

Curriculum Vitae

Matija Kazalicki

Personal Information:

Birthdate: 31.1.1981

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Academic Degrees

Ph.D. 2010 University of Wisconsin, Madison
Advisor: Ken Ono

B.Sc. 2003 University of Zagreb, Croatia

Professional Experience

2023 - Professor, Department of Mathematics,
University of Zagreb

2018 - 2023 Associate Professor, Department of Mathematics,
University of Zagreb

2013 - 2018 Assistant Professor (docent), Department of Mathematics,
University of Zagreb

2010 - 2013 Senior Assistant (Postdoc), Department of Mathematics,
University of Zagreb

2006 - 2010 Teaching Assistant, Department of Mathematics,
University of Wisconsin-Madison

2004 - 2006 Teaching Assistant, Department of Mathematics
University of Zagreb

Professional Duties

- 2023** Conference director
Representation Theory XVIII, Dubrovnik
- 2019 - 2021** Head of the Division for Algebra and Foundations of Mathematics
Faculty of Science, University of Zagreb
- 2013 - 2019** Chairman of Scientific colloquium of Croatian Mathematical Society
- 2022** Conference director
Representation Theory XVII, Dubrovnik
- 2020** Member of the Program Committee of 20th Central European
Conference on Cryptology, Zagreb
- 2018** Member of the Organizing Committee of Torsion groups and
Galois representations of elliptic curves, Zagreb
- 2018** Chairman of the Organizing Committee of Lectures on computational
aspects of algebraic geometry, Zagreb
- 2014** Member of the Organizing Committee of Workshop on Number Theory
and Algebra (on the occasion of the 60th birthday of Ivica Gusić), Zagreb

Grants

- 2018 - 2022** Principal investigator on the scientific project Diophantine geometry
and applications (supported by the Croatian Foundation for Science)
- 2017 -** Member of Center of Excellence QuantiXLie (Unit for Representation
Theory of Lie Algebras, Number Theory, and Related Structures)

Visiting Research Positions

- 2012** March MPIM, Bonn

Publications

- Murmurations of Mestre-Nagao sums** (joint with Z. Bujanovic and L. Novak), IJDSMS Volume No. 02, Issue No. 01, pp. 51 - 61, (2024)
- Rational Diophantine sextuples with strong pair** (joint with A. Dujella and V. Petricevic), Rev. Real Acad. Cienc. Exactas Fis. Nat. Ser. A-Mat. 119, 36 (2025)
- Quadratic twists of genus one curves and Diophantine quintuples**, preprint
- Ranks of elliptic curves and deep neural networks** (joint with D. Vlah), *Research in Number Theory*, 9, 53 (2023)
- Second moments and the bias conjecture for the family of cubic pencils** (joint with B. Naskrecki), *Mathematische Zeitschrift*, to appear
- Elliptic curves with torsion groups $\mathbf{Z}/8\mathbf{Z}$ and $\mathbf{Z}/2\mathbf{Z} * \mathbf{Z}/6\mathbf{Z}$** (joint with A. Dujella and J. C. Peral), Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM 115 (2021), Article 169
- Diophantine triples and K3 surfaces** (joint with B. Naskrecki), *J. Number Theory*, 236 (2021), 41-70, <https://doi.org/10.1016/j.jnt.2021.07.009>
- D(n)-quintuples with square elements** (joint with A. Dujella and V. Petričević), Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM 115 (2021), Article 172

