

# Arindam Roy

## Curriculum Vitae

Department of Mathematics  
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### Professional Employment

**Rice University** Houston, U.S.A.  
*G. C. Evans Instructor* 2015-present

### Education

**University of Illinois at Urbana-Champaign** Urbana, U.S.A.  
*Ph.D., Mathematics, Thesis advisor: Alexandru Zaharescu* 2009–2015

**University of Texas at Pan-American** Edinburg, U.S.A.  
*M.S., Mathematics, Thesis advisor: Arunava Mukherjea* 2008–2009

**University of Calcutta** Kolkata, India  
*M.Sc., Mathematics* 2005

**University of Calcutta** Kolkata, India  
*B.Sc., Mathematics* 2003

### Research Interests

**Number Theory:**  $L$ -functions and the distribution of their zeros, divisor and circle problems.  
**Special Functions:** Integral transforms, hypergeometric functions, and Bessel functions.  
**Graph Theory:** Zeta functions.

### Publications and Preprints

- (20) Zeros of partial sums of  $L$ -functions (with A. Vatwani), preprint.
- (19) Unnormalized differences of the zeros of the first derivative of completed  $L$ -functions, preprint.
- (18) On the distribution of zeros of derivatives of the Riemann  $\xi$ -function (with A. Malik), submitted.
- (17) On a generalization of the Selberg formula, Siegel zero and the Weil explicit formula (with N. M. Robles), to appear in *Acta Arith.*
- (16) Moments of averages of generalized Ramanujan sums (with N. M. Robles), *Monatsh. Math.* 182 (2017), no. 2, 433-461.
- (15) New pathways and connections in number theory and analysis motivated by two incorrect claims of Ramanujan (with B. C. Berndt, A. Dixit and A. Zaharescu), *Adv. Math.* 304 (2017), 809-929.
- (14) Smooth  $L^2$  distances and zeros of approximations of Dedekind zeta functions (with J. Li, M. Nastasescu and A. Zaharescu), *Manuscripta Math.* 154 (2017), no. 1–2, 195-223.
- (13) Error functions, Mordell integrals and an integral analogue of partial theta function (with A. Dixit and A. Zaharescu), *Acta Arith.* 177 (2017), no. 1, 1-37.
- (12) Zeros of a family of approximations of Hecke  $L$ -functions associated with cusp forms (with J. Li and A. Zaharescu), *Ramanujan J.* 41 (2016), no. 1–3, 391-419.

- (11) Some identities involving convolutions of Dirichlet characters and the Möbius functions (with M. Zaki and A. Zaharescu), Proc. Indian Acad. Sci. Math. Sci. 126 (2016), no. 1, 21-33.
- (10) Koshliakov kernel and identities involving the Riemann zeta-function (with N. M. Robles, A. Dixit and A. Zaharescu), J. Math. Anal. Appl. 435 (2016) 1107–1128.
- (9) Riesz-type criteria and theta transformation analogues (with A. Dixit and A. Zaharescu), J. Number Theory 160 (2016), 385-408.
- (8) Twisted second moments of the Riemann zeta-function and applications (with N. M. Robles and A. Zaharescu), J. Math. Anal. Appl. 434 (2016), no. 1, 271 – 314.
- (7) Ramanujan-Hardy-Littlewood-Riesz Type Phenomena for Hecke Forms (with A. Dixit and A. Zaharescu), J. Math. Anal. Appl., 426 No 1, (2015), 594–611.
- (6) Zeros of combinations of the Riemann  $\xi(s)$  on bounded vertical shifts (with A. Dixit, N. Robles and A. Zaharescu), J. Number Theory, 149 (2015), 404–434.
- (5) On a class of functions that satisfies Ramanujan’s explicit formula (with P. Kuhn and N. Robles), Ramanujan J. 38 (2015), no. 2, 383-422.
- (4) Zeros of partial sums of the Dedekind zeta function of a cyclotomic field (with A. Ledoan and A. Zaharescu), J. Number Theory, 136 (2014), 118–133.
- (3) Monotonicity Results for Dirichlet  $L$ -Functions (with A. Dixit and A. Zaharescu), J. Math. Anal. Appl., 410 No 1, (2014), 307–315.
- (2) Sums of magnetic eigenvalues are maximal on rotationally symmetric domains (with R. S. Laugesen and J. Liang), Ann. Henri Poincaré, 13 (2012), 731–750.
- (1) Convexity of Quotients of Theta Functions (with A. Dixit and A. Zaharescu), J. Math. Anal. Appl., 386 No 1, (2012), 319–331.
- (0) Ramanujan’s identities, Voronoi summation formula, and zeros of partial sums of zeta and  $L$ -functions, Thesis (Ph.D.)University of Illinois at Urbana-Champaign. 2015. 142 pp. ISBN: 978-1339-32663-4, ProQuest LLC

