

# Curriculum Vitae

Tom Denton

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## Academic Background

- **York University and the Fields Institute**, Toronto, Canada, 2011-2012, 2013-2014. Postdoctoral research with Nantel Bergeron and Mike Zabrocki on  $k$ -Schur functions and other topics in algebraic combinatorics.
- **Fulbright Scholar**, Maseno University, Kenya, 2012-2013. Project concerned using e-learning platforms and emerging technologies to improve the teaching of mathematics in the developing world. Led math camps for secondary students, and co-founded a new technology hub in Kisumu, Kenya.
- **University of California, Davis**, 2006-2011. I obtained a doctorate under Prof. Anne Schilling and Prof. Nicolas Thiéry of Paris Sud University, in Orsay, France. My dissertation was on algebraic combinatorics (representations of  $\mathcal{J}$ -trivial monoids and crystal basis theory).
- **University of Oregon**, Eugene, 2003-2006. Graduated *cum laude* with a bachelor's degree in mathematics and minor in political science.
- **Budapest Semesters in Mathematics**, Budapest, Hungary, 2002. This specialized program focuses on teaching higher mathematics to promising undergraduates. Founded by Paul Erdős, László Lovász, and Vera Sos, the program has a strong emphasis on combinatorics.

## Publications

- **Quonting Quores**. In preparation.
- **Affine Permutations and an Affine Catalan Monoid**. To appear, proceedings of "Workshop on Group Embeddings and Algebraic Monoids."
- **Algebraic and Affine Pattern Avoidance**. Séminaire Lotharingien de Combinatoire, B69c (2013), 40 pp. <http://arxiv.org/abs/1303.3767>.
- **Canonical Decompositions of Affine Permutations, Affine Codes, and Split  $k$ -Schur Functions**. Electronic Journal of Combinatorics, Vol 19, Issue 4, 2012, P19. <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v19i4p19>.
- **Excursions into Algebra and Combinatorics at  $q = 0$** . Dissertation, accepted July 2011. <http://www.arxiv.org/abs/1108.4379>.
- **Representation Theory of  $\mathcal{J}$ -Trivial Monoids**. Tom Denton, Florent Hivert, Anne Schilling, Nicolas Thiéry. Séminaire Lotharingien de Combinatoire, B64d (2011), 44p, arxiv: 1010.3455.
- **A Combinatorial Formula for Idempotents in the 0-Hecke Algebra of the Symmetric Group**. Electronic Journal of Combinatorics, vol 18, Feb 2011, arxiv: 1008.2401. [http://www.combinatorics.org/Volume\\_18/PDF/v18i1p28.pdf](http://www.combinatorics.org/Volume_18/PDF/v18i1p28.pdf).

- **A Combinatorial Formula for Idempotents in the 0-Hecke Algebra of the Symmetric Group (Extended abstract).** DMTCS Proceedings, North America, 0, Jul. 2010. This extended abstract was accepted to the yearly international conference on Formal Power Series and Algebraic Combinatorics (FPSAC) 2010. Available at: <http://www.dmtcs.org/dmtcs-ojs/index.php/proceedings/article/view/dmAN0150/3176>.
- **Linear Algebra in Twenty-Five Lectures.** Tom Denton and Andrew Waldron. Last revision December, 2009. These notes were created for the introductory linear algebra class at the University of California, Davis, and are available for free download at: <http://math.ucdavis.edu/~linear/linear.pdf>.

## Mathematical Activities

- *2013:* Co-founded LakeHub, a technology hub in Kisumu, Kenya, to bring together computer science graduates and students with local businesses.
- *July, 2013:* Ran sessions on Grobner bases and Sage at a month-long algebraic geometry workshop in Mombasa, Kenya.
- *July, 2013:* Coordinated the pure maths workshop at the 2nd Strathmore University Maths Conference in Nairobi, Kenya.
- *Spring, 2012:* Attended Sage Days 38 in Montreal, and Sage Days 40 in Minneapolis. Developed code for affine permutations, greatly speeding calculations essential to the symmetric function community.
- *Summer, 2010:* The FPSAC (Formal Power Series and Algebraic Combinatorics) conference published my extended abstract on idempotents in the 0-Hecke algebra of the symmetric group. I also presented a poster on my findings.
- *Summer, 2010:* Attended the Fields Institute workshop and conference on affine Schubert calculus in Toronto, Ontario.
- *Spring, 2010:* Spent four months at Université Paris-Sud in Orsay, France, working with Nicolas Thiéry and Florent Hivert on the representation theory of  $\mathcal{J}$ -trivial monoids. While in France, I participated in the 64th Séminaire Lotharingien de Combinatoire, in Lyon, France, and the 8th French Combinatorial Conference in Orsay.
- *Summer, 2009:* Received a grant to attend the Fields Institute Summer School and conference on Geometric Representation Theory.
- *December, 2008:* Organized and hosted a Sage Workshop and installation session for graduate students with Brant Jones. We demonstrated how we use Sage in our research, introduced the Sage-Combinat project, answered questions, and provided technical assistance.
- *2008-2011:* Maintained a blog on topics in algebraic combinatorics presented and discussed at our weekly informal seminar at Davis. This can be read online at: <http://math.ucdavis.edu/~sdenton/algcomb>.
- *Summer, 2008:* Received a VIGRE Summer Research grant for my work in algebraic combinatorics. This project involved extending the implementation of the MacDonal Polynomials in Sage, and some work on the root systems code.
- *Summer, 2008:* Assisted with a Sage-Combinat workshop hosted by Nicolas Thiéry at the FPSAC 2008 conference held in Viña del Mar, Chile.
- *Spring, 2008:* Attended two Sage-Combinat development workshops, one hosted at MSRI in Berkeley, CA and the second in Davis, CA. Participants made significant progress developing Sage code relating to crystal bases, root systems, and Hecke algebras.

