

MAHIR BILEN CAN

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EDUCATION

PhD. 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

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

PhD. AND MS. ADVISEES

PhD Theses (resp. Ms Theses) are indicated by PhD (resp. by Ms).

Zafar Iqbal (PhD, Uni. Nova de Lisboa, FTC, co-advising with Prof. Ana Casimiro)	2024 – Present	
Dillon Montero (PhD)	2022– Present	
Naufil Sakran (PhD)	2021– Present	
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
Dejun Zhang (Ms)	2020	Topological Galois Theory of Riemann Surfaces

UNDERGRADUATE ADVISEES

Honor's Theses (resp. Senior Theses) are indicated by HT (resp. by ST). Co-advising is indicated by 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

SERVICE

Various university-wide committees.

PATENT APPLICATION

“QUANTUM ERROR CORRECTING CODES FROM HIGHER GRASSMANN CODES” (Attorney Docket Number : 103361-172PV1), Inventors: Mahir Bilen Can, Roy Joshua, Ravindra Grivaru.

AWARDS and GRANTS

1. Louisiana Board of Regents, *Applications of Representation Theory to Quantum Error Correction*, (2023–2025) \$106,000.
2. Fulbright US Scholar Fellowship For Scientific Visit to Portugal (May–August 2024).
3. Louisiana Board of Regents, *Targeted Enhancement Research Grant*, Co-PI's: with Tai Huy Ha, Rafal Komendarczyk, Kalina Mincheva, 090ENH-21 (2021–2022) \$102,840.
4. Louisiana Board of Regents, *Enhance Research*, Co-PI with Tai Huy Ha (2017–2020) \$109,956.
5. NSA Standard Grant, *Algebra and Combinatorics of Symmetric Varieties and Their Embeddings*, Co-PI: Michael Joyce, (2014–2015) \$33,226.
6. Louisiana Board of Regents Research and Development Grant, *Combinatorics of Variety of Complete Quadrics* (2011–2014) \$146,658.
7. NSF Workshop Grant, *Workshop on Algebraic Monoids, Algebraic Group Embeddings and Algebraic Combinatorics* (2012–2013) \$16,000.
8. NSF Workshop Grant, *Clifford Lectures on Algebraic Groups: Structure and Actions* (2015–2016) \$12,000.

EDITORIAL SERVICE

1. Semigroup Forum
2. 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.

1. **Lec:** Universidade de Lisboa, FCT, May 27, June 21, 24, 26 2024
2. **Lec:** Universidade Nova de Lisboa, FCT, May 27, June 3 2024
3. **Sem:** Emmy Noether Seminar at Friedrich-Alexander-Universität (Erlangen-Nürnberg), May 17, 2024
4. **Conf:** Keynote speaker at the Southern Regional Algebra Conference 2024, March 21-23, University of Houston-Downtown
5. **Col:** St. Louis University, March 8, 2024.
6. **Conf:** International Conference on Algebraic Geometry, Coding Theory and Combinatorics, Hyderabad, India, December 4-8, 2023
7. **Conf:** 6th Annual Meeting of the SIAM Texas-Louisiana Section, November 3-5, 2023
8. **Sem:** (Online) Geometry Seminar, University of Rochester, October 6, 2023
9. **Col:** Okinawa Institute of Technology, July 16, 2023
10. **Sem:** The Combinatorics, Algebra, and Geometry Seminar, Drexel University, April 2023
11. **Col:** Lehigh University Mathematics Department Colloquium, Bethlehem, April 2023
12. **Sem:** Algebra Seminar, University of South Alabama, Mobile, April 2023
13. **Sem:** (Online) Universidade Nova de Lisboa, Portugal, January 2023
14. **Col:** Indian Institute of Technology Bombay, January, 2023
15. **Sem:** Washington University St. Louis, November 2022
16. **Conf:** Joachim Rosenthal's 60th Birthday Conference, University of Zurich, July 10, 2022
17. **Conf:** Southern Regional Algebra Conference, March 18-20, 2022
18. **Conf:** 27th Gökova Geometry-Topology Conference, Akyaka/Muğla, Turkey, May 30 - June 04, 2022
19. **Lec:** A week long lecture series in Universidade Nova de Lisboa, Portugal, December 2021
20. **Lec:** A week long online lecture series in Gökova Geometry-Topology Conference, Akyaka/Muğla, Turkey, August, 2021
21. **Sem:** (Online) : Institute of Mathematics of Czech Academy of Sciences, Prague, Czech Republic, December 9, 2020
22. **Sem:** (Online) Okinawa Institute of Technology, Japan, September 29, 2020
23. **Conf:** Southern Local Algebra Meeting, Tulane University, March 7-8, 2020
24. **Sem:** Geometry Seminar, University of Texas Rio Grande Valley, November 2019
25. **Sem:** Algebraic Geometry Seminar, The Ohio State University, December 6, 2019
26. **Conf:** Sectional Meetings of the AMS, Honolulu, Hawaii, March 25, 2019
27. **Sem:** Geometry Seminar, University of Rochester, Rochester, NY, Oct 1, 2018
28. **Conf:** Silk Road Geometry Conference 2018, GGT Institute, Akyaka-Turkey , June 6, 2018
29. **Conf:** AMS Spring Eastern Sectional Meeting, Northeastern University, April 18, 2018
30. **Conf:** AMS Fall Western Sectional Meeting, UC Riverside, Nov. 4, 2017
31. **Conf:** 30th National Mathematics Symposium of Turkish Mathematical Society, Atılım University, Ankara-Turkey, Sept. 6-9, 2017
32. **Conf:** Southern Regional Algebra Conference, Mobile Alabama, March 17-19 2017
33. **Conf:** Joint Meetings of the AMS. Combinatorial Invariants of Flag Manifolds and Related Varieties, Atlanta, Jan 5, 2017

