

Mahir Bilen Can

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EDUCATION

Ph.D. in Mathematics	University of Pennsylvania	2006
B.Sc. in Mathematics	METU (Turkey)	2001

EMPLOYMENT

Professor	Tulane University	2020–Present
Associate Professor	Tulane University	2014–2020
Assistant Professor	Tulane University	2008–2014
Postdoctorate	Western University (Canada)	2006–2008

PROFESSIONAL AFFILIATIONS AND ENTREPRENEURIAL ACTIVITY

Consultant, Xanadu	Present
Co-founder, QSPARC LABS (https://qsparclabs.com)	Present

VISITING POSITIONS

NOVA FCT, Portugal (as a Fulbright US scholar)	May–August, 2024
Okinawa Institute of Science and Technology, Japan	June–September, 2023
Indian Institute of Technology Bombay, India	January 2023; December 2023
NOVA FCT, Portugal	December 2021
University of California, San Diego	Spring 2017
Yale University	2012–2013
The Chinese University of Hong Kong	February 2013

GRADUATE STUDENT ADVISING

Isabel Pfaff (PhD)	2025 – Present	
Zafar Iqbal (PhD)	2024 – Present	
Naufil Sakran (PhD)	2021 – Present	
Dillon Montero (PhD)	2021 – 2025	Analogues of NRT Reed Solomon Codes in Bottleneck Metrics
Nestor Diaz Morera (PhD)	2018 – 2024	Torus Actions, Spherical Varieties, Dyck paths, and Shellability
Hayden Houser (PhD)	2017 – 2024	Signature Quantization of the Classical Groups
Corey Wolfe (PhD)	2017 – 2024	On the Borel Submonoid and Nilpotent Subsemigroup of a Symplectic Monoid
Aram Bingham (PhD)	2015 – 2021	Clans, Sects, and Symmetric Spaces of Hermitian Type
Yiyang She (PhD)	2016 – 2021	Strong Gelfand Subgroups of $\mathbb{Z}/p \wr S_n$
Tien Le (PhD)	2015 – 2020	Orbits in Double Flag Varieties
Özlem Uğurlu (PhD)	2013 – 2018	Counting Borel Orbits in Classical Symmetric Varieties

Tim Twelbeck (PhD) 2008 – 2013 Shellability of Bruhat Order on Borel Orbit Closures

Masters Thesis:

Dejun Zhang (Ms) 2020 Topological Galois Theory of Riemann Surfaces

UNDERGRADUATE STUDENT ADVISING

Honor's Theses (HT) and Senior Theses (ST). Co-advising (CA).

Batu El (CA, (HT)	2022	Parametrizing Chains in Generalized FPFIs
Alex Caione (ST)	2022	Moment Map
Ellen Calais (ST)	2020	Count Your Conics
Rachel Ryley (ST)	2014	Affine Coxeter Groups and Applications
Melanie Jensen (HT)	2013	Combinatorial Interpretations of Lucas Polynomials
Jordan Martin (ST)	2012	Properties and Applications of Involutions Under Bruhat Order

UNIVERSITY-LEVEL SERVICE

Promotion and Tenure Committee
Curriculum Committee
Honors and Awards Committee

PATENTS

International (PCT) Application

Title:	QUANTUM ERROR CORRECTING CODES FROM HIGHER GRASS-MANN CODES
International Application No.:	PCT/US2023/018890
International Publication No.:	WO 2024/058827 (A2)
Publication Date:	March 21, 2024
Applicant:	Ohio State Innovation Foundation
Inventors:	Mahir Bilen Can; Roy Joshua; Ravindra Grivaru
Attorney Docket:	103361-172WO1

U.S. Provisional Application

Title:	SYSTEMS AND METHODS FOR SECURE AND RELIABLE DATA STORAGE AND TRANSMISSION
U.S. Provisional Application No.:	63/783,638
Filing Date:	April 4, 2025
Applicant:	The Administrators of the Tulane Educational Fund
Inventors:	Can, Mahir Bilen; Montero, Dillon