9. **Rational $D(q)$ -quadruples** (joint with G. Dražić), *Indag. Math. (N.S.)*, Volume 33, Issue 2, March 2022, Pages 440-449
10. **Rational Diophantine sextuples containing two regular quadruples and one regular quintuple** (joint with A. Dujella and V. Petričević), *Acta Mathematica Spalatensia*, 1 (2021), 19-27
11. **There are infinitely many rational Diophantine sextuples with square denominators** (joint with A. Dujella and V. Petričević), *Journal of Number Theory*, 205 (2019), 340-346.
12. **Congruences for sporadic sequences and modular forms for non-congruence subgroups**, *Research in the Mathematical Sciences*, Res Math Sci (2019) 6: 28. <https://doi.org/10.1007/s40687-019-0191-3>.
13. **Diophantine m -tuples in finite fields and modular forms** (joint with A. Dujella), *Research in Number Theory* 7, 3 (2021)
14. **On a special case of Watkins' conjecture** (joint with D. Kohen), *Proceedings of AMS*, 146 (2018), pp. 541-545.
15. **Supersingular zeros of divisor polynomials of elliptic curves of prime conductor** (joint with D. Kohen) *Research in the Mathematical Sciences*, Res Math Sci (2017) 4: 10. <https://doi.org/10.1186/s40687-017-0099-8>
16. **More on Diophantine sextuples** (joint with A. Dujella), in *Number Theory - Diophantine problems, uniform distribution and applications, Festschrift in honour of Robert F. Tichy's 60th birthday (C. Elsholtz, P. Grabner, Eds.)*, Springer-Verlag, Berlin, 2017, pp. 227-235.
17. **There are infinitely many rational Diophantine sextuples** (joint with A. Dujella, M. Mikić and M. Szikszai), *Int. Math. Res. Not. IMRN 2017 (2)* (2017), 490-508.
18. **Modular parametrizations of certain elliptic curves** (joint with Y. Sakai and K. Tasaka), *Acta Arithmetica*, 163 (2014), pp. 33-43.
19. **Modular forms, hypergeometric functions and congruences**, *The Ramanujan Journal*, 34 (2014), pp. 1-9.
20. **Modular forms, de Rham cohomology and congruences** (joint with A.J. Scholl), *Trans. Amer. Math. Soc.* 368 (2016), pp. 7097-7117.
21. **Congruent numbers and congruences between half-integral weight modular forms**, *Journal of Number Theory*, 133 (2013), 4, pp. 1079-1085.
22. **2-adic properties of modular functions associated to Fermat curves**, *Proceedings of AMS*, 139 (2011), 12; pp. 4265-4271.
23. **2-adic and 3-adic part of class numbers and properties of central values of L -functions**, *Acta Arithmetica*, 147 (2011), pp. 51-72.
24. **Zeros of certain Drinfeld modular functions**, *Journal of Number Theory*, 128 (2008), pp. 1662-1669.
25. **Linear relations for coefficients of Drinfeld modular forms**, *International Journal of Number Theory*, 4 (2008), pp. 171-176.

Awards

2011 Best young scientist award

Faculty of Science, University of Zagreb

2006/2007, 2007/2008 Croatian Government Fellowship (5000 Euro)

2003 "Top Student" Scholarship

- 2003** Third Place at Vojtech Jarnik International Mathematical Competition (Ostrava)
- 2002** First Prize at International Mathematical Competition for University Students(Warsaw)
- 2001** 10th place at ACM programming competition (Warsaw)
- 1999** International Olympiad in Informatics, Bronze medal
- 1997,1998,1999** International Mathematical Olympiad, Bronze medal
- 1997-1998, 2001-2002** The City of Zagreb Merit Scholarship

Conference and seminar talks

- November 2024** Murmurations in Arithmetic Geometry and Related Topics
Simons center for geometry and physics, Stony Brook University, USA
Improving Mestre-Nagao heuristics with data science
- June 2024** 8th Croatian Mathematical Congress
Strossmayer University of Osijek
Ranks of elliptic curves and deep neural networks
- May 2024** SAGA seminar, Adam Mickiewicz University, Poznan
Ranks of elliptic curves and deep neural networks
- April 2024** Seminar for Analysis and Algebra - Alpe Adria
Ranks of elliptic curves and (deep) neural networks
- February 2024** Hybrid Conference on AI-Math, Rio de Janeiro
Ranks of elliptic curves and (deep) neural networks
- September 2023** Secure Communication in the Digital Age: Exploring the Synergy between Cryptography, Algebra, and Industrial Mathematics
BLENDED INTENSIVE PROGRAMME (BIP), Poznan
Quantum cryptography (three lectures)
- August 2023** DANGER 3: Data, Numbers, and Geometry, London
Ranks of elliptic curves and deep neural networks
- July 2023** Representation theory XVIII, Dubrovnik
Quadratic twists of genus one curves and Diophantine quintuples
- May 2023** 35th Automorphic Forms Workshop, Baton Rouge, Louisiana
Second moments and the bias conjecture for the family of cubic pencils
- April 2023** Seminar talk
UCD School of Mathematics and Statistics, Dublin
Congruence for sporadic sequences and modular forms
- June 2022** SAGA seminar, Adam Mickiewicz University, Poznan
Quadratic twists of genus one curves and Diophantine quintuples
- March 2021** Research seminar "Diophantine number theory"
joint project of the FWF and the NKFIH (online)
Recent development in the theory of rational
Diophantine m -tuples
- November 2020** Warsaw Number Theory Seminar (online)
Congruences for sporadic sequences, three fold covers of the elliptic modular surface and modular forms for non-congruence subgroups
- December 2019** Barcelona Fall Workshop on Number Theory II
University of Barcelona
Congruences for sporadic sequences and modular forms for non-congruence subgroups

