

CURRICULUM VITAE

Biographical Data

Name: Robert L. Bryant **Born:** August 30, 1953
Citizenship: United States **Birthplace:** Kipling, North Carolina

Education: B.S., North Carolina State University, 1974
Ph.D., University of North Carolina, 1979
(Ph.D. Advisor: Robert B. Gardner)

Areas of Research: Geometric Partial Differential Equations and Differential Geometry

Positions Held: Duke University
Juanita M. Kreps Professor of Mathematics, 1988–present
Arts and Sciences Professor of Mathematics, 1987–88
Rice University
Noah Harding Professor of Mathematics, 1986–88
Professor, 1982–86
Associate Professor, 1981–82
Assistant Professor, 1979–81
Visiting Positions
Visitor, IMPA (Rio de Janeiro, Brazil), July–August 1996
Visitor, Nankai Inst. of Mathematics (Tianjin, PRC), May 1995
André Aisenstadt Chair, Centre de Recherches Math., Montréal, Fall 1994
Member, MSRI (Berkeley, CA), January–June 1994
Member, IAS (Princeton, NJ), September–December 1993
Visitor, University of Adelaide, July–August 1993
Member, IMPA (Rio de Janeiro, Brazil), July–August 1990
W. R. Reynolds Professor, UNC–Chapel Hill, Fall 1987
Member, IMPA (Rio de Janeiro, Brazil), May 1986
Member, IHES (Bures-sur-Yvette, France), Nov 1985
Member, Max Planck Institute (Bonn, Germany), October 1985
Professor, Duke University, Fall 1984
Member, MSRI (Berkeley, CA), April–May 1983
Associate Professor, Harvard, Fall 1982
Member, IAS (Princeton, NJ), 1979–80

Professional Service: AMS-SIAM Committee on Chinese Graduate Students, 1984–89
Editor, Journal of Differential Geometry, 1988–93
Member of the Organizing Board, East Coast Geometry Festival, 1990–present
Organizing Board Member, AMS 1990 Summer Conference on Differential Geometry
AMS Centennial Fellowships Committee, 1990–92
Organizing Board Member, 1993–94 MSRI Special Year in Geometry
Undergraduate Director, Regional Geometry Institute, 1991–1993
Editor, Transactions and Memoirs of the AMS, 1992–1997
Director of the Undergraduate Program, Park City/IAS Mathematics Institute, 1993–2000
Editorial Board, Duke Mathematical Journal, 1997–present
Editor, Differential Geometry and its Applications, 1999–present
Member at Large, Council of the AMS, 1998–present
AMS Committee on Publications, 1998–present (chair, 2000–present)
MSRI Board of Trustees, 1999–present (chair, 2001–present)
Member of the Executive Council of the AMS, 2000–present
MAA Southeastern Section Lecturer, 2001–2002

Awards: NSF Postdoctoral Research Fellowship, 1979–80
Alfred P. Sloan Fellowship, 1982–84
Presidential Young Investigator Award, 1984–89
Trinity College Distinguished Teaching Award, 1992
MAA Southeastern Region Distinguished Teaching Award, 1993

Publications

Books:

- [1] (with S.-S. Chern, R. B. Gardner, H. L. Goldschmidt, and P. A. Griffiths) *Exterior Differential Systems*, Springer-Verlag, New York, 1991. MR 92h:58007
- [2] (with Chao Hao Gu and Marcel Berger (eds.)), *Differential geometry and differential equations*, Proceedings of the sixth symposium held at Fudan University, Shanghai, June 21–July 6, 1985., MR 88b:53002
- [3] (with Victor Guillemin, Sigurdur Helgason, and R. O. Wells, Jr. (eds.)), *Integral geometry*, Contemporary Mathematics 63. AMS, Providence, R.I., 1987., MR 87j:53003
- [4] *Rigidity and quasi-rigidity of extremal cycles in Hermitian symmetric spaces*, to appear in the series *Annals of Mathematics Studies*, Princeton University Press.

Expository Articles:

- [1] (with S.-S. Chern and P. A. Griffiths) *Exterior differential systems*, Proceedings of the 1980 Peking Symposium on Partial Differential Equations, **1** (1982), 219–338, Beijing Press.
- [2] *A survey of riemannian metrics with special holonomy groups*, Proceedings of the 1986 International Congress of Mathematicians, American Mathematical Society **1** (1987), 505–514. MR 89f:53068
- [3] *An Introduction to Lie groups and symplectic geometry*, in *Geometry and Quantum Field Theory (Park City, UT, 1991)*, 5–181, IAS/Park City Math. Ser. **1**, Amer. Math. Soc., Providence, RI, 1995. MR 96i:58002
- [4] *Élie Cartan and geometric duality*, Journées Élie Cartan 1998 et 1999, Institut Élie Cartan **16** (2000), 5–20.

