

Diane Maclagan

Curriculum Vitae

Mathematics Institute +44(0)24 7658 2333 (work)
Zeeman Building +44(0)24 7652 4182 (fax)
Warwick University D.Maclagan@warwick.ac.uk
Coventry CV4 7AL <http://www.warwick.ac.uk/staff/D.Maclagan>
United Kingdom

Employment

Summer 2007 - present. Associate Professor, **University of Warwick**
Summer 2007 - Summer 2009. Associate Professor, **Rutgers University**
Fall 2004 - Summer 2007. Assistant Professor, **Rutgers University**
Fall 2001 - Spring 2004. Szegő Assistant Professor, **Stanford University**
Fall 2000 - Summer 2001. Member, **Institute for Advanced Study**

Education

Ph.D., Mathematics, **University of California, Berkeley**, May 2000
Dissertation title: Structures on Sets of Monomial Ideals.
Advisor: Bernd Sturmfels
B.Sc. (Hons) (First Class), **University of Canterbury** (New Zealand), Awarded May 1995

Publications

1. *Lower and upper bounds for nef cones* (with Angela Gibney). In preparation.
2. *Smooth and irreducible multigraded Hilbert schemes* (with Gregory G. Smith). **Advances in Math.**, **223**, 1608-1631, 2010.
3. *Equations for Chow and Hilbert quotients* (with Angela Gibney). To appear in **Algebra and Number Theory**.
4. *Some cases of the Eisenbud-Green-Harris conjecture* (with Giulio Caviglia). **Math. Res. Lett.**, **15**, 427-433, 2008.
5. *Moduli of McKay quiver representations I: The coherent component* (with Alastair Craw and Rekha R. Thomas). **Proceedings of the LMS**, **95**, 179-198, 2007.
6. *Moduli of McKay quiver representations II: Gröbner basis techniques* (with Alastair Craw and Rekha R. Thomas). **Journal of Algebra**, **316**, 2, 514-535, 2007.
(Computational Algebra section)
7. *Fiber fans and toric quotients* (with Alastair Craw). **Discrete and Computational Geometry**, **37**, 251-266, 2007.
8. *Multigraded Castelnuovo-Mumford regularity* (with Gregory G. Smith). **Journal für die reine und angewandte Mathematik (Crelle's Journal)**, **571**, 179-212, 2004.
9. *Uniform bounds on multigraded regularity* (with Gregory G. Smith). **Journal of Algebraic Geometry** **14**, 137-164, 2005.

10. *The card game Set* (with Benjamin Lent Davis).
The Mathematical Intelligencer, **25**, (3):33–40, 2003.
11. *The toric Hilbert scheme of a rank two lattice is smooth and irreducible* (with Rekha R. Thomas)
Journal of Combinatorial Theory, Series A, **104** (1):29–48, 2003.
12. *Supernormal vector configurations* (with Serkan Hoşten and Bernd Sturmfels).
Journal of Algebraic Combinatorics, **19**, (3):297–313, 2004.
13. *The vertex ideal of a lattice* (with Serkan Hoşten).
Advances in Applied Mathematics, **29**, (4):521–538, 2002.
14. *Combinatorics of the toric Hilbert scheme* (with Rekha R. Thomas).
Discrete and Computational Geometry, **27**, (2):249–272, 2002.
15. *Antichains of monomial ideals are finite*.
Proceedings of the American Mathematical Society, **129**, (6):1609–1615, 2001.
16. *Boolean term orders and the root system B_n* . **Order** **15**, (3):279–295, 1998.
17. *Equivalent methods for global optimization* (with Timothy Sturge and William Baritompa)
In *State of the Art in Global Optimization* (Princeton, NJ, 1995), 201–211,
Nonconvex Optim. Appl., 7, Kluwer Acad. Publ., Dordrecht, 1996.

Expository Work

1. *Computational Algebra and Combinatorics of Toric Ideals* (with Rekha R. Thomas, and contributions from Sara Faridi, Leah Gold, A.V. Jayanthan, Amit Khetan and Tony Puthenpurackel). **Ramanujan Math. Soc. Lect. Notes Ser.**, **4** *Commutative algebra and combinatorics, Part I*, 106 pages, 2007
2. *Notes on Hilbert schemes*. Lecture notes from five lectures on Hilbert schemes given at the **Summer School on Introduction to explicit methods in algebraic geometry**, run September 3-7, 2007, at the University of Warwick. 28 pages.
3. *Introduction to tropical geometry*. Draft book-in-progress with Bernd Sturmfels. 200 pages.

