Leonardo Constantin Mihalcea

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Research Interests

Algebraic Geometry; Algebraic Combinatorics; Schubert Calculus; Geometric Representation Theory.

Employment history and visiting positions

August 2021 - present:	Virginia Tech University, Professor;
Spring 2021:	ICERM special semester on Combinatorial Algebraic Geometry (Visiting researcher; leave supported by ICERM);
2015 - 2021:	Virginia Tech University, Associate Professor;
2017 - 2018:	University of North Carolina at Chapel Hill (sabbatical leave);
2011 - 2015:	Virginia Tech University, Assistant Professor;
June 2011:	Max Planck Institut für Mathematik, Fellowship;
2009 - 2011:	Baylor University, Assistant Professor;
2010 - 2011:	University of Louisiana at Lafayette, Visiting Assistant Professor (on leave from Baylor);
2006- 2009:	Duke University, Visiting Assistant Professor;
July -August 2007, June - July 2006:	Max Planck Institut für Mathematik, Fellowship;
2005-2006:	Florida State University, Instructor (postdoctoral position).

Education

Ph.D.   Mathematics, 2005, University of Michigan, Ann Arbor, MI, USA.
      Advisor: Professor William Fulton.
      Dissertation title: *Equivariant quantum cohomology of homogeneous spaces*.
M.S.   Mathematics, 1998, Babes-Bolyai University, Cluj-Napoca, Romania.
      Advisor: Professor Dorin Andrica.
      Dissertation title: *Cone decompositions and critical points*.
B.A.   Mathematics, 1997, Babes-Bolyai University, Cluj-Napoca, Romania.

Research grants

International Exchanges 2023 Round 2 (IES/R2 232087), UK collaboration travel grant, joint with C. Korff (U. Glasgow), (12,000 GBP), Dec. 2023 - Nov. 2025.

NSF grant "Collaborative research: Calculus beyond Schubert" ($162,825), Aug. 2022- July 2025.

Simons Collaboration Grant ($ 42,000), Sept. 2018-Aug. 2023.

NSA Young Investigator Award H98230-16-1-0013 ($ 40,000), June 2016 - November 2018.

Simons Collaboration Grant ($ 35,000), Sept. 2015 - Aug. 2017 (used $ 7000, due to accepting the NSA award H98230-16-1-0013).

NSA Young Investigator Award H98230-13-1-0208 ($ 40,000), Jan. 2013 - Aug. 2015.

Awards and fellowships

Visiting researcher, Brown University, leave (including teaching buyout) supported by ICERM, in order to attend special semester in Combinatorial Algebraic Geometry, Spring 2021.

Virginia Tech College of Science Outreach Excellence Award (with Alex Elgart) for organizing the Blacksburg Math Circle for grades 4-8.

MSRI travel award ($1400 / 2 trips) to attend the workshops for the program "Enumerative Geometry beyond numbers", MSRI, Berkeley, CA, January - April 2018.

Nominated by Duke undergraduate students for 2009 Alumni Distinguished Undergraduate Teaching Award.

NSF/CIRM award for $ 900 + local expenses to attend the workshop "Equivariant Gromov-Witten theory and symplectic vortices", July 6-10, 2009, at CIRM, Luminy, France.

Rackham Graduate School one-term dissertation Fellowship, University of Michigan, Winter 2004.

European Union Fellowship for attending the Summer School "Pragmatic 2001"- Catania, Italy, July 2001.

The Ohio State University Fellowship, 1998 - 1999.

Publications

Wei Gu, Leonardo C. Mihalcea, Eric Sharpe, Weihong Xu, Hao Zhang, and Hao Zou, *Quantum K theory of partial flag manifolds*, to appear in *J. of Geometry and Physics*, preprint available at arχiv:2306.11094.

Leonardo C. Mihalcea and Rahul Singh, *Mather classes and conormal spaces of Schubert varieties in cominuscule spaces*, *Algebraic Geometry* **10** (2023), no.5., 554-575, preprint available on arχiv:2006.04842.

Paolo Aluffi, Leonardo C.Mihalcea, Jörg Schürmann, and Changjian Su, *Shadows of characteristic cycles, Verma modules, and positivity of Chern-Schwartz-MacPherson classes of Schubert cells*, Duke Math. J. **172** (17), 3257-3320, (15 November 2023) DOI: 10.1215/00127094-2022-0101

Wei Gu, Leonardo C. Mihalcea, Eric Sharpe, and Hao Zou, *Quantum K theory of symplectic Grassmannians*, J. of Geometry and Physics **177** (2022), Paper No. 104548, 38 pp.

