

CURRICULUM VITAE

ROBIN FORMAN

Senior Vice President for Academic Affairs and Provost

Tulane University

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EDUCATION

Ph.D. in Mathematics, Harvard University, 1985

Dissertation: Functional Determinants and Applications to Geometry Research

Advisor: Raoul Bott

M.A. in Mathematics, University of Pennsylvania, 1981

B.A., *summa cum laude* with honors in Mathematics, University of Pennsylvania, 1981

EMPLOYMENT

Senior Vice President for Academic Affairs and Provost, Tulane University

Dean, Emory College of Arts and Sciences and Asa Griggs Candler Professor of Mathematics, 2010-2016

Dean of Undergraduates, Rice University, 2005-2010

Chair of the Department of Mathematics, Rice University, 2002-2005 Professor of Mathematics, Rice University, 1999-2010

Associate Professor of Mathematics, Rice University, 1992-1999 Assistant

Professor of Mathematics, Rice University, 1987-1992

C.L.E. Moore Instructor, Massachusetts Institute of Technology, 1985-1987

VISITING APPOINTMENTS

University of Burgundy, Summer 2005 Harvard

University, Spring 1997

Mathematical Sciences Research Institute, Fall 1996 Rice

University, 1986-87

PH.D. STUDENTS SUPERVISED

Ken Richardson

Katherine Crowley

David Handron

Igor Prokhorenkov

Paul Phillips

Jer-Chin (Luke) Chuang

Hope McIlwain

Aaron Trout

Heather Hardway

HONORS, AWARDS, FELLOWSHIPS and GRANTS

Phi Beta Kappa

Alfred P. Sloan Doctoral Dissertation Fellow NSF

Postdoctoral Fellowship

Research funding from NSF, NSA and DARPA Invited and

Plenary Addresses – see presentations

INTERESTS OF NOTE

Chess. Hold title of Master.

Stand up comedy. From 1990 to 1998, performed in comedy clubs in Texas, New York and California, and in 1992 was named “Funniest Person in Houston” by the Houston Laff Stop Comedy Club.

Songwriting. Have written and performed songs in clubs in Texas and Massachusetts. Wrote lyrics for “The Three Cantors” (later renamed “The Three Jewish Tenors”).

Recordings: Arthur Gottschalk, Robin Forman "Fugue for Tenors." *The Three Jewish Tenors Live!*, CL-DPR-10D.

ADDITIONAL UNIVERSITY AND PROFESSIONAL SERVICE

Emory University

Served on search advisory committee for Provost for Emory University (hired Claire Sterk), and Vice President and Dean of Campus Life (chair, hired Ajay Nair).

Rice University

Faculty Master, Mary Gibbs Jones Residential College, 2002-2005.

Search Committees for the President of Rice University (hired David Leebron), the Vice President for Enrollment (chair, hired Chris Munoz), the Athletic Director (2010, chair, hired Rick Greenspan) the Athletic Director (2007, hired Chris Del Conte), the Head Coach of the Football Team (hired Todd Graham), the Director of Public Safety/Police Chief (hired Bill Taylor), the Director of the Rice Theatrical Program/the Rice Players (hired Mark Ramont). Rice NCAA recertification steering committee (chair).

Served on Faculty Council, Promotion and Tenure Committee, Athletic Committee (chair), Admissions Committee, Teaching Committee, Committee on Committees.

Mathematics

Member of the American Mathematical Society.

Member of the AMS Committee on the Undergraduate Mathematics Library, 2004- present

(chair 2005-2008).

Member of the AMS Committee on Committees 2001-2003.

Member of NSF review panels and site visit teams.

Referee for numerous journals.

Organizer of conferences and special sessions at AMS meetings.

Member of external assessment committee for departments of mathematics.

