

# Benjamin McKay

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## Experience

2007–present	Lecturer Above the Bar	University College Cork
2005–2007	Lecturer	University College Cork
2004–2005	Fellow	USF Center for the Study, Protection and Amelioration of Coastal Environments
2003–2005	Assistant Professor	University of South Florida (cross-appointed) Department of Mathematics and Department of Environmental Science, Policy & Geography
2001–2003	Scott Assistant Professor	University of Utah
2000–2001	Postdoctoral Fellow	University of Utah, Salt Lake City, USA
1999–2000	Postdoctoral Fellow	Max-Planck-Institut für Mathematik, Bonn, Germany
1989	Researcher	Department of Electrical Engineering, Dalhousie University, Halifax, Canada
1986	Computer programmer	Covello, Bryan and Associates, Arctic Geological Exploration, Yellowknife, Canada

## Visiting Positions

2012	Université Nice Sophia Antipolis	University of Rome Tor Vergata
2011	Université Nice Sophia Antipolis University of Waterloo University of Rome Tor Vergata Tata Institute of Fundamental Research	2009 Universität Munster 2008 Université Paris-Sud 11 2007 Université de Toulouse
2010	Université Paris-Sud 11	1996 Institute for Advanced Study, Princeton

## Grants & Awards

1. Sloan Fellow	Sloan Foundation	1998
2. Travel Award	ESP&G Department	2003–2004
3. Travel Award	College of Arts & Sciences	2003–2004
4. Research Grant	ESP&G Department	2003–2004
5. New Investigator Grant	USFSP	2004
6. Research Grant	ESP&G Department	2003–2004
7. Teaching Reduction	College of Arts & Sciences	2005
8. Book Allowance	UCC Maths	2005–2006
9. Travel Grant	UCC Maths	2005–2006
10. Seminar Grant	UCC Maths	2005–2006
11. Book Award	UCC Science Faculty	2005
12. Research Grant	Science Foundation Ireland	2007–2010
13. Research Grant	Science Foundation Ireland	2007–2010

## Education

1993 B.Sc.	Mathematics & Philosophy	University of Toronto	
1994 M.Sc.	Mathematics	University of Toronto	Advisor: Richard W. Sharpe
1999 Ph.D.	Mathematics	Duke University	Advisor: Robert L. Bryant

## Teaching Experience

Average teaching evaluation: 4.3/5.0

### Duke University

- Reform Precalculus
- Traditional Calculus
- Reform Calculus

### University of Utah

- PDE for Engineers (2×)
- Applied Complex Variables (2×)
- Complex Analysis (2×)
- Business Calculus (2×)
- Business Precalculus

### University of South Florida

- Precalculus Algebra
- Calculus I
- Business Calculus (2×)
- Linear Algebra
- Introductory Statistics (2×)
- Calculus II (2×)
- Finite Mathematics

### University College Cork

- Calculus
- Curves and Surfaces (3×)
- Game Theory and Linear Programming
- Graph Theory and Combinatorics
- Linear Algebra (12×)
- ODE (2×)
- Rings & Fields
- Topics in Modern Maths (2×)
- Topics in Maths and Applied Maths (3×)

## Publications

### Doctoral Thesis

*Duality and integrable systems of pseudoholomorphic curves*, Duke University, 1999.

### Books

1. (with K. Becker, M. Becker, A. Bertram and P. Green), **Lectures on the Geometry of Strings**, American Mathematical Society, 2006.