Paolo Aluffi, Leonardo C. Mihalcea, Jörg Schürmann, and Changjian Su, *Motivic Chern classes of Schubert cells, Hecke algebras, and applications to Casselman's problem*, accepted to Annales Sci. de l'École Normale Supérieure, available on arχiv:1902.10101.

Leonardo C. Mihalcea and Changjian Su, with an Appendix joint with David Anderson, *Whittaker functions from motivic Chern classes*, Transform. Groups, **27** (2022), no. 3, 1045 - 1067, available on arχiv:1910.14065.

Paolo Aluffi, Leonardo C. Mihalcea, Jörg Schürmann, and Changjian Su, *Positivity of Segre-MacPherson classes*, Facets of algebraic geometry. Vol. I, 1 - 28, London Math. Soc. Lecture Note Ser., 472, Cambridge Univ. Press, Cambridge, 2022.

Leonardo C Mihalcea, Hiroshi Naruse, Changjian Su, *Left Demazure - Lusztig Operators on Equivariant (Quantum) Cohomology and K-Theory*, Int. Math. Res. Not. IMRN (2022), no. 16, 12096 - 12147. rnab049, https://doi.org/10.1093/imrn/rnab049

Anders Buch, Sjuvon Chung, Changzheng Li and Leonardo C. Mihalcea, *Euler characteristics in quantum K theory of flag varieties*, *Selecta Math. (N.S.)* **26** (2020), no. 2, Paper No. 29, 11 pp.

Changzheng Li, Leonardo C. Mihalcea and Ryan Shifler, *Conjecture O holds for the odd symplectic Grassmannian*, *Bulletin of London Math. Society*, vol. **51**, issue 4, pages $705 - 714$, 2019.

Leonardo C. Mihalcea and Ryan Shifler, *Equivariant Quantum Cohomology of the Odd Symplectic Grassmannian*, *Math. Zeitschrift*, **291** (3-4), pag. 1569-1603, 2019.

Thomas Lam, Changzheng Li, Leonardo C. Mihalcea and Mark Shimozono, *A conjectural Peterson isomorphism in K-theory*, *J. of Algebra*, 513 (2018), 326 - 343. doi:10.1016/j.jalgebra.2018.07.029.

Liviu Mare and Leonardo C. Mihalcea, *An affine deformation of the quantum cohomology ring of flag manifolds and periodic Toda lattice*, *Proceedings of the London Mathematical Society* (3) vol. 116 (2018), pag. 135 - 181.

Anders Buch, Pierre-Emmanuel Chaput, Leonardo C. Mihalcea and Nicolas Perrin, *A Chevalley formula for the equivariant quantum K-theory of cominuscule varieties*, *Algebraic Geometry* **5** no. 5 (2018), 568 - 595. doi:10.14231/AG-2018-015

Anders Buch, Pierre-Emmanuel Chaput, Leonardo C. Mihalcea and Nicolas Perrin, *Projected Gromov-Witten varieties in cominuscule spaces*, *Proc. Am. Math. Soc.*, **146** (2018), no. 9, 3647 - 3660.

Trevor Norton and Leonardo C. Mihalcea, *Combinatorial curve neighborhoods for the affine flag manifold of type A_1^1*, Involve 10 (2017), no. 2, 317 - 325; (outcome of an undegraduate research project), available at `http://www.math.vt.edu/people/lmihalce/curvenbhdsA11(finalv).pdf`

Paolo Aluffi and Leonardo C. Mihalcea, *Chern-Schwartz-MacPherson classes for Schubert cells in flag manifolds*, Compositio Math., **152** (2016) no. 12, 2603 - 2625.

Takeshi Ikeda, Leonardo C. Mihalcea and Hiroshi Naruse, *Factorial P- and Q-Schur functions represent equivariant quantum Schubert classes*, Osaka J. Math. **53** (2016), no. 3, 591 - 619.

Rachel Elliott, Mark E. Lewers and Leonardo C. Mihalcea, *Quantum Schubert polynomials for the G_2 flag manifold*, Involve **9** (2016), no. 3, 437 - 451; (outcome of an undegraduate research project).