AWARDS AND GRANTS

Sponsor / Program	Project / Notes	Years	Amount
Faculty Mentor Award https://gssa.tulane.edu/faculty-award/	GSSA Faculty Award	2024–2025	—
Provost’s Proof of Concept (SPARC)	<i>Shortest Path and Antichain Metrics</i>	2025–2026	\$50,000
Louisiana Board of Regents	<i>Applications of Representation Theory to Quantum Error Correction</i> (Contract No. LEQSF(2023-25)-RD-A-21)	2023–2025	\$106,000
Fulbright U.S. Scholar Program	Scientific visit to Portugal (NOVA FCT), May–Aug 2024	2024	—
Louisiana Board of Regents	<i>Targeted Enhancement Research Grant</i> ; Co-PIs: Tai Huy Ha, Rafal Komendarczyk, Kalina Mincheva; Award No. 090ENH-21	2021–2022	\$102,840
Louisiana Board of Regents	<i>Enhance Research</i> ; Co-PI: Tai Huy Ha	2017–2020	\$109,956
NSA	<i>Algebra and Combinatorics of Symmetric Varieties and Their Embeddings</i> ; Co-PI: Michael Joyce	2014–2015	\$33,226
Louisiana Board of Regents	<i>Combinatorics of Variety of Complete Quadrics</i>	2011–2014	\$146,658
NSF	<i>Workshop on Algebraic Monoids, Algebraic Group Embeddings and Algebraic Combinatorics</i>	2012–2013	\$16,000
NSF	<i>Clifford Lectures on Algebraic Groups: Structure and Actions</i>	2015–2016	\$12,000

EDITORIAL SERVICE

Semigroup Forum
Journal of Gökova Geometry-Topology (GGT)

RECENT SEMINARS, CONFERENCES, LECTURE SERIES

Lecture series, seminars, colloquia, and conferences are abbreviated to **Lec**, **Sem**, **Col**, and **Conf**, respectively.

Type	Venue / Details	Date(s)
Conf	International Meeting on Numerical Semigroups 2026 (plenary speaker), Antalya, Türkiye	August 24–28, 2026
Conf	Conference on Theoretical and Computational Algebra 2026 (keynote speaker), Portugal	June 28–July 2, 2026
Sem	Tulane University Algebra Seminar	January 21, 2026
Conf	Fulbright Panel Moderator at Mathematical Association of America	August 7, 2025
Conf	Southern Regional Algebra Conference	April 4–6, 2025
Sem	Sectional Meetings of the AMS, University of Kansas (Lawrence)	March 29–30, 2025
Sem	(Zoom) Bilkent University Algebraic Geometry Seminar	March 28, 2025
Sem	Joint Meetings of the AMS, Seattle	Jan 8–11, 2025
Sem	(Zoom) Sabanci University Information Theory Seminar	December 18, 2025
Lec	Universidade de Lisboa, FCT	May 27; June 21, 24, 26, 2024
Lec	Universidade Nova de Lisboa, FCT	May 27; June 3, 2024

Sem	Emmy Noether Seminar at Friedrich-Alexander-Universität (Erlangen-Nürnberg)	May 17, 2024
Conf	Southern Regional Algebra Conference (keynote speaker), University of Houston–Downtown	March 21–23, 2024
Col	Saint Louis University	March 8, 2024
Conf	International Conference on Algebraic Geometry, Coding Theory and Combinatorics, Hyderabad, India	December 4–8, 2023
Conf	6th Annual Meeting of the SIAM Texas–Louisiana Section	November 3–5, 2023
Sem	(Online) Geometry Seminar, University of Rochester	October 6, 2023
Col	Okinawa Institute of Technology	July 16, 2023
Sem	The Combinatorics, Algebra, and Geometry Seminar, Drexel University	April 2023
Col	Lehigh University Mathematics Department Colloquium	April 2023
Sem	Algebra Seminar, University of South Alabama, Mobile	April 2023
Sem	(Online) Universidade Nova de Lisboa, Portugal	January 2023
Col	Indian Institute of Technology Bombay	January 2023

