

Curriculum Vitae

Michael E. Zieve

Homepage: www.math.lsa.umich.edu/~zieve/

Employment and Grants

Professor, University of Michigan, 2012–present.
Associate Professor, University of Michigan, 2009–2012.
Simons Fellow, 2016–2017.
US–Israel Binational Science Foundation 2014173, 2015–2019.
NSF SCREMS Grant DMS-1026317 (co-PI), 2010–2013.
NSF Grants, Principal Investigator, 2009–2019.
Member, Institute for Advanced Study, 2008–2009.
Visiting Professor, Rutgers University, 2007–2008.
Research Staff, Center for Communications Research (Princeton),
2000–2007.
Stieltjes Visiting Professor, Leiden University, 2000.
MSRI Postdoctoral Research Fellow, 1999.
Assistant Professor, University of Southern California, 1997–1999.
NSF Postdoctoral Research Fellow, 1996–1999.
NSF Graduate Fellow, 1992–1995.

Education

University of California at Berkeley, Ph.D. in Mathematics, 1996,
under the supervision of Hendrik W. Lenstra, Jr.
Harvard University, A.B., 1992.

Graduate Students Supervised

Asvin Gothandaram (Master's student)
Gil Cheong
Trevor Hyde
Andrew Odesky
Sijun Liu (Ph.D. 2014)
Alex Mueller (Ph.D. 2013)
Zach Scherr (Ph.D. 2013)
Qian (Lily) Yin (Ph.D. 2011)
Ben Weiss (Ph.D. 2011)
Brian Wyman (Ph.D. 2010)

Postdoctoral Fellows Supervised

Efrat Bank (2015–present)
Danny Neftin (NSF Postdoctoral Fellow, 2011–2015)

Undergraduate Research Supervised

Nine students (Michigan, summer 2015)
Six students (Tsinghua, spring 2014)

Sixteen students (Michigan, summer 2012)
Geoff Iyer, Feiqi Jiang, Molly Logue and Dominic Spadacene (Michigan, summer 2011)
Alex Carney, Ruthi Hortsch and Augie Odena (Michigan, summer 2010)
Five students (NSA, summer 2002)
Notes: my student Kate Gruher won the 2003 Alice T. Schafer prize; my students Ruthi Hortsch and Susan Xia were runners-up for this prize in 2011 and 2013. My students Molly Logue and Dominic Spadacene won 2nd place at the 2011 OSU Young Mathematicians Conference.

High School Research Supervised

Felix Wang (2016)
Kenz Kallal, Matt Lipman and Felix Wang (2015)
Gwyneth Moreland (2013)
Samuel Tenka (2010)
Eric Kalosa-Kenyon (2010)

Meetings Organized

RTG Workshop on Arithmetic Dynamics (12/2015)
BIRS Workshop (5/2013)
ICERM Semester Program (Spring 2012)
Special Session, AMS Sectional Meeting (10/2011)
Midwest Number Theory Day (11/2010)
Midwest Number Theory Conference for Graduate Students (11/2010)

Service

Simons Foundation Collaboration Grants Review Committee (2013–2015)
AMS–Simons Travel Grants Committee (2011–2013)
NSF Grant Review Panelist (2010, 2011)
NSA Grant Review Panelist (2012)
Editor of journal *Involve*
Mathematical Reviews, *Zentralblatt für Mathematik*, *SIAM Review*
Referee for various journals and NSF, NSA, and NSERC grant proposals (refereed 153 papers since 2008)
At Michigan: Executive Committee (2014–2016), Number Theory Area Leader (2014–2016), Qualifying Exam Committee (2009–2010), Computer Committee (2009–2013), Webpage Committee (2012–2014), Undergraduate Counseling (2009–2012), Undergraduate Math Club Advisor (2010–2011), Library Committee (2010–2016), Honors Committee (2010–2013), Official Mentor of an Incoming Graduate Student (2010–2016), Undergraduate Research Committee (2011–2016), Science Library Advisory Committee (2010–2014)
Dissertation Committee Member for: William Gignac (UM), Ajinkya More (UM), Rodrigo Parra (UM), Ricardo Portilla (UM), Julian Rosen (UM), Drew Shulman (UIC), Greg Simon (UM)