Anders Buch, Pierre-Emmanuel Chaput, Leonardo C. Mihalcea and Nicolas Perrin, *Rational connectedness implies finiteness of quantum K-theory*, Asian J. Math. **20** (2016), no. 1, 117 - 122.

Leonardo C. Mihalcea, *Binomial determinants and positivity of Chern-Schwartz-MacPherson classes*, The Australasian Journal of Combinatorics **62** (part 2) (June 2015).

Anders Buch and Leonardo C. Mihalcea, *Curve neighborhoods of Schubert varieties*, J. Differential Geom. **99** (2015), no. 2, $255 - 283$.

Changzheng Li and Leonardo C. Mihalcea, *K-theoretic Gromov-Witten invariants of lines in homogeneous spaces*, Int. Math. Res. Notices 2013, doi: 10.1093/imrn/rnt090.

Anders Buch, Pierre-Emmanuel Chaput, Leonardo C. Mihalcea and Nicolas Perrin, *Finiteness of cominuscule quantum K-theory*, Annales Sci. de l'École Normale Supérieure, **46**, fascicule 3 (2013), pag. 477– 494.

Anders Buch and Leonardo C. Mihalcea, *Quantum K-theory of Grassmannians*, Duke Math. Journal **156** (2011), no. 3, 501 - 538.

Takeshi Ikeda, Leonardo C. Mihalcea, and Hiroshi Naruse, *Double Schubert polynomials for the classical groups*, Advances in Math. **226** (2011), no. 1, 840 - 886.

Paolo Aluffi and Leonardo C. Mihalcea, *Chern classes of Schubert cells and varieties*, Journal of Alg. Geom. **18** (2009), no. 1, 63 - 100.

Takeshi Ikeda, Leonardo C. Mihalcea, and Hiroshi Naruse, *Double Schubert polynomials for the classical Lie groups*, 20th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2008), Discrete Math. Theor. Comput. Sci. Proc., AJ, Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2008, pp. 665 - 676.

Leonardo C. Mihalcea, *Giambelli formulae for the equivariant quantum cohomology of the Grassmannian*, Transactions of AMS **360** (2008), no. 5, 2285 - 2301.

Leonardo C. Mihalcea, *On equivariant quantum cohomology of homogeneous spaces: Chevalley formulae and algorithms*, Duke Math. J. **140** (2007), no. 2, 321 - 350.

Leonardo C. Mihalcea, *Equivariant quantum Schubert Calculus*, Adv. in Math. **203** (2006), no. 1, 1 - 33.

Leonardo C. Mihalcea, *Positivity in equivariant quantum Schubert calculus*, Amer. J. Math. **128** (2006), no. 3, 787 - 803.

Leonardo C. Mihalcea, *Equivariant quantum cohomology of homogeneous spaces*, Thesis (Ph.D.) University of Michigan. 2005. 120 pp

Gianni Ciolli and Leonardo C. Mihalcea, *A canonical resolution of the singularities of a triple covering of algebraic surfaces*, PRAGMATIC, 2001 (Catania). Matematiche (Catania) **56** (2001), no. 2, 281 - 296 (2003).

Preprints

Leonardo C Mihalcea, Hiroshi Naruse, Changjian Su, *Hook formula for Coxeter groups via the twisted group ring*, submitted, preprint available at arχiv:2401.06516.

Leonardo C Mihalcea, Hiroshi Naruse, Changjian Su, *Chevalley formulae for the motivic Chern classes of Schubert cells and for the stable envelopes*, submitted, preprint available at arχiv:2312.17200.

Wei Gu, Leonardo C. Mihalcea, Eric Sharpe, Weihong Xu, Hao Zhang, and Hao Zou, *Quantum K Whitney relations for partial flag manifolds*, submitted, preprint available at arχiv:2310.03826.

Leonardo C. Mihalcea and Rahul Singh, *Characteristic cycles of IH sheaves of simply laced minuscule Schubert varieties are irreducible*, submitted, preprint available on arχiv:2308.06249

Paolo Aluffi, Leonardo C.Mihalcea, Jörg Schürmann, and Changjian Su, *From motivic Chern classes of Schubert cells to their Hirzebruch and CSM classes*, submitted (2022), preprint available at arχiv:2212.12509

Wei Gu, Leonardo C. Mihalcea, Eric Sharpe, and Hao Zou, *Quantum K theory of Grassmannians, Wilson line operators, and Schur bundles*, submitted, preprint available on arχiv:2208.01091.