RECENTLY TAUGHT COURSES

Tulane University

Calculus III (Math 2210)	Undergraduate
Consolidated Calculus (Math 1310)	Undergraduate
Linear Algebra (Math 3060/6060)	Undergraduate & Graduate
Abstract Algebra I (Math 3110/6110)	Undergraduate & Graduate
Abstract Algebra II	Undergraduate
Honors Linear Algebra	Undergraduate Honors
Topics in Algebra: Lie Groups and Representation Theory	Graduate Topics
Topics in Algebra: Lie Algebras and Representation Theory	Graduate Topics
Topics in Algebra: Coding Theory I	Undergraduate & Graduate
Topics in Algebra: Coding Theory II	Undergraduate & Graduate
Topics in Algebra: Algebraic Geometry I	Graduate
Topics in Algebra: Algebraic Geometry II	Graduate
Combinatorics	Undergraduate

Other Institutions

Vector Calculus (Math 20E), University of California, San Diego	Undergraduate
Geometry of Coxeter Groups, Yale University	Graduate

RECENTLY ORGANIZED CONFERENCES AND MEETINGS

Event	Venue / Notes	Date(s)
Coding Theory and Cryptography	Fall Southeastern AMS Sectional Meeting, New Orleans; Coorganizers: Henry Chimal Dzul (UT San Antonio), Emily McMillon (Rice University)	October 2025
Generalized Numerical Semigroups (thematic session)	Conference on Theoretical and Computational Algebra 2024, Aveiro (Portugal)	July 3, 2024

PUBLICATIONS

1. Mixing and Merging Metric Spaces Using Directed Graphs (with S. Chakrabartty)
Submitted.
2. Horospherical Schubert Varieties (with S. Kannan, P. Saha)
Submitted.
3. Evaluation Codes in Bottleneck Metrics (with D. Montero, F. Özbudak)
Submitted.
4. Double Coset Schur Rings and Diagonal Subgroups (with J. Rainbolt)
Submitted.
5. Applications of Bruhat-Chevalley-Renner Decomposition to Metric-Aware Code-Based Cryptography (with E. C. Naig)
Submitted; available in the *Cryptology ePrint Archive*.
6. On the Homogeneous Space of a Pair of Associative Composition Algebras (with A. Casimiro, F. Özbudak)
Submitted.
7. Generalized hyperderivative Reed–Solomon codes (with B. Horowitz).
Designs, Codes and Cryptography **94**(4) (2026), 91.
8. *MDS Stabilizer Poset Codes*.
Designs, Codes and Cryptography, 94, 8 (2026). <https://doi.org/10.1007/s10623-025-01743-4>
9. Error correcting codes from general linear groups.
Journal of Algebra and Its Applications, 2025. DOI: 10.1142/S0219498825410324.
10. Higher Grassmann codes III: their decoding and quantum variants (with R. Joshua).
IEEE Transactions on Information Theory, 2025. DOI: 10.1109/TIT.2025.3596479.
11. Corrigendum to “Higher Grassmann codes II” [Finite Fields Appl. 89 (2023) 102211] (with R. Joshua, G. V. Ravindra).
Finite Fields and Their Applications, 2026. DOI: 10.1016/j.ffa.2025.102700.
12. K-Orbit Closures and Hessenberg Varieties (with M. Precup, J. Sharesian, Ö. Uğurlu).
Forum of Mathematics, Sigma **13** (2025), e103. DOI: 10.1017/fms.2025.103.
13. Shortest-Path and Antichain Metrics (with D. Montero).
Finite Fields and Their Applications **108** (2025), 102658. DOI: 10.1016/j.ffa.2025.102658.
14. Toric Richardson Varieties (with P. Saha).
Communications in Algebra **53** (2025), no. 5, 1770–1790. DOI: 10.1080/00927872.2024.2422028.
15. Nearly Toric Schubert Varieties of Type A (with N. Diaz Morera).
Turkish Journal of Mathematics **49** (2025), Article 6. DOI: 10.55730/1300-0098.3574.
16. Bounding the Sum of μ -Invariants on Pair Symbol Weights over Some Irreducible Codes (with F. Özbudak).
In: *26th International Symposium on Mathematical Theory of Networks and Systems (MTNS)*, Cambridge, UK, Aug 19–23, 2024.
17. Irreducible Unipotent Numerical Monoids (with N. Sakran).
Semigroup Forum **109** (2024), no. 2, 243–278. DOI: 10.1007/s00233-024-10442-5.
18. Defects of Codes from Higher Dimensional Algebraic Varieties (with R. Joshua, G. V. Ravindra).
Designs, Codes and Cryptography **92** (2024), no. 2, 477–494. DOI: 10.1007/s10623-023-01317-2.
19. Applications of Homogeneous Fiber Bundles to the Schubert Varieties (with P. Saha).
Geometriae Dedicata **217** (2023), Paper 103. DOI: 10.1007/s10711-023-00786-1.
20. On Generalized Wilf Conjectures (with N. Sakran).
Portugaliae Mathematica **81** (2024), no. 172, 21–55. DOI: 10.4171/pm/2192.
21. Locally Semialgebraic Superspaces and Nash Supermanifolds.
In: *Contemporary Mathematics* **804** (2024), 53–86. DOI: 10.1090/conm/804/16111.

