

# ROBERT KRONE

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## EMPLOYMENT

2015– 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

## PAPERS

Robert Krone, Anton Leykin and Andrew Snowden. Hilbert series of symmetric ideals in infinite polynomial rings via formal languages, *preprint* arXiv:1606.07956 (2016).

Robert Krone. Equivariant Gröbner bases of symmetric toric ideals,  
*In Proceedings of the 41th International Symposium on Symbolic and Algebraic Computation, ISSAC '16* (to appear).

Robert Krone and Anton Leykin. Eliminating dual spaces, *Journal of Symbolic Computation* (to appear).

Robert Krone and Anton Leykin. Numerical algorithms for detecting embedded components,  
*preprint* arXiv:1405.7871 (2014).

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. ACM (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

`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.

## RESEARCH TRAVEL

- Spring 2013      Technical University of Eindhoven, Netherlands (2.5 months)  
                         Invited for research by Professor Jan Draisma.
- Fall 2014        UC Berkeley (6 weeks)  
                         Simons Institute program: Algorithms and Complexity in Algebraic Geometry.

## TALKS AND POSTERS

- Jul 2016        SIAM 2016 Annual Meeting (Boston)  
                         Talk: "Hilbert series of invariant ideals"
- Jun 2016        Georgia Tech - Algebra Seminar  
                         Talk: "Macaulay dual spaces and local Hilbert functions"
- April 2016      Free Resolutions, Representations, and Asymptotic Algebra workshop (BIRS)  
                         Talk: "Equivariant Gröbner bases"
- Feb 2016        York University - Applied algebra seminar  
                         Talk: "Noetherianity for infinite-dimensional symmetric toric varieties"
- Nov 2015        McMaster University - Algebra seminar  
                         Talk: "Numerical Primary Decomposition"
- 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"
- Sept 2015       CUNY - Symbolic-Numeric Computing seminar  
                         Talk: "Numerical primary decomposition"
- April 2015      Meeting on Algebraic Geometry and Applications (Georgia Tech)  
                         Talk: "Equivariant Gröbner basis algorithms"
- Nov 2014        San Jose State University - Combinatorics seminar  
                         Talk: "Finite generation of symmetric toric ideals"
- Oct 2014        UC Berkeley - Computational Algebraic Geometry seminar  
                         Talk: "Numerically detecting embedded components"
- Oct 2014        AMS Western Sectional Meeting (San Francisco State)  
                         Talk: "Finite generation of symmetric toric ideals"  
                         Talk: "Equivariant lattice generators and Markov bases"
- Oct 2014        UC Davis - CAAO seminar  
                         Talk: "Finite generation of symmetric toric ideals"
- Sept 2014       University of Georgia - Algebraic Geometry seminar  
                         Talk: "Finite generation of symmetric toric ideals"
- 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"
- April 2014      North Carolina State University - Symbolic Computation seminar  
                         Talk: "Noetherianity for infinite-dimensional toric ideals"
- 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"
- Mar 2013        Technical University of Eindhoven - Discrete Mathematics seminar  
                         Talk: "Computing Equivariant Gröbner Bases"
- Oct 2012        RTG Workshop: Tensors and their Geometry in High Dimensions (UC Berkeley)

Apr 2012 Talk: "Algorithms for symmetric Gröbner bases"  
Texas Algebraic Geometry Symposium 2012 (Texas A&M)  
Oct 2011 Poster: "Numerical algorithms for dual bases of positive-dimensional ideals"  
SIAM Conference on Applied Algebraic Geometry (North Carolina State)  
Talk: "Numerical algorithms for dual bases of positive-dimensional ideals"

## TEACHING

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

2012–2013 Georgia Tech Research Horizons seminar - co-organizer  
2013–2014 Georgia Tech High School Math Competition - head problem writer and grader  
2010–2013 Georgia Tech High School Math Competition - problem writer and grader