

# Debanjana Kundu

*Curriculum Vitae*

Last Updated: August 10, 2021

## PERSONAL DETAILS

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<i>Birth</i>	January 6, 1993
<i>Address</i>	PIMS, 4176-2207 Main Mall, Vancouver, BC, V6T 1Z4 Canada
<i>Phone</i>	(+1) 437-344-2592
<i>Mail</i>	<a href="mailto:dkundu@math.ubc.ca">dkundu@math.ubc.ca</a>

## EDUCATION

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<b>Class X</b> <i>CBSE (India)</i> All India Rank 2	2008
<b>Class XII</b> <i>CBSE (India)</i> Top 1% in class XII	2010
<b>BS-MS Dual Degree</b> <i>Indian Institute of Science Education and Research, Mohali, India</i> CGPA 9.7	2010-2015
<b>MA PhD</b> <i>University of Toronto, Toronto, Canada</i>	2015–2020

## EMPLOYMENT

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<b>Université de Montréal</b> <i>CRM-ISM PostDoc, Thematic Program: Cohomology in Arithmetic</i>	Fall 2020
<b>University of British Columbia, Vancouver</b> <i>PIMS PostDoc Fellow</i>	January 2021– December 2022

## PUBLICATIONS/ PREPRINTS

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1. Growth of Fine Selmer Groups in Infinite Towers  
*Canadian Mathematics Bulletin (2020) Volume 63 / Issue 4 pp. 921-936.*
2. Growth of  $p$ -Fine Selmer Groups and  $p$ -Fine Shafarevich-Tate Group in  $\mathbb{Z}/p\mathbb{Z}$ -Extensions  
*Journal of the Ramanujan Math Society (2021) Volume 36, No. 1.*
3. Growth of Fine Selmer Groups in Uniform pro- $p$  Extensions  
*Accepted for publication (Annales Mathématiques du Québec)*
4. Perfect Powers that are Sums of Squares of an AP (with V. Patel)  
*Accepted for publication (Rocky Mountain Journal of Mathematics)*
5. On an Analogue of Kida's Formula for Fine Selmer Groups  
*Journal of Number Theory 222 (2021): 249-261.*

6. Anticyclotomic  $\mu$ -Invariants of Residually Reducible Galois Representations (with A. Ray)  
*accepted for publication (Journal of Number Theory)*
7. Statistics for Iwasawa Invariants of Elliptic Curves (with A. Ray)  
*accepted for publication (Transactions of the AMS)*
8. Control Theorems of Fine Selmer Groups (with M. F. Lim)  
*pre-print available upon request, submitted*
9. On the fine Selmer groups of modular forms and duality (with J. Hatley, A. Lei, and J. Ray)  
*pre-print available upon request, submitted*
10. Structure of fine Selmer Groups in  $p$ -adic Lie Extensions (with R. Sujatha)  
*pre-print available upon request, submitted*
11. Iwasawa Invariants for elliptic curves over  $\mathbb{Z}_p$ -extensions and Kida's Formula (with A. Ray) *pre-print available on arXiv, submitted*
12. Non-vanishing modulo  $p$  of Hecke  $L$ -values over imaginary quadratic fields (with A. Lei)  
*pre-print available upon request, submitted*
13. Statistics for anticyclotomic Iwasawa invariants of elliptic curves (with J. Hatley and A. Ray) *pre-print available on arXiv, submitted*
14. Statistics for Iwasawa Invariants of Elliptic Curves II (with A. Ray)  
*pre-print available on arXiv, submitted*
15. Rank jumps and growth of Shafarevich–Tate groups for elliptic curves in  $\mathbb{Z}/p\mathbb{Z}$ -extensions (with L. Beneish and A. Ray) *pre-print available on arXiv, submitted*
16. Growth of  $p$ -parts of ideal class groups and fine Selmer groups in  $\mathbb{Z}_q$ -extensions with  $p \neq q$  (with A. Lei) *preprint available upon request, submitted*

## FELLOWSHIPS

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<b>INSPIRE Fellowship</b>	2010–2015
<i>Department of Science and Technology, Government of India</i>	
<b>JNCASR Summer Fellowship</b>	2012
<i>JNCASR, India</i>	
<b>DAAD WISE Scholarship</b>	2013
<i>Germany</i>	
<b>IAS Summer Fellowship (not availed)</b>	2013
<i>Indian Academy of Sciences, India</i>	
<b>MITACS Globalink Research Internship</b>	2014
<i>Canada</i>	

<b>Rhodes Scholarship finalist (top 18)</b> <i>Oxford University, UK</i>	Class of 2015
<b>TIFR VSRP Fellowship</b> <i>TIFR, India</i>	2015
<b>BIGS Scholarship for Graduate Studies (not availed)</b> <i>Hausdorff Center for Mathematics, Bonn, Germany</i>	2015–2018
<b>MITACS Graduate Fellowship</b> <i>Canada</i>	2015–2018
<b>Vivekananda Graduate Award for International Students</b> <i>University of Toronto</i>	2018–2019
<b>General Motors Women in Mathematics and Science Award</b> <i>University of Toronto</i>	2019–2020
<b>Malcolm Slingsby Robertson Prize in Mathematics</b> <i>University of Toronto (best thesis award)</i>	2020
<b>CRM-ISM Postdoctoral Fellowship</b> <i>Université de Montréal</i>	Fall 2020
<b>PIMS Postdoctoral Fellowship</b> <i>University of British Columbia, Vancouver</i>	January 2021– December 2022

