

DR. BRENDAN GUILFOYLE
CURRICULUM VITAE

Nationality: Irish.

Date of Birth: 7th December 1966.

Current Position: Lecturer in the Institute of Technology, Tralee, Ireland.

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1. EDUCATION

- 1997** Ph.D. in Mathematics, University of Texas, Austin. Dissertation: *The Cauchy initial value problem for the gravitational Yang-Mills equations*, Supervisor: Prof. Karen K. Uhlenbeck (17/05/1997).
- 1991** Master of Science by Research in Mathematics, Trinity College, Dublin. Dissertation: *Weyl-type electrostatic fields: new exterior and interior solutions*, Supervisor: Prof. Petros Florides (12/07/1996).
- 1988** Bachelor of Arts in Mathematics, Trinity College, Dublin. Award: first class honours (10/07/1988).

2. EMPLOYMENT

- 1996** – Lecturer in the Institute of Technology, Tralee, Ireland.
- 1993** – **1996** Assistant Instructor in the University of Texas, Austin.
- 1991** – **1993** Teaching Assistant in the University of Texas, Austin.

3. VISITING RESEARCH POSITIONS

- Spring 2013** Research Member, Institut des Hautes Études Scientifiques, Paris, France.
- Spring 2013** Research Guest, Max Planck Institute for Mathematics, Bonn, Germany.
- Spring 2012** Research Member, Institut des Hautes Études Scientifiques, Paris, France.
- Fall 2011** Research Guest, Max Planck Institute for Mathematics, Bonn, Germany.
- 2009/10** Research Associate, MSRI, Berkeley California.
- 2006/7/8** Research in Pairs Programme, Mathematisches Forschungsinstitut Oberwolfach, Germany.
- 2008** Research Visitor, Albert Einstein Institute, Golm, Germany.
- 2002/7/8** SFB Research Visitor, Humboldt University, Berlin, Germany.
- 2006** Invited participant on Pseudo-riemannian Geometry Programme, ESI, Vienna, Austria.
- 2002/4** Grey College Research Fellowship, University of Durham, England.

4. TEACHING EXPERIENCE

- 1996** – Lecturer, service teaching primarily in Engineering, covering most areas of mathematics, including pre-calculus, calculus, vector calculus, geometry, matrix algebra, integral transforms, probability and statistics. Teaching load: 16 hours per week.
- 1993 – 1996** Assistant Instructor, lecturing and examining pre-calculus and calculus courses. Teaching load: 8 hours per week.
- 1991 – 1993** Teaching Assistant, responsible for tutorials, grading, continuous assessment, office hours for pre-calculus courses. Teaching load: 8 hours per week.

5. FUNDING

- 2009** Wellcome Trust (£330,000 - Co-PI)
- 2007** Research Frontiers Programme, Science Foundation Ireland (€149,500 PI).
- 2006** IRCSET Embark Initiative, IRCSET (€100,000 PI)
- 2005** Governing Body Postgraduate Fellowship, IT Tralee (€65,000 PI).
- 2003-5** International Collaboration Grant, Enterprise Ireland (€12,000 PI).
- 2002** Awarded International Travel Grant by the Royal Irish Academy (€1,000 PI).

6. AWARDS AND HONOURS

- 1995** Departmental Teaching Award at University of Texas, Austin.
- 1994** Departmental nomination for Sloan National Graduate Student Fellowship at University of Texas, Austin.
- 1987** Awarded (non-Foundation) Scholarship by Trinity College, Dublin.