Visiting Positions

- Member, **MSRI**, Program on Tropical Geometry, August–October, 2009.
 Member, **MSRI**, Program on Algebraic Geometry, January – April, 2009.
 Member, **Institute for Mathematics and its Applications (IMA)**, Program on Applications of Algebraic Geometry, September – November, 2006.
 Member, **MSRI**, Program on Commutative Algebra, January – March, 2003.

Grants

- University of Warwick Institute for Advanced Study Visiting Fellowship (funds for Professor Alicia Dickenstein)
 University of Warwick **North American Travel Grant**, 2008, 2009
 PI on **NSF grant DMS-0500386** *Multigraded Commutative Algebra* \$100,000 (2005-2009)
 Co-PI on **NSF Grant INT-0332270** for *US-India Workshop: Commutative Algebra, Algebraic Geometry and Combinatorics, Bangalore, India, December 2003*.
 Funding for travel for twenty participants from the US.
AWM Mentoring Travel Award, Summer 2001.

Conference and Colloquium Talks*Tropical bounds on effective cycles***MSRI Tropical geometry in combinatorics and algebra workshop**, October 2009.*Introduction to tropical algebraic geometry***MSRI Introductory Workshop** for program on Tropical Geometry, (two talks and a problem session), August 2009.*The T-graph of the Hilbert scheme of points***1st Pacific Rim Mathematical Association Congress**, Sydney, Australia, July 2009.*The tropical inverse problem***Strasbourg Tropical Day**, June 2009.**MSRI Tropical Colloquium**, September 2009.*Connected multigraded Hilbert schemes***Abel Symposium** on Combinatorial aspects of commutative algebra and algebraic geometry, June 2009.*Tropical bounds on nef cones***MSRI Combinatorial, Enumerative and Toric Geometry Workshop**, March 2009**Special Session on Algebra and Number Theory with Polyhedra**, AMS Spring Western Section Meeting, SFSU, April 2009.**Special Session on Algebraic Geometry**, British/Nordic Congress of Mathematics, June 2009.*Tropical Geometry*San Jose State University **Colloquium**, March 2009.**British Mathematical Colloquium**, April, 2010.*Bounds on nef cones from toric embeddings*Toric Geometry workshop at **Oberwolfach**, January 2009.*Smooth multigraded Hilbert schemes***Conference on Commutative, Combinatorial, and Computational Algebra** in Memory of Pilar Pisón Casares. Seville, Spain, February 2008.**Workshop on Commutative algebra, complexes and computer algebra**, University of Warwick, May 2008*The Projective Normality Problem***Oberwolfach mini-workshop** on *Projective normality of Smooth Toric Varieties*, August 2007.**American Institute for Mathematics** workshop on *Combinatorial Challenges in toric varieties*, April 2009.*Hilbert Schemes*University of Warwick **Algebraic Geometry Symposium**, *Introduction to explicit methods in algebraic geometry* Summer School. Series of five lectures and associated problem sessions. September 2007.

Equations and Degenerations of $\overline{M}_{0,n}$

Special session on Commutative Algebra and Algebraic Geometry

CMS Winter Meeting, Toronto, December 2006.

CRM conference on Interactions between Algebraic Combinatorics and Algebraic Geometry, Montreal, May 2007

IAS Women's program, May 2007.

Toric Geometry

Workshop on *What is Algebraic Geometry*, **Institute for Mathematics and its Applications**, April 2007.

The moduli space of genus zero curves

Colloquium, **University of Pennsylvania**, February 2007.

Presentation at University of Warwick, November 2006.

GIT and Chow quotients of toric varieties

Special session on Combinatorial Methods in Equivariant Topology,

AMS Fall Eastern Section Meeting, UConn, October 2006.

A nonnormal G -Hilbert scheme

AMS Summer Research Conference on Integer points in Polyhedra: Geometry, Number Theory, Representation Theory, Algebra, Optimization, Statistics. June 2006.

