

VITA

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Education

Ph. D. in Mathematics	Purdue University	Aug 2002
M. Sc. in Mathematics	IIT Bombay	May 1995
B. Sc. in Mathematics	CHM College, Ulhasnagar	May 1993

Thesis

Title: *Hilbert Functions of Cohen-Macaulay Modules*

Adviser: Luchezar L. Avramov

Research interests

Commutative Algebra

Employment

Professor	IIT Bombay	2015- till date
Associate Professor	IIT Bombay	2011- 2015
Assistant Professor	IIT Bombay	2005-2011
Visiting Professor	University of Kentucky	2008-2008
Sr. Lecturer	IIT Bombay	2003- 2005
Postdoctoral Fellow	TIFR Bombay	2002- 2003
Graduate Teaching Assistant	Purdue University	1995- 2002

Publications

[31] *A function on the the set of isomorphism classes in the stable category of maximal Cohen-Macaulay modules over a Gorenstein ring: with applications to Liason theory.*, *MATH. SCAND.* 120 (2017), 161–180

[30] *Relative Hilbert Coefficients* (jt with Mafi, Amir; Reddy, Rakesh B. T.; Saremi, Hero;) . *Glasg. Math. J.* [59\(2017\), no. 3](#), 729–741

[29] *On the Loewy length of modules of finite projective dimension.* *J. Commut. Algebra* [9 \(2017\), no. 2](#), 291–301.

- [28] Examples of non-commutative crepant resolutions of Cohen Macaulay normal domains. *J. Algebra* [485\(2017\)](#), 77–96.
- [27] Growth of Hilbert coefficients of syzygy modules. *J. Algebra* [482 \(2017\)](#), 131–158
- [26] *Ratliff-Rush filtration, regularity and depth of higher associated graded modules*. Part II. *J. Pure Appl. Algebra* [221 \(2017\), no. 3](#), 611–631.
- [25] *On associated graded modules having a pure resolution*. *Proc. Amer. Math. Soc.* [144 \(2016\), no. 10](#), 4107–4114.
- [24] *On the intersection of annihilator of the Valabrega-Valla module*. *Rend. Semin. Mat. Univ. Padova* [135 \(2016\)](#), 21–37.
- [23] *Asymptotic prime divisors over complete intersection rings*. (joint with Dipankar Ghosh) , *Math. Proc. Cambridge Philos. Soc.* [160 \(2016\), no. 3](#), 423–436. **Corrigendum** [163 \(2017\), no. 2](#), 381–384
- [22] *Associated primes of local cohomology modules over regular rings*. *Pacific J. Math.* [282 \(2016\), no. 1](#), 233–255.
- [21] Local cohomology modules of invariant rings. *Math. Proc. Camb. Phil. Soc*, Vol 160 (2016), no.2, 299-314.
- [20] *On two dimensional mixed characteristic rings of finite Cohen Macaulay type*. *Journal of Pure and applied algebra*. 220(2016), no. 1, 319-334.
- [19] *Local Cohomology of Multi-Rees Algebras with Applications to Joint Reductions and Complete Ideals*. (joint with S. K. Masuti and J. K. Verma). *Acta Mathematica Vietnamica* 40 (2015), no:3, 479-510.
- [18] *The dual Hilbert-Samuel function of a maximal Cohen-Macaulay module*. *Comm. Algebra* 43 (2015), no. 7, 2763-2784.
- [17] *De Rham cohomology of local cohomology modules: The graded case*. *Nagoya Math J.* 217(2015), 1-21.
- [16] On injective resolutions of local cohomology modules. *Illinois J. Math.* 58 (2014), no:3, 709-718
- [15] *The Hilbert function of a maximal Cohen-Macaulay module. Part II*. *J. Pure Appl. Algebra* [218 \(2014\), no. 12](#), 2218–2225.
- [14] *On the finite generation of a family of Ext modules*. *Pacific J. Math.* [266 \(2013\), no. 2](#), 367–389.
- [13] *Quasi-finite modules and asymptotic prime divisors*. (joint with D. Katz) *J. Algebra* [380 \(2013\)](#), 18–29.
- [12] *An elementary proof of Grothendieck's Non-Vanishing Theorem*. *Communications in Algebra* Vol 37, 2009, 2994-2996
- [11] *The Hilbert Coefficients of the fiber cone and the \mathfrak{S}_n -invariant of the associated graded ring*. (joint with C. D'Cruz) *Canad. J. Math*, Vol 61, 2009, p. 762-778

