

# Debanjana Kundu

## Curriculum Vitae

Last Updated: February 24, 2021

### PERSONAL DETAILS

*Birth* January 6, 1993  
*Address* PIMS, 4176-2207 Main Mall, Vancouver, BC, V6T 1Z4 Canada  
*Phone* (+1) 437-344-2592  
*Mail* [dkundu@math.ubc.ca](mailto:dkundu@math.ubc.ca)

### EDUCATION

**Class X** 2008  
*CBSE (India)*  
98.6% (Mathematics 99, Science 99, English 93)  
**Class XII** 2010  
*CBSE (India)*  
93.2% (Mathematics 98, Chemistry 95, Physics 91, English 94)  
(Top 1% in both class X and class XII.)  
**BS-MS Dual Degree** 2010-2015  
*Indian Institute of Science Education and Research, Mohali, India*  
CGPA 9.7  
**MA PhD** 2015-2020  
*University of Toronto, Toronto, Canada*

### EMPLOYMENT

**Université de Montréal** Fall 2020  
*CRM-ISM PostDoc, Thematic Program: Cohomology in Arithmetic*  
**University of British Columbia, Vancouver** January '21-December '22  
*PIMS PostDoc Fellow*

### PUBLICATIONS/ PREPRINTS

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  
*Accepted for publication (Journal of the Ramanujan Math Society)*
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  
*Accepted for publication (Journal of Number Theory)*
6. Control Theorems of Fine Selmer Groups (with M. F. Lim)  
*pre-print available upon request, submitted*
7. Characteristic ideals of fine Selmer groups of modular forms and Duality (with A. Lei and J. Ray)  
*pre-print available upon request, submitted*
8. Structure of Fine Selmer Groups in  $p$ -adic Lie Extensions (with R. Sujatha)  
*pre-print available upon request, submitted*
9. Anticyclotomic  $\mu$ -Invariants of Residually Reducible Galois Representations (with A. Ray)  
*pre-print available upon request, submitted*
10. Statistics for Iwasawa Invariants of Elliptic Curves (with A. Ray)  
*pre-print available on arXiv, submitted*

## FELLOWSHIPS

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<b>INSPIRE Fellowship</b> <i>Department of Science and Technology, Government of India</i>	2010-2015
<b>JNCASR Summer Fellowship</b> <i>JNCASR, India</i>	2012
<b>DAAD WISE Scholarship</b> <i>Germany</i>	2013
<b>IAS Summer Fellowship (not availed)</b> <i>Indian Academy of Sciences, India</i>	2013
<b>MITACS Globalink Research Internship</b> <i>Canada</i>	2014
<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>CRM-ISM Postdoctoral Fellowship</b> <i>Université de Montréal</i>	Fall 2020
<b>PIMS Postdoctoral Fellowship</b> <i>University of British Columbia, Vancouver</i>	Jan 2021- Dec 2022

## SEMINARS

<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 '20
<b>Iwasawa Theory of Fine Selmer Groups</b> <i>Invited talk, PIMS Online Colloquium</i>	Winter 2021
<b>TBA</b> <i>Invited lecture series (3 lectures), Seoul National University</i>	Summer 2021

## CONFERENCES, WORKSHOPS AND SUMMER SCHOOLS

<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 <math>p</math>-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, Session: Algebraic Number Theory</i>	June 2021

## **LEARNING SEMINARS ORGANIZED/ PARTICIPATED**

<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
<b>Learning Seminar on Eigenvarieties</b> <i>Iwasawa Seminar, Department of Math, UBC Vancouver <a href="#">notes</a></i>	Winter 2021
<b><a href="#">Learning Seminar on Quadratic Twists</a></b> <i>Iwasawa Seminar, online</i>	Winter 2021

## 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  
times

**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

## 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

**University of British Columbia (Vancouver):**

**MAT105 (Integral Calculus for Social Sciences and Commerce)**

*Course Coordinator: Keqin Liu*

Winter 2021

## SERVICE

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*Refereed*

*for*

*Reviewer*

*for*

Annales Mathématiques du Québec

Mathematics Reviews

## EXTRA-CURRICULAR ACTIVITIES

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### Outreach Committee, IISER Mohali

2013 - 2015

*I was a student volunteer of the institute Outreach Committee and had made several presentations. Our main focus was to introduce topics of current scientific research to school teachers (of the Punjab Government school system) and bring out the connection between learning science and doing science. We also organized the Annual Science Day for school students in the tri-city area (Chandigarh-Panchkula-Mohali).*

### MGSA, UofT

2016 - 2020

*I was an active member of the Mathematics Graduate Students' Association. For several years, I was a Graduate Planning Committee representative. In addition, for the academic year 2018-19, I was appointed the treasurer.*

### Math Outreach, UofT

2018-2020

*I was a mentor for the high school mentor-ship program. I mentored Anna Krokhine for her research project on graph theory and combinatorics in 2018. In 2019, I mentored Maya Bozzo-Rey on her project on Benford's Law. In 2020, my student, Jennifer Wang explored questions from number theory.*

### Women in Math, Toronto Chapter

2019-2020

*Female graduate students from schools in and around the Greater Toronto Area came together for WiM, Toronto Chapter in 2019. I was a part of the core team and a mentor for incoming graduate students.*

## SKILLS

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<i>Languages</i>	Bengali (mother tongue)
	English (fluent)
	Hindi (fluent)
<i>Software</i>	L <sup>A</sup> T <sub>E</sub> X

## REFERENCES

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Available upon request