Anders Buch, Pierre-Emmanuel Chaput, Leonardo C. Mihalcea and Nicolas Perrin, *Positivity of minuscule quantum K theory*, submitted, preprint available at arχiv:2205.08630.

Leonardo C Mihalcea, Hiroshi Naruse, Changjian Su, *Hook formulae from Segre-MacPherson classes*, submitted, preprint available at arχiv:2203.16461.

Rebecca Goldin, Leonardo C. Mihalcea and Rahul Singh, *Positivity of Peterson Schubert Calculus*, submitted, preprint available on arχiv:2106.10372.

Advising

Ph.D. advisor: Ryan Shifler (graduated in May 2017); Camron Withrow (graduated in May 2018); Songul Aslan (graduated in May 2019); David Oetjen (graduated in May 2022), Kevin Summers (current), Kamyar Amini (current).

MS advisor: Kevin Summers (earned MS in Summer 2021), Garrett Fowler (earned MS in Summer 2021), Allison Hodgkins (2022-23), Mason Beahr (current).

Postdoctoral mentor of Irit Huq-Kuruvilla (currently at Virginia Tech), Weihong Xu (currently at Virginia Tech), Rahul Singh ($2019 - 2021$) and of Dan Orr ($2012 - 13$).

I conducted undergraduate research projects with Heath Camphire, Jacob Crim, Rachel Elliott, Mark Lewers, Trevor Norton, Heath Camphire, Yichun Zhao, and obtained 2 joint publications listed above (both accepted in Involve).

Teaching

Virginia Tech	(graduate) Abstract Algebra, Fall 2022, Spring 2023.
	Modern Algebra, Fall 2019, 2021, Spring 2020,2022.
	Introductory ODE, Fall 2020.
	Intro Abstract Algebra, Fall semesters 2012 - 2016.
	Undergraduate Number Theory, Fall 2016, Spring 2019.
	Algebraic Geometry (year long class): 2014/15; 2018/19, 2021/22.
	Applied Combinatorics; Fall semesters 2011, 2015, 2016, Spring 2012.
	Topics in Algebra (Equivariant methods in Schubert Calculus), Spring 2020.
	Topics in Algebra (Lie algebras), Spring 2017.
	Topics in Algebra (Equivariant Cohomology), Spring 2014.
	Topics in Algebra (Schubert Calculus and Quantum cohomology), Fall 2012.
University of Louisiana at Lafayette	Vector Calculus; Spring 2011.
	Survey of Calculus; Fall 2010.
	Linear Algebra; Fall 2010, Spring 2011.
Baylor University	Calculus III;Spring 2010.
	Topics in Algebraic Geometry; Fall 2009.
	Bussiness Calculus; Fall 2009.
Duke University	Ordinary Differential Equations; Fall 2006, Spring 2007, 2009.
	(coordinator of this class in Spring 2009)
	Linear algebra and differential equations; Fall 2007,2008.
	Applied Combinatorics; Fall 2006,2008.
	Multivariable Calculus; Spring 2008.
	Introduction to Schubert Calculus; minicourse Spring 2007.
Florida State University	Calculus I; Spring 2006.
	Calculus II; Fall 2005.
University of Michigan	Instructor, Math 105 Pre-calculus; Fall 1999.
	Instructor, Math 115 Calculus I; Winter 2000, Fall 2000.
	Instructor, Math 116 Calculus II; Fall 2001.
	Instructor, Math 215 Calculus III; Fall 2002.
	Instructor, Math 216 Differential Equations; Winter 2001, Fall 2004.
	Instructor and Course coordinator, Math 115 Calculus I; Spring 2004.

Outreach

Co-organizer (with Alex Elgart and Agnieszka Miedlar) of Blacksburg Math Circle for grades 4 - 8, academic years 2015 - 2017, 2019-; details available at `https://intranet.math.vt.edu/mathcircle/`

Local Manager for Math Kangaroo contest (March 2016, 2017, 2019, 2020, 2022), and of AMC 8 contest (grades 6 - 8), Nov. 2016 (both in collaboration with Alex Elgart).

Judge in the Layman Prize competition dedicated to undergraduate research in the Math department at Virginia Tech.

