

David E. Anderson

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POSITIONS

June 2020–present	Associate Professor, Ohio State University
December 2023–March 2024	Simons-CRM Professor, Université du Québec à Montréal
Aug. 2014–May 2020	Assistant Professor, Ohio State University
March 2013–Aug. 2014	“Excellence” Postdoctoral Fellow, Instituto Nacional de Matemática Pura e Aplicada
Sept. 2012–March 2013	FSMP Postdoctoral Fellow, Institut de Mathématiques de Jussieu
Sept. 2009–Aug. 2012	Research Associate / NSF Postdoctoral Fellow, University of Washington
Jan.–June 2011	Visiting Scholar, University of British Columbia

GRANTS AND AWARDS

NSF RTG Grant DMS-2231565 (“RTG: Arithmetic, Combinatorics, and Topology of Algebraic Varieties,” \$2,142,315, June 2023—May 2028), *recommended for funding*

NSF CAREER Grant DMS-1945212 (“CAREER: Equivariant and Infinite-Dimensional Combinatorial Algebraic Geometry,” \$400,000, June 2020—May 2025)

NSA Conference Grant (“Facets of Algebraic Geometry,” \$20,000)

NSA Conference Grant H98230-18-1-0228 (“Fields retrospective workshop on Combinatorial Algebraic Geometry,” \$16,000)

NSF Conference Grant DMS-1763010, March 2018–March 2019 (“Midwest workshop on Schubert calculus,” \$27,210)

NSF Grant DMS-1502201, August 2015–July 2019 (“Degeneracy loci, toric degenerations, and equivariant algebraic geometry,” \$130,000)

NSA Young Investigator Grant, 2015 (declined)

NSF Postdoctoral Fellowship, 2009–2012

Clay Liftoff Fellowship, 2009

EDUCATION

University of Michigan, Ph.D., 2009

Thesis advisor: William Fulton

Thesis title: *Degeneracy loci and G_2 flags*

Columbia University, B.A., 2002, *magna cum laude*

JOURNAL ARTICLES AND PREPRINTS

1. “Integral equivariant cohomology of affine Grassmannians and moduli of vector bundles,” in preparation (2023).
2. “Strong equivariant positivity for homogeneous varieties and back-stable coproduct coefficients,” preprint, arXiv:2302.12765 (2023).
3. “Toric arc schemes and q -enumeration of lattice points in polytopes,” with Aniket Shah, preprint, arXiv:2302.03761 (2023).
4. “The multiplicity of a singularity in a vexillary Schubert variety,” with T. Ikeda, M. Jeon, and R. Kawago, preprint, arXiv:2112.07375 (2021).
5. “Infinite flags and Schubert polynomials,” preprint, arXiv:2105.11404 (2021).
6. “Identities for Schur-type determinants and pfaffians,” with William Fulton, preprint, arXiv:2103.16505 (2021).
7. “Schubert polynomials in types A and C,” with William Fulton, preprint, arXiv:2102.05731 (2021).
8. “Gillet descent for connective K-theory,” preprint, arXiv:2011.06074 (2020).
9. “Motivic classes of degeneracy loci and pointed Brill-Noether varieties,” with Linda Chen and Nicola Tarasca, *J. Lond. Math. Soc.* **105** (2022), 1787–1822.
10. Appendix to “Whittaker functions from motivic Chern classes,” with Leonardo Michalcea and Changjian Su, *Transformation Groups* **27** (2022), 1045–1067.
11. “On the finiteness of quantum K-theory of a homogeneous space,” with Linda Chen and Hsian Hua Tseng, appendix by H. Iritani, *Int. Math. Res. Notices IMRN* **2022**, no. 2 (2022), 1313–1349.
12. “K-classes of Brill-Noether loci and a determinantal formula,” with Linda Chen and Nicola Tarasca, *Int. Math. Res. Notices IMRN* **2022** no. 16 (2022), 12653–12698.
13. “Equivariant Grothendieck-Riemann-Roch and localization in operational K-theory,” with Richard Gonzales and Sam Payne, appendix by Gabriele Vezzosi, *Algebra & Number Theory* **15** (2021), 341–385.
14. “Vexillary signed permutations revisited,” with William Fulton, *Algebraic Combinatorics* **3** (2020), 1041–1057.