## SEMINARS

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<b>Introduction to Game Theory</b> <i>Mathematics Club, IISER Mohali</i>	Aug 2012
<b>27 Lines on a Cubic</b> <i>Department Colloquium, IISER Mohali</i>	Nov 2013
<b>Proofs of Quadratic Reciprocity</b> <i>Department Colloquium, IISER Mohali</i>	April 2014
<b>Linear Groups- Malcev's Theorem and Selberg's Lemma</b> <i>IISER Mohali</i>	April 2014
<b>Principal L-Functions of the Linear Group</b> <i>Department of Math, University of Toronto</i>	August 2016
<b>Understanding the Rank Distribution Conjecture</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Nov 2016
<b>What is an Elliptic Curve?</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	April 2017
<b>Fun with Tilings</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Fall 2018
<b>Möbius Functions and Number Theory</b> <i>Math Camp, Department of Math, University of Toronto</i>	Summer 2019
<b>Pigeonhole Principle and its Applications</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	January 2020
<b>Iwasawa Theory and Pseudo-nullity Conjectures</b> <i>Invited talk, Algebra &amp; Number Theory Seminar, University of Laval</i>	January 2020
<b>Iwasawa Theory of Fine Selmer Groups</b> <i>Invited talk, QVNTS, Montreal</i>	January 2020
<b>Overview of Iwasawa Theory</b> <i>Invited talk, Junior Number Theory Seminar, University of Toronto</i>	October 2020
<b>Iwasawa Theory of Fine Selmer Groups</b> <i>Invited talk, Fields Institute Number Theory Seminar <a href="#">video</a></i>	November 2020

<b>Iwasawa Theory of Fine Selmer Groups</b> <i>Invited talk, PIMS Online Colloquium</i>	February 2021
<b>Iwasawa Theory of Fine Selmer Groups</b> <i>Invited talk, Number Theory Seminar, University of Toronto</i>	March 2021
<b>Iwasawa Theory</b> <i>Invited lecture series (3 lectures), Seoul National University</i>	Summer 2021
<b>Iwasawa Theory and Arithmetic Statistics</b> <i>Invited talk, University of Göttingen</i>	June 2021

## **CONFERENCES, WORKSHOPS AND SUMMER SCHOOLS**

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<b>GANITA Conference, The Fields Institute</b> <i>participant</i>	June 2016
<b>Summer Graduate School, MSRI</b> <i>Summer school on Introduction to Character Theory and the McKay Conjecture.</i>	July 2016
<b>PIMS Summer School, UBC Vancouver</b> <i>Summer School on Representation Theory of Finite Groups</i>	July 2016
<b>Fields Medal Symposium, The Fields Institute</b> <i>participant</i>	Nov 2016
<b>Montreal-Toronto Workshop in Number Theory, CRM</b> <i>Workshop on Mock Modular Forms</i>	Dec 2016
<b>5 Day Workshops at BIRS, Banff</b> <i>Workshop on Diophantine Approximation and Algebraic Curves</i>	July 2017
<b>Summer Graduate School, MSRI</b> <i>Summer school on Automorphic Forms and Langlands Program</i>	July 2017
<b>AIM Workshop, San Jose</b> <i>Workshop on Functoriality and the Trace Formula</i>	Dec 2017
<b>Montreal-Toronto Workshop in Number Theory, CRM</b> <i>Workshop on Unitary Shimura Varieties</i>	January 2018
<b>Arizona Winter School, Tucson</b> <i>Winter school on Iwasawa Theory</i>	March 2018
<b>PIMS Focus Period, UBC Vancouver</b> <i>Focus Period on Representations in Arithmetic</i>	March 2018
<b>Upstate Number Theory Conference, SUNY Buffalo</b> <i>Young Researchers Conference</i>	April 2018
<b>Strength in Numbers, Queen's University</b> <i>Graduate Student Conference, Contributed talk</i>	May 2018
<b>CTNT Summer School, University of Connecticut</b> <i>Summer School and Conference</i>	May 2018
<b>CNTA Conference, Universite Laval</b> <i>Contributed talk</i>	July 2018
<b>Montreal-Toronto Workshop in Number Theory, CRM</b> <i>Workshop on p-adic Hodge Theory</i>	March 2019
<b>John H. Barrett Memorial Lectures, University of Tennessee</b> <i>participant</i>	May 2019
<b>Analytic &amp; Combinatorial Number Theory, UIUC</b> <i>Contributed talk</i>	June 2019
<b>SOGMSC, University of Guelph</b> <i>Contributed talk</i>	June 2019
<b>Boston University-Keio University Workshop</b> <i>Contributed talk</i>	June 2019