RECENTLY TAUGHT COURSES

1. Topics in Algebra: Lie Groups and Representation Theory, Fall 2024
2. Linear Algebra (Undergrad), Spring 2024
3. Topics in Algebra: Lie Algebras and Representation Theory (Grad), Spring 2023
4. Abstract Algebra I (Math 3110/6110), Fall 2022
5. Consolidated Calculus (Math 1310), Fall 2022
6. Topics in Algebra: Coding Theory II (Grad&Undergrad), Spring 2022
7. Topics in Algebra: Coding Theory I (Grad&Undergrad), Fall 2021
8. Linear Algebra (Undergrad), Fall 2021
9. Abstract Algebra II (Undergrad) , Spring 2020

10. Abstract Algebra I (Undergrad), Fall 2019
11. Honor's Linear Algebra, Fall 2019
12. Topics in Algebra: Algebraic Geometry II (Grad), Spring 2019
13. Topics in Algebra: Algebraic Geometry I (Grad), Fall 2018.
14. Abstract Algebra I (Undergrad), Fall 2018.
15. Topics in Algebra: Lie Groups and Representation Theory II (Grad), Spring 2018.
16. Combinatorics (Undergrad), Fall 2017.
17. Topics in Algebra: Lie Groups and Representation Theory (Grad), Fall 2017.
18. At UC San Diego: Math 20E - Vector Calculus, Spring Quarter 2017.

RECENTLY ORGANIZED CONFERENCES AND MEETINGS

1. "Generalized Numerical Semigroups" a thematic session as part of the "Conference on Theoretical and Computational Algebra 2024" Aveiro, July 3, 2024
2. "Southern Regional Algebra Conference 2023" March 24–26, 2023 Tulane University. Jointly organized with Kalina Mincheva and Naufil Sakran
3. "Geometric and Combinatorial Representation Theory" November 20–21, 2021. Fall Southeastern Sectional Meeting of the AMS, Virtual (formerly at the U. of South Alabama, Mobile, AL). Jointly organized with Jörg Feldvoss
4. "Geometries defined by differential forms" July 7–13, 2020 8th European Congress of Mathematics, Portoroz Slovenia. Jointly organized with Sergei Grigorian and Sema Salur
5. "Geometries defined by differential forms" July 29–August 2, 2019. Aveiro, Portugal. Jointly organized with Sergei Grigorian and Sema Salur
6. "A conference on Commutative Algebra and Representation Theory" November 8–10, 2018. Tulane University. Jointly organized with Tai Ha
7. "Geometries defined by differential forms" April 21–22, 2018. AMS Spring Eastern Sectional Meeting, Northeastern University, Boston. Jointly organized with Sergei Grigorian and Sema Salur

PUBLICATIONS

1. Irreducible Unipotent Numerical Monoids (with N. Sakran)
Semigroup Forum 2024
2. Defects of Codes from Higher Dimensional Algebraic Varieties (with R. Joshua and G.V. Ravindra)
Designs, Codes and Cryptography 92 (2024), no. 2, 477–494.
3. Applications of Homogeneous Fiber Bundles to the Schubert Varieties (with P. Saha)
Geometriae Dedicata 217 (2023), no. 6, Paper No. 103
4. On Generalized Wilf Conjectures, (with N. Sakran)
Portugaliae Mathematica 81 (2024), no. 1-2, 21–55.
5. Locally Semialgebraic Superspaces and Nash Supermanifolds
Contemporary Mathematics, 804 American Mathematical Society, [Providence], RI, 2024, 53–86.
6. Higher Grassmann Codes, II (with R. Joshua and G.V. Ravindra)
Finite Fields and Their Applications 89 (2023), Paper No. 102211
7. Idempotent Varieties of Incidence Monoids and Bipartite Posets (with Ana Casimiro and António Malheiro)
Algebras and Representation Theory 26 (2023), no. 5, 1975–2000. (DOI: 10.1007/s10468-022-10162-1)
8. Asymptotic semigroups and two-sided weak orders
Journal of Algebra 610 (2022), 338–365