15. “Effective divisors on Bott-Samelson varieties,” *Transformation Groups* **24** (2019), 691–711.
16. “K-theoretic Chern class formulas for vexillary degeneracy loci,” *Adv. Math.* **350** (2019), 440–485.
17. “Diagrams and essential sets for signed permutations,” *Electron. J. Comb.* **25** (3) (2018), #P3.46.
18. “Chern class formulas for classical-type degeneracy loci,” with William Fulton, *Compositio Math.* **154** (2018), 1746–1774.
19. “Operational K-theory,” with Sam Payne, *Documenta Math.* **20** (2015) 357–399.
20. “Degeneracy loci, Pfaffians, and vexillary signed permutations in types B, C, and D,” with William Fulton, preprint, arXiv:1210.2066 (2012).
21. “Positivity of equivariant Gromov-Witten invariants,” with Linda Chen, *Math. Res. Lett.* **22** (2015), no. 1, 1–9.
22. “Equivariant quantum Schubert polynomials,” with Linda Chen, *Adv. Math.* **254** (2014), 300–330.
23. “Okounkov bodies of finitely generated divisors,” with Alex Küronya and Victor Lozovanu, *Int. Math. Res. Not. IMRN* 2014, no. 9, 2343–2355.
24. “Schubert varieties are log Fano over the integers,” with Alan Stapledon, *Proc. Amer. Math. Soc.* **142** (2014), no. 2, 409–411.
25. “The Lie algebra of type G_2 is rational over its quotient by the adjoint action,” with Mathieu Florence and Zinovy Reichstein, *C. R. Math. Acad. Sci. Paris* **351** (2013), no. 23–24, 871–875.
26. “Eigenvalues of Hermitian matrices and equivariant cohomology of Grassmannians,” with Edward Richmond and Alexander Yong, *Compositio Math.* **149** (2013), no. 9, 1569–1582.
27. “Arc spaces and equivariant cohomology,” with Alan Stapledon, *Transformation Groups* **18**, no. 4 (2013), 931–969.
28. “Okounkov bodies and toric degenerations,” *Math. Ann.* **356** (2013), 1183–1202.
29. “Degeneracy of triality-symmetric morphisms,” *Algebra & Number Theory* **6** (2012), 689–706.
30. “Positivity and Kleiman transversality in equivariant K-theory of homogeneous spaces,” with Steve Griffeth and Ezra Miller, *J. Eur. Math. Soc.* **13** (2011), 57–84.
31. “Chern class formulas for G_2 Schubert loci,” *Trans. Amer. Math. Soc.* **363** (2011), 6615–6646.

32. “Positivity in the cohomology of flag bundles (after Graham),” preprint, arXiv:0711.0983.
33. “Schubert polynomials and classes of Hessenberg varieties,” with Julianna Tymoczko, *J. Algebra* **323** (2010), 2605–2623.
34. “A note on quantum products of Schubert classes in a Grassmannian,” *J. Algebr. Comb.* **25** (2007), 349–356.
35. “A cusp singularity with no Galois cover by a complete intersection,” *Proc. Amer. Math. Soc.* **132** (2004), 2517–2527.

BOOKS

1. *Equivariant Cohomology in Algebraic Geometry*, with William Fulton, Cambridge Studies in Advanced Mathematics, 210, Cambridge Univ. Press (November 2023). Draft available at people.math.osu.edu/anderson.2804/ecag/.
2. *Facets of Algebraic Geometry: A Collection in Honor of William Fulton’s 80th Birthday*, ed. P. Aluffi, D. Anderson, M. Hering, M. Mustața, and S. Payne, Cambridge Univ. Press, 2022.

PEER-REVIEWED CONFERENCE PROCEEDINGS

1. “Minuscule Schubert calculus and the geometric Satake correspondence,” with Antonio Nigro, in *Schubert Calculus and its applications in combinatorics and representation theory*, Proceedings of International Festival in Schubert Calculus (Guangzhou, 2017), ed. J. Hu, C. Li, and L. C. Mihalcea, Springer, 2020.
2. “Multiplicities of Schubert varieties in the symplectic flag variety,” with Takeshi Ikeda, Minyoung Jeon, and Ryotaro Kawago, *Proceedings of FPSAC 2019, Séminaire Lotharingien de Combinatoire* **82B** (2019), Article #95, 12pp.
3. “Computing torus-equivariant K-theory of singular varieties,” in *Algebraic Groups: Structure and Actions*, ed. Mahir Can, Proc. Sympos. Pure Math. **94** (2017), 1–15.
4. “Introduction to equivariant cohomology in algebraic geometry,” lectures from a mini-course given at the IMPANGA Summer School on Algebraic Geometry, July 2010; in *Contributions to Algebraic Geometry*, ed. Piotr Pragacz, 2012.

