

## CURRICULUM VITAE

Daniel J. Rudolph

Born October 3, 1949, in Sheridan Wyoming, US Citizen

### I. PERSONAL INFORMATION

#### EDUCATION

Institution	Degree	Date Awarded
Caltech	B.S.	1972
Stanford	M.S.	1973
Stanford	Ph.D.	1975
Thesis advisor: D.S. Ornstein		

#### EXPERIENCE IN HIGHER EDUCATION

Institution	Rank	Dates
Colorado State University	Yates Endowment Prof.	2003-present
University of Maryland	Professor	1985-2003
University of Maryland	Associate Professor	1981-1985
Stanford University	Assistant Professor	1978-1981

#### Temporary positions

PIMS Distinguished Chair		Fall, 2004
Inst. for Adv. St. Hebrew U. of Jerusalem	Wilson Fellow	Sept.-June, '96-'97
Univ. F. Rabelais, Tours	Visiting Professor	June-July, '93
LMD, Marseille	Visiting Professor	Jan.-June, '93
UNC Chapel Hill	Visiting Professor	Jan.-June, '91
N. Copernicus U.	Visiting Professor	July, '89
Math. Inst., U. of Warwick	Visiting Professor	May-June, '89
U. of Paris VI	Visiting Professor	Sept.-Mar. '88-'89
MSRI	Fellow	Aug.-Dec., '83
Inst. for Adv. St. Hebrew U. of Jerusalem	Fellow	Aug.-June, '75-'76
Miller Inst., UC Berkeley	Fellow	1976-'78

## II. RESEARCH, SCHOLARLY AND CREATIVE ACTIVITY

### PUBLICATIONS

#### RESEARCH ARTICLES

##### A. Articles published, or accepted for publication, in research journals.

1. **Two Nonisomorphic  $K$ -automorphisms with Isomorphic Squares**, Israel J. of Math., Vol. 23 Nos. 3-4, 1976, 274-287.
2. with G. Schwarz. **On attaining  $d$ -bar**, Israel J. of Math., Vol. 24, Nos. 3-4, 1976, 185-189.
3. **A Two-Valued Step Coding for Ergodic Flows**, Math. Z. 150, 1976, 201-220.
4. with D. S. Ornstein and B. Weiss, **Equivalence of Measure Preserving Transformations**, Memoirs of the AMS no. 262 114 pps.
5. with G. Schwarz, **The Limits in  $d$ -bar of Multistep Markov Chains**, Israel J. of Math., Vol. 28, Nos. 1-2, 1977, 103-109.
6. **Two Nonisomorphic  $K$ -automorphisms all of whose Powers Beyond One are Isomorphic**, Israel J. of Math., Vol. 27 Nos. 3-4, 1977, 277-298.
7. **The Second Centralizer of a Bernoulli Shift is just its Powers**, Israel J. of Math., Vol. 29, Nos. 203, 1978, 167-178.
8. **If a Two-Point Extension of a Bernoulli Shift has an Ergodic Square, then it is Bernoulli**, Israel J. of Math., Vol. 30. Nos. 1-2, 1978, 159-180.
9. **An Isomorphism Theory for Bernoulli  $\mathbb{Z}$ -skew-Compact Group Actions**, Adv. in Math., Vol. 47, No. 3, 1983, 241-257.
10. **If a Finite Extension of a Bernoulli Shift has no Finite Rotation Factors, it is Bernoulli**, Israel J. of Math., Vol. 30, Nos. 3, 1978, 193-206.
11. **Counting the Relatively Finite Factors of a Bernoulli Shift**, Israel J. of Math., Vol. 30, nos. 3, 1978, 255-263.
12. **Classifying the Isometric Extensions of a Bernoulli Shift**, J. de Analyse, Vol. 34, 1978, 36-59.
13. with J. Feldman and C. Moore, **Affine Extensions of a Bernoulli Shift**, Trans. AMS., Vol. 257, no. 1, 1980, 171-191.

