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# Abel Castillo

## Education

2012-present **PhD, Mathematics**, *University of Illinois at Chicago*, Chicago, IL.
In progress. Thesis advisor: A. C. Cojocaru

2010-2012 **MS, Mathematics**, *University of Illinois at Chicago*, Chicago, IL, *GPA 3.71/4.00*.
Faculty mentor: Ramin Takloo-Bighash

2004-2010 Transition period: full-time employment and relocation from Bolivia to the United States

2003-2004 **MEd, Teaching**, *Framingham State College, International Education Program*, Santa Cruz, Bolivia, *GPA: 4.00/4.00*.

1999-2002 **BS, Industrial Engineering**, *Universidad Católica Boliviana*, Santa Cruz, Bolivia, *GPA 3.92/4.00*.
Undergraduate thesis advisor: René Alfredo Ovando Patiño

## Areas of Interest

Number Theory: analytic number theory, sieve methods and their applications, function field arithmetic

## Awards and Recognitions

6. **Dean's Scholar Award, 2015-2016**, *University of Illinois at Chicago*.
Competitive award aimed at providing the most distinguished, advanced-level graduate students with a period of time dedicated solely to the completion of their programs. Selection process included internal departmental nomination round (2 nominations for 9 candidates) followed by school-wide competition for awards (18 awards for 51 nominations).
5. **Research Assistantship, Fall 2015 (declined)**, *University of Illinois at Chicago*.
Research assistantship offered by the Department of Mathematics, Statistics, and Computer Science via a Research Training Group grant (NSF Award DMS-1246844).
4. **Abraham Lincoln Fellowship, retention round, 2014-2015**, *University of Illinois at Chicago*.
Competitive award (approx. 8 awards for approx. 45 applicants) aimed at increasing the excellence and diversity of the graduate student body at UIC by attracting applicants who have overcome obstacles to achieve academic success.
3. **Provost's Award, Fall 2012**, *University of Illinois at Chicago*.
Competitive award (approx. 12 awards for approx. 60 applicants) given to support research by graduate students at UIC. This award led to an invitation by Prof. Henri Darmon to spend May-July 2013 visiting the number theory research community in Montréal.
2. **MSCS ComEd Scholarship, 2009**, *University of Illinois at Chicago*.
Competitive award given to outstanding graduate students in the department of Mathematics, Statistics, and Computer Science at UIC.

1. **Full Academic Scholarship, 1999-2002**, *Universidad Católica Boliviana.* Competitive award (3 awards for approx. 100 students) given every semester to the students in the degree program with the highest grade point average for the previous semester. Award received for eight consecutive semesters.

## Publications and Preprints

5. A. Castillo, *Distribution of the trace of Frobenius on average for rank 2 Drinfeld modules.* (preprint submitted for publication, 21 pages.)
4. A. Castillo, *The normal order of the divisor-counting function for rank 2 Drinfeld modules with nontrivial endomorphism ring.* (preprint submitted for publication, 18 pages.)
3. A. Castillo and R. Dietmann, *On Hilbert's Irreducibility Theorem.* (preprint submitted for publication, 11 pages.)
2. A. Castillo, C. Hall, R. J. Lemke Oliver, P. Pollack, and L. Thompson, *Bounded gaps between primes in number fields and function fields*, Proc. Amer. Math. Soc. **143** (2015), no. 7, 2841–2856.
1. J. Berg, A. Castillo, B. Grizzard, V. Kala, R. Moy, C. Wang, *Congruences for Ramanujan's $f$ and $\omega$ functions via generalized Borcherds products.* The Ramanujan Journal, 2014, vol. 35, no. 2, p. 327-338