Mentor for Robert Walker in Rackham's Summer Institute (2011)
 Organized Number Theory Working Seminar and Number Theory Learning Seminar at Michigan (2009–present)
 Webmaster for Michigan's Number Theory group
 Developed a widely-used webpage at CCR facilitating collaboration
 Judge for Hang Lung Mathematics Awards (2012)
 Judge for Shing-Tung Yau High School Math Awards (2012)
 Judge for Ohio State Young Mathematicians Conference applications and talks (2011, 2015)
 Ran two sessions of Michigan's Math Circle for high school students, and four for middle school students
 Gave the mathematician's address at the AMS Who Wants to be a Mathematician event in Michigan, March 2010
 Problem supporter for the USA Mathematics Talent Search
 Guest lecturer and frequent visitor at Thomas Grover Middle School Math Club in 2003

Selected Invited Addresses

Joint Annual Meeting of the German and Austrian Mathematical Societies (09/17) (plenary speaker)
 Maine–Quebec Number Theory Conference (10/15) (plenary speaker)
 International Conference on Finite Fields and Applications (7/15) (plenary speaker)
 Central Sectional Meeting, American Mathematical Society (10/11) (plenary speaker)
 Algebraic Dynamics, CUNY Graduate Center (6/10) (plenary speaker)
 Midwest Number Theory Conference for Graduate Students (11/09) (plenary speaker)
 Antalya Algebra Days (5/06) (plenary speaker)
 Automorphisms of Curves, Leiden, Netherlands (8/04) (2 talks)
 Finite Fields and Applications, Toulouse, France (5/03) (plenary speaker)
 Dutch Intercity Number Theory Seminar (2/00–5/00) (7 talks)
 Arizona Winter School for Arithmetic Geometry (2/00) (2 talks)
 Mathematisches Forschungsinstitut Oberwolfach, Germany:
 Coding Theory (5/00, 12/03)
 Computational Number Theory (5/95)
 Diophantische Approximationen (4/16)
 Finite Fields: Theory and Computation (1/97, 1/01, 12/04)
 Galois Groups and Fundamental Groups (6/97)
 Centre International de Rencontres Mathématiques, Luminy, France:
 Arithmetic, Geometry and Coding Theory (7/97)
 Number Theory and Dynamical Systems (7/95)
 Unlikely Intersections (2/14)

Additional Recent Invited Addresses

- 7/26/16: Model Theory and Arithmetic Dynamics, Fields Institute
- 5/17/16: Galois Theory of Orbits in Arithmetic Dynamics, AIM
- 2/25/16: Dynamics Seminar, IUPUI
- 1/4/16: Colloquium, Technion
- 12/31/15: Algebra Day, Technion
- 12/28/15: Colloquium, Tel Aviv University
- 12/8/15: Colloquium, University of Michigan
- 9/25/15: Doctoral Committee Seminar, University of Michigan
- 9/14/15: Complex Analysis, Dynamics and Geometry Seminar, University of Michigan
- 8/25/15: Topology–Geometry Seminar, Indiana University
- 8/18/15: Lifting Problems and Galois Theory, BIRS
- 4/30/15: Fakultät colloquium, Magdeburg
- 3/15/15: Number Theory Seminar, University of Illinois
- 7/13/14: ERC Research Program on Diophantine Geometry, Calabria
- 4/11/14: Colloquium, Tsinghua University
- 3/28/14: Groups and Combinatorics Seminar, University of Western Australia
- 11/22/13: Information Security Seminar, Chinese Academy of Sciences
- 11/21/13: Undergraduate Math Colloquium, Tsinghua University
- 11/10/13: Changsha University of Defense Technology
- 7/18/13: Number Theory Seminar, Graz
- 7/15/13: Algebra Seminar, Wuerzburg
- 7/11/13: Special Functions and Special Numbers, Utrecht
- 5/10/13: Iterating Functions over Finite Fields, BIRS
- 4/25/13: Colloquium, Stony Brook University
- 3/19/13: Joint Number Theory Seminar, BC/MIT
- 2/18/13: Colloquium, North Texas University
- 2/14/13: Number Theory Seminar, Texas
- 12/21/12: Number Theory Seminar, Chinese Academy of Sciences
- 10/18/12: Michigan Undergraduate Math Club
- 10/12/12: ERC Research Period in Diophantine Geometry, Pisa
- 10/8/12: Group, Lie, and Number Theory Seminar, University of Michigan
- 5/26/12: Tsinghua-NTU Number Theory Conference (plenary speaker)
- 5/17/12: Colloquium, Tsinghua University
- 5/15/12: Colloquium, Nanyang Technological University
- 5/7/12: Number Theory and Noncommutative Geometry, OSU
- 4/26/12: Connecticut Math Awards Day
- 3/26/12: Number Theory & Dynamics Seminar, Yale
- 3/19/12: ICERM Global Arithmetic Dynamics Workshop
- 3/1/12: Joint Columbia–CUNY–NYU Number Theory Seminar