14. **Smooth Orbit Equivalence of Ergodic  $\mathbb{Z}^d$  actions**,  $d \geq 2$ , Trans. AMS., Vol. 253, 291-302.
15. **An Example of a Measure Preserving Map with Minimal Self- Joinings and Applications**, J. de Analyse, Vol. 35, 1979, 97- 121.
16. with J. M. Steele, **Sizes of Order-Statistical Events**, Annals of Probability, Vol. 8, No. 6, 1980, 1079-1084.
17. **A Mixing Markov Chain with Exponentially Decaying Return Times is Finitarily Bernoulli**, J. of Erg. Th. and Dyn. Sys. Vol. 2, 1982, 85-97.
18. **Ergodic Behavior of Sullivan's Geometric Measure on a Geometrically Finite Hyperbolic Manifold**, J. of Erg. Th. and Dyn. Sys. Vol. 2, 1982, 491-512.
19. with A. Del Junco, **Kakutani Equivalence of Ergodic  $\mathbb{Z}^n$  Actions**, J. of Erg. Th. and Dyn. Sys., Vol. 4, 1984, 89-104.
20. with M. Rahe, **Loose Bernoullicity is Preserved Under Exponentiation by Integrable Functions**, J. of Erg. Th. and Dyn. Sys. Vol. 7, part 2, 1987, 263-266.
21. **Restricted Orbit Equivalence**, Memoirs of the AMS. Vol. 54, No. 323, Mar. 1985, 150 pps.
22. with E. Glasner, **Uncountably Many Topological Models for Ergodic Transformations**, J. of Erg. Th. and Dyn. Sys., Vol. 4, 1984, 233-236.
23.  **$K$ -fold Mixing lifts to Weakly Mixing Isometric Extensions**, J. of Erg. Th. and Dyn. Sys., Vol. 5, 1985, 445-447.
24. with A. Del Junco, **On Ergodic Actions whose Self-Joinings are Graphs**, J. of Erg. Th. and Dyn. Sys. Vol. 7, 1987, 531-557.
25.  **$\mathbb{Z}^n$  and  $\mathbb{R}^n$  Cocycle Extensions and Complementary Algebras**, J. of Erg. Th. and Dyn. Sys. Vol. 6, 1986, 583-599.
26. with A. del Junco, **A Rank One, Rigid, Simple, Prime Map**, J. of Erg. Th. and Dyn. Sys. Vol. 7, 1987, 229-247.
27. **Asymptotically Brownian Skew Products give Non-loosely Bernoulli  $K$ -Automorphisms**, Invent. Math., Vol. 91, 1988, 105-128.
28. With M. Boyle and D. Lind, **The Automorphism Group of a Shift of Finite Type**, Trans. of AMS. Vol. 306, no. 1, 1988, 71- 114.

29.  $\times 2$  and  $\times 3$  **Invariant Measures and Entropy**, Erg. Th. and Dyn. Sys. Vol. 10, 1990, 395-406.
30. with C. Silva, **Minimal Self-Joinings for Non-Singular Transformations**, Erg. Th. and Dyn Sys. Vol. 9, part 4, 1989, 759-800.
31. with A. Fieldsteel, **An ergodic transformation with trivial Kakutani centralizer**, Erg. Th. and Dyn. Sys. Vol. 12, part 3, 1992, 459-478.
32. with A. S. A. Johnson, **Commuting Endomorphisms of the Circle**, Erg. Th. and Dyn. Sys. Vol. 12, part 4, 1992, 743-747.
33. **A Joinings Proof of Bourgain's Return Time Theorem**, Erg. Th. and Dyn. Sys. Vol. 14, 1994, 197-203.
34. with J. Kwiatkowski and M. Lemańczyk **Weak isomorphism of measure-preserving diffeomorphisms**, Isr. Jour. of Math., 80, 1992, 33-64.
35. with E. Glasner and B. Host **Simple systems and their higher order self-joinings**, Israel J. Math. 78 (1992), no. 1, 131-142.
36. with A. Ivanik and M. Lemańczyk, **Absolutely continuous cocycles over irrational rotations**, Isr. Jour. of Math., 83, 1993, 73-95.
37. with J. Kwiatkowski and M. Lemańczyk, **A class of real cocycles having an analytic coboundary modification**, Isr. Jour. of Math., 87, 1994, 337-360.
38. with M. Lacey, K. Petersen and M. Wierdl, **Random ergodic theorems with universally representative sequences**, Annales of the Inst. H. Poincaré, Vol. 30, No. 3, 1994, 353-375.
39. with A. Johnson, **Convergence under  $\times q$  of  $\times p$  invariant measures on the circle**, Adv. in Math., Vol. 115, no.1, Sept. 15, 1995, 117-140.
40. appendix to **Metrics and entropy for non-compact spaces** by M. Handel and B. Kitchens, Isr. Journal of Math.,(91) no.'s 1-3, 1995, 253-271.
41. with A. Fieldsteel and A. del Junco, **Alpha-equivalence: a refinement of Kakutani Equivalence**, Erg. Th. & Dyn. Sys., Vol. 14 part 1, 1994, 69-102.
42. with F. Blanchard, B. Host, A. Maass, and S. Martínez **Entropy pairs for a measure**, Erg. Th. & Dyn. Sys., Vol. 15, 1995, 621-632.
43. with I. Assani and E. Lesigne **Wiener-Wintner return times ergodic theorem**, Isr. J. of Math., Vol. 92, 1995, 375-395.