PRESENTATIONS RELATED TO MATHEMATICS

1. Covering Spaces and Determinants, MIT, September 1987.
2. Determinants of Ordinary Differential Operators, MIT, December 1987.
3. Hodge Theory for Infinite Cyclic Covers, U.T. Austin, May 1988.
4. Hodge Theory for Infinite of Cyclic Covers, Univ. of Chicago, May 1988.
5. Analytic Torsion and Closed Orbits of Flows, The AMS Summer Meeting on Invariants of Elliptic Operators, Brunswick, Maine, July 1988.
6. Laplacians on Graphs, Williams College, October 1989.
7. Torsion and a Theorem of Milnor, Texas Geometry and Topology Conference, Rice Univ., Houston, TX, March 1990.
8. Torsion and Adiabatic Limits, AMS Summer Inst. on Differential Geometry, UCLA, 1990.
9. Determinants and Boundary Value Problems, Ohio State Univ., May 1991
10. Adiabatic Limits and Spectral Sequences, Conference on Quantized Geometry, Ohio State Univ., May 1991.
11. Adiabatic Limits and Spectral Sequences, International Congress on Differential Geometric Techniques in Mathematical Physics, Baruch College, New York City, NY, June 1991.
12. Determinants and Analytic Torsion, NSF Regional Geometry Institute, Park City, Utah, July 1991.
13. Adiabatic Limits and Spectral Sequences, Texas Geometry and Topology Conference, Univ. of Houston, February 1992.
14. 2-Dimensional Yang-Mills via Lattice Approximations, Univ. of Arizona, September 1992.
15. Determinants and Finite Difference Operators, Univ. of Arizona, September 1992.
16. The Geometry of Graphs, Rice Univ. School Mathematics Program, July 1993.
17. Witten-Morse Theory for Cell Complexes, Workshop on Degenerate Elliptic Partial Differential Operators, Stanford Univ., August 1993.
18. Geometry after High School, Workshop for Math Teachers in the Spring Branch School District, August 1993.
19. Laplacians on Graphs, Texas Christian Univ., September 1993.
20. Morse Theory for Cell Complexes, Oklahoma State Univ., October 1993.
21. The 2nd Derivative Test When There are No Derivatives at All (Morse Theory for Cell Complexes), Vassar College, November 1993.
22. Morse Theory for Cell Complexes, MSRI, Berkeley, CA, January 1994.
23. Morse Theory for Cell Complexes, Louisiana State Univ., March 1994.
24. The 2nd Derivative Test When There are No Derivatives at All (Morse Theory for Cell Complexes), Texas A&M, January 1995.

25. The 2nd Derivative Test When There are No Derivatives at All (Morse Theory for Cell Complexes), Claremont College, February 1995.
26. Combinatorial Differential Topology, Special Session on Topology, Geometry, and Analysis on Non-Compact Manifolds, Joint Meeting of the MAA and AMS, Orlando January 1996.
27. Combinatorial Morse Theory, Univ. of Pennsylvania, May 1996.
28. Knot Invariants, after Bott and Taubes (a series of 6 lectures). MSRI, September-October 1996.
29. Combinatorial Differential Topology and Geometry, Univ. of Illinois at Chicago, October 1996.
30. Combinatorial Differential Topology and Geometry, Indiana Univ., October 1996. 31
- The 2nd Derivative Test When There are No Derivatives at All (Morse Theory for Cell Complexes), Depauw Univ., October 1996.
32. Combinatorial Differential Topology and Geometry, October 1996.
33. How many equilibria are there? (An introduction to Morse Theory). Undergraduate Conference, Rice Univ., November 1996.
34. An Introduction to Vassiliev Invariants (series of 2 lectures). MSRI, November, 1996.
35. Combinatorial Differential Topology and Geometry, Workshop on Combinatorial Geometry, MSRI, February 1997.
36. Combinatorial Ricci Curvature, Special Session on Partial Differential Equations, AMS meeting, Baltimore, March 1997.
37. Combinatorial Differential Topology and Geometry, Harvard Univ., April 1997.
38. Combinatorial Differential Topology and Geometry, Boston Univ., May 1997.
39. Combinatorial Ricci Curvature, Northeastern Univ., May 1997.
40. Combinatorial Ricci Curvature, Pacific Northwest Geometry Seminar, Univ. of Utah, May 1998.
41. Finite Type Invariants for Knots (a series of 10 lectures), Institute for Mathematics and its Applications, Summer School in Topology, Univ. of Iowa, July 1998.
42. Combinatorial Ricci Curvature, Midwest Geometry Conference, Louisiana State Univ., October 1998.
43. Combinatorial Ricci Curvature, Geometry Analysis and Topology Seminar, Texas A&M Univ., October 1998.
44. Combinatorial Morse Theory, Fall School in Combinatorial Topology, Berlin, November 1998.
45. Combinatorial Differential Topology and Geometry, Einstein Chair Seminar in Dynamics and Geometry, CUNY, September 1998.
46. Morse Theory and Evasiveness, Special Session on Topological Combinatorics, Joint AMS/MAA meeting, San Antonio, January 1999.
47. Combinatorial Differential Topology and Geometry, Seminar on Geometric and Functional Analysis, Penn State Univ., January 1999.
48. A User's Guide to Discrete Morse Theory, Conference on Topological Combinatorics, Oberwolfach, Germany, April 1999.
49. An Introduction to Discrete Morse Theory, Cornell, September 1999.
50. Discrete Morse Theory, Univ. of Minn., September 1999.
51. Applications of Discrete Morse Theory, Univ. of Minn., September 1999.
52. Discrete Morse Theory, Special Session on Recent Developments in Index Theory,