- June 2019** Representation theory XVI
Dubrovnik
Congruences for sporadic sequences and modular forms
for non-congruence subgroups
- April 2019** The fifth mini symposium of the Roman Number Theory Association
Universita Roma Tre
Congruences for sporadic sequences and modular forms
for non-congruence subgroups
- January 2019** Seminar talk
Adam Mickiewicz University, Poznan
Congruences for sporadic sequences and modular forms
for non-congruence subgroups
- November 2018** Seminar talk
Istanbul Center for Mathematical Sciences, Istanbul
Congruences for sporadic sequences and modular forms
for non-congruence subgroups
- October 2018** Conference on Diophantine m -tuples and Related Problems II
Purdue University Northwest, Westville/Hammond Indiana
Rational Diophantine m -tuples
- October 2018** Seminar talk
University of Toronto, Toronto
Congruences for sporadic sequences and modular forms
for non-congruence subgroups
- September 2018** Joint meeting UMI-SIMAI-PTM
Wrocław
“Zagier’s sporadic sequences and Atkin and Swinnerton-Dyer
congruences”
- May 2018** Antalya Algebra Days XX
Şirnice, Turkey
“Diophantine m -tuples”
- April 2018** AIMS course (with Dino Festi)
Senegal
“Elliptic curves in cryptography”
- December 2017** Seminar talk
University of Cologne
“Supersingular zeros of divisor polynomials of elliptic curves
of prime conductor and Watkins’ conjecture”
- October 2017** Seminar talk
University of Wisconsin, Madison
“Supersingular zeros of divisor polynomials of elliptic curves
of prime conductor and Watkins’ conjecture”
- October 2017** Seminar talk
Penn State University
“Diophantine m -tuples”
- June 2017** Journales Algophantiennes Bordelaises 2017
Bordeaux
“Supersingular zeros of divisor polynomials of elliptic curves of prime conductor”
- September 2016** ELAZ 2016
Strobl am Wolfgangsee
“Rational Diophantine sextuples”
- July 2016** Building Bridges: Workshop on Automorphic Forms and Related Topics
University of Sarajevo
“Diophantine quadruples over finite fields”

- June 2016** 6th Croatian Mathematical Congress,
Department of Mathematics, University of Zagreb
"Diophantine quadruples in finite fields and modular forms"
- December 2014** Mathematical colloquium
Department of Mathematics, University of Osijek
"Modular forms in number theory "
- November 2014** Seminar talk,
UCD, Dublin
"Modular forms, de Rham cohomology and congruences"
- May 2014** 28th Automorphic Forms Workshop,
Moab Arts and Recreation Center, Moab, Utah
"Divisor polynomials of Hecke eigenforms"
- March 2013** 27th Automorphic Forms Workshop,
University College Dublin, Dublin
"Modular parametrizations of certain elliptic curves"
- June 2012** 5th Croatian Mathematical Congress,
Department of Mathematics, University of Rijeka, Rijeka,
"Modular forms, de Rham cohomology and congruences"
- February 2012** A Workshop on Modular Forms and Related Topics,
AUB, Beirut
"Weakly Modular Forms, de Rham Cohomology and Congruences"
- October 2011** Student Conference on Automorphic Forms,
Technische Universitat, Darmstadt
"The arithmetic of modular forms for noncongruence subgroups"
- July 2011** Seminar talk,
Morningside Center of Mathematics, Chinese Academy of Sciences, Beijing
"The arithmetic of modular forms associated to Fermat curves"
- July 2011** NCTS Special Day on Noncongruence Modular Forms ,
NCTS, Hsin-Chu, Taiwan
"The arithmetic of modular forms associated to Fermat curves"
- March 2011** Scientific colloquium of Croatian Mathematical Society,
University of Zagreb, Zagreb
"The arithmetic of modular forms on Fermat curves"
- February 2011** Number theory and algebra seminar,
University of Zagreb, Zagreb
"Jacobi sums, Grossencharacters and modular forms"
- January 2011** Colloquium of Mathematical and Physical Society of Rijeka,
Rijeka
"The ubiquity of modular forms in mathematics (and physics) "
- January 2011** Arithmetic of Modular forms and Elliptic curves,
IMPA, Rio de Janeiro
"The arithmetic of modular forms associated to Fermat curves"
- October 2010** Seminar talk,
Max Planck Institute, Bonn
"The arithmetic of modular forms associated to Fermat curves"
- October 2010** Seminar talk,
University of Cologne, Cologne
"The arithmetic of modular forms associated to Fermat curves"
- October 2010** Number theory and its applications,
University of Debrecen, Debrecen
"2-adic properties of modular functions associated to the Fermat curves"
- May 2010** Illinois Number Theory Conference,
University of Urbana-Champaign, Urbana-Champaign
"2-adic properties of modular functions associated to the Fermat curves"

- March 2010** 24th Automorphic Forms Workshop,
University of Hawai'i at Manoa, Honolulu
"2-adic properties of modular functions associated to the Fermat curves"
- June 2009** Conference in number theory,
Carleton University, Ottawa
"2-adic and 3-adic part of class numbers and properties"
- March 2008** 22nd Annual Workshop on Automorphic Forms and Related Topics,
Texas AM University
"Zeros on certain Drinfeld modular functions"