Profesional service

Conferences organized (international)

Co-organizer (with A. Buch, R. Goldin, and R. Rimányi) of the *Schubert Seminar*, an online seminar in Schubert Calculus and related areas;

ICERM series: `https://icerm.brown.edu/programs/sp-s21/ls1/`,

Continuation: `https://sites.math.rutgers.edu/ asbuch/schubert/` and

YouTube channel: `https://www.youtube.com/channel/UC7v3B0dtn8t1pbZ0XSN0CEg`

Co-organizer (with B. Leclerc, N. Perrin, M. Varagnolo) of the workshop 'Quantum groups and cohomology theorties for quiver and flag varieties', CIRM, Marseille, France, December 2020.

Co-organizer (with L. Jeffrey and L. Mare) of the special session 'Equivariant methods in symplectic and algebraic geometry', CMS Summer Meeting, Regina, June 2019.

Co-organizer (with Jianxun Hu and Changzheng Li) of the International Festival in Schubert Calculus (Guangzhou, China, Nov. 6-10, 2017), consisting of 1 day mini-school and a 4 days long conference.

Conferences organized (domestic)

Co-organizer (with A. Buch, M. Chan, J. Huh, T. Lam, S. Payne, L. Williams) of the ICERM special semester in 'Combinatorial Algebraic Geometry', Spring 2021.

Lead co-organizer (with D. Anderson, A. Gibney, J. Huh, T. Lam), of the workshop 'Geometry and Combinatorics from Root Systems"; ICERM special semester in Spring 2021.

Co-organizer (with A. Buch, M. Chan, T. Lam) of the 'Introductory workshop: Combinatorial Algebraic Geometry"; ICERM special semester in Spring 2021.

Co-organizer (with P. Aluffi) of the special session 'Singularities and characteristic classes', Joint Math Meetings, Denver CO, January 2020.

Co-organizer (with Richard Rimányi) of the AMS Special Session "Geometry and combinatorics on homogeneous spaces", Greensboro, NC, November 2014.

Organizer of the special session "Recent progress in Schubert Calculus", AMS sectional meeting, Iowa City, March 18-21, 2011.

Organizer of the "Schubert Calculus" minisymposium at SIAM Conference in Discrete Mathematics, Austin, TX, June 14-17, 2010.

Co-organizer (with Richard Rimányi) of the AMS Special Session "Enumerative Geometry and related topics", Raleigh, April 2009.

Refereeing

Editor (with Changzheng Li and Jianxun Hu) for 'Schubert Calculus and its applications in combinatorics and representation theory', ICTSC: International Conference on the Trends in Schubert Calculus, Guangzhou, China, November 2017; Springer Proceedings in Mathematics & Statistics book series (PROMS, volume 332), DOI `https:// doi.org/ 10.1007/ 978-981-15-7451-1`, Springer Singapore 2020.

Referee for more than 30 mathematical journals, including Annals of Math., Journal of the AMS, Acta Mathematica; reviewer for Mathematical Reviews.

Department and university service

College of Science representative in the Academic Support Committee (university wide, $2020 - 2023$).

Member in Graduate Program Committee (2016-current) and subcommittee on Graduate Admissions (2016-2020, 2024).

Member in Diversity committee (2020-21).

Member in Department Executive Committee (2021-2023).

Undergraduate advisor for Applied and Discrete Math option students (have about 7 advisees each year, starting from 2018-2021).

Co-organizer (with D. Orr, and T. Morrison) of the Algebra seminar at Virginia Tech (2011 - 2022).

Invited talks

Lecture series:

- Lectures on "Quantum K theory of flag manifolds" (3 lectures, 90 minutes each), the Summer School portion of MSJ-SI 2023 "Elliptic Integrable Systems, Representation Theory and Hypergeometric Functions", Tokyo University of Marine Science and Technology, Etchujima, Tokyo, Japan, July 2023.
- Lectures on "Quantum K theory of flag manifolds" (3 lectures), Schubert Summer School, University of Urbana-Champaign, June 2023.
- Lectures on "Quantum K theory of flag manifolds" (4 lectures) at "School 2022: Representation theory and flag or quiver varieties", University of Paris (Jussieu), 13-17 June 2022 Paris, France.
- Lectures on "Quantum Schubert Calculus" (3 lectures) at Univ. of Illinois at Urbana-Champaign, April 2018.
- Lectures on "Quantum cohomology" (6 lectures) at Canadian Math. Soc. Summer School on Combinatorial Models in Geometry and Topology of Flag manifolds, Regina, Saskatchewan, Canada, 2007.

