

RESEARCH ACTIVITIES OF RONALD FULP

Supervision of Doctoral Students:

1. James Cook–Ph.D, Mathematics,”Foundations of Supermathematics with Applications to N=1 Supersymmetric Field Theory” May 2008.
2. Jining Gao–Ph.D., Mathematics, “The Algebraic Structure of BRST Operators” May 2005.
3. Samer Al-Ashhab– Ph.D., Mathematics, “The Role of sh-Lie Algebras in Lagrangian Field Theory”, May 2003.
4. Jeffery K.Lawson– Ph.D., Mathematics, “Generalized Symplectic Geometry for Classical Fields”, May 1994 (with L.K.Norris)
5. Andrew V. Talmadge Jr. – Ph.D., Mathematics, “A Geometric Formulation of the Higgs Mechanism via Internal Metric Fields”, May 1990
6. Louton, Thomas – Ph.D., Biomathematics, “A Mathematical Study of Noncommutative Probability Theory”, May 1974
7. Shrieves, Herbert Leonard – Ph.D., Mathematics, “The Structure of Proper Semigroups”, May 1976

Supervision of Masters Students:

1. Horton, Dean – Directed Master’s Project, “Fiber Bundle Description of Electromagnetism”,1980?
2. Talton, Kathy Ann – Directed Master’s Project, “The Crystallographic Groups”, completed Summer 1982
3. Green, Edward L. – Directed Master’s Project, “Dirac’s Hamiltonian Constraint”,
4. Rose, John – Directed Master’s Project, “It’s About Time; a Study of Causality, completed May 1984
5. Cantwell, Allen – Directed Master’s Project, A Mathematical Interpretation of Quantum Mechanics, May 1987
7. Davenport Paul S – Directed Master’s Project, Representations of Compact Lie Groups and Applications to Quantum Mechanics, May 1991
6. Perry, Chris – Directed Master’s Project, The Gravitational Field of a Star, May 1991
7. Hawkins, Richard R. – Directed Master’s Project, The Action Principle in Classical and Quantum Mechanics, 1991
8. Cook, Ginny – Directed Master’s Project, Quantum Mechanical Symmetries, May 2008

Professional Activities:

1. Invited Lecture at the conference on Differential Geometry and Mathematical Physics held at Arkansas State University April 1991.

2. Invited Lecture at the conference on Differential Geometry (Mathematical Physics Session) sponsored by the AMS and held at University of California at Los Angeles July 1990.

3. I have attended a number of Mathematics conferences and meetings over the years and presented research results at many of these but I kept no records of these.

4. Active member of the local organizing committee for the Lanczo's Conference on Mathematics and Physics held here at NCSU in December 1993. This was a large conference involving about 600 Mathematicians and Physicists.

5. Active member of the local organizing committee for a conference on Kac-Moody algebras and Mathematical Physics held here in April 1990? This was a CBMS conference sponsored by AMS. There were about 150 participants.

Publications:

1. "Reflexive Semigroups," Proceedings of the American Mathematical Society, 1965, pp. 1096-1098, (with Paul Hill).

2. "On Extending Semigroup Characters", Proceedings of Edinburg Mathematical Society, 1965, pp. 199-202.

3. "On Homomorphisms of Commutative Inverse Semigroups", Czech. Mathematical Journal, 1965, pp. 72-75.

4. "Generalized Semigroup Kernels", Pacific Journal of Mathematics, Vol. 24, 1968, pp. 92-101.

5. "Continuous Characters of Compact Semigroup", Transactions of the American Mathematical Society, Vol. 137, pp. 421-430.

6. "Homological Study of Purity in Locally Compact Groups", Proceedings of the London Mathematical Society, 1970, pp. 502-512.

7. "Tensor and Torsion Product of Semigroups", Pacific Journal of Mathematics, 1970, Vol. 32, pp. 685-696.

8. "Extensions of Locally Compact Abelian Groups I", Transactions of the American Mathematical Society, 1971, Vol. 154, pp. 341-356, (with P. A. Griffith).