7. PUBLICATIONS

- (1) N. Georgiou and B. Guilfoyle, *Marginally trapped surfaces in spaces of oriented geodesics*, J. Geom. Phys. **82** (2014) 1–12.
- (2) D.V. Alekseevsky, B. Guilfoyle and W. Klingenberg, *On the geometry of spaces of oriented geodesics*, Ann. Global Anal. Geom. **40** (2011) 389–409.
- (3) H. Anciaux and B. Guilfoyle, *On the three-dimensional Blaschke-Lebesgue problem*, Proc. Amer. Math. Soc. **139** (2011) 1831–1839.
- (4) H. Anciaux, B. Guilfoyle and P. Romon, *Minimal Lagrangian surfaces in the tangent bundle of a Riemannian surface*, J. Geom. Phys. **61** (2011) 237–247.
- (5) B. Guilfoyle and W. Klingenberg, *On Weingarten surfaces in Euclidean and Lorentzian 3-space*, Differential Geom. Appl. **28** (2010) 454–468.
- (6) B. Guilfoyle, M. Khalid and J. J. Ramón Marí, *Lagrangian curves on spectral curves of monopoles*, Math. Phys. Anal. Geom. **13** (2010) 255–273.
- (7) N. Georgiou and B. Guilfoyle, *On the space of oriented geodesics of hyperbolic 3-space*, Rocky Mountain J. Math. **40** (2010) 1183–1219.

- (8) N. Georgiou and B. Guilfoyle, *A characterization of Weingarten surfaces in hyperbolic 3-space*, Abh. Math. Sem. Univ. Hambg. **80** (2010) 233–253.
- (9) B. Guilfoyle and W. Klingenberg, *On C^2 -smooth surfaces of constant width*, Tbilisi Math. J. **2** (2009) 1–17.
- (10) B. Guilfoyle and W. Klingenberg, *A neutral Kähler surface with applications in geometric optics*, in Recent developments in pseudo-Riemannian Geometry, European Mathematical Society Publishing House, Zurich (2008) 149–178.
- (11) B. Guilfoyle and W. Klingenberg, *On area-stationary surfaces in certain neutral Kähler 4-manifolds*, Beiträge Algebra Geom. **49** (2008) 481–490.
- (12) B. Guilfoyle and W. Klingenberg, *Geodesic flow on the normal congruence of a minimal surface*, Progr. Math. **265** (2007) 427–436.
- (13) B. Guilfoyle and W. Klingenberg, *Reflection of a wave off a surface*, J. Geom. **84** (2006) 55–72.
- (14) B. Guilfoyle and W. Klingenberg, *On Hamilton’s characteristic functions for reflection*, Irish Math. Soc. Bulletin **57** (2006) 29–40.
- (15) B. Guilfoyle and W. Klingenberg, *Reflection in a translation invariant surface*, Math. Phys. Anal. Geom. **9** (2006) 225–231.
- (16) B. Guilfoyle and W. Klingenberg, *Geodesic flow on global holomorphic sections of TS^2* , Bull. Belg. Math. Soc. **13** (2006) 1–9.
- (17) B. Guilfoyle and W. Klingenberg, *Isolated umbilical points on surfaces in \mathbb{R}^3* , Bull. Greek Math. Soc. **51** (2006) 23–30.
- (18) B. Guilfoyle and W. Klingenberg, *An indefinite Kähler metric on the space of oriented lines*, J. London Math. Soc. **72** (2005) 497–509.
- (19) B. Guilfoyle, W. Klingenberg and S. Sen, *The Casimir effect between non-parallel plates by geometric optics*, Reviews in Math. Phys. **17** (2005) 859–880.
- (20) B. Guilfoyle, *A structure theorem for stationary perfect fluids*, Class. Quantum Grav. **22** (2005) 1599–1606.
- (21) A. Diatta, P. Giblin, B. Guilfoyle and W. Klingenberg, *Level sets of functions and symmetry sets of surface sections*, in Mathematics of Surfaces. Lecture Notes in Computer Science **3604** (2005).
- (22) B. Guilfoyle and W. Klingenberg, *On the space of oriented affine lines in \mathbb{R}^3* , Archiv der Math. **82** (2004) 81–84.
- (23) B. Guilfoyle and W. Klingenberg, *Generalised surfaces in \mathbb{R}^3* , Math. Proc. R. Ir. Acad. **104A(2)** (2004) 199–209.
- (24) B. Guilfoyle, *The local moduli of Sasakian 3-manifolds*, Int. J. Math. Sci. **32** (2002) 117–127.
- (25) B. Guilfoyle, *Weyl-type fields with geodesic lines of force*, J. Math. Phys. **40** (2000) 2032–2045.
- (26) C.M. Delahunty and B. Guilfoyle, *Volatile compound release during consumption: a proposed aroma stimulus index*, in Flavour Release, ACS Symposium Series 763, American Chemical Society, Washington, DC (2000) 405–412.
- (27) B. Guilfoyle, *Interior Weyl-type solutions to the Einstein-Maxwell field equations*, Gen. Rel. and Grav. **31** (1999) 1645–1674.
- (28) B. Guilfoyle and B. Nolan, *Yang’s gravitational theory*, Gen. Rel. and Grav. **30** (1998) 473–495.