### Papers in Pure Mathematics

1. *Dual curves and pseudoholomorphic curves*, **Selecta Mathematica N.S.**, 9 (2003), pp. 251–311, math.DG/0101017.
2. *The Blaschke conjecture and great circle fibrations of spheres*, **American Journal of Mathematics**, vol. 126, no. 5, October 2004, 1155–1191, math.DG/0112027.
3. *Smooth projective planes*, **Geometriae Dedicata**, 116, # 1 December 2005, 157–202, math.DG/0412500.
4. *Lagrangian manifolds in affine symplectic geometry*, **Differential Geometry and Its Applications**, vol. 24, no. 6, December 2006, 670–689, math.DG/0508118.
5. *Complete complex parabolic geometries*, **International Mathematics Research Notices**, vol. 2006, Article ID 86937, 2006, math.DG/0409559.
6. *Complex nonlinear ordinary differential equations and geometry*, **International Workshop on Multi-Rate Processes & Hysteresis**, Journal of Physics Conference Series, vol. 55, Institute of Physics, 2006, pp. 165–170.
7. *Analogues of complex geometry*, **Journal of the London Mathematical Society**, vol. 76, no. 2, 2007, 16–40. math.DG/0107073.
8. *Almost complex rigidity of the complex projective plane*, **Proceedings of the American Mathematical Society**, 135 (2007) 597–603, math.SG/0403155.
9. *Sussmann’s orbit theorem and maps*, **Differential Geometry and its Applications**, June 2007, vol. 25, no. 3, 277–280, math.DG/0508121.
10. *Extension phenomena for holomorphic geometric structures*, **Symmetry, Integrability, Geometric Structures and Applications**, special issue “Élie Cartan and Differential Geometry”, 2009, 5, 1, 1–45, arXiv:0812.2353.
11. (with Indranil Biswas), *Holomorphic Cartan geometries and Calabi-Yau manifolds*, **Journal of Geometry and Physics**, 60, 2010, 610–613, arXiv:0812.3978.
12. (with Indranil Biswas), *Holomorphic Cartan geometries, Calabi-Yau manifolds and rational curves*, **Diff. Geom. Appl.** 28 (2010), no. 1, 102–106.
13. (with Alexey Pokrovskiy), *Locally homogeneous geometric structures on Hopf surfaces*, **Indiana U. Math. J.**, 59 (2010), 1491–1540, arXiv:0910.0369.
14. *Characteristic forms of complex Cartan geometries*, **Advances in Geometry**, 2011, vol. 11, no. 1, 138–168, arXiv:0704.2555.
15. *Holomorphic Cartan geometries on uniruled surfaces*, **C. R. Math. Acad. Sci. Paris**, Ser. I, 2011, arxiv:1105.4732.
16. *Holomorphic parabolic geometries and Calabi-Yau manifolds*, **Symmetry, Integrability, Geometric Structures and Applications**, 7 (2011), 090, 11 pages, arXiv:0812.1749.
17. *Rigid geometry on projective varieties*, **Mathematische Zeitschrift**, 2011, to appear, arXiv:math/0603276.

18. *Exotic geometric structures on Kodaira surfaces*, **Indiana U. Math. J.**, to appear, arXiv:1201.4278v1.
19. *Soliton solutions for the Laplacian coflow of some  $G_2$ -structures with symmetry*, **Differential Geometry and Its Applications**, to appear, arXiv:1108.2192v1.

#### Papers in Mathematics Applied to Medicine

1. (with Devashish Shrivastava and Robert Roemer), *An analytical study of heat transfer in finite tissue with two blood vessels and uniform Dirichlet boundary conditions*, **Journal of Heat Transfer**, February 2005, vol. 127, #2, p. 179-188.
2. (with William P.S. McKay and Peter H. Gregson), *Transfer-function analysis in anesthesia research*, **Canadian Journal of Anaesthesia** September 1999, vol. 46, #9, pp. 813-819.
3. (with William P.S. McKay, Peter H. Gregson, and Julio Militzer), *Sternal acceleration ballistocardiography and arterial pressure wave analysis to determine stroke volume*, **Clinical and Investigative Medicine** vol. 22 #1, February, 1999, 4-14.
4. (with William P.S. McKay, Peter H. Gregson, and Terence Blanchet), *Resting muscle sounds in anaesthetized patients*, **Canadian Journal of Anaesthesia** vol. 45 (1998), no. 5, part II:A26.
5. (with William P.S. McKay, Peter H. Gregson, and Terence Blanchet), *Resting muscle sounds in anesthetized patients*, **The Canadian Journal of Physiology and Pharmacology** 1998 April 76(4): 401-6.
6. (with William P.S. McKay, Miklavs Erjavec, Peter H. Gregson, Terence Blanchet and Guy Kember), *Muscle sounds in anaesthetized patients*, (abstract) **Canadian Journal of Anaesthesia** 43 (1996), no. 5, part II:A10-A.
7. (with William P.S. McKay and Peter H. Gregson), *Sternal accelerometer ballistocardiography and arterial pressure wave analysis to determine stroke volume*, (abstract) **Canadian Journal of Anaesthesia** 41 (1994), no. 5, part II:A45A.
8. (with William P.S. McKay and Peter H. Gregson), *Direct accelerometer ballistocardiography for the detection of coronary artery disease*, (abstract) **Clinical and Investigative Medicine** 15 (1992), no. 4:A9.

