algebra, NPTEL Online course. July-November, 2022.  
Course Instructor : Prof. Manoj Kummini.
- Computational Commutative Algebra, NPTEL Online course. July-November, 2021.  
Course Instructor : Prof. Manoj Kummini.
- Computational Commutative Algebra, NPTEL Online course. September-December, 2020.  
Course Instructor : Prof. Manoj Kummini.
- Algebra I, Chennai Mathematical Institute, Chennai, India. August-November, 2019.  
Course Instructor : Prof. Purusottam Rath.
- Madhava Mathematics Competition Nurture Camp, *Invariant theory of finite groups*, CMI, Chennai, India. June 2019.  
Course Instructor : Prof. Manoj Kummini.
- Homological algebra, Chennai Mathematical Institute, Chennai, India. January-April, 2019.  
Course Instructor : Prof. Kumari Saloni.

## Research Visits

- University of Genoa, Genoa, Italy. June, 2025.  
Host : Prof. Also Conca.
- Sabancı University, Tuzla, Turkey. May, 2025.  
Host : Prof. Ayesha Asloob Qureshi.
- Max Planck Institute for Mathematics, Bonn, Germany. Nov - Dec, 2023.
- Sabancı University, Tuzla, Turkey. August, 2022.  
Host : Prof. Ayesha Asloob Qureshi.

## Internships

- May 22 – August 6, 2016 **Summer Fellow**, Centre for Excellence in Basic Sciences (CBS), Mumbai, India, Supervisor : Prof. Balwant Singh.
- May 3 – June 2, 2015 **Summer Fellow**, Centre for Excellence in Basic Sciences (CBS), Mumbai, India, Supervisor : Prof. Balwant Singh.

## Participation in Workshops/Conferences

- Conference on Homological Commutative Algebra and Related Topics, Georgia Southern University, Savannah, USA. August, 2025.
- Modules and Rings: Recent Developments in Commutative Algebra, a conference in honor of Marilina Rossi, University of Genova, Genova, Italy. June, 2025.
- Workshop on *Weak and Strong Lefschetz Properties across Mathematics*, Sophus Lie Conference Center, Nordfjordeid, Norway. June, 2025.
- Conference on *Combinatorial Algebra Meets Algebraic Combinatorics (CAAC)*, The Fields Institute, Toronto, Canada. January, 2025.
- Apprenticeship Program in Commutative Algebra, The Fields Institute, Toronto, Canada. January, 2025.
- Workshop on *Cohen Macaulay simplicial complexes in graph theory*, Chennai Mathematical Institute, Chennai, India. July, 2023.
- Conference on Commutative Algebra and its interaction with Algebraic Geometry and Combinatorics, VIASM Hanoi, Vietnam. June 2023.
- AIS School on *Topics in Birational Geometry*, Chennai Mathematical Institute, Chennai, India. May-June, 2023.
- Conference on Commutative Algebra and Algebraic Geometry, IIT Hyderabad, India. February 2023.
- EMS Summer School on Combinatorial Commutative Algebra, Gebze Technical University, Istanbul, Turkey. August, 2022.
- A Conference on Topics in Algebraic Geometry and Commutative Algebra, SRM University-AP, Andhra Pradesh, India. July, 2022.
- NCM Workshop on *maximal Cohen-Macaulay Modules*, Chennai Mathematical Institute, Chennai, India. July, 2022.
- 4<sup>th</sup> BRICS Mathematics Conference, IISER Tiruvananthapuram, Kerala, India. December, 2021.
- AIS School on *advanced commutative algebra*, IIT Kharagpur, India. December, 2019.
- Workshop on Hochschild Homology, Chennai Mathematical Institute, Chennai, India. July, 2019.
- NCM Workshop *commutative algebra and algebraic geometry in positive characteristics*, IIT Bombay, Mumbai, India. December, 2018.
- Projective Modules, IIT Bombay, Mumbai, India. May-June, 2018.
- AIS School on *Gröbner Bases and their Applications*, IIIT Delhi, New Delhi, India. December, 2017.
- ATM Workshop on *positive Characteristic Methods in Commutative Algebra*, IIT Bombay, Mumbai, India. June, 2017.
- Workshop on Seshadri constants, Chennai Mathematical Institute, Chennai, India. February, 2017.

- AIS School on commutative Algebra, Chennai Mathematical Institute, Chennai, India. December, 2015.

## Awards and Achievements

- May 3, 2024 – **AARMS Postdoctoral fellowship.**  
till date Awarded by AARMS, Canada.
- August, 2018 – **Senior Research Fellowship.**  
November, 2022 Awarded by Chennai Mathematical Institute, Chennai, India.
- August, 2016 – **Junior Research Fellowship.**  
July, 2018 Awarded by Chennai Mathematical Institute, Chennai, India.
- August, 2014 – **Postgraduate Scholarship.**  
April, 2016 Awarded by Chennai Mathematical Institute, Chennai, India.
- 2016 **Selected for PhD in IISER Pune (didn't avail)..**
- 2016 **Qualified Graduate Aptitude Test in Engineering(GATE).**  
Conducted by Indian Institute of Technology (IIT).
- December 2015 **73rd Rank in CSIR-JRF Dec-2015 Mathematical Science test.**  
Conducted by CSIR-UGC for Junior Research Fellowship and eligibility for lectureship.
- December 2014 **44th Rank in CSIR-NET Dec-2014 Mathematical Science test.**  
Conducted by CSIR-UGC for eligibility for lectureship.
- 2014 **62nd Rank in IIT – JAM 2014 Mathematics subject test.**  
Conducted by Indian Institute of Technology (IIT) for Master's programme in Mathematics.
- 2004 – 2011 **Free Education and Accommodation From Class 6th to 12th.**  
Awarded by HRD Ministry of India on the Basis of Aptitude Test.

## Other Academic Activities

- **Co-organizer (with Graham Denham, Sara Faridi , Selvi Kara, and Hugh Thomas), of the Combinatorial Algebra meets Algebraic Combinatorics (CAAC) 2026 Conference,** at Dalhousie University, Halifax, Canada. 23 – 25 January 2026.
- **Organizer of Weekly Commutative Algebra Seminar,** at Dalhousie University, Halifax, Canada. Since October 2024.