TEACHING

Ohio State University (Columbus)

Math 8110, Geometry of homogeneous spaces	(Spring 2021)
Math 6502, Combinatorics II	(Spring 2020)
Math 7161, Lie Algebras	(Fall 2018)
Math 8140, Equivariant Cohomology	(Spring 2018)
Math 6112, Algebra II	(Spring 2017, Spring 2019)
Math 7142, Algebraic Geometry II	(Spring 2016)
Math 7141, Basic Algebraic Geometry I	(Fall 2015, Fall 2017, Fall 2018, Fall 2021)
Math 2174, Linear algebra and differential equations	(Fall 2014, Spring 2017, Fall 2017, Fall 2020, Fall 2021, Fall 2022, Spring 2023)
Math 4570, Applications of Algebraic Topology	(Spring 2023)

Instituto Nacional de Matemática Pura e Aplicada (Rio de Janeiro)

Equivariant cohomology	(March–June 2014)
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Instituto de Matemática y Ciencias Afines (Lima)

Mini-course on Schubert calculus for college students.	(March 2014)
Mini-course on symmetric functions for college students.	(August 2013)

University of Washington (Seattle)

Linear Analysis (systems of ODEs, some PDEs)	(Spring 2012)
Geometry and Combinatorics of Homogeneous Spaces	(Fall 2011)
Matrix Algebra	(Fall 2010)

University of Michigan (Ann Arbor)

Geometry of Homogeneous Spaces (with W. Fulton)	(Winter 2009)
Calculus I	(Fall 2004, Fall 2008)
Calculus II	(Fall 2006)

Canada/USA Mathcamp (Tacoma)

Instructor and mentor for five-week program for gifted high-school students. Taught courses on projective geometry, combinatorics, and singularities of plane curves.	(Summer 2006)
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Middle East Technical University (Ankara)

Calculus I	(Fall 2002)
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MENTORING

Postdocs

- Joshua Kiers (Ohio State, 2020–2022, now TT Assistant Professor at Mar-
ian University, Indianapolis)
Sjuvon Chung (Ohio State, 2017–2020)
Davide Fusi (Ohio State, 2015–2016, now Associate Professor at Univer-
sity of South Carolina, Beaufort)

PhD students

- Chen Chen (Ohio State, PhD expected 2023)
Ian Cavey (Ohio State, PhD 2023; postdoc at University of Illinois,
Urbana-Champaign)
Minyoung Jeon (Ohio State, PhD 2022; postdoc at University of Georgia,
Athens)
Aniket Shah (Ohio State, PhD 2021; postdoc at Charles University,
Prague)
Jordan Lambert Silva (Campinas, São Paulo, PhD 2017; professor at Universidade
Federal Fluminense, Volta Redonda)

Undergraduate research

- Gabriel Black (Ohio State, 2022–23)
Jacob Monzel (Ohio State, 2021–22)
Blake Whitman (Ohio State, 2020)
Adrian Neff (Ohio State, 2018–19)
Erin Wesner (Ohio State, 2018)

INVITED CONFERENCES AND RESEARCH TALKS

1. BIRS workshop on Toric Degenerations (December 2022)
2. INdAM Cortona workshop “Approximation Theory and Numerical Analysis meet
Algebra, Geometry, and Topology” (September 2022)
3. Stanford University Algebraic Geometry Seminar (April 2022)
4. San Francisco State Algebra, Geometry, and Combinatorics Seminar (March 2022)
5. University of Michigan Combinatorics Seminar (February 2022)
6. Washington University-St. Louis Algebraic Geometry Seminar (online, October 2021)
7. School and Workshop on Lie Theory VII (Brazil, online, September 2021)
8. Oberwolfach workshop on Algebraic Groups (online, April 2021)
9. Algebra, Geometry, and Combinatorics Colloquium (online, March 2021)
10. Joint Mathematics Meeting Special Session on Singularities and Characteristic Classes
(Denver, January 2020)
11. New Interactions Between Geometry and Combinatorics (conference in honor of
Hiroshi Naruse, Osaka, October 2019)