<b>Palmetto Number Theory Seminar (PANTS) XXXII</b> <i>Invited talk</i>	Sep 2019
<b>Maine-Quebec Number Theory Conference</b> <i>Contributed talk</i>	October 2019
<b>MAAIM, Emory University</b> <i>Contributed talk</i>	Nov 2019
<b>CMS Mini-Course on Iwasawa Theory</b> <i>Co-organizer with R. Sujatha</i>	Dec 2019
<b>CTNT Conference, University of Connecticut</b> <i>Contributed talk <a href="#">slides</a></i>	June 2020
<b>Maine-Quebec Number Theory Conference</b> <i>Contributed talk <a href="#">slides</a> <a href="#">video</a></i>	Fall 2020
<b>John's Hopkins Junior Number Theory Days</b> <i>Invited Talk <a href="#">notes</a> <a href="#">video</a></i>	Dec 2020
<b>AIM Workshop, Online</b> <i>Workshop on Arithmetic Intersection Theory on Shimura Varieties</i>	Jan 2021
<b>Spring School towards a mod-<math>p</math> Langlands correspondence</b> <i>participant</i>	April 2021
<b>CMS Summer Meeting</b> <i>Invited talk (Statistics of Iwasawa Invariants), Session: Algebraic Number Theory</i>	June 2021
<b>Workshop on Arithmetic Statistics Problems</b> <i>Invitation-only Conference</i>	July 2021

## **LEARNING SEMINARS ORGANIZED/ PARTICIPATED**

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<b>Summer Learning Seminar on Modular Forms</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Summer 2017
<b>Summer Learning Seminar on Galois Cohomology</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Summer 2017
<b>Introduction to Automorphic Forms and Langlands Program</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Fall 2017
<b>Learning Seminar on Classical Iwasawa Theory</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Fall 2017
<b>Learning Seminar on Beyond Endoscopy</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	2017–18
<b>Learning Seminar on Etale Cohomology</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Winter 2018
<b>Learning Seminar on Complex Multiplication</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Fall 2018
<b>Learning Seminar on <math>p</math>-adic Lie Groups</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Summer 2019
<b>Learning Seminar on Tate Conjectures</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Fall 2019
<b>Learning Seminar on Abelian <math>\ell</math>-Adic Representations</b> <i>Graduate Seminar, Department of Math, University of Toronto</i>	Summer 2020
<b>Learning Seminar on Euler system and Eisenstein congruences</b> <i>Iwasawa Seminar, Department of Math, UBC Vancouver</i>	Fall 2020
<b>CRM Women's Seminar</b> <i>Part of the thematic program at CRM</i>	Fall 2020
<b><a href="#">Learning Seminar on Coleman Families of Modular Forms</a></b> <i>Part of the thematic program at CRM</i>	Fall 2020

**Learning Seminar on Eigenvarieties***Iwasawa Seminar, Department of Math, UBC Vancouver [notes](#)*

Winter 2021

**Learning Seminar on Quadratic Twists***Iwasawa Seminar, online*

Winter 2021

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**TEACHING ASSISTANCE EXPERIENCE  
(UNIVERSITY OF TORONTO)**

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**MAT223 (Linear Algebra)***Instructor: Mr. Sean Uppal*Fall/Winter  
2015–16**MAT235 (Multivariable Calculus)***Instructor: Dr. Nara Jung*Fall/Winter  
2018–19**MAT237 (Multivariable Calculus)***Instructor: Dr. Tyler Holden, Prof. Robert Gerrard*Summer 2016,  
Fall/Winter  
2018–19**MAT240 (Linear Algebra for Math Specialists)***Instructor: Prof. Eckhard Meinrenken*Fall 2016; Fall  
2017**MAT246 (Concepts in Abstract Math)***Instructor: Dr. J Korman, Dr. H Soheil, Prof. F Murnaghan, Dr. D. Burbulla*

Multiple

**MAT247 (Linear Algebra II for Math Specialists)***Instructor: Prof. Stephen Kudla*

Winter 2018

**MAT315 (Elementary Number Theory)***Instructor: Prof. Henry Kim*

Winter 2020

**MAT336 (Elements of Analysis)***Instructor: Dr. H Soheil*

Winter 2017

**MAT401 (Polynomial Equations and Fields)***Instructor: Dr. Jonathan Korman*

Summer 2017

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**TEACHING EXPERIENCE**

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**University of Toronto:****MAT188 (Linear Algebra)***Course Coordinator: Dr. Dietrich Burbulla*

Fall 2018

**MAT136 (Calculus II)***Course Coordinator: Dr. Sarah Mayes-Tang*

Winter 2019

**MAT136 (Calculus II)***Course Coordinator along with Daniel Le and Abhishek Oswal*

Summer 2019

**MAT237 (Multivariable Calculus)***Course Coordinator along with Travis Ens, Armanpreet Pannu, and Ren Zhu*

Summer 2020

*Course Coordinator: Kegin Liu*

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## **REFERENCES**

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Available upon request.