

# Thomas A. Ivey

Department of Mathematics  
College of Charleston  
66 George St.  
Charleston, SC 29424  
phone: 843-953-7276  
email: iveyt@cofc.edu

- Education** 1992: Ph.D. in Mathematics, Duke University  
Thesis title: *On Solitons for the Ricci Flow*  
Advisor: Robert L. Bryant  
1987: Bachelor of Mathematics, joint honours in Applied Math and  
Computer Science, University of Waterloo
- Research  
Interests** Differential Geometry, Partial Differential Equations, Calculus of Variations,  
Integrable Systems (AMS Subject Classifications: 53, 58, 35Q, 49)
- Academic  
Positions** Fall 2006: Ulam Visiting Professor, University of Colorado Boulder  
August 2000–present: Assistant Professor, College of Charleston  
(promoted to Associate Professor in August 2005)  
August 1997–June 2000: Assistant Professor, Ball State University  
July 1994–June 1997: Visiting Assistant Professor,  
Case Western Reserve University  
Sept. 1992–June 1994: S. E. Warshawski Assistant Professor,  
University of California San Diego
- Teaching  
Experience** *Courses for math majors:* single-variable calculus, vector calculus, linear algebra,  
ordinary differential equations, partial differential equations, linear and non-linear  
systems of differential equations, college geometry, axiomatic geometry, group theory  
*General education courses:* college algebra, contemporary mathematics, elemen-  
tary statistics  
*Advanced courses:* geometry for teachers, differential geometry, algebraic curves,  
exterior differential systems
- Professional  
Societies** American Mathematical Society, 1986–present
- NSF  
Grants** Nov. 2005: *RUI: Topology and Stability of Integrable Vortex Filament Motion*,  
with A. Calini (funded, \$150000 for 2006-2008)  
Nov. 2005: *Southeast Geometry Conference, 2006-2008*, with A. Kasman (funded,  
\$18000 for 2006-2008)  
Nov. 2001: *RUI: Integrable Dynamics of Knotted Vortex Filaments*,  
with A. Calini (funded, \$148000 for 2002–2005)

- Publications**
1. *Ricci Solitons on Compact 3-Manifolds*,  
Differential Geometry and Its Applications **3**(1993), 301–307.
  2. *New Examples of Complete Ricci Solitons*,  
Proceedings of the AMS **122** (1994) # 1, 241–246.
  3. *Surfaces with orthogonal families of circles*,  
Proceedings of the AMS **123** (1995) # 3, 865–872.
  4. *The Ricci Flow on Radially Symmetric  $\mathbf{R}^3$* ,  
Comm. Part. Diff. Eq. **19** (1994), # 9/10, 1481–1500.
  5. *Ricci Solitons on Compact Kähler Surfaces*,  
Proceedings of the AMS **125** (1997) # 4, 1203–1208.
  6. *Affine Isometric Embeddings and Rigidity*,  
Geometriae Dedicata **64** (1997), 125–144.
  7. *Local Existence of Ricci Solitons*,  
Manuscripta Mathematica **91** (1996), 151–162.
  8. *On Isometric and Minimal Isometric Embeddings* (with J.M. Landsberg)  
Duke Math. J. **89** (1997), 555–576.
  9. *Bäcklund transformations and knots of constant torsion* (with A. Calini)  
J. Knot Theory and its Ramifications **7** (1998), 719–746.
  10. *Affine Isometric Embedding for Surfaces*,  
Geometriae Dedicata **75** (1999), 235–243.
  11. *Knot types, homotopies and stability of closed elastic rods* (with D. Singer),  
Proc. London Math. Soc. **79** (1999) 429–450.
  12. *Topology and Sine-Gordon Evolution of Constant Torsion Curves*  
(with A. Calini), Physics Letters A **254** (1999) 170–178.
  13. *Minimal Curves of Constant Torsion*,  
Proceedings of the AMS **128** (2000), 2095–2103.
  14. *Helices, Hasimoto surfaces and Bäcklund transformations*,  
Can. Math. Bull. **43**, (2000), 427–439.
  15. *Knot types, Floquet spectra, and finite-gap solutions of the Vortex  
Filament Equation* (with A. Calini), Math. & Computers in Simulation  
**55** (2001), 341–350.
  16. *Connecting geometry, topology and spectra for finite-gap NLS potentials*  
(with A. Calini), Physica D 152/153 (2001), 9–19.
  17. *Integrable Geometric Evolution Equations for Curves*,  
Contemp. Math. 285 (2001), 71–84.
  18. *An inverse problem from sub-Riemannian geometry*,  
Pacific Math. J. 208 (2003), 111–124.
  19. *Cartan for Beginners: Differential geometry via moving frames and  
exterior differential systems* (with J.M. Landsberg), Graduate Studies in  
Mathematics vol. 61, American Mathematical Society (2003), 390 pages.
  20. *Parametric Bäcklund Transformations I: Phenomenology* (with J. Clelland), Trans-  
actions of the AMS, **357** (2005), 1061–1093.
  21. *Finite-gap solutions of the vortex filament equation: Symmetric Solutions and  
Genus One Solutions* (with A. Calini), Journal of Nonlinear Science, vol. 15 #5,  
321–361.
  22. *Geometry and Topology of Finite-Gap Vortex Filaments*, in Proceedings of the  
Seventh International Conference on Geometry, Integrability and Quantization  
(Varna, 2005), Bulgarian Academy of Sciences, Sofia 2006.