- [10] *Hilbert Polynomials and Powers of ideals* (joint with J. Herzog and J. K. Verma). Math. Proc. Camb. Phil. Soc, Vol 145, 2008, 623-642
- [9] *On the upper bound of the Multiplicity conjecture*. Proc. AMS, Vol 136, 2008, p. 3429-3434
- [8] *Ratliff-Rush Filtration, Regularity and depth of Higher Associated graded modules: Part I*. Journal of Pure and Applied Algebra, Volume 208, Issue 1, 2007, p. 159-176
- [7] *On fiber cones of \mathfrak{m} -primary ideals*. (with A.V. Jayanthan and J.K. Verma). Canad. J. Math. Vol 59, No 1, (2007), p. 109-126
- [6] *Ratliff-Rush Filtrations associated with ideals and modules in a Noetherian ring*. (joint with F. Zulfqarr), Journal of Algebra, Vol 311, 2007, p. 551--583.
- [5] *Hilbert-Samuel functions of modules over Cohen-Macaulay rings*. (with S.Iyengar), Proc. AMS, Vol 135 (2007) p. 637-648.
- [4] *A short note on the non-negativity of partial Euler characteristics*. Beitrage zur Algebra and Geometrie Vol. 46, No. 2, 2005, 559-560.
- [3] *Hilbert Function of a Maximal Cohen-Macaulay Module* , Math. Z, 2005, Volume 251, Pg. 551-573
- [2] *Invariance of a length associated to a reduction*. Comm.in Algebra Vol **33** (2005), P. 2039—2042.
- [1] *Hilbert functions of a Cohen-Macaulay Module*, Journal of Algebra, **264**, 2003, Pages 82-97.

Papers accepted for Publication

- [1] *Characterizations of regular local rings via syzygy modules of the residue field* (joint with Dipankar Ghosh, [Anjan Gupta](#)), Accepted for publication in Journal of Commutative algebra.
- [2] *A short proof of a result of Katz and West* (joint with Dipankar Ghosh), Accepted for publication in Journal of Commutative algebra.

Papers in Refereed Conference Proceedings

- [3] *de Rham cohomology of local cohomology modules*. *Algebra and its applications*, 159–181, [Springer Proc. Math. Stat.](#), **174**, Springer, Singapore, 2016.
- [2] *Analytic deviation one ideals and test modules*. *Commutative algebra and algebraic geometry (CAAG-2010)*, 89–99 (joint with G. Kadu), [Ramanujan Math. Soc. Lect. Notes Ser.](#), **17**, Ramanujan Math. Soc., Mysore, 2013
- [1] *An analogue of a theorem due to Levin and Vasconcelos*. (with J.Asodallahi), Contemp. Math. V 390, 9-16. 2005

Invited talks at conferences

20) *Graded components of local cohomology modules*, The Prospects for Commutative Algebra, Osaka, Japan, July 10-14, 2017

19) *Symmetries and Connected component of the AR-Quiver*, International Conference of the Indian Mathematics Consortium (TIMC) in cooperation with AMS, 14-17 December 2016, BHU

18) *Symmetries and Connected component of the AR-Quiver*, CAAG , Mohali, 2016

17) *Symmetries and Connected component of the AR-Quiver*, ICRA XVII, Syracuse University August 15-19, 2016.

16) *Associated primes of Local cohomology modules over Regular rings*. Spring Eastern Sectional AMS Meeting, Special Session on Algebra and Representation Theory (Code: SS 13A), Georgetown University, Washington, DC, March 7-8, 2015

15) *Associated primes of Local cohomology modules over Regular rings*. International Conference on Algebra and its Applications, Aligarh Muslim University, Aligarh, December 2014

14) *A function on the the set of isomorphism classes in the stable category of maximal Cohen-Macaulay modules over a Gorenstein ring: with applications to Liason theory*. Route 81 2013 , Syracuse University, October 19, 2013

