Anna MEDVEDOVSKY

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Employment

2024–present	Assistant professor, **University of Arizona**, Tucson, AZ
2023–2024	Postdoc, **Max Planck Institute (MPIM)**, Bonn, Germany
2021–2023	Postdoctoral research associate, **Boston University**, Boston, MA
2019–2021	NSF Postdoctoral Research Fellow, **Boston University**, Boston, MA
2018–2019	Maternity leave/Visitor, **Boston University**, Boston, MA
2017–2018	NSF Postdoctoral Research Fellow, **Max Planck Institute (MPIM)**, Bonn, Germany
2016–2017	Postdoctoral fellow, **Max Planck Institute (MPIM)**, Bonn, Germany
2015–2016	Institute Postdoctoral Fellow, **ICERM**, Providence, RI

Education

2008–2015	**Brandeis University**, Waltham, MA Ph.D. in number theory, 2015. Advisor: Joël Bellaïche. Thesis: Lower bounds on dimensions of mod-p Hecke algebras: The nilpotence method
1996–2001	**Harvard University**, Cambridge, MA: *AB cum laude* in mathematics, 2001.

Papers and preprints

- **Euler-Kronecker constants of modular forms: beyond Dirichlet L-series**.
  Preprint. Joint with Steven Charlton and Pieter Moree.
  We compute the Euler-Kronecker constant for the Dirichlet series associated to the coefficients of Δ_{16} mod 59, solving a problem posed by Ciolan, Languasco, and Moree in 2023.

- **On the parity of eta powers**.
  Preprint. Joint with Steven Charlton and Lukas Mauth.
  We study a new notion of mod-p twisted density for a modular form f supported on an arithmetic progression, focusing on $p = 2$ and f a positive power of the Dedekind eta function, using Galois-theoretic techniques developed by Bellaïche in level 1 and extending them to level 9.

- **An explicit universal Galois representation on the mod-3 Hecke algebra**.
  Preprint.
  We analyze the space of mod-3 modular forms of level one and its big Hecke algebra, identifying a compatible $(\mathbb{Z}/3\mathbb{Z})^\times$-grading on both. We construct a universal Galois representation on this Hecke algebra; study its localizations modulo prime ideals, identifying ideals of reducibility and dihedrality; and finally give an explicit matrix realization.

- **Mod-2 Hecke algebras of level 3 and 5.** Joint with Shaunak Deo. Submitted.
  We use deformation theory to prove that the big Hecke algebra acting on mod-2 modular forms of prime level 3 or 5 is, up to taking maximal reduced quotients, isomorphic to the corresponding universal deformation ring. We determine the explicit structure of this big mod-2 Hecke algebra, and prove an $R = \mathbb{T}$ theorem for the related partially full Hecke algebra.

- **Elementary symmetric functions and deep power-sum congruences**.
  Joint with Samuele Anni and Alexandru Ghitza. Integers (2024).
  When are two finite free $\mathbb{Z}_p[T]$-modules isomorphic as semisimplified $\mathbb{F}_p[T]$-modules? We give a precise criterion, with torsion-free $\mathbb{Z}_{(p)}$-algebras with divided-power ideals generalizing $\mathbb{Z}_p$.

- **Big images of Galois pseudorepresentations**.
  Joint with Andrea Conti and Jaclyn Lang. *Mathematische Annalen* (2022).
  We prove a purely algebraic result: under mild conditions, the image of a two-dimensional pseudorepresentation of a p-finite profinite group on a local pro-p domain is "big" — as big as

it can be. As a corollary we recover and extend known p-adic big-image theorems for Galois representations arising from classical, Hilbert, and Bianchi modular forms, and from p-adic Hida and Coleman families of classical and Hilbert modular forms.

- **Newforms mod p in squarefree level, with applications to Monsky's Hecke-stable filtration**. Joint with Shaunak Deo, and with an appendix by Alexandru Ghitza. *Transactions of the AMS*, Series B 6 (2019).

  We propose an algebraic definition of the space of ℓ-new mod-p modular forms for $\Gamma_0(N\ell)$ for ℓ, N, p pairwise coprime. Along the way we renormalize the Atkin-Lehner involution to obtain an algebra automorphism of the algebra of modular forms that is well defined in characteristic p.