2/20/12: ICERM Members' Seminar
 1/31/12: ICERM Introductory Workshop
 1/5/12: AMS Annual Meeting
 11/17/11: Quebec–Vermont Number Theory Seminar
 5/25/11: Michigan Conference on Inquiry-Based Learning
 4/28/11: Trends in Dynamics, Northwestern University
 4/19/11: Number Theory Seminar, MIT
 3/9/11: Colloquium, Brown University
 3/4/11: Information-Theoretic Cryptography, IPAM/UCLA
 2/25/11: Rocky Mountain Algebraic Combinatorics Seminar
 2/17/11: PNYLABS, Princeton
 1/13/11: Michigan Undergraduate Math Club
 5/7/10: Conformal Methods in Analysis, Seillac, France
 11/14/09: OSU/UIC/UM Weekend Algebraic Geometry Workshop
 11/7/09: Midwest Number Theory Conference for Graduate Students,
 University of Wisconsin-Madison
 11/6/09: Midwest Number Theory Day, University of Wisconsin-Madison
 10/26/09: Group, Lie, and Number Theory Seminar, University of Michi-
 gan
 7/21/09: Dynamical Numbers, Max-Planck-Institute für Mathematik
 4/17/09: Colloquium, University of Miami
 4/9/09: Columbia-CUNY-NYU Number Theory Seminar
 3/5/09: Colloquium, Michigan State University
 2/3/09: Algebraic Geometry Seminar, Princeton University
 1/26/09: Number Theory Seminar, University of California at Berkeley
 1/21/09: Colloquium, University of Illinois
 1/20/09: Colloquium, University of Michigan
 1/20/09: What is ...? Seminar, University of Michigan
 1/15/09: Québec-Vermont Number Theory Seminar
 1/14/09: Colloquium, McGill University
 1/12/09: Algebra, Number Theory, and Combinatorics Seminar, Univer-
 sity of Texas
 1/7/09: Colloquium, Georgia Tech University
 1/6/09: Colloquium, Emory University
 12/1/08: Colloquium, Rice University
 10/31/08: Algebra Seminar, Wesleyan University
 10/12/08: special session on Number Theory, AMS sectional meeting
 10/10/08: Ontario Research Center for Computer Algebra Seminar,
 University of Waterloo
 10/9/08: Number Theory Seminar, University of Waterloo
 9/29/08: Computer Science and Discrete Mathematics Seminar,
 Institute for Advanced Study
 9/22/08: Algebra Seminar, Rutgers University

5/21/08: Combinatorial and Additive Number Theory conference, CUNY Graduate Center
 5/2/08: Kolchin Seminar, CUNY Graduate Center
 4/18/08: Kolchin Seminar, CUNY Graduate Center
 4/15/08: Colloquium, Center for Communications Research (Princeton)
 4/8/08: Number Theory Seminar, Rutgers University
 4/4/08: Commutative Algebra and Algebraic Geometry Seminar, CUNY Graduate Center
 3/27/08: New York Number Theory Seminar, CUNY Graduate Center
 3/3/08: Algebra Seminar, Brown University
 2/25/08: Gelfand Seminar, Rutgers University
 2/8/08: Computational and Commutative Algebra Seminar, Rutgers
 1/11/08: Discrete Mathematics and Representation Theory Seminar, University of California (Davis)
 1/8/08: special session on Algebraic Dynamics, AMS annual meeting

Papers Written

G. Kyureghyan and M. Zieve, Permutation polynomials of the form $X + \gamma \text{Tr}(X^k)$, *Contemporary Developments in Finite Fields and their Applications*, to appear.

M. Zieve, Factorizations of certain bivariate polynomials, *Acta Arith.*, to appear.

M. Zieve, Permutation polynomials on \mathbf{F}_q induced from Rédei function bijections on subgroups of \mathbf{F}_q^* , *Monatsh. Math.*, to appear.

M. Zieve, Planar functions and perfect nonlinear monomials over finite fields, *Des., Codes and Cryptography* **75** (2015), 71–80.

H. Krieger, A. Levin, Z. Scherr, T. Tucker, Y. Yasufuku and M. Zieve, Uniform boundedness of S -units in arithmetic dynamics, *Pacific J. Math.* **274** (2015), 97–106.

