

VITA

**Jeffrey Stephen Fox**

**EDUCATION:**

- B.S. in Mathematics, Massachusetts Institute of Technology , 1975
- Ph.D. in Mathematics, University of California-Berkeley, 1983
- Thesis: Analysis on Algebraic Solvable Groups
- Thesis Advisor: Calvin C. Moore

**EXPERIENCE:**

- Research Assistant Professor, Purdue University, 1983-1985
- Assistant Professor, Louisiana State University, 1985-1988
- Member, Mathematical Sciences Research Institute, 1987-1988
- Assistant Professor, University of Colorado-Boulder, 1988-1990
- Associate Professor, SUNY at Albany, 1990-1992
- Associate Professor, University of Colorado-Boulder, 1992-2000
- Professor, University of Colorado-Boulder, 2000- present

## GRANTS AND AWARDS

### Grants and Awards Supporting My Research

1. *Inverting Dirac Induction in K-Theory*: NSF, 1984-1986.
2. *Group Representations, Probability Theory and Differential Equations* Louisiana Education Quality Support Fund, 1986-1989.
3. *The Arithmetic of Compact Solvmanifolds* Louisiana State University Summer Research Program, 1987.
4. *The Analysis of the Quasi-Regular Representation and Index Theory on Non-Compact Manifolds* NSF, 1986-1988.
5. The above proposal was also partly funded by a grant from the Mathematical Sciences Research Institute. 1987-1988
6. *Equivariant Index Theory on Non-Compact Manifolds* NSF, 1989-1991.
7. Member, The National Academy of Sciences-National Research Council Panel on Cooperation with Romania in Operator Algebras, 1989-1990.
8. *Equivariant KK-Theory* NSF, 1992-1994.
9. *K-Theory and Harmonic Analysis*, NSF, 1996-1999
10. *Harmonic Analysis and Operator K-theory* NSF 1999-2002
11. *Computational Neurobiology* NSF, \$200,000 7/2002-7/2003

### Grants and Awards Supporting Conferences and Undergraduate Research

1. *Special Year In Course Topology and Index Theory* 1995-1996, NSF
2. *K-Homology and Index Theory* CBMS Regional Conference, American Mathematical Society and NSF, 1990-1991.
3. *Index Theory and Coarse Topology* CBMS Regional Conference, American Mathematical Society and NSF, 1994-1995
4. *Index Theory and Coarse Topology* Center for Research and Creative Work, University of Colorado, 1994-1995.
5. *Research Projects for Undergraduate Minorities*, Spring 1995 CIMD-NSF (four students at \$2500 each)
6. *Art and Mathematics* Undergraduate Research Opportunity Program - University of Colorado Summer 1997 (one student at \$2500)

7. *Modeling Neural Networks* Undergraduate Research Opportunity - University of Colorado Summer 1998 (three students, one at \$2500 and two at \$1000)
8. *Modeling Neural Networks* Research Experience for Undergraduates- National Science Foundation (REU supplement to *K-Theory and Harmonic Analysis*) (two students each at \$2500)
9. *Computation and Neural Networks* Research Experience for Undergraduates- National Science Foundation (REU supplement to *Harmonic Analysis and Operator K-theory*) (Two students for three years at \$2000 per student plus \$10,000 for computer hardware)
10. *Motions of Mathematics* A grant from the Collage of Arts and Science to produce a kinetic sculpture with a mathematical theme
11. *Computational Neurobiology* UROP Summer 2002 and NSF (two students)