Research Articles:

- [1] (with E. Berger and P. A. Griffiths) *Some isometric embedding and rigidity results for Riemannian manifolds*, Proc. Natl. Acad. Sci. USA **78** (1981), 4657–4660. MR 82h:53074
- [2] *Holomorphic curves in Lorentzian CR-manifolds*, Trans. Amer. Math. Soc. **272** (1982), 203–221. MR 83i:32029
- [3] *Submanifolds and special structures on the octonians*, Journal of Differential Geometry **17** (1982), 184–232. MR 84h:53091

- [4] *Conformal and minimal immersions of compact surfaces into the 4-sphere*, Journal of Differential Geometry **17** (1982), 455–473. MR 84a:53062
- [5] (with P. A. Griffiths) *Some observations on the infinitesimal period relations for regular three-folds with trivial canonical bundles*, in *Arithmetic and Geometry II*, Progress in Mathematics **36** (1983), 77–102. MR 86a:32044
- [6] (with E. Berger and P. A. Griffiths), *The Gauss equations and rigidity of isometric embeddings*, Duke Math. Journal **50** (1983), 803–892. MR 85k:53056
- [7] (with P. A. Griffiths and D. Yang) *Characteristics and existence of isometric embeddings*, Duke Math. Journal **50** (1983), 893–994. MR 85d:53027
- [8] *A duality theorem for Willmore surfaces*, Journal of Differential Geometry **20** (1984), 23–53. MR 86j:58029
- [9] *Lie groups and twistor spaces*, Duke Math. Journal **52** (1985), 223–261. MR 87d:58047
- [10] *Metrics with holonomy G_2 or $Spin(7)$* , Lecture Notes in Mathematics **1111** (1984), Springer-Verlag, 269–277. MR 87a:53082
- [11] *Minimal surfaces of constant curvature in S^n* , Trans. Amer. Math. Soc. **290** (1985), 259–271. MR 87c:53110
- [12] *Minimal Lagrangian submanifolds of Kähler-Einstein manifolds*, Lecture Notes in Mathematics **1255** (1987), 1–12. MR 88j:53061
- [13] (with P. A. Griffiths) *Reduction for constrained variational problems and $\int \frac{1}{2}\kappa^2 ds$* , American Journal of Mathematics **108** (1986), 525–570. MR 88a:58044
- [14] *On notions of equivalence of variational problems with one independent variable*, Contemporary Mathematics **68** (1987), 65–76. MR 89f:58037
- [15] *Metrics with exceptional holonomy*, Annals of Mathematics **126** (1987), 525–576. MR 89b:53084
- [16] *Surfaces of mean curvature one in hyperbolic space*, Asterisque **154–155** (1987), 321–347. CMP 955 072
- [17] *Surfaces in conformal geometry*, Proceedings of Symposia in Pure Mathematics **48** (1988), 227–240. MR 89m:53102
- [18] (with R. Harvey) *Submanifolds in hyper-Kähler geometry*, Journal of the Amer. Math. Soc. **2** (1989), 1–31. MR 89m:53090
- [19] (with S. Salamon) *On the construction of some complete metrics with exceptional holonomy*, Duke Math. Journal **58** (1989), 829–850. MR 90i:53055
- [20] *Some remarks on the geometry of austere submanifolds*, Boletim da Sociedade Brasileira de Matematica (Nova Série) **21** (1991), 133–157. MR 92k:53112
- [21] *Two exotic holonomies in dimension four, path geometries, and twistor theory*, in *Complex Geometry and Lie Theory*, Proceedings of Symposia in Pure Mathematics **53** (1991), 33–88. MR 93e:53030
- [22] (with L. Hsu) *Rigidity of integral curves of rank 2 distributions*, Inventiones Mathematicae **114** (1993), 435–461. MR 94j:58003