- **Mod-2 dihedral Galois representations of prime conductor**. Joint with Kiran Kedlaya. *Proceedings of the* 13^{th} *Algorithmic Number Theory Symposium*. Open Book Series 2 (2019).

  For odd primes N up to $500k$, we compute the action of the Hecke operator T_2 on weight-2 cuspforms of level N, and determine whether 0 and 1 appear as mod-2 eigenvalues. We then partially explain our observations in terms of class field theory and modular mod-2 Galois representations. Our methods recover and extend prior results of Setzer, Hadano, and Kida on the nonexistence of elliptic curves and modular forms with certain mod-2 reductions.

- **Nilpotence index growth of recursion operators in characteristic p**. *Algebra and Number Theory* 12 (2018) no. 3.

  We prove that the killing rate of certain degree-lowering "recursion operators" on a polynomial algebra over a finite field grows slower than linearly in the degree of the polynomial attacked. The motivating application is obtaining lower bounds on the Krull dimension of local components of big mod-p Hecke algebras, here explained for $p = 2, 3$ and level one.

Forthcoming work

- **$\bar{\rho}$-Refined dimensions of Atkin-Lehner eigenspaces.** Joint with S. Anni and A. Ghitza.

  We use the trace formula and our earlier work to count cuspidal eigenforms of weight k and level Np with prescribed Atkin-Lehner-at-p eigenvalue and mod-p Hecke eigenvalue system.

- **Lower bounds on dimensions of mod-p Hecke algebras in the genus-zero case.**

  We use earlier work to obtain lower bounds on Krull dimensions of local components of mod-p Hecke algebras of level N if the genus of $X_0(Np)$ is zero, generalizing Ph.D. thesis to $N > 1$.

- **Density of modular forms of level one modulo 3.**

  We apply Bellaïche's density results to prove that "half" of the generic forms of level one mod 3 have equidistributed prime Fourier coefficients. We also give explicit combinatorial formulas for the density of abelian and dihedral forms, generalizing unpublished work of Bellaïche on $p = 2$.

Posthumous publication editing

- Joël Bellaïche, **Formes modulares spéciales modulo 2**.
  To appear in a special volume of the Tunisian Journal of Mathematics dedicated to the memory of Joël Bellaïche. Edited in collaboration with J-P. Serre.

Awards and honors

2022	(Canceled, Ukraine invasion) AMS-NSF-Simons-ICM Travel Grant recipient for ICM 2022
2017–2021	DMS-1703834 NSF Mathematical Sciences Postdoctoral Research Fellowship (24 months research support; sponsoring scientists: Don Zagier, Jared Weinstein)
2016-2017	AMS-Simons Travel Grant (funds for two years of research-related travel; stopped 2017 for NSF fellowship)
2015	Jerome Levine Thesis Prize (department award for best dissertation)
2008–2010	GAANN Fellowship
2006–2007	Math in Moscow Scholarship (NSF/AMS)

2000, 1998 Certificate of Distinction and Excellence in Teaching, Derek Bok Center, Harvard
∗ Math 122 (abstract algebra), Fall 2000 ∗ Math 25a (real analysis), Fall 1998

Conference organization/Lecture series/Special invited workshops

2025–2026 Arizona Winter School 2026 Scientific Committee

2024 June Modular Forms, L-functions, and eigenvarieties, Paris France
Organizer for conference in memoriam of Joël Bellaïche. Provided own admin support.

2023 June Research in pairs, CIRM, Luminy, France
(with Jean-Morlet co-Chair in Arithmetic Statistics Samuele Anni and Alexandru Ghitza)

2023 Jan/Feb Research school "Introduction to SAGA" CIRM, Luminy, France
Taught short course on modular forms and Galois representations, with Alexandru Ghitza

2022 June Galois representations, automorphic forms and L-functions, CIRM, Luminy, France

2016 May AIM workshop for the LMFDB release, San Jose, CA
Organizer for the mod-p modular forms working group

Conference and workshop talks

2025 Jan JMM talk in AMS Special Session on Modular Forms, Hypergeometric functions,..., Seattle

2023 Feb Plenary talk, Symposium on Arithmetic Geometry and its Applications, CIRM, Luminy, France

2023 Jan JMM talk in AMS special session on arithmetic geometry informed by computation, Boston

2023 Jan JMM talk in AMS special session on women in automorphic forms, Boston, MA

2022 July (Covid-derailed) Thematic Program in p-adic L-functions and Eigenvarieties,
University of Notre Dame, South Bend, IN