9. A Catalanization Map on the Symmetric Group (with Luke Nelson and Kevin Treat)
Enumerative Combinatorics and Applications ECA 2:4 (2022) Article #S4PP7
10. Algebraic Groups in Action
Proceedings of the Gökova Geometry-Topology Conference 2021
Gökova Geometry/Topology Conference (GGT), Gökova, (2022). ISBN: 978-1-57146-415-6
11. Higher Grassmann Codes (with R. Joshua and G.V. Ravindra)
Finite Fields and Their Applications 76 (2021) Paper No. 101905.
12. Toric Codes from Order Polytopes (with T. Hibi)
Discrete Comput. Geom. 69 (2023), no. 3, 834–848, (DOI 10.1007/s00454-021-00329-w).
13. Incidence Monoids: Automorphisms and Complexity
Semigroup Forum 103 (2021), no. 2, 414–438.
14. Strong Gelfand Subgroups of $F \wr S_n$ (with Yiyang She and Liron Speyer).
International Journal of Mathematics 32 (2021), no. 2
15. Diagonal Orbits in a Type A Double Flag Variety of Complexity One (with Tien Le).
Order 38 (2021), no. 1, 97–110.
16. On the Borel Submonoid of a Symplectic Monoid (with Hayden Houser and Corey Wolfe).
Adv. in Appl. Math. 120 (2020), 102073, 26 pp.
17. Toroidal Schubert Varieties (with Reuven Hodges, Venkatramani Lakshmibai).
Algebras and Representation Theory 23 (2020), no. 5, 1927–1943.
18. Stirling Posets (with Yonah Cherniavsky).
Israel Journal of Math. 237 (2020), no. 1, 185–219.
19. The Bruhat-Chevalley-Renner order on the set partitions (with Y. Cherniavsky)
Sém. Lothar. Combin. 84B (2020), Art. 64, 11 pp.
20. Adjoint Representations of the Symmetric Group (with Miles Jones).
Proceedings of the 12th ISAAC Congress (Trends in Mathematics)
Birkhäuser; (April 8, 2022)
21. Sects (with Aram Bingham).
Journal of Algebra 560 (2020), 192–218.
22. Remarks on Enveloping Semigroups
Communications in Algebra 48 (2020), no. 5, 2092–2109.
23. A Filtration on Equivariant Borel-Moore Homology (with Aram Bingham and Yıldıray Ozan)
Forum Math. Sigma 7 (2019), e18.
24. The rook monoid is lexicographically shellable
European J. Combin. 81 (2019), 265–275.
25. A Geometric Interpretation of the Intertwining Number (with Y. Cherniavsky and M. Rubey)
Electronic Journal of Combinatorics Volume 26, Issue 2 (2019)
26. The genesis of involutions (polarizations and lattice paths) (with Özlem Uğurlu).
Discrete Mathematics 342 (2019) 201–216.
27. Monoid Embeddings of Symmetric Varieties (with R. Howe and L. Renner).
Colloq. Math. 157 (2019), no. 1, 17–33.
28. Classification of Reductive Monoid Spaces Over an Arbitrary Field.
Advances in algebra 67–94, Springer Proc. Math. Stat., 277, Springer, Cham, 2019.
29. Loop-augmented forests and variant of Foulkes’ conjecture (with Jeff Remmel).
Algebraic Combinatorics Vol. 1 (2018) no. 5, p. 573–601
30. Wonderful Symmetric Varieties and Schubert Polynomials (with M. Joyce and B. Wyser).
Ars Mathematica Contemporanea Vol 15, No 2 (2018)
31. Counting Borel Orbits in Symmetric Varieties of Types BI and CII (with Özlem Uğurlu).
Arnold Mathematical Journal 4 (2018), no. 2, 213–250.
32. The Cross-section of a Spherical Double Cone.
Advances in Applied Mathematics Volume 101, October 2018, Pages 215–231
33. A representation on labeled rooted forests