#### Invited Talks

2000

- Utah State University, Mathematics and Physics Departments, *Seminar in Formal Geometry & Mathematical Physics*

2002

- Northeastern University, *AMS Conference: Developments and Applications in Differential Geometry*
- Utah State University, Mathematics Department, *Colloquium*

2003

- University of Florida, Mathematics Department, *Colloquium*
- University of Florida, Mathematics Department, *Geometry & Mathematical Physics Seminar*
- University of Texas Austin, Mathematics Department, *Geometry Seminar*
- University of South Florida Saint Petersburg, *College of Arts & Sciences Colloquium*
- Fordham University, Mathematics Department, *Colloquium*
- University of South Florida Tampa, Mathematics Department, *Colloquium*

2004

- University of Arizona, Mathematics Department, *Colloquium*
- University of Arizona, Mathematics Department, *Geometry Seminar*
- University of Manitoba, Mathematics Department, *Colloquium*
- Brock University, Mathematics Department, *Colloquium*
- Vrije Universiteit Amsterdam, Mathematics Department, *Colloquium*

- Dalhousie University, *Canadian Mathematical Society Summer Meeting*
- University College Cork, Mathematics Department, *Colloquium*

2005

- Texas A&M University, Mathematics Department, *Geometry Seminar*
- National University of Ireland Maynooth, Mathematics Department, *Departmental Seminar*
- University College Cork, Mathematics Society, *Colloquium*

2006

- Erwin Schrödinger Institute, Vienna, *Colloquium*
- University College Cork, *International Workshop on Multi-Rate Processes & Hysteresis*
- Trinity College Dublin, School of Mathematics, *Colloquium*
- University of Münster, *Topological Problems in Geometry*
- Keio University, Japan, *Workshop on Geometry and Dynamical Systems*

2007

- University of Utrecht, Netherlands, *Colloquium*
- Banff International Research Station, *Focused Research Group: the  $\Xi$ -transform*
- Laboratoire de Mathématiques Emile Picard, Toulouse, *Colloquium*
- CIRM, Luminy, *Rigidity in Geometry and in Dynamics*
- Dublin City University, *Colloquium*
- Korean Institute for Advanced Study, *Colloquium*