P. Mueller and M. Zieve, Low-degree planar monomials in characteristic two, *J. Algebraic Combinatorics* **42** (2015), 695–699.

Z. Scherr and M. Zieve, Separated Belyi maps, *Math. Res. Letters* **21** (2014), 1389–1406.

M. Zieve, On a theorem of Carlitz, *J. Group Theory* **17** (2014), 667–669.

F. Voloch and M. Zieve, Rational points on some Fermat curves and surfaces over finite fields, *Int. J. Number Theory* **10** (2014), 319–325.

Z. Scherr and M. Zieve, Some planar monomials in characteristic 2, *Annals of Combinatorics* **18** (2014), 723–729.

D. Kreso and M. Zieve, On factorizations of maps between curves, arXiv:1405.4753.

- M. Zieve, Permutation polynomials induced from permutations of subfields, and some complete sets of mutually orthogonal latin squares, arXiv:1312.1325.
- M. Zieve, Permutation groups generated by binomials, arXiv:1312.2649.
- G. Moreland and M. Zieve, Some Diophantine equations related to positive-rank elliptic curves, arXiv:1304.1442.
- M. Zieve and P. Müller, On Ritt’s polynomial decomposition theorems, submitted for publication.
- M. Zieve, Decompositions of Laurent polynomials, submitted for publication.
- M. Zieve, A remark on the paper “ N -tuples of positive integers with the same sum and the same product” by Zhang and Cai *Math. Comp.*, to appear.
- M. Zieve, An equality between two towers over cubic fields, *Bull. Braz. Math. Soc.*, to appear.
- M. Zieve, Exceptional polynomials, Handbook of Finite Fields, CRC Press (2013), 229–233.
- G. Mullen and M. Zieve, Value sets of polynomials, Handbook of Finite Fields, CRC Press (2013), 225–229.
- D. Ghioca, T. Tucker and M. Zieve, Linear relations between polynomial orbits, *Duke Math. J.* **161** (2012), 1379–1410.
- B. Wyman and M. Zieve, Two questions on polynomial decomposition, *Quarterly Journal of Math. (Oxford)* **63** (2012), 507–511.
- J. Rosen, Z. Scherr, B. Weiss and M. Zieve, Chebyshev mappings of finite fields, *Amer. Math. Monthly* **119** (2012), 151–155.
- D. Ghioca, T. Tucker and M. Zieve, The Mordell–Lang question for endomorphisms of semiabelian varieties, *J. Théor. Nombres Bordeaux* **23** (2011), 645–666.
- R. Guralnick and M. Zieve, Polynomials with $\mathrm{PSL}(2)$ monodromy, *Annals of Math.* **172** (2010), 1321–1365.
- R. Guralnick, J. Rosenberg and M. Zieve, A new family of exceptional polynomials in characteristic two, *Annals of Math.* **172** (2010), 1367–1396.
- K. Lindahl and M. Zieve, On hyperbolic fixed points in ultrametric dynamics, *p -Adic Numbers, Ultrametric Analysis and Applications* **2** (2010), 232–240.
- M. Zieve Classes of permutation polynomials based on cyclotomy and an additive analogue, in *Additive Number Theory*, Springer–Verlag (2010), 355–361.
- M. Zieve, p^k -torsion of genus two curves over \mathbb{F}_{p^m} , *Math. Comp.* **79** (2010), 1833–1838.