### INVITED TALKS:

1. Adeles and the Spectrum of Compact Nilmanifolds, LSU, Conference on Nilmanifolds, 1984.
2. The Spectrum of Compact Solvmanifolds, University of Colorado-Boulder, Conference on Harmonic Analysis, 1986.
3. The K-Amenability of  $SU(2,1)$ , University of Wroclaw, Poland, Conference in Harmonic Analysis, 1986.
4. Index Theory on Non-Compact Manifolds, University of Wroclaw, Poland, 1986.
5. K-Homology-K-Cohomology and the Kasparov Bifunctor, St. Louis University, 1987.
6. Equivariant K-theory and the K-Amenability of  $SU(n,1)$ , St. Louis University, 1987.
7. Equivariant K-Theory for Non-Compact Group Actions, Oberwolfach, Germany, Conference on Harmonic Analysis, 1987.
8. The Structure of  $R(G)$ , AMS Meeting, Phoenix, Arizona, 1989.
9. KK-Theory and the Selberg Trace Formula, Chern Character in Cyclic Theory, University of Colorado-Boulder, 1989.
10. KK-Theory and the Spectrum of Discrete Subgroups, University of Wroclaw, Poland, Harmonic Analysis Conference.
11. Asymptotic Pseudodifferential Operators and the Chern Character in Cyclic Cohomology, Penn. State University, 1989.
12. K-Theory and the Spectrum of Discrete Subgroups, University of Illinois-Chicago, 1989.
13. Asymptotic Pseudodifferential Operators, IUPUI, 1990.
14. Representations of Lie Groups and Index Theory, IUPUI, 1990.
15. Higher G-index for Proper Actions, SUNY-Albany 1990.
16. Higher G-index for Proper Actions, Oklahoma State University, 1990.
17. Higher G-index for Proper Actions, University of Oklahoma, 1990.
18. Index Theory and Group Actions, Dartmouth College, 1990.
19. Index Theory for Transversally Elliptic Operators, Penn State University, 1991.

20. Index Theory and Representations of Lie Groups, University of Maryland, 1991.
21. Index Theory and Representations of Lie Groups, SUNY-Buffalo, 1991.
22. Index Theory for Transversally Elliptic Operators, Midwest Geometry Conference, 1991.
23. The Arithmetic of Compact Solvmanifolds, University of Wroclaw, Poland, 1993.
24. Geometric Quantization and Index Theory, Fields Institute, Waterloo Canada 1994.
25. Index Theory on Open Manifolds and the Multiplicities of Representations, University of Wroclaw, Poland, 1995.
26. Dirac-Schrodinger Operators and Index Theory, AMS Special Session, January 1996
27. Abelian Extensions of the Heisenberg Group, AMS Special Session, January 1996
28. The K-Homology Chern Character and Index Theory, Dartmouth College, February 1997
29. K-theory for Frechet Algebras attached to Semi-Simple Lie Groups, Dartmouth College, February 1997
30. The Geometry of Representation Theory with Applications to the Baum Connes Conjecture, Dartmouth College, October 1998
31. The Flag Variety and Equivariant K-theory, Penn State University, Workshop on Uniformly Bounded Representations, October 1999
32. Modeling the Dynamics of Neural Membranes, Indiana University-Purdue University, Indiana School of Medicine, March 2005

**PUBLICATIONS and Scholarly Work:**

*The following papers are all peer reviewed*

1. *On the Spectrum of Compact Nilmanifolds*, Trans. of the AMS, **290**, (2), August 1985, 577-584.
2. *Frobenius Reciprocity and Extensions of Nilpotent Groups*, Trans. of the AMS, **298**(1), November 1986, 123-145.

3. *KK-Equivalence and Proper Actions of Connected Reductive Groups*, (with P.Haskell and I. Raeburn), Journal of Operator Theory,**22** (1989), 3-29.
4. *A New Proof of K-Amenability of  $SU(1,1)$* , Index Theory of Elliptic Operators, Foliations, and Operator Algebras, J. Kaminker, et al, eds., Contemporary Mathematics, Vol.. 70.
5. *K-Amenability of  $SU(n,1)$* , (with P. Haskell), Journal of Functional Analysis, Vol. 117, No. 2, November 1, 1993, 274-307
6. *Adeles and the Spectrum of Nilmanifolds*, Pacific Journal of Mathematics, **140** (2), 1989, 233-250.
7. *Asymptotic Pseudodifferential Operators and Index Theory* (with J. Block), Contemporary Mathematics, **105** 1990, 1-32.
8. *Two themes in Index Theory on Singular Varieties* (with P. Haskell and W. Pardon), Proceedings of Symposia in Pure Mathematics, **51** (2), 1990, 103-115.
9. *KK-Theory and the Spectrum of Discrete Subgroups of  $Spin(4,1)$*  (with P. Haskell) Proceedings of OATS-2, Craiova, Romania.
10. *Index Theory on Locally Homogeneous Spaces* (with P. Haskell) K-Theory, **4**, 1991, pp 547-568.
11. *Hodge Decomposition and Dolbeault Complexes on Normal Surface* (with P. Haskell) Trans. of the AMS. **Vol 343**, Number 2, June 1994, pp 765-778.
12. *Index Theory of Transversally Elliptic Operators on Locally Homogeneous Spaces of Finite Volume* Michigan Math. J. **41** (1994), 323-336
13. *The Index of Transversally Elliptic Operators for Locally Free Actions* (with P. Haskell), Pacific Journal of Mathematics, **Vol 164** No 1, 1994, pp 41-85.
14. *Index Theory for Perturbed Dirac Operators on Manifolds with Conical Singularities*( with P. Haskell), Proceedings of AMS, Vol 123, Number 7, July 1995, 2265-2273
15. *Comparison of Perturbed Dirac Operators* (with P. Haskell),Proceedings of AMS, Volume 124, Number 5, May 1996, 1601-1608
16. *K homology and regular singular Dirac-Schrodinger operators on Even Dimensional Manifolds* (with P. Haskell), Pacific Journal of Mathematics, vol 180, No. 2, 1997 pp 251-272
17. *Homology Chern Character of Perturbed Dirac Operators* (P.Haskell, C. Gajdzinsky) ,Houston Journal of Mathematics, Vol 27, No. 1 2001 pp 97-121