9. "Extensions of Locally Compact Abelian Groups II", Transactions of the American Mathematical Society, 1971, Vol. 154, pp. 357-363, (with P. A. Griffith).
10. "Structure of the Semigroup of Semigroup Extensions", Transactions of the American Mathematical Society, 1971, Vol. 158, pp. 63-73, (with J. W. Stepp).
11. "Character Semigroups of Locally Compact Inverse Semigroups", Proceedings of the American Mathematical Society, 1971, Vol. 27, pp. 613-618.
12. "The Semigroup of Semigroup Extension", Semigroup Forum, 1971, Vol. 2, pp. 173-180, (with J. W. Stepp).
13. "Semigroup Extensions", J. Fur Die Riene Und Angewandte Mathematik, 1971, Vol. 248, pp. 28-41, (with J. W. Stepp).
14. "Baer Extensions of Semigroups", Symposium paper at University of Florida, 1970.
15. "Splitting Locally Compact Abelian Groups", Michigan Journal of Mathematics, 1972, Vol. 19.
16. "Integrals of Foliations on Manifolds with a Generalized Symplectic Structure", Pacific Journal of Mathematics, 1976, Vol. 67, pp. 373-387, (with J. A. Marlin).
17. "Integrals and Reduction of Order", reprint with J. A. Marlin.
18. "Function Groups on Constraint Submanifold", Reports on Mathematical Physics, 1980, Vol. 18, No. 3, pp. 295-301, (with J. A. Marlin).
19. "On the Role of Fibre Bundle Structure in the Formulation of Gravitational Theories", Proceedings Einstein Centenary Symposium, 1981, pp. 1-28, (with L. K. Norris).
20. "Underlying Fibre Bundle Structure of A(4) Gauge Theories", Physics Letters, 1980, Vol. 79A, pp. 278-282, (with L. K. Norris and W. R. Davis).
21. "Algebraically special Yang-Mills solutions without sources", Journal of Mathematical Physics, 1981, Vol. 22, pp. 2040-2054, (with Paul Sommers and L. K. Norris).
22. "Splitting of the Connection in Gauge Theories with Broken Symmetry", Journal Mathematical Physics, 1983, Vol. 24, pp. 1871-1887, (with L. K. Norris).
23. "Projective and Conformal Invariance Properties and Their Bundle Formulations in Gravitational Theories and Their Extensions", Proceedings of Einstein Foundation International, 1983, Vol. 1, pp. 1-41, (with W. R. Davis).

24. "Projective and Volume Preserving Bundle Structure Involved in the Formulation of A(4) Gauge Theories", 1986, Vol. 18, pp. 1-29, in "General Relativity and Gravitation", (with W. R. Davis and L. K. Norris).
25. "Conformal Extension of Gauge Theories with Spontaneously Broken Symmetry", Physical Review D, 1987, Vol. 36, pp. 1220-1228, (with L. K. Norris).
26. "Affine geometries defined by fiber preserving diffeomorphisms", Journal of Geometry and Physics, 1990, Vol.7,pp. 201-240.
27. "The nonintegrable phase factor and gauge theory", Proceedings of Symposia in Pure Mathematics,1993,Vol.54 Part 2,pp. 223-247.
28. "Connections on the path bundle of a principal fiber bundle", Differential Geometry and its Applications, 1994, Vol.4, pp. 201-237.
29. "Geometric prequantization on the spin bundle based on n-symplectic geometry: the Dirac equation",International Journal of Theoretical Physics, 1994,Vol.33, pp. 1011-1028, (with J.K.Lawson and L.K.Norris).
30. "Generalized symplectic geometry as a covering theory for the Hamiltonian theories of classical particles and fields", Journal of Geometry and Physics, 1995,Vol. 20, pp. 195-206, (with J.K.Lawson and L.K.Norris).
31. "The sh Lie Structure of Poisson brackets in field theory", Commun. Math. Phys. , 1998, Vol. 191, pp. 585-601,(with G. Barnich, T. Lada and J. Stasheff).
32. "Algebra structures on $\text{Hom}(C,L)$ ", Commun. in Algebra, 2000, Vol. 28 (11), pp. 5481-5501,(with G.Barnich, T.Lada and J. Stasheff).
- 33." sh-Lie Algebras induced by gauge transformations", Commun. Math. Phys., 2002, Vol. 231, pp. 25-43, (with T.Lada and J. Stasheff).
34. "Noether's variational theorem II and the BV formalism", Rendiconti del Circolo Matematico di Palermo, Serie II, Suppl. 71, pp. 115-126, (with T. Lada and J.Stasheff).
35. "Canonical transformations of local functionals and sh-Lie structures", Journal of Geometry and Physics, 2005, Vol. 53, pp.365-391, (with S. Al-Ashhab).
36. "Functionals and the quantum master equation", International Journal of Theoretical Physics, 2005, Vol. 44, pp. 1601-1618.
37. "BRST extension of geometric quantization", Foundations of Physics, 2007, Electronic Journal.
38. "Infinite dimensional super Lie groups", Differential Geometry and its Applications,2008, Vol 26, pp. 463-482 (with J. Cook).

39. "Holonomy in Rogers Supermanifolds with applications Super Yang-Mills Theory", International Journal of Geometric Methods in Modern Physics, 2011, Vol 8, No.2, pp. 429-428 (with J. Cook).
40. "Horizontal Lifts of Superpaths and Superloops", preprint, new proofs of known results.
41. "Direct Limits of Finite Dimensional Supergroups", to be submitted, in preparation.
42. " Infinite Dimensional DeWitt Supergroups and their Bodies, Canad. Math. Bull., 2014, Vol. 57, No.2, pp.283-288. Correction to this paper, Canad. Math. Bull., 2014.
43. " Spin Groups of Super Metrics and a Theorem of Rogers, 2014, submitted for publication May 8, Revised October 9.