- AMS meeting, Austin, October 1999.
53. Some Recent Applications of Discrete Morse Theory, Penn State Univ., April 2000.
 54. Discrete Morse Theory, AMS Summer Conference on Noncommutative Geometry, Mt. Holyoke College, July 2000.
 55. Some Informal Remarks, Annual Meeting of the Council for the Advancement of Science Writing, Rice Univ., October, 2000.
 56. Finite-Type Invariants for Graphs and Graph Reconstructions, CombinaTexas, Texas A&M Univ., April, 2001.
 57. Applications of Combinatorial Differential Topology, Plenary Address at the 2001 International Conference on Formal Power Series and Algebraic Combinatorics, Arizona State Univ., May 2001.
 58. Applications of Combinatorial Differential Topology, The Cornell Topology Festival, Cornell Univ., May 2001.
 59. Applications of Combinatorial Differential Topology, Invited Address, SullivanFest, a conference in honor of Dennis Sullivan's 60th birthday, SUNY Stony Brook, June 2001.
 60. An Introduction to Discrete Morse Theory, Invited Address at the Eastern Sectional Meeting of the American Mathematical Society, Williams College, October 2001.
 61. How Many Equilibria are There? An Introduction to Morse Theory, Texas Christian Univ., November 2001.
 62. An Introduction to Discrete Morse Theory, Colloquium, Texas Christian Univ., November 2001.
 63. Topological Problems in Combinatorics, MASS Colloquium, Penn State Univ., 2002.
 64. A Topological Approach to the Game of "20 Questions", Colloquium, Washington Univ. in St. Louis, March 2002.
 65. How Many Equilibria are There? An Introduction to Morse Theory, Harvard Univ. Math Club, March 2002.
 66. An Introduction to Discrete Morse Theory, MIT, March 2002.
 67. A Topological Approach to the Game of "20 Questions", MIT, March 2002.
 68. A Topological Approach to the Game of "20 Questions", Conference on Computable Topology and Geometry, Schloss Dagstuhl, June 2002.
 69. A Topological Approach to the Game of "20 Questions", Stanford, March 2003.
 70. An Introduction to Discrete Morse Theory, Stanford, March 2003.
 71. On Combinatorial Formulas for Characteristic Numbers, Conference on Combinatorial Topology and Geometry, Oberwolfach, April 2003.
 72. On Combinatorial Formulas for Characteristic Numbers, Special Session on Combinatorial Topology and Geometry, Northeast Section Meeting of the AMS, New York, April 2003.
 73. A Mini-course on Discrete Morse Theory (series of 5 lectures), Workshop on Algorithmic Geometry and Discrete Morse Theory, Dijon, May 2003.
 74. Topics in Combinatorial Differential Geometry (series of 2 lectures), Introductory Workshop in Discrete and Computational Geometry, MSRI, August 2003.
 75. Topics in Combinatorial Differential Topology and Geometry (series of 5 lectures), IAS/Park City Summer Math Inst., Summer 2004.
 76. A Topological Approach to the Game of "20 Questions", Algebraic Topological Methods in Computer Science, Ontario, July 2004.
 77. Tangent bundles and curvature for point cloud data, HOT TOPICS: Mathematical and

Statistical Methods for Visualization and Analysis of High Dimensional Data, MSRI, December 2004.

78. Tangent bundles and curvature for point cloud data, in Special session on curvature and group theory and combinatorics, AMS meeting in Santa Barbara, April 2005.

79. A Topological Approach to the Game of “20 Questions”, Algebraic Topological Methods in Computer Science III, Paris, France 2008.