Update on multigraded regularity

Castelnuovo-Mumford regularity and related topics, Luminy, May 2006.

Fibrations of $\overline{M}_{0,n}$

Special Session on Combinatorial Algebraic Geometry, AMS Spring Central Section Meeting, Notre Dame, April 2006.

Moduli of representations of the McKay quiver

Convex and Algebraic Geometry at **Oberwolfach**, January 2006.

Moduli spaces and combinatorics, BIRS, Banff, Canada, July 2006.

Workshop on computational and combinatorial commutative algebra, Fields Institute, Toronto, August 2006.

Gröbner techniques in the McKay correspondence

Theoretical effectivity and practical effectivity of Groebner bases, Rikkyo University, Tokyo. August, 2005.

Special session on Geometry of Gröbner bases, AMS Spring Western Section Meeting, SFSU, April 2006.

Holes in Semigroups

Combinatorics in the Northeast, Wesleyan University, February 2005.

Polyhedral Geometry in the McKay Correspondence

Park City Mathematics Institute, July 2004

Special Session on Algebraic Geometry, AMS Fall Western Section Meeting, Albuquerque, October 2004.

Special Session on Algebraic Geometry and Combinatorics, AMS Spring Western Section Meeting, Santa Barbara, April 2005.

Toric regularity

Special Session on Algebraic Geometry, AMS Fall Central and Western Section Meeting, Boulder, October 2003.

AMS Summer Research Conference on Commutative Algebra, Snowbird, Utah, July 2003.

Special Session on Combinatorial Commutative Algebra and Algebraic Geometry, AMS Spring Western Section Meeting, SFSU, May 2003.

Current Trends in Commutative Algebra, Levico, Italy, June 2002.

Symbolic Computational Algebra 2002, University of Western Ontario, July 2002.

Workshop on Resolutions, Cornell University, October 2004.

Toric Hilbert schemes

Meeting on **Combinatorics, Convexity and Algebraic Geometry at Oberwolfach**, January 2003.

Colloquia at Temple University, LSU, Tulane University, Queen's University, UIUC, Rutgers, Barnard, Utah, and Nebraska. January/February 2004.

A random walk on zero-one contingency tables,

Special Session on Algebraic Combinatorics, AMS Spring Central Section Meeting, University of Michigan, March 2002.

Towards the (dis)connectness of the toric Hilbert scheme,

Special Session on Computational Commutative Algebra and Algebraic Geometry, Joint Meetings of the AMS and MAA, San Diego, January 2002.

Supernormal vector configurations

Special Session on Computational Algebraic Geometry and its Applications, AMS Eastern Section Meeting, Hoboken, April 2001.

Gröbner fans of codimension three lattice ideals.

Special Session on Hyperplane Arrangements, AMS Fall Eastern Section Meeting, Columbia University, November 2000.

COMbinatorialists of New England (CONE), February 2001.

The vertex ideal.

Bay Area Discrete Math Day, UC Davis, October 2000.

Combinatorics of the toric Hilbert scheme.

AMS Summer Research Conference on Symbolic Computation, Mt Holyoke. June 2000.

Special Session on Effective Methods and Commutative Algebra, Joint Meetings of the AMS and MAA, Washington D.C. January 2000.

The Baues problem and the toric Hilbert scheme.

AWM workshop, Joint Meetings of the AMS and MAA, New Orleans, January 2001.

The toric Hilbert scheme.

Texas A&M colloquium. January, 2001.

Colorado State University Colloquium February, 2001.

Antichains of monomial ideals are finite.

Workshop on Ordered Sets and Universal Algebra, Vanderbilt University, May 2000.

DREI Week 3 - Graphs, Posets and Algorithms, DIMACS, Rutgers University, August 1999.

FPSAC 1999, Barcelona, Spain, June 1999.

Boolean term orders and the root system B_n .

Special Session in Algebraic and Geometric Combinatorics, AMS Regional Meeting, Gainesville, Florida, March 1999.