- X. Faber, B. Hutz, P. Ingram, R. Jones, M. Manes, T. Tucker and M. Zieve, Uniform bounds on pre-images under quadratic dynamical systems, *Math. Res. Letters* **16** (2009), 87–101.
- R. Beals, J. Wetherell and M. Zieve, Polynomials with a common composite, *Israel J. Math.* **174** (2009), 93–117.
- A. Masuda and M. Zieve, Permutation binomials over finite fields, *Trans. Amer. Math. Soc.* **361** (2009), 4169–4180.
- M. Zieve, On some permutation polynomials over \mathbb{F}_q of the form $x^r h(x^{(q-1)/d})$, *Proc. Amer. Math. Soc.* **137** (2009), 2209–2216.
- D. Ghioca, T. Tucker and M. Zieve, Intersections of polynomial orbits, and a dynamical Mordell–Lang conjecture, *Inventiones Math.* **171** (2008), 463–488.
- D. Goldstein, R. Guralnick, E. Howe and M. Zieve, Nonisomorphic curves that become isomorphic over extensions of coprime degrees, *J. Algebra* **320** (2008), 2526–2558.
- M. Zieve, Some families of permutation polynomials over finite fields, *Int. J. Number Theory* **4** (2008), 851–857.
- A. Masuda and M. Zieve, Rational functions with linear relations, *Proc. Amer. Math. Soc.* **136** (2008), 1403–1408.
- A. Masuda and M. Zieve, Nonexistence of permutation binomials of certain shapes, *Electronic J. Combinatorics* **14** (2007), N12.
- G. Kuperberg, R. Lyons and M. Zieve, Analogues of the Jordan–Hölder theorem for transitive G -sets, arXiv:0712.4142.
- R. Guralnick, T. Tucker and M. Zieve, Exceptional covers and bijections on rational points, *Internat. Math. Res. Notices* **2007**.
- D. Wiedemann and M. Zieve, Equivalence of sparse circulants: the bipartite Ádám problem, arXiv:0706.1567.
- I. Duursma, B. Poonen and M. Zieve, Everywhere ramified towers of global function fields, *Finite Fields and Applications*, Springer Lecture Notes in Comput. Sci. **2948** (2004), 148–153.
- S. Ball and M. Zieve, Symplectic spreads and permutation polynomials, *Finite Fields and Applications*, Springer Lecture Notes in Comput. Sci. **2948** (2004), 79–88.
- N. Elkies, E. Howe, A. Kresch, B. Poonen, J. Wetherell and M. Zieve, Curves of every genus with many points, II: Asymptotically good families, *Duke Math. J.* **122** (2004), 399–422.
- A. Kresch, J. Wetherell and M. Zieve, Curves of every genus with many

- points, I: Abelian and toric families, *J. Algebra* **250** (2002), 353–370.
- S. Cohen, H. Niederreiter, I. Shparlinski and M. Zieve, Incomplete character sums and a special class of permutations, *J. Theor. Nombres Bordeaux* **13** (2001), 53–63.
- D. desJardins and M. Zieve, Polynomial mappings mod p^n , arXiv:0103046.
- J. Csirik, J. Wetherell and M. Zieve, On the genera of $X_0(N)$, arXiv:0006096.
- S. Abhyankar, S. Cohen and M. Zieve, Bivariate factorizations connecting Dickson polynomials and Galois theory, *Trans. Amer. Math. Soc.* **352** (2000), 2871–2887.
- M. Bhargava and M. Zieve, Factoring Dickson polynomials over finite fields, *Finite Fields Appl.* **5** (1999), 103–111.
- M. Zieve, Bivariate factorizations via Galois theory, with application to exceptional polynomials, *J. Algebra* **210** (1998), 670–689.
- M. Zieve, A note on the discriminator, *J. Number Theory* **73** (1998), 122–138.
- H. Lenstra and M. Zieve, A new family of exceptional polynomials, *Finite Fields and Applications*, Cambridge Univ. Press (1996), 209–218.
- M. Zieve, Take-away games, *Games of No Chance*, Cambridge Univ. Press (1996), 351–361.
- M. Zieve, Cycles of Polynomial Mappings, Ph.D. thesis, Berkeley, 1996.

Courses Taught

- Algebraic Curves (Tsinghua, 2013)
- Algebraic Number Theory (Michigan, 2010, 2012, 2014)
- The Arithmetic of Dynamical Systems (Michigan, 2010)
- Business Calculus (USC, 1997)
- Diophantine Problems (Michigan, 2015)
- Elliptic Curves (Community High School, 2013)
- Engineering Calculus (USC, 1997, 1998)
- Explorations in Mathematical Research (Michigan, 2011)
- Functional Equations (Tsinghua, 2014)
- Graduate Algebra I (Michigan, 2012)
- Graduate Algebra II (Michigan, 2016)
- Honors Calculus (Michigan, 2011)
- Honors Applied Calculus II (Michigan, 2009)
- Linear Algebra (Michigan, 2015)
- Mathematical Statistics (Rutgers, 2007)
- Number Theory (USC, 1999)
- Probability (Michigan, 2014)

Research Interests

Algebra

Number theory and arithmetic geometry

Dynamical systems

Value distribution of meromorphic functions

Branched covers of compact surfaces

Discrete mathematics, geometry over finite fields, and cryptography

References

Stephen DeBacker (Michigan)

Robert Guralnick (USC)

William Kantor (Oregon)

David Saltman (IDA/CCR-P)

Thomas Scanlon (Berkeley)

Joseph Silverman (Brown)

Karen Smith (Michigan)

Felipe Voloch (Texas)

Umberto Zannier (Pisa)