Major conferences:

- "Elliptic Integrable Systems, Representation Theory and Hypergeometric Functions", MSJ-SI 2023, Univ. of Tokyo, Japan, Aug. 2023.
- Tenth Congress of Romanian Mathematicians, Session on Algebraic and Complex Geometry, Piteşti, Romania, July 2023.
- International Workshop "Representation theory and flag or quiver varieties", University of Paris (Jussieu), 20-23 June 2022 Paris, France.
- International Workshop: P-positivity in Matroid Theory and Related Topics, RIMS, Kyoto, Japan (virtual talk, Oct. 2021).
- IMPANGA 20, July 2021, virtual talk, Bedlewo, Poland.
- Quantum groups and cohomology theories for quiver and flag varieties, CIRM, Marseille, France, December 2020.
- Conference 'Verlinde algebras and the Grassmannians', June 2019, Guangzhou, China.
- GLEN seminar, University of Edinburgh, June 2018, Edinburgh, Scotland, UK.
- Workshop on "Quantum integrability and quantum Schubert Calculus", June 2018, Chicheley Hall, London, UK.
- Workshop in Schubert Calculus, May 2018, Ohio State University.

- AGNES, April 2018, Rutgers.
- International Festival in Schubert Calculus, November 2017, Guangzhou, China; support from Chinese organizers.
- MCA 2017 (Mathematics Congress of the Americas), session on Symmetries of Symplectic Manifolds and Related Topics, Montreal, Canada, July 2017.
- 3rd workshop in Schubert Calculus, August 2014, Okayama University of Science, Okayama, Japan.
- Workshop "Equivariant Gromov-Witten theory and applications", May 2014, Simons Center for Geometry and Physics, Stony Brook, NY; support from organizers.
- Workshop in Schubert Calculus, July 2012, Osaka, Japan; local support jointly from American Math. Society and Math. Society of Japan.
- Workshop "Equivariant Gromov-Witten theory and symplectic vortices", July 6-10, 2009, at CIRM, Luminy, France; travel support from NSF/CIRM.
- Conference on Eigenvalue and Saturation problems for reductive groups, May 2009, (UNC Chapel Hill).
- Workshop "Combinatorial, Enumerative and Toric Geometry", April 2009, MSRI, Berkeley; support from NSF.
- Workshop in Schubert Calculus, 18-21 March, 2008, Kyoto, Japan; support from organizers.
- Workshop on "Contemporary Schubert Calculus and Schubert Geometry", Banff International Research Station, Banff, March 2007; support from Banff.
- Workshop on "Interactions between Algebraic Geometry and Algebraic Combinatorics", CRM, Montréal, May 2007; support from CRM.
- Workshop in Schubert Calculus, Fields Institute, Toronto, June 2005.

Colloquium/Seminar talks (from most recent): *U. Ottawa, June 2023, special session on 'Equivariant Schubert Calculus and beyond'*, *U. Pittsburgh*, Algebra seminar, April 2022, *Sun Yat-Sen Univ.*, Guangzhou, China, Nov. 2021 (virtual), *Brown University*, Algebraic Geometry seminar, Nov. 2021, *Ohio State University*, Combinatorics Seminar, Columbus OH (October 2019), *University of Toronto, Geometric Representation Theory seminar, Toronto ON (October 2019), George Mason University, Algebra seminar, Fairfax VA (September 2019), US Naval Academy Colloquium, Annapolis MD (March 2019), SUNY Albany Colloquium, Albany NY (Feb.* 2019), *Babes-Bolyai University Algebra seminar, Cluj-Napoca, Romania (April* 2018*), Universität Münster, Germany (April* 2018*), Université de Paris-Saclay, Versailles, France (April* 2018*), Univ. of Virginia, algebra seminar (October* 2017*), UNC, Geometric Methods seminar (September* 2017, *NC State algebra seminar (September* 2017*), Romanian Institute of Nuclear Physics, Măgurele, Bucharest, Romania, Geometry and Physics seminar* (July 2016), *Cornell, Lie seminar* (April 2016), *Caltech, Algebraic Geometry seminar* (January 2016), *2 hour lecture on "An affine quantum cohomology ring and periodic Toda lattice", August 2015, Center for Geometry and Physics, Institute of Basic Science, POSTECH, (Pohang, South Korea)*; *1 hour lecture on "Chern-Schwartz-MacPherson classes for Schubert cells in flag manifolds", August 2015, Korea Institute for Advanced Study (KIAS), Seoul, South Korea*; *University of Pittsburg, Algebra seminar (Pittsburgh, PA, Nov.* 2014*), University of Virginia, Algebra seminar (Charlottesville, VA, April 2014), University of North Carolina, Physically Inspired Math seminar (Chapel Hill, NC, March 2014),Florida State University, Colloquium (Tallahassee, FL, Oct.* 2013*), University of Copenhagen (Denmark, July 2013), Cornell, Colloquium (Ithaca, NY, May 2013), UNC Chapel Hill, Math Physics seminar*, (Chapel Hill, NC, April 2013),*University of Illinois, Urbana-Champaign, Algebra seminar*, (Urbana-Champaign, IL Apr. 2013), *University of Maryland, Algebra seminar*, (College Park, MD Nov. 2012), *IPMU seminar*, (Kashiwa-Tokyo, Japan July 2012), *NCState, Algebra seminar*, Raleigh, NC February 2012, *Virginia Tech Algebra seminar*, several talks during Fall 2011 - Spring 2012, *UNC Geometric Methods in Representation Theory seminar*, Chapel Hill, NC,