Seminar Talks

Algebraic Geometry Seminar, **KTH**, March 2010
Algebra and Geometry Seminar, **Bristol University**, May 2009
Pure Mathematics Colloquium, **Sheffield University**, May 2009
Combinatorics Seminar, **MIT**, April 2009
MIT/Harvard Algebraic Geometry Seminar, **Harvard University**, April 2009
Algebra/Geometry/Combinatorics Seminar, **San Francisco State University**, February 2009
Discrete Mathematics Seminar, **UC Berkeley**, February 2009
Algebra and Discrete Mathematics Seminar, **UC Davis**, February 2009
Tropical Reading Group Seminar, **University of Manchester**, December 2009
Algebraic Geometry Seminar, **University of Georgia**, November 2008
Geometry and Topology Seminar, **University of Glasgow**, November 2008
Algebraic Geometry Seminar, **Queen's University**, September 2008
Algebraic Geometry Seminar, **University of Utah**, September 2008
Algebraic and Symplectic Geometry Seminar, **Oxford University**, May 2008
Algebraic Geometry Seminar, **Freie Universität Berlin**, November 2007
Algebraic Geometry Seminar **October 2007**
Valley Geometry Seminar, **UMass Amherst**, December 2006
Algebraic Geometry Seminar, **Queen's University**, December 2006
COW (Cambridge, Oxford, Warwick) Seminar, **Imperial College, London**, November 2006
Combinatorics Seminar, **University of Minnesota**, November 2006
Algebraic Geometry and its applications Seminar, **IMA**, November 2006
Geometry Seminar, **University of Texas**, October 2006
Algebra Seminar, **University of Pennsylvania**, July 2006
Algebra, Geometry and Physics Seminar, **Stony Brook University**, April 2006
Algebraic Geometry Seminar, **Freie Universität Berlin**, November 2005
Algebra Seminar, **Colorado State University**, November 2005
Algebraic Geometry Seminar, **Columbia University**, November 2005
Graduate combinatorics seminar, **Rutgers University**, April 2005
Valley Geometry Seminar, **UMass, Amherst**, February 2005
Experimental Mathematics Seminar, **Rutgers University**, November 2004
Combinatorics Seminar, **University of Pennsylvania**, October 2004
Computational Commutative Algebra Seminar **Rutgers University**, September/October, 2004
Discrete Mathematics Seminar, **UC Davis**, November 2003
Algebra Seminar, **University of Washington**, November 2003
Computational Algebraic Geometry Seminar **Rice University**, October 2003
Algebraic Geometry and Number Theory Seminar **UIC**, August 2003
Commutative Algebra Seminar, **UC Berkeley**, February 2003

Algebraic Geometry Seminar, **University of Utah**, October 2002
 Algebraic Geometry Seminar, **Stanford University**, November 2002
 Combinatorics Seminar, **UC Berkeley**, February 2002
 Commutative Algebra Seminar, **UC Berkeley**, Fall 2001, Spring 2002
 Algebraic Geometry Seminar, **Stanford University**, November 2001
 Commutative Algebra Seminar, **UC Berkeley**, November 2001
 Algebraic Methods Seminar, **Stanford University**, October 2001
 Algebra Seminar, **Rutgers University**, April 2001
Kolchin Differential Algebra Seminar, New York, February 2001
 Combinatorics Seminar, **University of Pennsylvania**, November 2000
 Computational and Commutative Algebra Seminar, **Rutgers University**, September 2000
 Geometry/Topology Seminar, **UC Davis**, December 1999
 Algebraic Geometry Seminar, **Columbia University**, October 1999
 Geometry-Algebra-Singularities-Combinatorics Seminar, **Northeastern University**,
 October 1999
 Combinatorics Seminar, **MIT**, October 1999
 Combinatorial and Algebraic Geometry Seminar, **Cornell University**, October 1999
Route 81 Algebra Conference, Syracuse University, New York, October 1999
 Algebra Seminar, **Universidad de Sevilla**, Spain, June 1999.
Universidad de Santander, Spain, June 1999.
 GAT Seminar, **Texas A &M University**, April 1999.
 Combinatorics and Commutative Algebra Seminars, **UC Berkeley**, 1997-2000