### Work in Progress

- (2) Distribution of the zeros of the first derivative of the completed Riemann zeta-function, in preparation.
- (1) Modular relations and Ramanujan’s identity (with A. Dixit), in preparation.

### Grants

AMS-Simons Travel Grant \$4000 for collaborative research	2015–2018
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### Awards and Honors

- Bateman Prize in Number Theory	2015–2016
- Bateman Fellowship in Number Theory	2014–2015
- Hohn/Nash Fellowship and Hack Fellowship	2012–2013
- Appeared on ‘the List of Teachers Ranked as Excellent by their Students’	Summer 2012
- Appeared on ‘the List of Teachers Ranked as Excellent by their Students’	Fall 2010

### Conference Specific Grants

- Graduate Student Travel Grant for Joint Math Meeting, Baltimore *Spring 2014*
- Graduate Student Travel Grant for AMS Sectional Meeting, Lubbock *Spring 2014*
- Graduate Student Travel Grant for AMS Sectional Meeting, Tucson *Fall 2012*

### Conference Talks

- On the distribution of imaginary parts of zeros of derivatives of the Riemann  $\xi$ -function *Summer 2017*  
*Mathematical Congress of The Americas, Montréal*
- Moments of the average of a generalized Ramanujan sum *Spring 2015*  
*Joint Mathematics Meeting, San Antonio*
- Zeros of partial sums of the Dedekind zeta function of a Galois Extension *Fall 2014*  
*Central Fall Sectional Meeting, UW-Eau Claire*
- Zeros of partial sums of the Dedekind zeta function of a Galois Extension *Summer 2014*  
*Midwest Number Theory conference for Graduate Students 2014, UIUC*
- Generalization of Ramanujan's double Bessel function series identities *Spring 2014*  
*Spring Central Sectional Meeting, TTU - Lubbock*
- Zeros of partial sums of the Dedekind zeta function of a cyclotomic field *Spring 2014*  
*Joint Mathematics Meetings, Baltimore*
- Ramanujan-Hardy-Littlewood-Riesz type phenomena for Hecke forms *Spring 2013*  
*Joint Mathematics Meetings, San Diego*
- Ramanujan-Hardy-Littlewood-Riesz type phenomena for Hecke forms *Fall 2012*  
*Midwest Number Theory conference for Graduate Students 2012, UIUC*
- Convexity of Quotients of Theta Functions *Fall 2011*  
*Midwest Number Theory conference for Graduate Students 2011, UW-Madison*

### Seminar and Colloquium Talks

- Ford Circles *Fall 2017*  
*Undergraduate Colloquium, Rice University*
- Unnormalized differences of the zeros of the derivative of the completed  $L$ -function *Fall 2017*  
*AGNT Seminar, Rice University*
- Unnormalized differences and fractional parts of zeros of the derivative of the Riemann  $\xi$  function *Summer 2017*  
*Number Theory Seminar, Queen's University*
- Unnormalized differences and fractional parts of zeros of the derivative of the Riemann  $\xi$  function *Summer 2017*  
*Number Theory Seminar, ISI Kolkata*
- Zeros of the Riemann zeta-function on the critical line *Fall 2015*  
*AGNT Seminar, Rice University*
- Moments of the average of a generalized Ramanujan sum *Spring 2015*  
*Number Theory Seminar, University of Rochester*
- Moments of the average of a generalized Ramanujan sum *Fall 2014*  
*Number Theory Seminar, University of Zurich*
- Zeros of partial sums of the Dedekind zeta function of a cyclotomic field *Fall 2013*  
*Number Theory Seminar, University of Zurich*