12. Facets of Algebraic Geometry (conference in honor of William Fulton, Ann Arbor, October 2019)
13. Oberwolfach workshop on Toric Geometry (September 2019, April 2012)
14. Fields Institute Workshop on Forms, Flags, Graphs and Beyond (May 2019)
15. Mid-Atlantic Algebra, Geometry, and Combinatorics (MAAGC) workshop (May 2019)
16. Rutgers University Algebra Seminar (April 2019)
17. Central Michigan University Department Colloquium (February 2019)
18. University at Albany Algebra/Topology Seminar (January 2019)
19. University of Michigan Algebraic Geometry Seminar (February 2018, October 2017)
20. Sun Yat-sen University International conference on Schubert Calculus (November 2017)
21. University of Oslo Algebraic Geometry Seminar (May 2017)
22. Oberwolfach workshop on Algebraic Groups (April 2017)
23. BIRS workshop on Newton-Okounkov Bodies, Test Configurations, and Diophantine Geometry (February 2017)
24. Joint Mathematics Meetings, AMS special session on Combinatorial and Cohomological Invariants of Flag Manifolds and Related Varieties (January 2017)
25. Fields Institute Colloquium (October 2016)
26. Princeton University Algebraic Geometry Seminar (October 2016)
27. York University Applied Algebra Seminar (October 2016)
28. University of Western Ontario Algebraic Topology seminar (October 2016)
29. University of Toronto Representation Theory Seminar (September 2016)
30. American Institute of Mathematics (August 2016)
31. University of Washington Combinatorics Seminar (May 2016)
32. University of Wisconsin Algebraic Geometry Seminar (April 2016)
33. University of Pennsylvania CAGE seminar (October 2015)
34. Virginia Tech Department Colloquium (May 2015)
35. IMPANGA Algebraic Geometry conference (April 2015)
36. Tulane University Clifford Conference (March 2015)
37. Columbia University Algebraic Geometry Seminar (February 2015)
38. CMS Winter Meeting in Hamilton, ON, special session on Toric and Combinatorial Algebraic Geometry (December 2014)
39. AMS Sectional Meeting in Greensboro, NC, special sessions on Exceptional Groups in Physics, Algebra, and Geometry, and on Geometry and Combinatorics of Homogeneous Spaces (November 2014)

40. Yale University Algebraic and Tropical Geometry seminar (October 2014)
41. Insitut Mittag-Leffler memorial conference for Dan Laksov (June 2014)
42. Oberwolfach workshop on Okounkov bodies and applications (May 2014)
43. Simons Center workshop on Equivariant Gromov-Witten theory and applications (May 2014)
44. University of Melbourne workshop on Representation Theory (November 2013)
45. ALGA (annual meeting for algebra and geometry in Brazil, July 2013)
46. AGNES (semi-annual meeting in algebraic geometry, Yale, April 2013)
47. ICERM workshop on Whittaker functions, Schubert calculus, and crystals (March 2013)
48. University of Edinburgh Algebraic Geometry Seminar (November 2012, June 2014)
49. University of Warwick Algebraic Geometry Seminar (November 2012)
50. Mathematical Society of Japan Seasonal Institute on Schubert Calculus, Osaka (July 2012)
51. AMS Sectional Meeting in Honolulu, HI, special session on Algebraic Combinatorics (March 2012)
52. Princeton University Algebraic Topology Seminar (February 2012)
53. University of Illinois Urbana-Champaign Algebra, Geometry and Combinatorics Seminar (January 2012, November 2008)
54. University of Utah Algebraic Geometry Seminar (November 2011, January 2008)
55. Oberwolfach mini-workshop on New Developments in Newton-Okounkov Bodies (August 2011)
56. Hausdorff Institute Research in Groups program on Topological invariants of orbifold toric varieties (May 2011)
57. AlGeCom (Purdue–UIUC semiannual workshop on algebra, geometry, and combinatorics, March 2011)
58. Purdue University Working Algebraic Geometry Seminar (March 2011, October 2009)
59. AMS joint meetings, New Orleans (January 2011)
60. Texas A&M University Algebra and Combinatorics Seminar (December 2010)
61. BIRS workshop on Topological methods in toric geometry, symplectic geometry and combinatorics (November 2010)
62. University of British Columbia Algebraic Geometry Seminar (October 2010, November 2009, February 2009, February 2008)
63. George Mason University Department Colloquium (September 2010)
64. University of Pennsylvania CAGE seminar (September 2010)