13) *On the intersection of Annihilator of the Valabrega-Valla module*. Conference on Commutative algebra, Indian Institute of Science, Mumbai, 2013

12) *Bockstein cohomology of associated graded rings*, 27th annual meeting of RMS, 2012

11) *Monotonicity of Hilbert functions*, CAAG, Pondicherry 2012

10). *Quasi-finite modules and asymptotic prime divisors*, CAAG, Bangalore 2010

9). *Asymptotic Prime Divisors of Extension Functor over local complete intersection rings*. Commutative Algebra conference, Nebraska, May 2008

8). *Asymptotic Prime Divisors of Extension Functor over local complete intersection rings*. Workshop in Commutative Algebra, Essen, November 20, 2006.

7. *The Hilbert Coefficients of the fiber cone and the a -invariant of the associated graded ring*. CIMPA School on Commutative Algebra, Hanoi, Vietnam: Jan 3-6 2006

6). *On a filtration of the canonical module*. Sixth National meeting in Commutative Algebra and Algebraic Geometry, IMSc, Chennai , Aug1-6, 2005

5. *Depth of Higher Associated rings*. Nebraska Commutative Algebra Conference: Weigand Fest, May7-9, 2005
4. *The first Hilbert coefficient of the canonical module*. School on Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics, ICTP Italy, June 7- 11, 2004
- 3). *Resolutions of Modules over local rings*. Session for Young Researchers in Commutative Algebra and Algebraic Geometry, Indian Institute of Science, Bangalore, December 16, 2003
- 2). *Cohen-Macaulay modules of dimension two having generalized Cohen-Macaulay associated graded module*. International Conference on Commutative Algebra and Combinatorics, Harish-Chandra Research Institute, Allahabad, December 8-14, 2003
- 1). *Finite Homological dimensions and the associated graded module*, Fifth National meeting in Commutative Algebra and Algebraic Geometry, IIT Bombay, April 1-5, 2003.

Conference and Workshop Organization.

1. CIMPA workshop in Commutative Algebra held at IIT-Bombay from Jan2-6, 2008 and International Conference in Commutative Algebra held at IIT-Bombay from Jan8-11, 2008.

Grants and fellowships

BOYSCAST fellowship	DST, India	April-Nov 2008
DFG Grant	DFG, Germany	Nov-Dec 2006
IMU Travel Grant	IMU, USA	August 2006
CIMPA Travel Grant	CIMPA, France	Dec 2005
Faculty Development Fund	IIT-Bombay	May 2005
CIV Travel Grant	ICTP Italy	October 2004
ICTP Travel Grant.	ICTP Italy	May 2004
Seed Grant	IIT-Bombay	2003-2005
Purdue Research Foundation grants	Purdue University	Summers1998,2000
NBHM Scholarship	IIT Bombay	1993-1995

Awards

Silver Medal for best performance in M.Sc. Mathematics, IIT Bombay, 1995.

Professional activities

Reviewer for Math Reviews.

Refereed papers for *Journal of Algebra*, *Proceedings of the Indian Acad. Sci*, *Indian Journal of Pure and Applied Mathematics*, *Math. Z*, *Transaction of AMS*, *Illinois Math Journal* and *Communication in Algebra*.

Colloquia

[21] Gorenstein rings of finite representation type, IIT-Bombay, September 2016

[20] A sub-functor for Ext and Brauer-Thrall for associated graded modules, UNL, March

2015

- [19] *CM rings of finite representation type*, IIT-Bombay, August 2014
- [18] *A function on the the set of isomorphism classes in the stable category of maximal Cohen-Macaulay modules over a Gorenstein ring: with applications to Liason theory*, UNL, October 2013
- [17] *On the intersection of annihilators of the Valabrega-Valla module*, TIFR, March 2011
- [16] *Properties of Koszul homology modules*, UNL, October 2008
- [15] *Properties of Koszul homology modules*, University of Kansas, September 2008
- [14] *Gorenstein approximations, Dual filtrations and applications*, University of Kentucky, April 2008
- [13] *Depth of Higher associated graded rings*, Barcelona, Dec 1, 2006
- [12] *Gorenstein Approximations and Applications*, Oberseminar, Essen, Nov, 2006
- [11] *Asymptotic Prime Divisors of Extension Functor over local complete intersection rings*. October 06, IIT-Delhi

- [10] *On a filtration of the canonical module*. International Workshop on Commutative Algebra and Algebraic Geometry St. Joseph's College, Irinjalakuda, Kerala. June 23, 2005
- [9] *Asymptotic depth of the Fiber Cone*, Algebra Seminar, University of Suzhou, China October 27, 2004
- [8] *Cohen-Macaulay modules of dimension two having generalized Cohen-Macaulay associated graded module*. *Seminari di Algebra-Geometria*, University of Genoa, Italy, June 15, 2004.