**In  
Preparation**

23. *Ricci Solitons* (book chapter co-authored with Ben Chow), to appear in “The Ricci Flow, Volume 2: Foundations of Singularity Analysis”, American Mathematical Society.
24. *Finite-gap solutions of the vortex filament equation: Isoperiodic Deformations* (with A. Calini), submitted to Journal of Nonlinear Science
25. *Hypersurfaces in  $CP^2$  and  $CH^2$  via Exterior Differential Systems* (with P.J. Ryan)
26. *Bäcklund Transformations and Darboux Integrability for Nonlinear Wave Equations*, (with J. Clelland)

## Selected Talks

- “Seminar on Discrete Integrable Systems and Geometry”, University of Colorado (Boulder), August-December 2006.
- “Five Lectures on Exterior Differential Systems”, Workshop on Differential Geometry and Applications, La Trobe University (Melbourne, Australia), June 2006.
- “Special hypersurfaces in  $\mathbb{C}P^2$  and  $\mathbb{C}H^2$ ”, American Mathematical Society meeting, Notre Dame University, April 2006.
- “An inverse problem from sub-Riemannian geometry”, American Mathematical Society meeting, University of Nebraska, Oct. 2005
- “An Application of Exterior Differential Systems: Surfaces Orthogonally Foliated by Circles”, Seventh International Workshop on Geometry, Integrability and Quantization; Varna, Bulgaria, June 2005
- “Geometry and Topology of Finite-Gap Vortex Filaments”, Varna, June 2005; repeated at Southeast Geometry Seminar, Georgia Tech, Dec. 2005.
- “Special solutions of the vortex filament flow and related evolution equations”, Colloquium, Northern Illinois University, April 2005
- “The  $1/\kappa$  flow and related geometric evolution equations for curves”, AMS meeting, Texas Tech University, April 2005.
- “Some Results and Open Problems on Ricci Solitons”, Workshop on Geometric Evolution Equations, Banff International Research Station, July 2004
- “Life, the Universe and Everything: A glimpse of differential geometry”, College of Charleston Math Club, Feb. 2004
- “Darboux Integrability and Bäcklund Equivalence for Hyperbolic EDS”, American Mathematical Society (AMS) Meeting, University of Colorado, Oct. 2003
- “Closed, Knotted and Symmetric Solutions of the Vortex Filament Equation”, Workshop on Differential Equations & Symmetry, Banff International Research Station, July 2003
- “Geometry of Bäcklund Transformations”, Workshop on Formal Geometry and Mathematical Physics, Utah State University, May 2002
- “Homotopies of elastic rods and isoperiodic deformations of NLS potentials”, Southeast Geometry Conference, University of Georgia, April 2002
- “Which of these things is like the other?”, colloquium, College of Charleston, Sept. 2001
- “Bäcklund Transformations and other Integrable Extensions”, Geometry Colloquium, Georgia Tech., March 2001
- “Geometric Evolution Equations for Curves”, CBMS Workshop on the Geometrical Study of Differential Equations, Howard University, June 2000
- “Connecting geometry, topology and spectra for finite-gap NLS potentials”, AMS Meeting, University of Notre Dame, April 2000
- “You can’t fly on one wing—or can you?”, Geometry Seminar, University of Bath, July 1999
- “Geometry and Topology of DNA”, Sigma Xi lecture, Ohio Northern University, May 1999

- Internal Grants** Nov. 2001, Nov. 2004: CETL Travel Grants for attending Joint Mathematics Meetings (funded, \$664)  
 May 2001: *SMFT Geometry Course Development*, CETL proposal with A. Pellegrino *et al.* (funded, \$1500)  
 Jan. 2001: *Geometry of Bäcklund Transformations*, College of Charleston Faculty Research Grant (funded, \$2500)
- Professional Activities** Fall 2006: Organizer, Ulam Seminar on Discrete Integrable Systems and Geometry, UC Boulder  
 Spring 2006: Main Organizer, Southeast Geometry Conference, College of Charleston  
 Fall 2005: Participant, Discrete Integrable Systems Seminar  
 Spring 2004–present: Member, Organizing Committee, Southeast Geometry Conference  
 Fall 2003/Spring 2004: Organizer, Geometry Seminar, College of Charleston  
 March 2003: Co-organizer, Southeast Geometry Conference, College of Charleston  
 2002-2003: Contributor, *Encyclopedia of Nonlinear Sciences*  
 Fall 2000/Spring 2001: Participant, Loop Groups Seminar, College of Charleston  
 2000–present: Reviewer for *Zentralblatt Mathematik*  
 2000–present: Referee for *Contemporary Mathematics*, *Differential Geometry and its Applications*, *Houston Mathematics Journal*, *Journal of Experimental Mathematics*, *Journal of Lie Theory*, *Journal of Nonlinear Science*, *Proceedings of the London Mathematical Society*  
 1996–present: Reviewer for *Mathematical Reviews*
- Department and College Service** Fall 2005: Member, Ad-Hoc Committee on Linear Algebra  
 Fall 2004–Spring 2006: Member, Mathematics Education Search Committee  
 Spring 2003–Spring 2006: Member, Departmental Research Committee  
 Spring 2004: Member, Departmental Search Committee  
 Fall 2003–Spring 2006: Member, College Library Committee  
 Fall 2003: Coach, Putnam Mathematics Contest Team  
 Fall 2003: Advisor, College of Charleston Math Club  
 Spring 2003–Spring 2004: Person in charge, Math Student Study Area  
 Spring 2003: Member, Ad-Hoc Committee on Revising Tenure and Promotion Guidelines  
 Spring 2003: Member, Ad-Hoc Committee on Departmental Space Requirements  
 Fall 2002–Spring 2006: Member, Departmental M.S. Program Steering Committee  
 Fall 2002–Spring 2006: Member, Departmental Committee on the Major  
 Fall 2001–Fall 2003: Member, Departmental Committee on Mathematics for Teachers  
 Spring 2001: Member, Ad-Hoc Committee for Proposing an SMFT Geometry Course