Teaching Experience

- **Associate Professor**, Mathematics Institute, University of Warwick, Fall 2007 - present. Taught geometry and combinatorial optimization classes to second year students, and algebraic geometry to fourth year students. Supervised 24 tutorial students.
- **Assistant Professor**, Department of Mathematics, Rutgers University, Fall 2004 - Spring 2007. Complete responsibility for classes, including preparing syllabi and supervising teaching assistants and undergraduate assistants. Taught calculus, linear algebra, differential equations and graph theory undergraduate classes, and graduate algebra, graduate commutative algebra, and a topics in algebra graduate class. Taught independent studies on algebraic geometry at the undergraduate and graduate levels.
- **Graduate Lecturer**
 1. **AARMS Graduate school** on *Tropical Geometry*, 14 July – 8 August, 2008.
 2. Summer school on *Introduction to explicit methods in algebraic geometry*, University of Warwick, **Algebraic Geometry Symposium**. Series of five lectures and associated problem sessions.

3. Graduate school at the International Conference on Commutative Algebra and Combinatorics, Allahabad, India, December 2003. With Rekha Thomas, ran a 6 day long graduate course. Lectured, organized teaching assistants, and produced a companion book.
- **Szegö Assistant Professor**, Department of Mathematics, Stanford University, Fall 2001 - Spring 2004. Complete responsibility for classes, including preparing syllabi and supervising teaching assistants. Taught multivariable calculus, linear algebra, real analysis, combinatorics, group theory, computational commutative algebra, and a graduate class in toric varieties.
 - **Teaching Assistant**, Department of Mathematics, UC Berkeley 1995 - 2000 (4 Semesters). Led discussion sections, graded quizzes and homework, and held office hours for calculus, linear algebra, discrete mathematics and numerical analysis classes.
 - **Teaching Assistant**, (for Hélène Barcelo) Summer Institute for Mathematical Sciences (SIMS), UC Berkeley, Hyperplane Arrangements class. Summer 1997. SIMS was a summer mathematics program for talented undergraduate women. Attended lectures and other activities, ran discussion section, discussed research problems, and mentored 10 students.
 - **Tutor**, Department of Mathematics, University of Canterbury, New Zealand. 1994-5. Led discussion sections for calculus and statistics classes.

Graduate Students

Piotr Zwiernik (joint with Statistics). University of Warwick. Ph.D. student.
 Martha Bernal Guillén. University of Warwick. PhD. student.
 Andrew Chan. University of Warwick. PhD. student.

Professional Service

Organized an **AIM workshop** on *Components of Hilbert schemes*, July 2010.
 Organized an **AIM workshop** on *Combinatorial challenges in toric varieties*, April 2009.
 Chaired organizing committee of the **MSRI workshop** on *Connections for Women: Algebraic Geometry and Related Fields*, January 2009.
 On organizing committee for the **Clifford Lectures** at Tulane University, November 2008.
 Organized a **Special Session on Toric Varieties** (with Milena Hering) at the AMS 2007 Fall Eastern Section Meeting.
 Rutgers Mathematics Department Graduate Committee (Spring 2007 – Fall 2008)

Organized a **Oberwolfach Mini-Workshop** on *Projective Normality of Smooth Toric Varieties* (with Christian Haase (FU Berlin) and Takayuki Hibi (Osaka)), August 2007.

Editorial Advisory Board, London Mathematical Society Journals, 2009 - present.

Organized a **Special Session on Combinatorial Algebraic Geometry** (with Angela Gibney) at the AMS 2007 Spring Eastern Section Meeting.

Organized a **Seminar on Tropical Mathematics**, Rutgers University, Fall 2005.

Organized a **Learning Seminar on Toric Varieties**, Rutgers University, Fall 2004.

Organized **Bay Area Discrete Mathematics Day**, (one day conference) Spring 2002, Spring 2004.

Bay Area Discrete Mathematics Day committee, 2001–2004.

Organized the **Stanford Algebra Seminar**, 2003/2004.

Referee for J. Algebra, J. Symb. Comp., Adv. Appl. Math, Proc. Amer. Math. Soc., Math. Programming, J. Combin. Theory (Series A), Math. Ann., Comm. Algebra, Rocky Mountain J. Math., Found. Comp. Math, Internat. J. Algebra Comput., Illinois J. Math., Discrete Appl. Math., Mathematics of Operations Research, J. Pure and Applied Algebra, J. Alg. Combinatorics, Amer. J. Math., and Duke Math. J.