

Angelica Babei

McMaster University
Hamilton Hall, Room 417
1280 Main Street West
Hamilton, ON, Canada, L8S 4K1

Phone: (603) 266-7124
Email: babeiangelica@gmail.com
Website: angelicababei.com
Last updated: Jan 23, 2023

EDUCATION

- Dartmouth College**, Hanover, NH
Ph.D. in Mathematics (Advisor: Thomas R. Shemanske) 2019
Thesis: *On the Arithmetic of Tiled Orders*
A.M. in Mathematics 2015
- Colgate University**, Hamilton, NY
B.A. in Mathematics and German 2014

EMPLOYMENT

- McMaster University**, Hamilton, ON
Postdoctoral Fellow (Mentor: Cameron Franc) Fall 2021 - present
- Dartmouth College**, Hanover, NH
Postdoctoral Researcher (Mentor: John Voight) Spring 2021 - Summer 2021
- Université de Montréal CRM**, Montréal, QC
Postdoctoral Fellow, thematic semester “Cohomology in Arithmetic” Fall 2020 - Spring 2021
- Vanderbilt University**, Nashville, TN
Postdoctoral Scholar (Mentor: Larry Rolen) Fall 2019 - Summer 2020

RESEARCH INTERESTS

A blend of algebraic number theory, combinatorial and computational methods. More specifically, classical and Hilbert modular forms, modular forms for noncongruence subgroups, Atkin and Swinnerton-Dyer type congruences, quaternionic orders and orders in central simple algebras, and Bruhat-Tits buildings.

PUBLICATIONS

1. *A database of basic numerical invariants of Hilbert modular surfaces* (with Eran Assaf, Benjamin Breen, Edgar Costa, Juanita Duque-Rosero, Aleksander Horawa, Jean Kieffer, Avinash Kulkarni, Grant Molnar, Sam Schiavone and John Voight). Submitted for publication.
2. *Families of ϕ -congruence subgroups of the modular group* (with Andrew Fiori and Cameron Franc). Submitted for publication. ([PDF](#))
3. *Generalized Ramanujan-Sato series arising from modular forms* (with Lea Beneish, Manami Roy, Holly Swisher, Bella Tobin, and Fang-Ting Tu). To appear in *Research Directions in Number Theory: Women in Numbers V*. ([PDF](#))
4. *Computing zeta functions of table algebra orders using local zeta integrals* (with Allen Herman). To appear in the *Mediterranean Journal of Mathematics*. ([PDF](#))
5. *Type numbers of orders in central simple algebras*. Preprint ([PDF](#))
6. *The Riemann Hypothesis for period polynomials of Hilbert modular forms* (with Larry Rolen and Ian Wagner). *Journal of Number Theory*, 218 (2021), 44–61. ([PDF](#))

7. *Metacommutation of primes in Eichler orders* (with Sara Chari). *Acta Arithmetica*, 197:1 (2021), 77–92. [\(PDF\)](#)
8. *Computing normalizers of tiled orders in $M_n(k)$* , Proceedings of the Thirteenth Algorithmic Number Theory Symposium, edited by Renate Scheidler and Jonathan Sorenson, Open Book Series 2, Mathematical Sciences Publishers, Berkeley, 2019, 55-68. [\(PDF\)](#)

COMPUTATIONAL PROJECTS

1. Implementing a new environment for Hilbert modular forms in Magma ([github repository](#))
2. Contributor to the [LMFDB](#)

GRANTS AND AWARDS

Simons Laufer Mathematical Sciences Institute (SLMath, formerly MSRI) June 2023
 2023 Summer Research in Mathematics program
 Group members: Bella Tobin, Manami Roy, Holly Swisher, Fang-Ting Tu

TALKS

*Invited talks are marked with **

- *On symmetries of modular forms* January 2023
 Post-Doc Threads Colloquium, McMaster University
- *A family of ϕ -congruence subgroups of the modular groups* January 2023
 JMM 2023, AMS Special Session on Quadratic Forms, Modular Forms, and Applications
- *A family of ϕ -congruence subgroups* June 2022
 COGENT, Workshop on Cohomology, Geometry and Explicit Number Theory
- A family of ϕ -congruence subgroups* June 2022
 Algebra and Number Theory Seminar, University of Calgary
- *Solomon zeta functions of table algebras* November 2021
 Number Theory Seminar, Oregon State University
- Solomon zeta functions of table algebras* September 2021
 Algebra and Algebraic Geometry Seminar, McMaster University
- Genus 2 curves with real multiplication and graded rings of Hilbert modular forms* September 2021
 Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation
- *Period polynomials, their zeros, and Eichler cohomology* April 2021
 Algebra and Number Theory Seminar, Louisiana State University
- *Period polynomials, their zeros, and Eichler cohomology* February 2021
 Algebra and Representation Theory Seminar, University of Oklahoma
- *On the partition function modulo 3* January 2021
 Joint Mathematics Meetings 2021, AMS Special Session on Quadratic Forms and Theta Functions
- *Zeros of period polynomials for Hilbert modular forms* December 2020
 CMS 2020 Winter Meeting, special session on *Computations with Arithmetic Groups*.
- Counting ideals in Eichler orders: a combinatorial approach* March 2020
 Bates College, ME.
- Metacommutation in quaternion orders and actions on the Bruhat-Tits tree* January 2020
 Joint Mathematics Meetings 2020, Denver, CO.