8. PREPRINTS

- (1) B. Guilfoyle and W. Klingenberg, *A global version of a classical result of Joachimsthal*, (2014) [math.DG/1404.5509]
- (2) B. Guilfoyle and W. Klingenberg, *A Converging Lagrangian Curvature Flow in the Space of Oriented Lines*, (2013) [math.DG/1310.4402]
- (3) S. Katina, A. Ayoub, A.W. Bowman, B. Guilfoyle, B. Khambay, K. McNeil, P. Siebert, F. Sukno, J. Waddington and P. Whelan, *The definition and validation of three-dimensional landmarks on the human face: an interdisciplinary view*, (2013)
- (4) B. Guilfoyle and W. Klingenberg, *From global to local: an index bound for umbilic points on smooth convex surfaces*, (2012) IHES preprint M-12-18 [math.DG/1207.5994]
- (5) B. Guilfoyle and W. Klingenberg, *Proof of the Carathéodory conjecture*, (2008) [math.DG/0808.0851]
- (6) N. Georgiou, B. Guilfoyle and W. Klingenberg, *Totally null surfaces in neutral Kähler 4-manifolds*, (2008) [math.DG/0810.4054]
- (7) B. Guilfoyle, *Einstein metrics adapted to contact structures on 3-manifolds*, (2000) [math.DG/0012027].

9. EXPOSITORY VIDEO

- (1) *From global to local (in 5 parts)*(2012)
 - (a) Introduction: <http://www.youtube.com/watch?v=ybop3dETUjc>
 - (b) Background: <http://www.youtube.com/watch?v=P1wz-QC40wo>
 - (c) Reformulation: <http://www.youtube.com/watch?v=9POw5ToJouM>
 - (d) Totally Real Blow-up: <http://www.youtube.com/watch?v=UMPHniXAV3M>
 - (e) Global Aspects: http://www.youtube.com/watch?v=D-T1_rP4H5I
- (2) *A global version of a classical result of Joachimsthal and the slice problem for knots*: <http://youtu.be/FdHQYSpXoXo> (2014)

10. EDUCATIONAL ISSUES

- (1) B. Guilfoyle, *New Metrics for Detecting Changes in Educational Standards*, (2011) www.stopgradeinflation.ie/papers.html
- (2) B. Guilfoyle, *Grade Inflation in Irish Second and Third Level Education*, Teachers Union of Ireland News, Nov/Dec 2008.
- (3) B. Guilfoyle, *Grade Inflation in Second and Third Level Education*, Public Affairs Ireland Journal **49** July 2008, 16–17.
- (4) M. O’Grady and B. Guilfoyle, *Grade Inflation in Irish Universities 1994 - 2004*, (2007) www.stopgradeinflation.ie/papers.html
- (5) M. O’Grady and B. Guilfoyle, *Evidence of Grade Inflation 1994 - 2004 in the Institute of Technology Sector in Ireland*, (2007) www.stopgradeinflation.ie/papers.html

11. SELECTED INVITED TALKS

2013

- *Proof of the Carathéodory conjecture*, 4 lectures in the Perspectives in Geometry Series, University of Texas at Austin, USA.
- *From global to local*, Differential Geometry and Geometric Analysis Seminar, Princeton University, USA.
- *Classical surface theory revisited*, New York Polytechnic, USA.

2012

- *Carathéodory's conjecture on umbilic points and a codimension 2 capillary problem*, Geometry Seminar, Université Paul Sabatier, Toulouse, France.
- *A new geometric application of PDE*, Geometry seminar, Pierre et Marie Curie University, Paris, France.
- *A capillary problem in codimension two with application*, Geometry seminar, Durham University, England.

2011

- *Carathéodory's conjecture on the umbilics of a convex surface*, Max Planck Institute for Mathematics, Bonn, Germany.
- *Proof of the Carathéodory conjecture I and II*, CIRM, Marseille, France.