- Communications in Algebra* 46 (2018), no. 10, 4273–4291.
34. Complex G_2 and associative grassmannian (with S. Akbulut).
Journal of Gökova Geometry Topology Volume 11 (2017) 56–79.
 35. Monodromy of torus fibrations and decomposability problem (with M. Topkara).
Topology and Its Applications 222 (2017), 165–176.
 36. 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.
 37. 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>
 38. Toroidal affine Nash groups
Journal of Lie Theory 26 (2016), no. 4, 1069–1077.
 39. Chains in Weak Order Posets Associated to Involutions (with M. Joyce and B. Wyser).
J. Combin. Theory Ser. A 137 (2016), 207–225.
 40. 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.
 41. Divisors and specializations of Lucas polynomials (with T. Amdeberhan and M. Jensen).
Journal of Combinatorics 6 (2015), no. 1-2, 69–89.
 42. Omitting Parentheses From the Cyclic Notation (with Y. Cherniavsky).
Mediterr. J. Math. 12 (2015), no. 4, 1199–1214.
 43. Some plethystic identities and Kostka-Foulkes polynomials.
Ars Combinatoria 122 (2015), 411–421.
 44. $SL(2)$ -regular subvarieties of complete quadrics (with M. Joyce).
Communication Series of Fields Institute Book 71 (2014). (Springer.)
 45. Bruhat Order on Partial Fixed Point Free Involutions (with Y. Cherniavsky and T. Twelbeck).
Electronic Journal of Combinatorics Volume 21, Issue 4 (2014)
 46. Lexicographic Shellability of Partial Involutions (with T. Twelbeck).
Discrete Mathematics Volume 335, 66–80, November 2014
 47. On Bruhat Posets Associated to Composition (with Y. Cherniavsky).
DMTCS Proceedings 26th Int. Conference on Formal Power Series and Algebraic Comb. (2014).
 48. Calculating Heegaard-Floer Homology by Counting Lattice Points in Tetrahedra (with Ç. Karakurt).
Acta Mathematica Hungarica Issue 1, Volume 144, 43–75 (2014)
 49. Branching through G_2 (with Roger Howe).
Proceedings of the Gökova Geometry-Topology Conference
2013, 41–75, Gökova Geometry/Topology Conference (GGT), Gökova, 2014.
 50. Unipotent invariant matrices (with R. Howe and M. Joyce).
Linear Algebra and its Applications 439 (2013), no. 1, 196–210.
 51. Weak order on complete quadrics (with M. Joyce).
Trans. Amer. Math. Soc. 365 (2013), no. 12, 6269–6282.
 52. 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.
 53. 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).
 54. Irreducible representations of semisimple algebraic groups and supersolvable lattices.
Journal of Algebra Volume 351, Issue 1 (2012), 235–250.
 55. The Bruhat-Chevalley ordering on the rook monoid (with L.E. Renner).
Turkish Journal of Math. No. 36 (2012), 499–519.
 56. From parking functions to Gelfand pairs (with K. Aker).
Proc. Amer. Math. Soc. 140 (2012), 1113 - 1124.

57. Generators of the Hecke algebra of (S_{2n}, B_n) (with K. Aker).
Advances in Mathematics 231 (2012), no. 5, 2465–2483.
58. Partitions, rooks, and symmetric functions in noncommuting variables (with B. Sagan).
Electron. J. Combin. 18 (2011), no. 2, Paper 3.
59. 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.
60. R -polynomials of finite monoids of Lie type (with K. Aker, M. Taşkin).
Internat. J. Algebra Comput. 20 (2010), no. 6, 793–805.
61. H -polynomials and rook polynomials (with L.E. Renner).
Internat. J. Algebra Comput. 18 (2008), no. 5, 935–949.
62. Nested Hilbert schemes and the nested q, t -Catalan series.
DMTCS Proceedings 20th Int. Conference on Formal Power Series and Algebraic Comb. (2008).
63. A Proof of the q, t -Square Conjecture (with N. Loehr).
Journal of Comb. Theory, Series A 113 (2006), no. 7, 1419–1434.

BOOKS EDITED

- *A Glimpse into Geometric Representation Theory*, jointly edited with Jörg Feldvoss, Contemp. Math., 804 American Mathematical Society, Providence, RI, (2024).
- *Algebraic Monoids, Group Embeddings and Algebraic Combinatorics*, jointly edited with Zhenheng Li, Benjamin Steinberg and Qiang Wang. Fields Institute Communication Series, Volume 71, (2014), Springer.
- *Clifford Lectures on Algebraic Groups: Structure and Actions*. Proceedings of Symposia in Pure Mathematics series of A.M.S. Volume 94.