

# DEBADITYA RAYCHAUDHURY

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## EMPLOYMENT

University of Toronto <i>Postdoctoral Fellow</i>	Toronto, ON, Canada 2022 – 2023
The Fields Institute for Research in Mathematical Sciences <i>Simons Postdoctoral Fellow</i>	Toronto, ON, Canada 2021 – 2022

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## EDUCATION

University of Kansas <i>Ph.D. in Mathematics (Advisor: Prof. Purnaprajna Bangere)</i>	Lawrence, KS, USA 2015 – 2021
University of Kansas <i>M.A. in Mathematics</i>	Lawrence, KS, USA 2015 – 2016
Chennai Mathematical Institute <i>M.Sc. in Mathematics</i>	Chennai, TN, India 2013 – 2015
Chennai Mathematical Institute <i>B.Sc. (Hons.) in Mathematics and Computer Science</i>	Chennai, TN, India 2010 – 2013

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## RESEARCH INTERESTS

My research is focused on Algebraic Geometry. I am interested in problems on positivity of linear series and syzygies of projective varieties, ACM and Ulrich bundles on projective varieties, Fourier–Mukai transforms and generic vanishing theory, deformation theory and geometry of moduli spaces.

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## PUBLICATIONS AND PREPRINTS

- (1) ***On the projective normality and normal presentation on higher dimensional varieties with nef canonical bundle*** (with J. Mukherjee). *J. Algebra* **540** (2019), 121–155. [[journal](#)] [[arXiv](#)]
- (2) ***Remarks on projective normality for certain Calabi–Yau and hyperkähler varieties*** (with J. Mukherjee). *J. Pure Appl. Algebra* **224** (2020), no. 10, 106383, 19 pp. [[journal](#)] [[arXiv](#)]
- (3) ***K3 carpets on minimal rational surfaces and their smoothings*** (with P. Bangere, and J. Mukherjee). *Internat. J. Math.* **32** (2021), no. 6, 2150032, 20 pp. [[journal](#)] [[arXiv](#)]
- (4) ***Smoothing of multiple structures on embedded Enriques manifolds*** (with J. Mukherjee). *Math. Z.* **300** (2022), no. 2, 1241–1263. [[journal](#)] [[arXiv](#)]
- (5) ***A note on stability of syzygy bundles on Enriques and bielliptic surfaces*** (with J. Mukherjee). *Proc. Amer. Math. Soc.* **150** (2022), no. 9, 3715–3724. [[journal](#)] [[arXiv](#)]
- (6) ***Deformation of morphisms, varieties of low codimension and asymptotic limits*** (with P. Bangere, F. J. Gallego, and J. Mukherjee). *Submitted*. [[arXiv](#)]
- (7) ***Deformations and moduli of irregular canonical covers with  $K^2 = 4p_g - 8$***  (with P. Bangere, F. J. Gallego, and J. Mukherjee). *Submitted*. [[arXiv](#)]
- (8) ***Tautological families of cyclic covers of projective spaces*** (with P. Kundu, and J. Mukherjee). *Submitted*. [[arXiv](#)]
- (9) ***Koszul property of Ulrich bundles and rationality of moduli spaces of stable bundles on Del Pezzo surfaces*** (with P. Bangere, and J. Mukherjee). *Submitted*. [[arXiv](#)]

- (10) **Positivity of zero-regular bundles, continuous CM-regularity, and generic vanishing** with an appendix by A. Ito. *Preprint*. [arXiv]

## PRESENTATIONS

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### Research Talks

- *Algebra and Geometry Seminar*; Queen's University, Kingston, ON (*Upcoming*) Oct. 2022
- *Fields Number Theory Seminar*; Fields Institute, Toronto, ON (*Upcoming*) Oct. 2022
- *Fields Postdoc Colloquium*; Fields Institute, Toronto, ON Jan. 2022
- *Midwest Algebraic Geometry Graduate Conference* (Online lightning talk); Hosted by University of Illinois Chicago, Chicago, IL May. 2020
- *URiCA-KUMUNUJr*; University of Nebraska-Lincoln, Lincoln, NE (**cancelled**) Apr. 2020
- *Geometry Seminar*; University of Kansas, Lawrence, KS Nov. 2019
- *Midwest Algebraic Geometry Graduate Conference*; University of Illinois Chicago, Chicago, IL Mar. 2019
- *Geometry Seminar*; University of Kansas, Lawrence, KS Sep. 2018