2008

- Université Paris-Sud, *Colloquium*

- Utah State University, Mathematics and Physics Departments, *Colloquium*
  - Oxford, *Colloquium*
  - Institute of Technology Tralee, *Irish Geometry Meeting*
  - Kyungpook National University, Taegue, Korea, *12th International Workshop on Differential Geometry*
- 2009
- Wilfred Laurier University, *Colloquium*
  - University of Rome Tor Vergata, *Colloquium*
  - National University of Ireland Maynooth, *Colloquium*
  - St. Francis Xavier University, *Colloquium*
  - CIRM Levico Terme, Italy, *Complex Analysis and Geometry*
  - University of Oslo, *25th Nordic Congress of Mathematicians*
  - University of Münster, *Oberseminar*
- 2010
- University of Toronto, *Seminar*
  - University of Waterloo, *Geometry and Topology Seminar*
  - St. Jerome's University, *Colloquium*
  - McGill University/UQAM, *Joint Geometry Seminar*
  - Queen's University, *Colloquium*
  - University of Lille-1, *Conference on Almost Complex Geometry and Foliations*
  - University of Rome Tor Vergata, *Colloquium*
- Dublin Institute of Technology, *Irish Mathematical Society Meeting*
  - St. Patrick's College Drumcondra, *Irish Algebraic Geometry Conference*
  - Independent University of Moscow, *Geometry of Differential Equations Seminar*
- 2011
- Université Nice–Sophia Antipolis, *Colloquium*
  - Glucksman Art Gallery, *In Detail*
  - University of Rome Tor Vergata, *Colloquium*
  - CIRM Levico Terme, Italy, *Complex Analysis and Geometry*
  - Erwin Schrödinger Institute, Vienna, *Cartan Connections, Geometry of Homogeneous Spaces and Dynamics*
  - University College Cork, *Nonlinear Dynamics Conference in Memory of Alexei Pokrovskii*
  - National University of Ireland Galway, *Colloquium*
  - University College London, *Geometry Seminar*
- 2012
- Université Paris-Sud, *Harmonic Analysis Seminar*
  - Université Nice Sophia-Antipolis, *Colloquium*
  - Banff International Research Station, *Manifolds with Special Holonomy and their Calibrated Submanifolds and Connections*
  - Laboratoire de Mathématiques Emile Picard, Toulouse, *Colloquium*
  - University of Rome Tor Vergata, *Colloquium*

### Conference Organizing

- Co-organizer, Joint AMS–IMS–SIAM *Conference on String Geometry*, Snowbird Resort, Utah, June 5–11, 2004.
- Organizer, Irish Geometry Conference, Cork, Ireland, May 8–9, 2009.
- Co-organizer, Nonlinear Dynamics Conference in Memory of Alexei Pokrovskii, Cork, Ireland, September 5–9, 2011.
- Organizer, Irish Geometry Conference, Cork, Ireland, June 13–14, 2012.

### Student Comments on Teaching

- Very thorough and enthusiastic.
- Very thorough coverage of course content
- Patient and considerate with students. Portrays a love for what he teaches.
- Treats everyone with respect.
- McKay is an excellent instructor who is always willing to assist his students in any way.
- Very thorough with ideas and concepts!
- He makes it easy to understand the work and materials for this class. I would definitely recommend for students to take the course with Professor McKay.
- Prof. McKay has a genuine interest in imparting this course's information in an enthusiastic and approachable way.
- Great way of teaching math.
- I found Mr. McKay to be well prepared for each class and extremely flexible with regards to availability for review and quizzes. Mr. McKay was very respectful to all students—only wish I could say the same for some of my classmates! The web page was an excellent idea!
- Was very good. No need to improve.
- Best maths lecturer so far!
- Brilliant lecturer.
- Very interesting course. Excellent lecturer (best maths lecturer I've had so far).
- Best of all my maths teachers!
- Very interesting lectures, made easily understandable with terms such as “kill everything beneath pivot.” Thanks for your time and effort.
- He was very approachable.
- It's grand the way it is. I like the tests every couple of weeks to make sure we're keeping up with the material.
- In what way could the structure or content of this course be improved? It couldn't. It is laid out very well.
- Great material on web site.
- He chose a book that was easy to access and free. He took into account people's requests and tried to adhere to them.
- He is a really great professor.
- Dr. McKay presents course material in a very clear and concise manner. Applications to science and engineering are presented and this makes the course all the more interesting and valuable. He is the best math professor I have ever had a class with.
- Excellent teaching!!