2017 May 03 Bridges between automatic sequences, algebra, number theory, CRM, Montréal, Canada

2016 Sept 09 Automorphic Forms: theory and computation (workshop), King's College, London, UK

2016 July Building Bridges 3, Sarajevo, Bosnia (contributed talk; speed talk)

2016 March 30th Automorphic Forms Workshop, Wake Forest University (contributed talk)

2015 Sept BU-Keio Workshop in number theory, Boston University (contributed talk; poster)

2015 April Upstate Number Theory Conference, Cornell University (contributed talk)

Seminar talks

2024 Oct 29 Algebra and Number Theory Seminar, University of Arizona, Tucson, AZ

2024 Apr 25 Groups, Arithmetic & Algebraic Geometry Seminar, EPFL, Lausanne, Switzerland

2023 Nov 28 Luxembourg Number Theory Seminar, Université de Luxembourg, Luxembourg

2023 Nov 11 Number theory lunch seminar, Max Planck Institute, Bonn, Germany,

2023 Oct 25 Heilbronn Number Theory Seminar, University of Bristol, Bristol, UK

2022 Dec 5 Special colloquium, University of Arizona, Tucson, AZ

2022 Apr 13 Johns Hopkins Number Theory Seminar, Baltimore, MD

2021 Oct 13 Dublin Algebra and Number Theory Seminar, online

2021 May 26 London Number Theory Seminar, online

2020 Dec 7 Boston University Number Theory Seminar, online

2020 Nov 18 Michigan State University algebra seminar, online

2018 Jan 30 Oberseminar Zahlentheorie, Universität zu Köln, Cologne, Germany

2017 March 8 Heilbronn Number Theory Seminar, University of Bristol, Bristol, UK

2017 Jan 27 University of Heidelberg number theory seminar, Heidelberg, Germany

2016 Nov 30 Bielefeld Arithmetic Geometry Seminar [BAGS], Bielefeld, Germany

2016 Nov 23	Max Planck Institute number theory lunch seminar, Bonn, Germany
2016 Nov 16	University of Luxembourg number theory seminar, Luxembourg
2016 Apr 7	Joint Columbia-CUNY-NYU Number Theory Seminar, NYC
2016 Feb 15	Brown University Algebra Seminar, Providence, RI
2015 April 21	Five College Number Theory Seminar, Amherst College, Amherst, MA
2015 Mar 17	Brandeis University Everytopic Seminar, Waltham, MA
2015 Feb 21	AMS Graduate Student Math Conference, Brown University, Providence, RI
2015 Feb 8	University of Connecticut Algebra Seminar, Storrs, CT
2014 Dec 8	Boston University Number Theory Seminar, Boston, MA

Medium-term visits (longer than a conference, shorter than a year)

2021 July	**Max Planck Institute (MPIM)**, Bonn, Germany
2020 July	(Covid-canceled) Visit to **Max Planck Institute (MPIM)**, Bonn, Germany
2015 Fall	Computational Aspects of the Langlands Program participant, **ICERM**, Providence, RI

Service and outreach

2016–present	Referee (Acta Arithmetica, Research in Number Theory, the Ramanujan Journal)
2025–2026	University of Arizona Mathematics Colloquium organizer
Fall 2024	Tucson Math Circle. Led two sessions, assisted at several others.
2022–2023	Math circle leader, grades 3–5, Baldwin School, Cambridge, MA
2022 June 7	Guest lecture, Connecticut Summer School in Number Theory, UConn, CT
2021 May	Outdoor math circle activity, Morse School, Cambridge, MA
2020 Spring	(Covid-canceled after one meeting) Math circle leader (grade 2), Morse School, Cambridge, MA
2015–2018	**LMFDB** contributor. Worked on a user-friendly database of mod-p modular forms.
2015–2016	Math circle leader (grades K-3), Tobin Montessori School, Cambridge, MA
2015 Oct 28	UConn Math Club talk (undergraduates), UConn, CT
2010 Apr 10	Kaplan Math Circle talk (middle-schoolers), Boston, MA
2007 Summer	Teacher counselor, **PROMYS**, Boston University, Boston, MA
2001 Summer	Seminar instructor, **Ross Young Scholars Program**, Ohio State University, Columbus, OH