### Poster Presentations

- *Algebraic Geometry in Roma Tre. A conference on the occasion of Sandro Verra's 70(+2)th birthday*; Università degli Studi Roma Tre, Rome, Italy Jun. 2022
- *Western Algebraic Geometry Symposium*; University of Utah, UT Nov. 2019
- *Southwest Local Algebra Meeting*; University of Arkansas, Fayetteville, AR Feb. 2018

## TEACHING EXPERIENCES

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### At the **University of Toronto**:

- *Instructor of record* for MAT 137 (Calculus with proofs) (*Upcoming*) Winter 2023

### At the **University of Kansas**:

- *Instructor of record* for MATH 127 (Calculus III) Summer 2018
- *Instructor of record* for MATH 126 (Calculus II) Summer 2019
- *Recitation instructor* for MATH 126 (Calculus II) Spring 2019, Fall 2020
- *Instructor of record* for MATH 125/197 (Calculus I Enhanced) Spring 2018, 2020, 2021 Fall 2019
- *Recitation instructor* for MATH 125 (Calculus I) Spring 2017, Fall 2017
- *Instructor of record* for MATH 115 (Applied Calculus I) Fall 2015, 2016, Spring 2016
- *Instructor of record* for MATH 104 (Precalculus) Fall 2018

## AWARDS AND HONORS

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- Simons Postdoctoral Fellowship (*Fields Institute*) 2021 – 2022
- Charles J. and Mary Pat Himmelberg Graduate Student Award (*University of Kansas*) 2020  
(Awarded annually to outstanding mathematics graduate students)
- Selected for MSRI summer graduate school on algebraic curves (**cancelled**) 2020  
*Hainan, China*
- Nominated for Florence Black Award for Excellence in Teaching 2018, 2019, 2021  
(*University of Kansas*) (An award limited to 5 nominees and 1 winner per year)
- U.G. Mitchell Graduate Summer Scholarship (*University of Kansas*) 2020, 2018
- Graduate Scholarship (*Chennai Mathematical Institute*) 2013 – 2015

- INSPIRE Scholarship for Higher Education (SHE) 2010 – 2013  
*Department of Science and Technology, Govt. of India*

#### OTHER CONFERENCES AND WORKSHOPS ATTENDED

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- $\text{Spec}(\overline{\mathbb{Q}})$ , *Fields Institute, Toronto, ON* Jul. 2022
- MPS Conference on Higher Dimensional Geometry Feb. 2022  
*(Fully funded invited participant, attended virtually)*
- I-70 Algebraic Geometry Symposium, *University of Missouri-St. Louis, St. Louis, MO* Oct. 2018
- Midwest Algebraic Geometry Graduate Conference (MAGGC 2018), May. 2018  
*University of Illinois at Chicago, Chicago, IL*
- I-70 Algebraic Geometry Symposium, *University of Kansas, Lawrence, KS* Nov. 2017
- Hodge Theory, Moduli and Representation Theory, *Stony Brook University, NY* Aug. 2017
- 42nd Annual Spring Lecture Series on Geometry, *University of Arkansas, Fayetteville, AR* Mar. 2017
- I-70 Algebraic Geometry Symposium, *University of Missouri, Columbia, MO* Nov. 2016
- KUMUNU 2016, *University of Kansas, Lawrence, KS* Oct. 2016
- KUMUNU 2015, *University of Missouri, Columbia, MO* Oct. 2015
- AIS (Advanced Instructional School) Schemes and Cohomology Dec. 2014  
*Kerala School of Mathematics, India*

#### PROFESSIONAL SERVICES

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- *Reviewer*; zbMATH 2020 – Present
- *Co-organizer*; Geometry Seminar, *University of Kansas* 2019 – 2021
- *Secretary*; Graduate Student Organization, *University of Kansas* 2019 – 2020
  - Collaborated with chapter president to ensure successful execution of events.
  - Organized Graduate Student Seminars.

#### COMPUTING AND LANGUAGES

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*Programming Languages*: C++, Python, Haskell, Java, Mathematica

*Languages*: Fluent in English (second language), Bengali (native)