- Zeros of Derivatives of the  $L$ -functions associated with the cusp forms  
*Mini Research Experience for Graduate Students, UI-Urbana-Champaign* *Summer 2013*
- Zeros of partial sums of the Dedekind zeta function of a cyclotomic field  
*Mini Research Experience for Graduate Students, UI-Urbana-Champaign* *Summer 2013*
- Convexity of Quotients of Theta Functions  
*Number Theory Seminar, UI-Urbana-Champaign* *Fall 2011*

## Mentoring

- Director and co-founder of the Rice Geometry Lab -  
A unique research opportunity for undergraduates  
*Rice University* *Spring 2017-present*  
Managing, Organizing, and coordinating the projects and the lab
- Project Mentor at the Rice Geometry Lab -  
Mentoring five undergraduates  
*Rice University* *Fall 2017-present*  
Project: Music and Geometry.
- Instructor of the Math Undergraduate Research  
*Rice University, Student - Tommy Stasko* *Summer 2016*  
Project: Zeros of derivatives of The Riemann zeta-function.
- Graduate Mentor at the Illinois Geometry Lab  
Mentored three undergraduates  
*University of Illinois at Urbana-Champaign* *Fall 2013*  
Project: Angular Distribution of Hyperbolic Lattice Points.

## Academic Service

- Co-organizer of the Math colloquium  
*Rice University* *Fall 2016-present*
- Co-organizer of the Algebraic Geometry  
and Number Theory seminar  
*Rice University* *Fall 2016-Spring 2017*
- Instructor of the Current Mathematics Seminar  
*Rice University* *Fall 2015-Spring 2016*
- Initiator and Co-organizer of the Graduate Student  
Number Theory Seminar  
*University of Illinois at Urbana-Champaign* *Fall 2014-Spring 2105*
- Served as referee for more than 10 articles in *Publication Matemàtiques*,  
*Bulletin of the London Mathematical Society*,  
*Journal of Mathematical Analysis and Applications*, *Ramanujan Journal*,  
*Monatshefte für Mathematik*, *Journal of Number Theory*

## Teaching Experience

### Rice University

- Topics in Complex Analysis (Graduate Course) *Fall 2017*
  - Analytic Number Theory and Elliptic Functions
- Calculus on Manifolds *Spring 2017, 2018*
- Topics in Complex Analysis (Graduate Course) *Fall 2016*
  - Analytic Number Theory

Complex Analysis	<i>Spring 2016</i>
Number Theory	<i>Fall 2015</i>
Calculus II	<i>Spring 2016, 2017, 2018</i>
- Included active learning component in every class.	<i>Summer 2016</i>
Calculus I	<i>Summer 2017</i>
- Included active learning component in every class.	

### **University of Illinois at Urbana-Champaign**

Calculus III ( <i>Full Instructor</i> )	<i>Summer 2010, 2011 and 2012</i>
- Prepared syllabus, lectures, exams, and homework.	
- Included active learning component in every class.	
- Used instructional technology.	
Calculus III with Mathematica ( <i>Full Instructor</i> )	<i>Fall 2011, Spring 2012</i>
- Used Mathematica to enhanced pedagogical approach.	
- Developed curriculum.	
A Mathematical World ( <i>Full Instructor</i> )	<i>Spring 2011</i>
- Taught students who are taking their only math course.	
- Explained challenging concepts using experiments.	
Calculus III ( <i>Teaching Assistant</i> )	<i>Fall 2010</i>
- Prepared worksheets and engaged students in group work.	
Differential Equations ( <i>Teaching Assistant</i> at NetMath)	<i>Summer 2013, Fall 2013, Spring 2014, Summer 2014</i>
- Provided one-on-one mentoring to help students understand the lecture materials.	
- Prepared homework and exams.	
Differential Equations ( <i>Grader</i> )	<i>Fall 2009, Spring 2010</i>
Applied Linear Algebra ( <i>Grader</i> )	<i>Fall 2009, Spring 2010</i>
Modern Euclidean Geometry ( <i>Grader</i> )	<i>Fall 2009</i>

### **University of Texas at Pan-American**

College Algebra ( <i>Full Instructor</i> )	<i>Fall 2008, Spring 2009</i>
- Prepared syllabus, lectures, exams, and home works.	
- Provided interactive learning method.	
Intermediate Algebra ( <i>Full Instructor</i> )	<i>Spring 2008</i>
- Prepared syllabus, lectures, exams, and home works.	
- Provided interactive learning method.	