

ROBERT KRONE

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EMPLOYMENT

2017– Krener Assistant Professor, **University of California - Davis**
2015–2017 Postdoctoral Fellow, **Queen’s University**

EDUCATION

2010–2015 Ph.D. in Mathematics, **Georgia Institute of Technology**
Advisor: Anton Leykin
Thesis: “Symmetric ideals and numerical primary decomposition”
Minor: Computer Science
2004–2008 B.A. in Mathematics, **Princeton University**
Certificate in Computer Science

RESEARCH INTERESTS

Applied algebraic geometry, computation, commutative algebra, combinatorial algebra.

PAPERS

- Jesús A. De Loera, Serkan Hoşten, Robert Krone, Lily Silverstein. Average Behavior of Minimal Free Resolutions of Monomial Ideals, accepted to *Proceedings of the AMS* (2018).
- Hector Baños, Nathaniel Bushek, Ruth Davidson, Elizabeth Gross, Pamela E Harris, Robert Krone, Colby Long, Allen Stewart, and Robert Walker. Dimensions of Group-based Phylogenetic Mixtures, *Bulletin of Mathematical Biology* 1522-9602, pages 1-21 (2018).
- Madeline Brandt, DJ Bruce, Taylor Brysiewicz, Robert Krone, and Elina Robeva. The degree of $SO(n)$, *Combinatorial Algebraic Geometry* (book), pages 229-246 (2016).
- Hector Baños, Nathaniel Bushek, Ruth Davidson, Elizabeth Gross, Pamela E Harris, Robert Krone, Colby Long, Allen Stewart, and Robert Walker. Phylogenetic Trees, *preprint* arXiv:1611.05805 (2016).
- Chris Hillar, Robert Krone and Anton Leykin. Equivariant Gröbner bases, *The 50th Anniversary of Gröbner Bases* (book), pages 129-154 (2018).
- Robert Krone, Anton Leykin and Andrew Snowden. Hilbert series of symmetric ideals in infinite polynomial rings via formal languages, *Journal of Algebra* 485, pages 353-362 (2016).
- Robert Krone. Equivariant Gröbner bases of symmetric toric ideals, *In Proceedings of the 41th International Symposium on Symbolic and Algebraic Computation, ISSAC '16*, pages 311-318 (2016).
- Robert Krone and Anton Leykin. Numerical algorithms for detecting embedded components, *Journal of Symbolic Computation* 82, pages 1-18 (2017).

Robert Krone and Anton Leykin. Eliminating dual spaces, *Journal of Symbolic Computation* 79, pages 609-622 (2017).

Robert Krone. Numerical Hilbert functions for Macaulay2, *preprint* arXiv:1405.5293 (2014).

Thomas Kahle, Robert Krone, Anton Leykin. Equivariant lattice generators and markov bases, *In Proceedings of the 39th International Symposium on Symbolic and Algebraic Computation, ISSAC '14*, pages 264–271 (2014).

Jan Draisma, Rob Eggermont, Robert Krone, Anton Leykin. Noetherianity for infinite-dimensional toric varieties, *Algebra & Number Theory* 9-8, pages 1857–1880 (2015).

Robert Krone. Numerical algorithms for dual bases of positive-dimensional ideals, *Journal of Algebra and Its Applications* 12.06 (2013).

SOFTWARE

PhylogeneticTrees package for Macaulay2 computer algebra system for computing invariants of phylogenetic tree statistical models.

NumericalHilbert package for Macaulay2 computer algebra system for numerically computing local Hilbert functions.

EquivariantGB package for Macaulay2 computer algebra system for computing equivariant Gröbner bases.