22. Higher Grassmann Codes, II (with R. Joshua, G. V. Ravindra).
Finite Fields and Their Applications **89** (2023), 102211. DOI: 10.1016/j.ffa.2023.102211.
23. Idempotent Varieties of Incidence Monoids and Bipartite Posets (with A. Casimiro, A. Malheiro).
Algebras and Representation Theory **26** (2023), no. 5, 1975–2000. DOI: 10.1007/s10468-022-10162-1.
24. Asymptotic Semigroups and Two-sided Weak Orders.
Journal of Algebra **610** (2022), 338–365. DOI: 10.1016/j.jalgebra.2022.07.021.
25. A Catalanization Map on the Symmetric Group (with L. Nelson, K. Treat).
Enumerative Combinatorics and Applications **2:4** (2022), Article S4PP7. DOI: 10.54550/ECA2022V2S4PP7.
26. Algebraic Groups in Action.
Proceedings of the Gökova Geometry?Topology Conference 2021 (GGT), 2022. ISBN 978-1-57146-415-6.
27. Higher Grassmann Codes (with R. Joshua, G. V. Ravindra).
Finite Fields and Their Applications **76** (2021), 101905. DOI: 10.1016/j.ffa.2021.101905.
28. Incidence Monoids: Automorphisms and Complexity.
Semigroup Forum **103** (2021), no. 2, 414–438. DOI: 10.1007/s00233-021-10199-6.
29. Strong Gelfand Subgroups of $F \wr S_n$ (with Y. She, L. Speyer).
International Journal of Mathematics **32** (2021), no. 2, 2150010. DOI: 10.1142/S0129167X21500105.
30. Diagonal Orbits in a Type A Double Flag Variety of Complexity One (with T. Le).
Order **38** (2021), 97–110. DOI: 10.1007/s11083-020-09530-7.
31. On the Borel Submonoid of a Symplectic Monoid (with H. Houser, C. Wolfe).
Advances in Applied Mathematics **120** (2020), 102073. DOI: 10.1016/j.aam.2020.102073.
32. Toroidal Schubert Varieties (with R. Hodges, V. Lakshmibai).
Algebras and Representation Theory **23** (2020), no. 5, 1927–1943.
33. Stirling Posets (with Y. Cherniavsky).
Israel Journal of Mathematics **237** (2020), no. 1, 185–219. DOI: 10.1007/s11856-020-2004-1.
34. The Bruhat-Chevalley-Renner order on the set partitions (with Y. Cherniavsky)
Sém. Lothar. Combin. 84B (2020), Art. 64, 11 pp.
35. Adjoint Representations of the Symmetric Group (with Miles Jones).
Proceedings of the 12th ISAAC Congress (Trends in Mathematics)
Birkhäuser; (April 8, 2022)
36. Sects (with Aram Bingham).
Journal of Algebra 560 (2020), 192–218.
37. Remarks on Enveloping Semigroups
Communications in Algebra 48 (2020), no. 5, 2092–2109.
38. A Filtration on Equivariant Borel-Moore Homology (with Aram Bingham and Yıldıray Ozan)
Forum Math. Sigma 7 (2019), e18.
39. The rook monoid is lexicographically shellable
European J. Combin. 81 (2019), 265–275.
40. A Geometric Interpretation of the Intertwining Number (with Y. Cherniavsky and M. Rubey)
Electronic Journal of Combinatorics Volume 26, Issue 2 (2019)
41. The genesis of involutions (polarizations and lattice paths) (with Özlem Uğurlu).
Discrete Mathematics 342 (2019) 201–216.
42. Monoid Embeddings of Symmetric Varieties (with R. Howe and L. Renner).
Colloq. Math. 157 (2019), no. 1, 17–33.
43. Classification of Reductive Monoid Spaces Over an Arbitrary Field.
Advances in algebra 67–94, Springer Proc. Math. Stat., 277, Springer, Cham, 2019.
44. Loop-augmented forests and variant of Foulkes’ conjecture (with Jeff Remmel).
Algebraic Combinatorics Vol. 1 (2018) no. 5, p. 573–601
45. Wonderful Symmetric Varieties and Schubert Polynomials (with M. Joyce and B. Wyser).
Ars Mathematica Contemporanea Vol 15, No 2 (2018)
46. Counting Borel Orbits in Symmetric Varieties of Types BI and CII (with Özlem Uğurlu).
Arnold Mathematical Journal 4 (2018), no. 2, 213–250.