2010

- *Mean curvature flow, holomorphic discs and umbilic points on surfaces*, 6th William Rowan Hamilton Geometry and Topology Workshop, Hamilton Mathematics Institute, Trinity College Dublin.
- *From Codazzi-Mainardi to Cauchy-Riemann*, Geometry Seminar, Stanford University, California.
- *Wild symplectic structures, mean curvature flow and holomorphic discs*, Research Seminar, MSRI, Berkeley, California.
- *Neutral Kähler geometry, mean curvature flow and holomorphic curves*, Geometry and Topology Seminar, Imperial College, London.

2009

- *Proof of the Carathéodory Conjecture by mean curvature flow*, Pure Mathematics Department Colloquium, Cambridge University, England.
- *Mean curvature flow in indefinite spaces*, Differential Geometry Seminar, University of Köln, Germany.
- *Proof of the Carathéodory Conjecture by mean curvature flow*, Differential Geometry Seminar, University of Münster, Germany.
- *Proof of the Carathéodory Conjecture I and II*, SFB Seminar, Humboldt University, Berlin, Germany.

2008

- *A mixed boundary value mean curvature flow for positive discs in TS^2* , Geometric Analysis Seminar, Albert Einstein Institute, Golm, Germany.
- *Mean curvature flow for higher codimensional spacelike submanifolds*, SFB Seminar, Free University, Berlin, Germany.

2007

- *Lagrangian curves on spectral curves of monopoles*, DIAS/IMS Symposium, Dublin Institute for Advanced Studies, Ireland.
- *A neutral Kähler surface with applications in geometric optics*, Mathematical Physics Seminar, Cambridge University, England.

2005

- *An indefinite metric on the space of oriented lines*, Erwin Schrödinger Institute, Vienna, Austria.

12. CURRENT INTERNATIONAL COLLABORATORS

- Dr. Wilhelm Klingenberg, Durham University, England.
- Prof. Dimitri Alekseevsky, Edinburgh University, England.
- Prof. Henri Anciaux, University of Sao Paulo, Brazil.
- Dr. Pascal Romon, Université de Paris-Est Marne-la-Vallée, France.
- Prof. Adrian Bowman, University of Glasgow, Scotland.

13. SOCRATES PARTNERS

- Durham University, England.
- University of Cyprus, Nicosia, Cyprus.
- Humboldt University, Berlin, Germany.

14. POSTGRADUATE STUDENT SUPERVISION

2009 - Nikos Georgiou awarded PhD for thesis *The geometry of the space of oriented geodesics of hyperbolic 3-space*.

15. EXTERNAL EXAMINER

2012 - Benjamin Lambert (Durham University, England) PhD thesis *Mean curvature flow with a Neumann boundary condition in flat spaces*.

16. POSTDOCTORAL RESEARCHERS

2006 – 2008 Dr. Madeeha Khalid funded by IRCSET Embark Initiative.
 2007 – 2010 Dr. Henri Anciaux funded by SFI Research Frontiers Programme.
 2010 – 2011 Dr. Nikos Georgiou funded by SFI Research Frontiers Programme.

17. PROFESSIONAL ACTIVITIES

2012 Organising Committee for William Rowan Hamilton Geometry and Topology Workshop, Dublin.
 2009 Founder member of Network for Mathematical Researchers in IoT's.
 2008 Organising Committee for Irish Geometry Conference in IT Tralee.
 2007 Irish Mathematical Society Public Relations Officer.
 2007 Member of HETAC Working Group on External Examiners.
 2007 Founder member of Network for Irish Educational Standards.
 2006 Organising Committee for IMS September Meeting in IT Tralee.
 2006 Irish Mathematical Society Committee Member.

- 2006 Member of the Advisory Board of the Exploration Station, the National Science Centre, Dublin.
- 2005 Organising Committee for 2nd Meeting on Teaching Mathematics in Institutes of Technology in IT Tralee.
- 2004 Local organising committee for 17th International Conference on General Relativity and Gravitation in Royal Dublin Society.
- 2004 Mathematical Consultant, Hamilton Mathematics Institute, Trinity College Dublin.