18. *Perturbed Dolbeault Operators and the Homology Todd Class* (with P. Haskell) Proceedings of the AMS, Vol 128, Number 12, pp 3715-3721, June 2000
19. *Index Theory of Peerturbed Dolbeault Operators: Smooth Polar Divisors* (with P. Haskell) International Journal of Mathematics, Vol 11, No. 2 (2000) pp 201-213
20. *Heat Kernels for Perturbed Dirac Operators on Even Dimensional Manifolds with Bounded Geometry* with P. Haskell International Journal of Mathematics, Vol 14 Number 1, (2003), pp 69-104
21. *The Atiyah-Patodi-Singer Theorem for perturbed Dirac operators on even dimensional manifolds with bounded geometry* with P.Haskell New York J. Math vol 11 (2005) 303-332

I was an editor for the following volume:

**Index Theory and Operator Algebras**, Contemporary Mathematics vol 148, Jeffrey Fox, Peter Haskell Editors, American Mathematical Society, 1993.

**SERVICE:**

1. Reviewed proposals for NSF.
2. Wrote reviews for Math Reviews.
3. Refereed papers for journals
4. Served on Graduate Committee, Department of Mathematics, 1988-1990
5. Served on National Science Foundation board to select the recipients of the Young Researcher Awards, 1993.
6. Help develop Mathematics 1310-1320, Calculus with Computer Applications, 1993-1994.
7. Served on **Committee on Courses**, College of Arts and Science, 1993-1994.
8. Served on **Core Curriculum Committee**, College of Arts and Science, 1993-1994.
9. Served on **Minority Arts and Science Program Committee**, College of Arts and Science, 1993-1995.
10. Associate Chair, Department of Mathematics, 1993-1996.
11. Ran *Index Theory and the Geometry of Coarse Manifolds*, CBMS August 1995
12. Ran *Perspectives in K-Homology*, a conference in July of 1996
13. Member of the College of Arts and Science ACARP committee, 1996-1998
14. Ran special session in non-commutative geometry at AMS meeting at San Diego, January 1997
15. Member of the NSF panel for Career Awards in mathematics, 10/2000.
16. Member of the NSF panel for modern analysis, 1/2001.
17. Member of the NSF panel in modern analysis , 12/2002
18. Reviewed proposals in computational neuroscience for NSF



**STUDENTS:**

1. Dean. Moore, **Kirillov Theory for  $C^*(G, \Omega)$**  ,1995, Ph.D
2. Molly Salanzis **Knot Theory and Biology** , MA 1996
3. Fatma Azmi, **Computation of the Equivariant Cocycle of the Dirac Operator**, Ph.D, 1996
4. Kari Korneison, **Signal Filtering and Canonical Coordinates** MA 1997
5. Francisco Quirous , Ph.D in progress

**RESEARCH INTEREST:**

Representation Theory of Topological Groups, K-theory and Applications of Operator Algebras to Differential Geometry. Computational Neurobiology.