65. SIAM conference on Discrete Mathematics (June 2010)
66. University of Iowa Algebraic Geometry Seminar (April 2010, April 2008)
67. AIM workshop on Localization Techniques in Equivariant Cohomology (March 2010)
68. Queen's University Algebraic Geometry Seminar (October 2009, March 2008)
69. AMS Sectional Meeting in Raleigh, NC, Special Session on Enumerative Geometry and Related Topics (April 2009)
70. MSRI workshop on Enumerative and Combinatorial Algebraic Geometry (January 2009)
71. University of North Carolina Geometric Methods in Representation Theory Seminar (October 2008)
72. AMS Sectional Meeting in New York, NY, Special Session on Algebraic Combinatorial Geometry (March 2008)
73. BIRS workshop on Recent Progress on the Moduli Space of Curves (March 2008)
74. University of Minnesota Combinatorics Seminar (January 2008)
75. Stanford University Geometry and Combinatorics Seminar (October 2007)
76. MSRI workshop on Deformation Theory and Moduli in Algebraic Geometry (Summer 2007)
77. GAeL XV, İstanbul (meeting for young algebraic geometers, June 2007)
78. Oberwolfach seminar on Algebraic Stacks (October 2006)
79. AMS Sectional Meeting in Storrs, CN, special session on Combinatorial Methods in Equivariant Topology (October 2006)
80. Fields Institute workshop on Schubert varieties and Schubert calculus (June 2005)

INVITED MINICOURSES

1. Schubert Summer School at UIUC (June 2023)
2. Fields Institute Thematic Program Lecture Series (September 2016)
3. IMPA summer minicourse on quantum and affine Schubert calculus (February 2015)
4. University of Melbourne workshop on Representation Theory (November 2013)
5. University of Freiburg, Graduiertenkolleg Lecture Series (October 2012)
6. IMPANGA Summer School on Algebraic Geometry (July 2010)

CONFERENCES ORGANIZED

1. Kentucky-Ohio Algebra Alliance: KOALA '23 (with Angelica Cueto and Eric Katz, May 2023)
2. IMPANGA '20 (Scientific Committee Member, July 2021)

3. Ohio State workshop on Degeneracy Loci and Applications (with Joshua Kiers, May 2021)
4. ICERM workshop on Combinatorics and Geometry from Root Systems (with Angela Gibney, June Huh, Thomas Lam, and Leonardo Mihai, March 2021)
5. Oberwolfach Mini-Workshop on Newton-Okounkov Bodies and Mirror Symmetry (with Alex Küronya and Konni Rietsch, cancelled due to COVID-19)
6. Facets of Algebraic Geometry (with Paolo Aluffi, Milena Hering, Mircea Mustața, and Sam Payne, October 2019)
7. Fields Institute workshop on Combinatorial Algebraic Geometry (with Renzo Cavalieri and Megumi Harada, June 2018)
8. Midwest Workshop on Schubert Calculus (with Rachel Karpman and Hsian-Hua Tseng, May 2018)
9. AMS special session on Convex bodies in geometry and representation theory (with Kiumars Kaveh, March 2018)
10. Fields Institute Workshop on Convexity in Algebraic Geometry (with Klaus Altmann, Megumi Harada, Allen Knutson, and Hannah Markwig, October 2016)
11. Workshop on Applications of Schubert Calculus, Iowa City, IA (with Julianna Tymoczko, March 2011)
12. AMS Central Section Meeting in Iowa City, IA, special session on Geometric Commutative Algebra and Applications (with Julianna Tymoczko, March 2011)

SELECTED OTHER ACADEMIC ACTIVITIES

- Co-organize Ohio State University Algebraic Geometry seminar
- Organize Ohio State University Geometry, Combinatorics, and Integrable Systems seminar
- Moderator for STEAM Exchanges (interdisciplinary salon-style events)
- Radical Pi lecture (OSU undergrad math club, online, October 2020).
- Reviewer for *Mathematical Reviews* (23 items).
- Referee for many journals (*Annals of Math.*, *Acta Math.*, *J. Amer. Math. Soc.*, *IMRN*, *Advances Math.*, *Invent. Math.*, *Duke Math. J.*, et al) and granting organizations (NSF, NSERC, et al).

LANGUAGES

English, Spanish; Maple, Macaulay 2, Sage (basic)