## Conference Presentations

9. **Distribution of Frobenius traces for Drinfeld modules,**, *University of Illinois, Urbana-Champaign, USA*, Illinois Number Theory Conference, August 2015.
8. **Distribution of Frobenius traces for Drinfeld modules,**, *University of Georgia, Athens, USA*, Elementary, analytic, and algorithmic number theory: in honor of Carl Pomerance's 70th birthday, June 2015.
7. **Bounded gaps between primes in number fields and function fields**, *Cornell University, Ithaca, NY, USA*, Upstate Number Theory Conference, April 2015.
6. **Effective versions of Hilbert's Irreducibility Theorem**, *University of Alabama, Huntsville, AL, USA*, AMS Spring Southeastern Sectional Meeting - Special Session on Analytic Methods in Elementary Number Theory, March 2015.
5. **Effective versions of Hilbert's Irreducibility Theorem**, *University of Michigan, Ann Arbor, MI, USA*, Automorphic Forms Workshop, March 2015.
4. **Hilbert's Irreducibility Theorem and Galois resolvents**, *Northwestern University, Evanston, IL, USA*, UIC-Northwestern Graduate Student Number Theory Day, September 2014.
3. **Distribution of the trace of Frobenius for Drinfeld modules**, *Hausdorff Center for Mathematics, Bonn, Germany*, ENFANT (Exciting New Faces in Analytic Number Theory) Conference, July 2014.
2. **The normal order method and rank 2 Drinfeld modules with nontrivial endomorphism ring**, *University of Illinois at Urbana-Champaign, Champaign, IL, USA*, Midwest Number Theory Conference for Graduate Students, June 2014.
1. **Congruences for Ramanujan's $f$ and $\omega$ functions via generalized Borcherds products**, *Soutwest Center for Arithmetic Geometry, Tucson, AZ, USA*, Arizona Winter School, team presentation, March 2013.

## Seminar Presentations

9. **Brun's Theorem towards twin primes and improvements: a survey**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Number Theory Seminar, January 2015.
8. **The normal order method and rank 2 Drinfeld modules with nontrivial endomorphism ring**, *University of Illinois at Chicago, Chicago, IL, USA*, Number Theory Seminar, October 2014.
7. **A survey of conjectures about the distribution of Frobenius for elliptic modules**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Number Theory Seminar, October 2014.
6. **Bounded gaps between primes and applications of the Maynard-Tao method**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Number Theory Seminar, September 2014.
5. **The normal order method and rank 2 Drinfeld modules with nontrivial endomorphism ring**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Number Theory Seminar, April 2014.
4. **Remarks on effective versions of Hilbert's Irreducibility Theorem**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Student Colloquium, Nov. 2013.
3. **On the analogy between elliptic curves and Drinfeld modules**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Student Number Theory Seminar, Oct. 2013.
2. **Effective versions of Hilbert's Irreducibility Theorem**, *University of Illinois at Chicago, Chicago, IL, USA*, Number Theory Working Seminar, series of 7 lectures, Spring 2013.
1. **Introduction to modular forms**, *University of Illinois at Chicago, Chicago, IL, USA*, Graduate Number Theory Seminar, series of 4 lectures, January 2013.

## Teaching Experience

Spring 2014 **Teaching Assistant Coordinator**, *University of Illinois at Chicago, Chicago, IL, USA*.
Performed classroom visits and offered feedback to incoming teaching assistants in the mathematics department. Approximately 5 TAs.

Spring 2014 **Moderator, TA mentoring workshop**, *University of Illinois at Chicago, Chicago, IL, USA*.
Planned and moderated a weekly meeting for first-year mathematics teaching assistants to field questions about teaching and being a graduate student at UIC. Approximately 5 TAs.

Spring 2014 **Homework Grader**, *University of Illinois at Chicago, Chicago, IL, USA*.
Course: MATH 215, Introduction to Proofs. Approximatedy 25 students

Fall 2013 **Homework Grader**, *University of Illinois at Chicago, Chicago, IL, USA*.
Course: MATH 516, Second Course in Abstract Algebra I. Approximately 15 students.

Fall 2013 **Teaching Assistant Coordinator**, *University of Illinois at Chicago, Chicago, IL, USA*.
Performed classroom visits and offered feedback to incoming teaching assistants in the mathematics department. Approximately 10 TAs.

2010-2013 **Teaching Assistant**, *University of Illinois at Chicago, Chicago, IL, USA*.
Courses included MATH 180 (Calculus I), MATH 181 (Calculus II), and MATH 210 (Calculus III). Approximately 60 students per semester on average.

2010-2011 **Online Homework Coordinator**, *University of Illinois at Chicago, Chicago, IL, USA*.

Courses: MATH 180 (Calculus I) and MATH 181, Calculus II. Created and posted online homework assignments three times a week, edited HTML and Python code for questions and automated grading, responded to student and faculty concerns. Assignments used for ~6 sections of each course, with ~80 students per section

2001-2010 **High School and College Mathematics Teaching**, *various locations*.

Taught high school and college mathematics, ranging from pre-Algebra to Advanced Placement Calculus. Locations included an local colleges and an overseas American school in Bolivia, Evanston Township High School (Evanston, IL), and the Center for Talent Development at Northwestern University (Evanston, IL). In Illinois, coached high school math teams that competed at the state level (ICTM state math competitions) and the national level (ARML, AMC, AIME).