47. The Cross-section of a Spherical Double Cone.
Advances in Applied Mathematics Volume 101, October 2018, Pages 215–231
48. A representation on labeled rooted forests
Communications in Algebra 46 (2018), no. 10, 4273–4291.
49. Complex G_2 and associative grassmannian (with S. Akbulut).
Journal of Gökova Geometry Topology Volume 11 (2017) 56–79.
50. Monodromy of torus fibrations and decomposability problem (with M. Topkara).
Topology and Its Applications 222 (2017), 165–176.
51. An Analogue of Springer fibers in certain wonderful compactifications (with R. Howe and M. Joyce).
Journal of Algebra and its Applications 16 (2017), no. 9.
52. Corrigendum to “Generators of the Hecke algebra of (S_{2n}, B_n) ” (with Ş. Özden).
Advances in Math. Volume 308 (2017), pg 1337–1339
Extended version: <http://arxiv.org/pdf/1407.3700v1.pdf>
53. Toroidal affine Nash groups
Journal of Lie Theory 26 (2016), no. 4, 1069–1077.
54. Chains in Weak Order Posets Associated to Involutions (with M. Joyce and B. Wyser).
J. Combin. Theory Ser. A 137 (2016), 207–225.
55. Lexicographic shellability of the Bruhat-Chevalley order on fixed-point-free involutions (with Y. Cherniavsky and T. Twelbeck).
Israel J. Math. 207 (2015), no. 1, 281–299.
56. Divisors and specializations of Lucas polynomials (with T. Amdeberhan and M. Jensen).
Journal of Combinatorics 6 (2015), no. 1-2, 69–89.
57. Omitting Parentheses From the Cyclic Notation (with Y. Cherniavsky).
Mediterr. J. Math. 12 (2015), no. 4, 1199–1214.
58. Some plethystic identities and Kostka-Foulkes polynomials.
Ars Combinatoria 122 (2015), 411–421.
59. $SL(2)$ -regular subvarieties of complete quadrics (with M. Joyce).
Communication Series of Fields Institute Book 71 (2014). (Springer.)
60. Bruhat Order on Partial Fixed Point Free Involutions (with Y. Cherniavsky and T. Twelbeck).
Electronic Journal of Combinatorics Volume 21, Issue 4 (2014)
61. Lexicographic Shellability of Partial Involutions (with T. Twelbeck).
Discrete Mathematics Volume 335, 66–80, November 2014
62. On Bruhat Posets Associated to Composition (with Y. Cherniavsky).
DMTCS Proceedings 26th Int. Conference on Formal Power Series and Algebraic Comb. (2014).
63. Calculating Heegaard-Floer Homology by Counting Lattice Points in Tetrahedra (with Ç. Karakurt).
Acta Mathematica Hungarica Issue 1, Volume 144, 43–75 (2014)
64. Branching through G_2 (with Roger Howe).
Proceedings of the Gökova Geometry-Topology Conference
2013, 41–75, Gökova Geometry/Topology Conference (GGT), Gökova, 2014.
65. Unipotent invariant matrices (with R. Howe and M. Joyce).
Linear Algebra and its Applications 439 (2013), no. 1, 196–210.
66. Weak order on complete quadrics (with M. Joyce).
Trans. Amer. Math. Soc. 365 (2013), no. 12, 6269–6282.
67. On the Bruhat-Chevalley order on fixed-point-free involutions (with Y. Cherniavsky, and T. Twelbeck).
The Seventh European Conference on Combinatorics, Graph Theory and Applications, 457–462, CRM Series, 16, Ed. Norm., Pisa, 2013.
68. Ordered Bell numbers, Hermite polynomials, skew Young tableaux and Borel orbits (with M. Joyce).
Journal of Comb. Theory, Series A. Vol. 119, Issue 8, pp. 1798–1810, (2012).
69. Irreducible representations of semisimple algebraic groups and supersolvable lattices.
Journal of Algebra Volume 351, Issue 1 (2012), 235–250.
70. The Bruhat-Chevalley ordering on the rook monoid (with L.E. Renner).