PUBLICATIONS

1. Metastability and solid solutions in cooperative games, with James D. Laing, *Mathematical Social Sciences* **2**(1982), 397-420.
2. Game-theoretic expectations, interest groups, and salient majorities in committees, with James D. Laing, in *Aspiration Levels in Bargaining and Economic Decision Making (Proceedings of the Third Conference on Experimental Economics, Wizenhohl, Germany, August 29--September 3, 1982)*, Reinhard Tietz ed., 13-36, Lecture Notes in Economics and Mathematical Systems **213**, Springer-Verlag, New York, 1983.
3. *Functional determinants and applications to geometry*, Harvard University thesis, 1985.
4. Functional determinants and geometry, *Inventiones Mathematicae* **88** (1987), 447-493.
5. Difference operators, covering spaces and determinants, *Topology* **28** (1989), 413-438.
6. Sequences with many primes, *American Mathematical Monthly* **99** (1992), 548-557.
7. Adiabatic limits, small eigenvalues and spectral sequences, in *Proceedings of the XXth International Congress on Differential Geometric Techniques in Mathematical Physics*, Sultan Catto and Alvany Rocha eds., 306-315, World Scientific, Singapore, 1992.
8. Determinants, finite difference operators and boundary value problems, *Communications in Mathematical Physics* **147** (1992), 485-526.
9. Determinants of laplacians on graphs, *Topology* **22** (1993), 35-46.
10. Small volume limits of 2-d Yang-Mills, *Communications in Mathematical Physics*, **151** (1993), 39-52.
11. Hodge theory and spectral sequences, *Topology* **33** (1994), 591-611.
12. A discrete Morse theory for cell complexes, in *Geometry, Topology and Physics in Honor of Raoul Bott*, Shing-Tung Yau ed., 112-125, Conference Proceedings and Lecture Notes in Geometry and Topology IV, International Press, Somerville, 1995.
13. Spectral sequences and adiabatic limits, *Communications in Mathematical Physics* **168** (1995), 57-116.
14. Morse theory for cell complexes, *Advances in Mathematics* **134** (1998), 90-145.
15. Combinatorial vector fields and dynamical systems, *Mathematische Zeitschrift* **228** (1998), 629-681.
16. Witten-Morse theory for cell complexes, *Topology* **37** (1998), 945-979.
17. Combinatorial differential topology and geometry, in *New Perspectives in Algebraic Combinatorics*, Louis J. Billera, Anders Björner, Curtis Greene, Rodica Simeon, and Richard Stanley eds., 177-206, MSRI Publications **38**, Cambridge University Press, Cambridge, 1999.

18. How many equilibria are there? An introduction to Morse theory, in *Six Themes on Variation*, Robert Hardt ed., 13-36, Student Mathematical Library, American Mathematical Society, Providence, 2004.
19. The Euler characteristic is the only numerical invariant of simplicial complexes which assigns the same number to every cone, *Discrete And Computational Geometry* **23** (2000), 485-488.
20. Morse theory and evasiveness, *Combinatorica* **20** (2000), 489-504.
21. A users guide to discrete Morse theory, *Séminaire Lotharingien de Combinatoire* **48** (2002), Art. B48c. (electronic)
22. Combinatorial Novikov-Morse theory, *International Journal of Mathematics* **13** (2002), 333-368.
23. Discrete Morse theory and the cohomology ring, *Transactions of the American Mathematical Society* **354** (2002), 5063-5085.
24. Bochner's method for cell complexes and combinatorial Ricci curvature, *Journal of Discrete and Computational Geometry* **29** (2003), 323-374.
25. Lessons from graduate school, in *The Founders of Index Theory: Reminiscences of Atiyah, Bott, Hirzebruch and Singer*, Shing-Tung Yau ed., International Press, Somerville, 2003.
26. Some applications of combinatorial differential topology, in *Graphs and patterns in mathematics and theoretical physics*, M. Lyubich and L. Takhajan eds., 281-313, Proceedings of Symposia in Pure Mathematics **73**, American Mathematical Society, Providence, 2005.
27. Finite-type invariants for graphs and graph reconstructions, *Advances in Mathematics* **186** (2004), 181-228.
28. Topics in combinatorial differential topology and geometry, in *Geometric Combinatorics*, Ezra Miller, Victor Reiner, and Bernd Sturmfels eds., 135-204, IAS/Park City Mathematics Series **14**, American Mathematical Society and Institute for Advanced Studies, Providence, 2007.
29. Modeling the precision and robustness of Hunchback border during *Drosophila* embryonic development, with Heather Hardway, Bibhash Mukhopashyay, Tim Burke, and Theron Hitchman, *Journal of Theoretical Biology* **254** (2008), 390-399.