## Service

- UCC Mathematics Circle Summer Academy (for gifted high school students), Organizer, 2006, 2007
- Supervisor
  - Postdoctoral Fellowships  
2008–2009: Edward Lee, Jesse Ratzkin
  - Master’s Theses  
2006–2007: Rory Conboye
  - Undergraduate Senior Theses  
2005–2006: Ricky O’Riordan, Rory Conboye  
2006–2007: Danny Gleeson  
2007–2008: Jane Cahill  
2008–2009: Cormac Egan, Peter Fennell  
2010–2011: Kaya Luken  
2011–2012: Eoin Healy
  - Undergraduate Summer Research Projects  
2007: Aidan Floyd, Tara Hennessy, Mary Clare Murphy, Gerard O’Hara-Lyons  
2008: Alexey Pokrovskiy Jr.
- Reviewer
  - Acta Universitatis Matthiae Belii
  - Annales Polonici Mathematici
  - Central European Journal of Mathematics
  - Czech Science Foundation
  - Differential Geometry and its Applications
  - Duke Mathematics Journal
  - Geometriae Dedicata
  - Mathematical Reviews
  - Monatshefte für Mathematik
  - Proceedings of the American Mathematical Society
  - Royal Society
  - SIGMA
  - USF Tampa Internal Grants Program
  - Zentralblatt MATH
- Colloquium director, UCC School of Mathematics, 2005–present
- School of Maths representative, 2008–present, Research and Graduate Studies Committee, College of Science, Engineering and Food Science, UCC
- Member, UCC Science Education, Outreach, Promotion and Public Engagement Committee, 2008–present
- Open Day Director, School of Maths, 2005–present
- Head, School of Maths Postgraduate and Research Funding Working Group, 2009–present
- Founder and organizer
  - Differential Geometry Seminar, Univ. of Utah, 2001–2003
  - QFT/String Geometry Seminar (joint with Katrin Becker), Univ. of Utah, 2002–2003
  - Geometry Seminar, UCC, 2005–2007
  - Riemann Surfaces Seminar, UCC, 2011–present
- Department of Environmental Science, Policy and Geography, University of South Florida, 2004–2005
  - Chair, Budget Committee
  - Member, Colloquium Committee
  - Member, Statistics Search Committee
- Copyeditor, Marcel Berger’s *A Panoramic View of Riemannian Geometry*
- Webmaster, UCC School of Maths, 2006–present
- Ph. D. examiner
  - UCC, 2006
  - Utrecht, 2007
- Mathematical Contest in Modelling, Team Advisor: 2006 (Honorable Mention), 2007, 2008 (Meritorious Winner)
- Interdisciplinary Contest in Modelling, Team Advisor, 2006 (Meritorious Winner)
- Superbrain Mathematics Competition, Organizing committee member, 2007–present
- Chair, UCC Linear Algebra Committee
- Irish Intervarsity Mathematics Competition, Organizing committee member, 2009
- Member, Student Recruitment and Outreach Committee, College SEFS, 2011–present
- Member, Quality Review Steering Committee, College of Science, Engineering and Food Science, 2011–present
- Mentor, CK407 Science Engineering and Food Science, 2011–present
- Member, School of Maths SWOT team, 2011
- Member, College SWOT team, 2011
- Member, SEFS College Council, 2011–present
- Acting Head, Department of Mathematics, July–September, November, December 2011
- Co-ordinator for the courses: MS1001, MS2001, MS2002, MS2003, MS2005, MS2012, MS2013, MS3001, MS3003, MS3005, MS3006, MS3011, MS5005, MA1003, MA1008, MA1058, MA1100, MA1905, MA2006, MA2007, MA2013, MA2051, MA2054, MA2055, MA2059, MA2071, MA2200, MA3051, MA3052, MA3053, MA3054, MA3056, MA3060, MA3301, MA3901, MA4051, MA4052, MA4053, MA4058, MA4061, MA4402, MA4403.
- Developed new courses: MA1004 Calculus for Science, MA4062 Topics in Modern Algebra, MA4063 Topics in Differential Geometry, MA4069 Topics in Maths.
- Maths Circle coordinator, 2010, 2012
- School of Maths representative, Faculty of Food Science and Technology
- Listed in **Who’s Who in the World**, 25th ed.

Last updated April 30, 2012.