- [23] (with P. A. Griffiths) *Characteristic cohomology of differential systems, I: General theory*, Journal of the AMS **8** (1995), 507–596. MR 96c:58183
- [24] (with P. A. Griffiths) *Characteristic cohomology of differential systems, II: Conservation laws for a class of parabolic equations*, Duke Mathematical Journal **78** (1995), 531–676. MR 96d:58158
- [25] (with P. A. Griffiths and Lucas Hsu) *Hyperbolic exterior differential systems and their conservation laws, Part I*, Mathematica Selecta, **1** (1995), 21–112. CMP 1 327 228
- [26] (with P. A. Griffiths and Lucas Hsu) *Hyperbolic exterior differential systems and their conservation laws, Part II*, Mathematica Selecta, **1** (1995). CMP 1 354 599
- [27] (with P. A. Griffiths and Lucas Hsu) *Toward a geometry of differential equations*, in *Geometry, Topology & Physics*, 1–76, Conf. Proc. Lecture Notes Geom. Topology, VI, Internat. Press, Cambridge, MA, 1995. CMP 1 358 612
- [28] (with R. Gardner) *Control Structures, Geometry in Nonlinear Control and Differential Inclusions*, Banach Center Publications **32** (1995), Institute of Mathematics, Polskiej Akademii Nauk, Warszawa, Poland. MR 96h:93024
- [29] *On extremals with prescribed Lagrangian densities*, in *Manifolds and Geometry*, Symposia Mathematica **XXXVI** (1996), Cambridge University Press, pp. 86–111. MR 99a:58043
- [30] *Classical, Exceptional, and Exotic Holonomies: A Status Report*, in *Actes de la Table Ronde de Géométrie Différentielle en l'Honneur de Marcel Berger*, Collection SMF, Séminaires & Congrès **1** (1996), Soc. Math. de France, pp. 93–166. MR 98c:53037
- [31] *Finsler structures on the 2-sphere satisfying $K = 1$* , in *Finsler Geometry*, Contemporary Mathematics **196** (1996), AMS Publications, pp. 27–42. MR 97e:53128
- [32] *Projectively flat Finsler 2-spheres of constant curvature*, Selecta Mathematica, (New Series) **3** (1997), 161–203. dg-ga/9611010, MR 98i:53101
- [33] *Harmonic morphisms with fibers of dimension one*, *Communications in Analysis and Geometry* **8** (2000), 219–265. dg-ga/9701002
- [34] (with Eric. R. Sharpe) *D-Branes and Spin^c Structures*, Physics Letters B **450** (1999), 353–357. hep-th/9812084, MR 2000c:53054
- [35] *Some examples of special Lagrangian tori*, Adv. Theor. Math. Phys., vol. 1, (1999), 83–90. math.DG/9902076, MR 2000f:32033
- [36] *Recent Advances in the Theory of Holonomy*, Exposés de la Seminar Bourbaki, no. 861 (1999), Astérisque **266** (2000), 351–374. math.DG/9910059
- [37] *Calibrated embeddings in the special Lagrangian and coassociative cases*, Annals of Global Analysis and Geometry **18** (2000), 405–435. math.DG/9912246
- [38] *Levi-flat minimal hypersurfaces in two-dimensional complex space forms*, in *Lie Groups, Geometric Structures and Differential Equations*, Advanced Studies in Pure Mathematics, accepted 2000, math.DG/9909159

- [39] *Pseudo-Riemannian metrics with parallel spinor fields and vanishing Ricci tensor*, in *Global Analysis and Harmonic Analysis*, Séminaires & Congrès 4 (2000), Soc. Math. de France, pp. 53–93. math.DG/0004073
- [40] *Bochner-Kähler metrics*, Journal of the AMS, 14 (2001), 623–715. math.DG/0003099

Submitted or In Preparation:

- [1] *Second order families of special Lagrangian 3-folds*, preprint 2000, math.DG/0007128
- [2] *Calibrated embeddings in the special Lagrangian and coassociative cases*, submitted, [math.DG/9912246]
- [3] (with P. A Griffiths and Lucas Hsu) *Poincaré-Cartan forms and the geometry of first-order functionals*, in preparation.
- [4] *On the geometry of webs*, in preparation.
- [5] *On metrics in 3-space for which the planes are minimal*, in preparation.
- [6] *On the geometry of some degenerate partial differential equations in three dimensions*, in preparation.
- [7] *Lectures on the geometry of differential equations*, to appear in the CRM Monograph Series as the 1994 Andre Aisenstadt Lectures volume, in preparation.
- [8] *Finsler structures on the n -sphere with constant flag curvature*, in preparation.
- [9] (with P. A Griffiths) *Calibrating minimal submanifolds*, in preparation.
- [10] *Minimizing cycles in compact Lie groups*, in preparation.
- [11] *The geometry of almost-complex 6-manifolds*, in preparation.

Current to 25 May 2001