<i>Metacommutation in Eichler orders</i> PANTS 2019, University of North Carolina at Charlotte, Charlotte, NC.	September 2019
<i>Hilbert modular forms in Magma</i> Number Theory Seminar, Vanderbilt University, Nashville, TN.	August 2019
<i>Type numbers of orders in central simple algebras</i> Joint Mathematics Meetings 2019, Baltimore, MD.	January 2019
<i>*Type numbers of orders in central simple algebras</i> Five College Number Theory Seminar, Amherst College, Amherst, MA.	November 2018
<i>Class and type numbers of orders in central simple algebras</i> Québec-Maine Number Theory Conference, Université Laval, Québec.	October 2018
<i>Computing normalizers of tiled orders in $M_n(\mathbb{Q}_p)$</i> Algorithmic Number Theory Symposium XIII, University of Wisconsin, Madison, WI.	July 2018
<i>Type numbers of orders in central simple algebras</i> Number Theory Seminar, Dartmouth College, NH.	May 2018
<i>Tiled orders and the building for $SL_n(\mathbb{Q}_p)$</i> Maine-Québec Number Theory Conference, University of Maine, ME.	September 2017

TEACHING EXPERIENCE

<i>Instructor</i> , McMaster University	
Math 1K03 - Advanced Functions	Fall 2021, 2022
Math 1MM3 - Applied Calculus	Winter 2022, 2023
<i>Instructor</i> , Vanderbilt University	
Math 2420 - Methods of Ordinary Differential Equations	Spring 2020
Math 1300 - Accelerated Single Variable Calculus I (2 sections)	Fall 2019
<i>Instructor</i> , Dartmouth College	
Math 22 - Linear Algebra with Applications	Fall 2018
Math 8 - Calculus of Functions of One and Several Variables	Fall 2017
Math 1 - Calculus with Algebra	Fall 2016
<i>Ethics Seminar Facilitator</i> , Dartmouth College	
Topics: Professionalism, Mentoring, Authorship and Peer Review, Data Collection	Fall 2018

PROFESSIONAL ACTIVITIES

- **Hilbert Modular Forms Infrastructure Week** July 2021
Organized a 1-week workshop bringing together researchers affiliated with the Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation.
- **Vanderbilt University Online Course Design Institute** June - July 2020
Participated in a 2-week workshop to prepare for planning and teaching an online course. Topics include building sample learning modules, online teaching tools and issues of access, and planning strategies to provide a thriving online learning experience.
- **Vanderbilt Center for Teaching - The Open Classroom** September 2019
Participated in discussion sessions on *Teaching Creativity* and *Active Learning*
- **Dartmouth Algebra and Number Theory Seminar - Organizer** 2015 - 2019
- **Dartmouth Mathematics Women's Tea - Organizer** Fall 2018
- **Dartmouth Center for the Advancement of Learning** August 2018
Participated in a workshop on *Creating an Inclusive Learning Environment*

- **Sage Days 95 : Women in Sage** July 2018
- **Dartmouth Ethics Facilitator Training** Spring 2018
- **Sage Days 87 : p-adics in Sage and the LMFDB** July 2017
 Computed Galois splitting models for the LMFDB.
- **2016 NES MAA Vermont Workshop** October 2016
 Teaching Calculus Now - Current Trends and Best Practices
- **Dartmouth College Mathematics Teaching Seminar** Summer 2016
 Participated in an 8-week course focused on the discussion and implementation of pedagogical materials and philosophies. Topics included planning lessons and courses, student assessments and collaborative learning assignments.

OUTREACH

- **Nashville Math Club - Workshop Co-leader** 2019 - 2020
Knot Theory (September 2019)
Set Theory and the Inclusion-Exclusion Principle (February 2020)
- **Nebraska Conference for Undergraduate Women in Mathematics - Panelist** January 2019
- **Dartmouth Sonia Kovalevesky Day - Panelist** May 2019
- **Dartmouth Sonia Kovalevesky Day - Workshop Co-leader** 2015 - 2018
Cryptography: The Mathematics of Secrets (April 2018)
The Number Games: Survival of the Brainiacs (May 2017)
Complex Networks (April 2016)
Ramsey's Three Friends and Three Strangers (May 2015)
- **Johns Hopkins University : Center for Talented Youth - Workshop Co-leader** 2016 - 2017
The Number Games: Survival of the Brainiacs (May 2017)
Complex Networks (April 2016)
- **Exploring Mathematics Camp at Dartmouth - Workshop Co-leader** August 2016
 Developed two week-long workshops for middle and high school students.
Probability and *Knot Theory*

OTHER SKILLS

- Programming skills: Magma, SageMath, Python, MATLAB, Git
- Language skills: native Romanian, fluent English, proficient German, Russian