## Talks

- **Canonical Decompositions of Affine Permutations, Affine Codes, and Split  $k$ -Schur Functions**
  - *February, 2013*: Bahir Dar University, Ethiopia.
  - *January, 2013*: Strathmore University, Kenya
  - *May, 2012*: Sage Days 40, Institute for Mathematics and its Applications, Minnesota
  - *February, 2012*: UQAM, Montreal.
- **Affine and Algebraic Pattern Avoidance**
  - *July, 2012*: Fields Institute Workshop on Algebraic Monoids, Group Embeddings and Algebraic Combinatorics.
  - *August, 2011*: Strathmore University, Kenya
- **Promotion Operators, Dual Equivalence, and Broken Dreams.**
  - *December, 2011*: York University, Canada
  - *December, 2011*: University of Toronto, Canada
- **Combinatorial Representation Theory of  $\mathcal{J}$ -Trivial Monoids**
  - *November, 2010*: Pure Mathematics Workshop 2010, Maseno University, Kenya
  - *October, 2010*: Algebraic Lie Theory Seminar, Colorado University, Boulder
  - *October, 2010*: UC Davis Student Run Discrete Seminar (SRDS)
- **A Combinatorial Formula for Idempotents in the 0-Hecke Algebra of  $S_N$ .**
  - *October, 2010*: Colorado State University, Fort Collins.
  - *April, 2010*: Marne-la-Valee, Université Paris-Est.
  - *September, 2010*: Discrete Math and Algebra Seminar, UC Davis
  - *August, 2010*: FPSAC 2010 Conference (Poster Session)

## Teaching Experience

- *Fall, 2013*: Math for Life and Social Sciences, York University, instructor.
- *January, 2013*: Introduction to Mathematical Problem Solving, African Institute of Mathematical Sciences, South Africa.
- *Fall, 2012*: Foundations of Pure Mathematics, Maseno, Kenya.
- *August, 2011-Present*: Co-organizer of the Maseno Maths Camp, a yearly week-long event for secondary students in Kenya. This is the first such camp in East Africa. Also co-ordinated for the first Ethiopian math camp in Bahir Dar, July 2013.
- *Winter, 2012*: 'Linear Algebra II with Applications,' York University, instructor.
- *August, 2011*: Lectured in a graduate workshop and assisted with the 1st Annual Strathmore Math Conference.
- *Spring, 2011*: 'Calculus for Biology III,' UC Davis, instructor.
- *Winter, 2010*: Math Circle. A class on mathematics arising from games, and using game-like structures to solve mathematical problems for advanced high school students.
- *Summer 2008 and 2009*: COSMOS. Teaching assistant for a robotics class for advanced high school students. Taught principles of programming in a C-like language for LEGO Mindstorms robots.

- *Spring, 2008*: ‘Calculus III,’ UC Davis, instructor.
- *Winter 2008*: Math Circle. A class on non-Euclidean geometries for advanced high school students, deriving well-known properties of spaces of constant curvature.
- *2006-2008*: Served as a Teaching Assistant for a number of calculus courses at UC Davis.
- *2005*: Ran a year-long class at an alternative high school. The curriculum dealt variously with civics, game theory, and the mathematics of bicycling. Center for Appropriate Transport, Eugene, Oregon.

## Service

- 2010: Peer-reviewed for the ‘Discrete Mathematics’ journal.
- 2009-2010: Served on a UC Davis advisory board on campus cooperative housing.
- 2007-2009: Served as representative to the UC Davis graduate student teacher’s union.
- 2007-2009: Served as liaison between UC Davis cooperative housing and the university.
- 2007-2008: Served as a department representative to the Graduate Student Association.

## Non-Mathematical Activities

- In 2013, I became a board member of the Campus Co-operative, a student housing cooperative in Toronto with 270 residents and a \$2 million per year operating budget.
- From 2007 to 2011, I was an active member of a Davis housing cooperative, and served for three years as a liaison between the cooperative and the University. Designed and facilitated workshops on consensus decision making, and co-authored a successful plan to keep the space open in 2011. Submitted proposals that led to \$20,000 in grants for the cooperative.
- I have played various instruments for most of my life, focusing mainly on the ukulele since 2005. Played numerous shows and events in Davis between 2008 and 2011, and wherever I happen to find myself since then.
- From 2007 to 2009, participated in the Sustainable Living Circus as an actor and musician, using performance to educate people of all ages about sustainable living. I can juggle five balls and use the affine symmetric group to explain juggling patterns.
- Have worked with numerous bike education groups, including the Center for Appropriate Transport in Oregon, the Davis Bike Church, and Toronto Bike Pirates.

## References

- Prof. Nantel Bergeron, York University – Researcher. [bergeron@yorku.ca](mailto:bergeron@yorku.ca)
- Prof. Mike Zabrocki, York University – Researcher. [zabrocki@mathstat.yorku.ca](mailto:zabrocki@mathstat.yorku.ca)
- Prof. Anne Schilling, UC Davis – Advisor. [anne@math.ucdavis.edu](mailto:anne@math.ucdavis.edu)
- Prof. Nicolas M. Thiéry, Université Paris-Sud – Co-Advisor. [Nicolas.Thiery@u-psud.fr](mailto:Nicolas.Thiery@u-psud.fr)
- Rick West, Lecturer, UC Davis – Teaching mentor. [rgwest@ucdavis.edu](mailto:rgwest@ucdavis.edu)