- [7] *The Hilbert function of a maximal Cohen-Macaulay Module*, Commutative Algebra and Algebraic Geometry Seminar, IIT Bombay, Sept 27, 2002.

- [6] *The Hilbert of a maximal Cohen-Macaulay Module over a hypersurface ring*, Commutative Algebra Seminar, TIFR Bombay, Sept 24, 2002.

- [5] *Hilbert coefficients of a Cohen-Macaulay Module*, Commutative Algebra Seminar, TIFR Bombay, Sept 18, 2002.

- [4] *Hilbert coefficients of a Cohen-Macaulay Module*, Commutative Algebra Seminar, University of Nebraska, Lincoln, Jan 16, 2002.

- [3] *Hilbert coefficients of Syzygy of a maximal Cohen-Macaulay Module*, Commutative Algebra Seminar, Purdue University, November 6, 2001.

- [2] *Hilbert function of a Cohen-Macaulay local ring*, Commutative Algebra Seminar, Purdue University, April 5, 2000.

- [1] *When topologists become jewel thieves*, Graduate Student Seminar, Purdue University, Jan24, 2000.

Seminar series

- [11] *Topics in Galois Theory, 6 lectures*, Advanced Foundation School III, IISER-TVM, July 2016

- [10] Lectures in local cohomology and D-modules, ATMW Local Cohomology (2016)" which June 2016, St. Joseph College, Irinjalakuda, Kerala
- [9] Use of Non-commutative Ring theory in Commutative Algebra, IISER-TVM, August 2015
- [8] Lectures in Commutative Algebra Seminars, 2011, 2012, 2013, 2014, 2015, IIT-Bombay
- [7] *Lectures on Homological Algebra*. Oct-Nov 05. Feb-March 06, Oct-Nov 06, June 2010, July 2011, IIT-Bombay
- [6] *Gorenstein Rings, 6 lectures*, Advanced Instructional School in Commutative Algebra and Algebraic Geometry, IIT Bombay, July 6-31, 2005
- [5] *Finite free resolutions, 3 lectures*, Commutative Algebra Seminar, February 2005
- [4] *Topics in Galois Theory, 3 lectures*, Advanced Foundation School I, IIT Bombay, May 2004
- [3] *Projective and Injective Resolutions, 5 lectures*, October 2003
- [2] *Local Cohomology and Duality, 3 lectures*, University of Pune, July 7-12, 2003
- [1] *Buchsbaum-Rim multiplicity, 6 lectures*, Feb-April, 2003.

Courses taught at IIT Bombay

Graduate Courses

General Topology, Numerical Analysis
Algebra I, Algebra MA825, Algebra II
Basic Algebra, Algebra MA 812, 811

Undergraduate courses

Mathematics II
Numerical Analysis

Project Students

K.M. Sangeeta Maini, *Computing Hilbert functions of Modules using Singular and Cocoa*, Aug 2004-Jan 2005, funded by my Seed Grant.

MSc Project Students

Vaneet Sethi	2003-2004
Mousumi Mandal	2004-2005
Acushla Naraynan	2004-2005

Graduated Ph.D Students

Fahed Zulfequarr
Kadu Ganesh Shivajirao
Vivek Sadhu (co-guide)
Rakesh Reddy
Dipankar Ghosh

Current Ph.D Students

Sudeshna Roy
Provanjan Mallick
Ankit Mishra

Postdoctoral Students:

Jyoti Singh

Outreach activities

Organizer of a series of 2 lectures, one in Computer Science and another in Mathematics at TIFR April 29, 2003 for students from Smt. Chandibai Himathmal Mansukhani College, Ulhasnagar.