Poster sessions and junior seminar talks

2015 Nov 30	ICERM peer-to-peer seminar (postdoc seminar talk)
2015 Nov	Computational aspects of L-functions, ICERM (poster)
2015 Oct	Explicit methods for modularity of K3 surfaces, higher weight motives, ICERM (poster)
2015 Sept	Modular forms and curves of low genus, ICERM (poster)
2014 Oct 30	Graduate Student Seminar, Brandeis Mathematics Department (talk)
2014 Apr 3	Graduate Student Seminar, Brandeis Mathematics Department (talk)

Additional workshop and conference participation

2023 Sept	Young Number Theorists in Bonn
2020 Feb	A Room of One's Own initiative (supported focused research time)
2018 July	Galois representations (workshop), Heidelberg, Germany
2018 July	Explicit and computational approaches in Galois representations (summer school), Luxembourg
2018 March	Conf. on Arithmetic and Automorphic Forms (Günter Harder's 80th birthday), Bonn, Germany

2017 May	Modular forms are everywhere (conference in honor of Don Zagier), Bonn, Germany
2016 May	The p-adic Langlands Program and related topics, Indiana University, Bloomington, IN
2015 May	p-Adic methods in number theory (conference inspired by Robert Coleman) UC Berkeley, CA
2015 Mar	p-Adic methods in the theory of classical automorphic forms, CRM Montréal
2015 Jan	Joint Mathematics Meeting, San Antonio, TX
2014 Feb	Hot Topics: Perfectoid Spaces and their Applications, MSRI
2013 March	Arizona Winter School: Modular forms and modular curves Project group: Congruences between modular forms (Frank Calegari)
2012 Jan	Joint Mathematics Meeting, Boston, MA
2011 May	Workshop on L-functions, Galois representations, and Iwasawa theory, Ann Arbor, MI
2011 March	Arizona Winter School: Stark-Heegner points. Project group: Stark-Heegner points (Henri Darmon, Victor Rotger)
2010 May	Women and Mathematics: p-Adic Langlands, IAS, Princeton, NJ
2009 Summer	PCMI Summer Session: Arithmetic of L-functions, Park City, UT

Teaching

Spring 2025	University of Arizona Math 313: Introduction to Linear Algebra
Spring 2023	Boston University MA 542: Modern Algebra II (rings, fields, and Galois theory)
Fall 2022	Boston University MA 123: Calculus I (150-student lecture in coordinated course)
Spring 2022	Boston University MA 294: Applied abstract algebra (requirement for joint math/CS majors)
Fall 2021	Boston University MA 541: Modern Algebra I (group theory)
Fall 2020	Boston University MA 741: Algebra I (graduate algebra)
Fall 2019	Boston University MA 541: Modern Algebra I (group theory)
Fall 2011	Brandeis University Math 10B: Calculus II
Spring 2011	Brandeis University Math 10A: Calculus I
Fall 2010	Brandeis University Math 10A: Calculus I
Fall 2009	Brandeis University Math 10A: Calculus I

Additional experience

2008–2014	**Brandeis University**, Waltham, MA Grader, section leader. Differential equations, algebra, multivariable calculus etc.
2000 Summer	**PROMYS**, Boston University, Boston, MA, Boston University, Boston, MA Counselor for flagship high-school student program
1997–2000	**Harvard University Mathematics Department**, Cambridge, MA Course assistant: Led weekly review sections, graded problem sets
1999–2000	**Collège J. Vallès**, **Ecoles J. Macé**, **V. Hugo**, Choisy-le-Roi, France Foreign assistant. Taught English as a foreign language in a suburb of Paris.
2002–2006	**SparkNotes LLC**, New York, NY Editor, writer at educational publishing company. Published works include *For Whom the Bell Tolls* SparkNote, 2003 (writer).
1996 Summer	**Ross Young Scholars Program**, Ohio State University, Columbus, OH Junior counselor

Personal

- US citizen. Emigrated from Russia to the US as a child. Fully bilingual Russian/English.

- □ Proficient in French and German. (French Language Citation, Harvard University, 2001)