Nov. 2011, *LSU Colloquium*, Baton Rouge LA, Feb. 2011, *University of Alberta Colloquium*, Edmonton AB, Feb. 2011, Virginia Tech Colloquium, Blacksburg VA, Jan. 2011, *UL Lafayette - Colloquium*, (Lafayette LA, November 2010), *Tulane - Algebra seminar*, (New Orleans, LA, October 2010), *LSU - Lie seminar*, (Baton Rouge, LA, October 2010), *Texas A & M - Algebraic Geometry Seminar*, (College Station TX, October 2010), *UNC Chapel Hill, Geometric methods in Representation Theory seminar*, Chapel Hill, NC, Sept. 2010, *LSU - Algebra seminar*, (Baton Rouge, LA, April 2010), *TCU - Algebra/Geometry Seminar*, (Forth Worth TX March 23, 2010), *LSU - Colloquium*, Baton Rouge LA, February 11, 2010, *SUNY Albany - Colloquium*, (Albany NY, February 5, 2010), *UL Lafayette - Colloquium*, (Lafayette LA, January 21, 2010), *Texas A & M - Algebra Seminar*, (College Station TX, December 4, 2009), *North Carolina State University - Algebra seminar*, (Raleigh, April 2009), *Baylor University - Colloquium*, (Waco, Feb. 2009), *University of Ottawa - Colloquium*, (Ottawa, Canada, Feb. 2009), *IUPUI - Colloquium*, (Indianapolis, Feb. 2009), *Texas Tech University - Colloquium*, (Lubbock, Feb. 2009), *University of Iowa - Algebraic Geometry seminar*, (Iowa City, Dec. 2008), *University of Georgia - Algebraic Geometry seminar*, (Athens, Nov. 2008), *University of North Carolina at Chapel Hill - Geometric Methods in Representation Theory seminar*, (Chapel Hill, Nov. 2008), *Drexel University - Combinatorics seminar*, (Philadelphia, Oct. 2008), *Workshop on Representation Theory, Geometry and Combinatorics (20 minutes presentation)*, (Berkeley, June 2008), *Texas A&M University- Algebraic Geometry Seminar (College Station, April 2008), University of Pittsburg, Algebraic Geometry seminar (Nov. 2007), Univ. of North Carolina at Chapel Hill, Geometric methods seminar (Nov. 2007), Duke Algebraic Geometry seminar (Oct. 2007), KTH, Stockholm, Sweden, Algebraic Geometry seminar (July 2006), Florida State Univ., Algebra seminar, (Oct. 2005), Univ. of Michigan, Combinatorics seminar (Nov. 2004), Univ. of Illinois at Urbana-Champaign, Algebraic Geometry seminar (Sept. 2004),Ohio State University, Algebraic Geometry seminar (May 2004).*

Talks at special sessions at AMS/CMS/SIAM meetings:

- *CMS Special session "Combinatorial Methods in Algebraic Geometry and Commutative Algebra"*, virtual, December 2021, Canada.
- *AMS Special session "Combinatorial and Geometric Representation Theory"*, virtual, Univ. of Southern Alabama, November 2021.
- *CMS Special session "Algebraic and Geometric Theory of Homogeneous Spaces"*, Ottawa, June 2020, Canada (took place in June 2021).
- *Special session "Recent advances in Schubert calculus and related topics"*, March 2020 (postponed to March 2021 due to the pandemic, virtual), Tufts, Boston, MA.
- *Special session "Combinatorics related to geometry and representation theory"*, March 2020, UVA, Charlottesville, VA (cancelled due to the pandemic).
- *Special session "Combinatorial Lie Theory"*, November 2019, University of Florida, Gainesville.
- *Special session "Equivariant Topology and Geometry"*, December 2016, Niagara Falls, Ontario, Canada.
- *Special session "Modern Schubert Calculus"*, November 2015, Rutgers, New Brunswick, NJ.
- *Special session "Geometric Applications of Algebraic Combinatorics"*, AMS Joint Math Meetings, Baltimore, January 2014.
- *Special session "Geometry and Topology of Lie Transformation Groups"*, Canadian Math Society Summer Meeting, Regina, SK, June 2012.
- *Special session "Combinatorial Algebraic Geometry"*, AMS meeting at Wake Forest University, Winston-Salem, NC, October 2011.
- *Special session "Combinatorial Algebraic Geometry"*, AMS Joint meetings, New Orleans, LA, January 2011.
- *SIAM minisymoposium in Schubert Calculus*, SIAM meeting in Discrete Math., Austin, TX, July 2010.

- *Special session in Algebraic Combinatorics*, Canadian Mathematical Society meeting, Fredericton, New Brunswick, June 4-6, 2010.
- *Special session "Analysis on homogeneous spaces"*, AMS sectional meeting, Waco, TX Oct. 2009.
- *Special Session on Combinatorial Algebraic Geometry*, AMS meeting - Stevens Institute of Technology (Hoboken, NJ, April 2007).
- *Special Session on Combinatorial Methods in Equivariant Topology*, University of Connecticut, (Storrs, Connecticut, Oct. 2006).
- *Special Session in Algebraic Combinatorics*, Eugene, OR, Nov. 2005.
- *Special session in Geometry and Combinatorics*, UC Santa Barbara, (Santa Barbara, CA, Apr. 2005).
- *Special session in Modern Schubert Calculus*, Northwestern Univ., (Evanston, IL, Oct. 2004).

Professional activities

Attended the following events.

Conferences:

- "Facets of Algebraic Geometry", a conference in honor of W. Fulton 80th birthday, October 2019, Ann Arbor, MI.
- Workshop "Quiver varieties and representation theory" (week 3), Aug. 2019, Montreal, Canada.
- Workshop "Symplectic varieties and geometric representation theory", Oct. 2016, UNC Chapel Hill.
- Workshop "Convexity in Algebraic Geometry", Oct. 2016, organized at Fields Institute, Toronto, Canada.
- Workshop "Representation Theory and Geometry of Symplectic Resolutions", May 18-21, 2015, Northeastern University, Boston.
- PCMI Summer School "Geometry of moduli spaces and representation theory", June 28 - July 18, 2015, Park City UT; partial support from AMS.
- Summer Institute in Algebraic Geometry, Week 2, Salt lake City UT, July 2015; partial support from AMS.
- Workshop *Whittaker Functions, Schubert Calculus and Crystals*, ICERM (Brown University), March 2013.
- Triangle Lectures in Combinatorics, (rotates between NCState and Duke), February 2012, September 2012.
- *Presentations by Young Researchers*, Snowbird, UT, July 2004.
- *Red-Raider Mini-Symposium, in Contemporary Algebra and Algebraic Geometry*, Texas-Tech University, Lubbock, Nov. 2002.
- *Algebraic Transformation Groups*, CRM, Université de Montréal, June 2002.

MSRI workshops:

- *Structures in Enumerattive Geometry*, March 19 - 23, 2018 (support from MSRI).
- *Enumerative Geometry beyond numbers*, January 18-19 and 22-26, 2018 (support from MSRI).
- *Introductory workshop in topological aspects of Real Algebraic Geometry*, Jan. 2004.
- *Intersection Theory on stacks*, March 2002.
- *Introductory workshop in Algebraic Stacks, Intersection Theory and non abelian Hodge Theory*, Jan. 2002.

AMS meetings:

- *Boston - AMS Special Session in Schubert Calculus*, Nov. 2002.
- *Ann Arbor - AMS sectional meeting*, March 2002.

Summer Schools:

- *Pragmatic 2001*, Catania, Italy, July 2001.
- *Scuola Matematica Interuniversitaria*, Perugia, Italy, July 1997.