- Turkish Journal of Math.* No. 36 (2012), 499–519.
71. From parking functions to Gelfand pairs (with K. Aker).
Proc. Amer. Math. Soc. 140 (2012), 1113–1124.
 72. Generators of the Hecke algebra of (S_{2n}, B_n) (with K. Aker).
Advances in Mathematics 231 (2012), no. 5, 2465–2483.
 73. Partitions, rooks, and symmetric functions in noncommuting variables (with B. Sagan).
Electron. J. Combin. 18 (2011), no. 2, Paper 3.
 74. Broken Bracelets, Molien Series, Paraffin Wax and an Elliptic Curve of Conductor 48 (with T. Amdeberhan and V. Moll).
SIAM Journal on Discrete Math. 25(4) (2011), pp. 1843–1859.
 75. R -polynomials of finite monoids of Lie type (with K. Aker, M. Taşkın).
Internat. J. Algebra Comput. 20 (2010), no. 6, 793–805.
 76. H -polynomials and rook polynomials (with L.E. Renner).
Internat. J. Algebra Comput. 18 (2008), no. 5, 935–949.
 77. Nested Hilbert schemes and the nested q, t -Catalan series.
DMTCS Proceedings 20th Int. Conference on Formal Power Series and Algebraic Comb. (2008).
 78. A Proof of the q, t -Square Conjecture (with N. Loehr).
Journal of Comb. Theory, Series A 113 (2006), no. 7, 1419–1434.

PREPRINTS AND WORKING PAPERS (ANNOUNCED)

These are announced preprints; versions may be updated on arXiv.

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| <i>On the Fixed Points of a Regular Unipotent Element</i> | https://arxiv.org/abs/2012.10487 |
| <i>The Betti Numbers of a Determinantal Variety</i> | https://arxiv.org/abs/1903.06849 |
| <i>Ansatz for $(-1)^{n-1}\nabla p_n$ (with Soumya D Banerjee, Adriano Garsia)</i> | https://arxiv.org/abs/1806.05704 |
| <i>Sphericity of Smooth Schubert Varieties (with Reuven Hodges)</i> | https://arxiv.org/abs/1803.05515 |
| <i>On the Cohomology Rings of Grassmann Varieties and Hilbert Schemes (with Jeff Remmel)</i> | https://arxiv.org/abs/1706.02713 |
| <i>Complexity c Pairs in Simple Algebraic Groups</i> | https://arxiv.org/abs/1703.05076 |
| <i>Combinatorial Models for the Variety of Complete Quadrics (with S. Banerjee, Michael Joyce)</i> | https://arxiv.org/abs/1610.02698 |
| <i>Equivariant K-Theory of Smooth Projective Spherical Varieties (with S. Banerjee)</i> | https://arxiv.org/abs/1603.04926 |

BOOKS EDITED

- *A Glimpse into Geometric Representation Theory* (co-edited with J. Feldvoss). Contemporary Mathematics 804, American Mathematical Society, Providence, RI, 2024. ISBN 978-1-4704-7090-6; eISBN 978-1-4704-7664-9.
- *Algebraic Monoids, Group Embeddings, and Algebraic Combinatorics* (co-edited with Z. Li, B. Steinberg, Q. Wang). Fields Institute Communications 71, Springer, 2014. DOI 10.1007/978-1-4939-0938-4.
- *Algebraic Groups: Structure and Actions* (editor). Proceedings of Symposia in Pure Mathematics 94, American Mathematical Society, Providence, RI, 2017. ISBN 978-1-4704-2601-9; eISBN 978-1-4704-3751-0.