CONFERENCE TALKS AND POSTERS

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| Sep 2018 | Core Computational Methods in Nonlinear Algebra (ICERM)
Talk: “Computational tools for FI-algebras” |
| Aug 2018 | Representation Stability Week (University of Michigan)
Talk: “Computational tools for FI-algebras” |
| Jul 2018 | SIAM 2018 Annual Meeting (Portland, OR)
Talk: “Dimensions of group-based phylogenetic mixtures” |
| Aug 2017 | SIAM Conference on Applied Algebraic Geometry (Georgia Tech)
Talk: “Modules over FI-algebras” |
| Jul 2017 | Applied Macaulay2 Tutorials (Georgia Tech)
Talk: “Degree of SO(n)” |
| Jan 2017 | AMS Joint Mathematics Meeting (Atlanta)
Talk: “The degree of the special orthogonal group” |
| Nov 2016 | AMS Southern Sectional Meeting (North Carolina State University)
Talk: “Hilbert series of infinite symmetric ideals” |
| July 2016 | ISSAC 2016 (Wilfrid Laurier University)
Talk: “Equivariant Gröbner Bases of Symmetric Toric Ideals” |
| Jul 2016 | SIAM 2016 Annual Meeting (Boston, MA)
Talk: “Hilbert series of invariant ideals” |
| April 2016 | Free Resolutions, Representations, and Asymptotic Algebra workshop (BIRS)
Talk: “Equivariant Gröbner bases” |
| Oct 2015 | Route 81 Conference (Queen’s University)
Talk: “Equivariant Gröbner bases” |
| Oct 2015 | AMS Central Sectional Meeting (Loyola University)
Talk: “Equivariant Gröbner bases of toric ideals” |
| April 2015 | Meeting on Algebraic Geometry and Applications (Georgia Tech)
Talk: “Equivariant Gröbner basis algorithms” |
| Oct 2014 | AMS Western Sectional Meeting (San Francisco State)
Talk: “Finite generation of symmetric toric ideals” |

	Talk: “Equivariant lattice generators and Markov bases”
July 2014	ISSAC 2014 (Kobe University)
	Talk: “Equivariant lattice generators and Markov bases”
July 2014	Workshop on applications of algebraic geometry and algebraic analysis (Kobe University)
	Talk: “Finite generation of symmetric toric ideals”
June 2014	Computational Nonlinear Algebra conference (ICERM)
	Poster: “Numerical Primary Decomposition”
Jan 2014	Macaulay2 Workshop (MSRI - UC Berkeley)
	Talk: “Equivariant Gröbner Bases”
Aug 2013	SIAM Conference on Applied Algebraic Geometry (Colorado State)
	Talk: “Macaulay Dual Space and Numerical Primary Decomposition”
Jun 2013	Effective Methods in Algebraic Geometry 2013 (Goethe-Universität)
	Talk: “Algorithms for equivariant Gröbner Bases”
Jun 2013	DIAMANT Symposium 2013 (Heeze, Netherlands)
	Talk: “Noetherianity for infinite-dimensional toric varieties”
Oct 2012	RTG Workshop: Tensors and their Geometry in High Dimensions (UC Berkeley)
	Talk: “Algorithms for symmetric Gröbner bases”
Apr 2012	Texas Algebraic Geometry Symposium 2012 (Texas A&M)
	Poster: “Numerical algorithms for dual bases of positive-dimensional ideals”
Oct 2011	SIAM Conference on Applied Algebraic Geometry (North Carolina State)
	Talk: “Numerical algorithms for dual bases of positive-dimensional ideals”

TEACHING

2018 Winter	MATH 16B: Short Calculus B
2017 Fall	MATH 67: Modern Linear Algebra
2017 Fall	MATH 16B: Short Calculus B
2017 Winter	MATH 228: Complex Analysis
2016 Fall	MATH 221: Vector Calculus
2016 Spring	APSC 172: Calculus II
2016 Winter	APSC 171: Calculus I
2013 Fall	Lead Instructor - MATH 1522: Linear Algebra
2012 Fall	Recitation TA - MATH 1512: Honors Calculus II
2012 Spring	Recitation TA - MATH 2605: Linear and Discrete Mathematics
2011 Fall	Recitation TA - MATH 2605: Calculus III for Computer Science
2011 Spring	Recitation TA - MATH 2602: Linear and Discrete Mathematics
2010 Fall	Recitation TA - MATH 2602: Linear and Discrete Mathematics
2009–2010	Private Tutor - high school math and science

HONORS AND AWARDS

2016	Best Thesis Award, Georgia Institute of Technology - School of Mathematics
2015	Top Graduate Student Award, Georgia Institute of Technology - School of Mathematics
2014 Spring	Algorithms & Randomness Center Student Fellowship, Georgia Institute of Technology
2010–2014	President’s Fellowship, Georgia Institute of Technology

SERVICE

Winter 2018	UC Davis Mathematics for Data Science and Decision Making seminar - organizer
Fall 2018	ICERM Nonlinear Algebra postdoc seminar - co-organizer
Jul 2017	SIAM Conference on Applied Algebraic Geometry mini-symposium on Theory of Numerical Algebraic Geometry - co-organizer
Jan 2017	AMS Joint Meeting mini-symposium on Numerical Algebraic Geometry - co-organizer
2012–2013	Georgia Tech Research Horizons seminar - co-organizer