44. **Eigenfunctions of  $T \times S$  and the Conze-Lesigne algebra**, Ergodic Theory and its Connections with Harmonic Analysis, eds. K. Petersen and I. Salama, London Math. Soc. Lecture note series, (205), 1995, 369–432.
45. with K. Schmidt, **Almost block independence and Bernoullicity of  $\mathbb{Z}^d$  actions by automorphisms of compact Abelian groups**, Inv. Math., 120 (1995), no. 3, 455–488.
46. with W. Bulatek and M. Lemańczyk **Constructions of cocycles over irrational rotations**, Studia Math. 125 (1997), no. 1, 1–11.
47. with A. Nogueira, **Topological weak-mixing of interval exchange maps**, Erg. Th. & Dyn. Sys., Vol. 17, 1997, 1183–1209.
48. with J. Kammeyer **Restricted orbit equivalence for ergodic  $\mathbb{Z}^d$ -actions**, Erg. Th. and Dyn. Sys., Vol. 17, 1997, 1083–1129.
49. with A. del Junco, **Residual behavior of induced maps**, Isr. J. of Math., 93, 1996, 387–398.
50. **Fully generic sequences and a multiple-term return-times theorem**, Inv. Math., Vol. 131, 1998, 199–228.
51. with A. del Junco, G. Goodson, and M. Lemańczyk, **Ergodic transformations conjugate to their inverses by involutions**, Erg. Th. and Dyn. Sys., 16 (1996), 97–124.
52. with J. Feldman **Standardness of sequences of  $\sigma$ -fields given by certain endomorphisms**. Fund. Math., 157, (1998), 175–189.
53. with B. Weiss **Entropy and Mixing for Amenable Group Actions**, Ann. of Math. (2) 151 (2000), no. 3, 1119–1150.
54. with D. Hecklen and C. Hoffman **Entropy and Dyadic Equivalence of Random Walks on a Random Scenery**, Advances in Mathematics, Vol. 156, No. 2, Dec 2000, pp. 157-179
55. with C. Hoffman **Uniform Endomorphisms which are isomorphic to a Bernoulli shift**, Annals of Mathematics, 156 (2002), 79–101.
56. with C. Hoffman **A dyadic endomorphism which is Bernoulli but not standard**, Isr. J. of Math., 130, (2002), 365–379.

57. **Applications of orbit equivalence to actions of discrete amenable groups**, Proceedings of the International Congress of Mathematicians, Vol. III (Beijing, 2002), 339–347, *Higher Ed. Press*, Beijing.
58. with C. Hoffman **If the  $[T, \text{Id}]$  automorphism is Bernoulli then the  $[T, \text{Id}]$  endomorphism is standard**, *Studia Math.*, 155, (2003), no.3, 195–206.
59. **An entropy preserving Dye’s theorem for ergodic actions**, *Journal d’Analyse Math.*, 95, (2005), 1–44.
60. **Pointwise and  $L^1$  mixing relative to a sub sigma algebra**, *Ill. J. of Math.*, 48 (2004), no. 2, 505–517.
61. with C. H. Lin **Sections for semiflows and Kakutani shift equivalence** *Modern dynamical systems and applications*, Cambridge Univ. Press, Cambridge, (2004) 145–161.
62. with M. Foreman and B. Weiss **On the conjugacy relation in ergodic theory**, *C. R. Math. Acad. Sci. Paris* 343 (2006), no. 10, 653–656.
63. **Ergodic Theory on Borel foliations by  $\mathbb{R}^\times$  and  $\mathbb{Z}^\times$** , *Contemp. Math.* Vol 444 (2007) 89–113.
64. with M. Roychowdhury **Any two irreducible Markov chains are finitarily orbit equivalent** *Isr. J. of Math.*, to appear.
65. with M. Roychowdhury **Any two irreducible Markov Chains of equal entropy are finitarily Kakutani equivalent**, *Isr. J. of Math.*, to appear.
66. with W. Kosek and N. Ormes **Flow orbit equivalence for minimal Cantor systems** *Erg. Th. and Dyn. Sys.*, to appear.
67. with M. Roychowdhury, **The Morse minimal system and the binary odometer are finitarily Kakutani equivalent**, *Fund. Math.*, Vol 198 (2008) 149–163.

## B. Articles in Proceedings of Symposia, Conferences, etc.

1. **A Characterization of those Processes Finitarily Isomorphic to a Bernoulli Shift**, Proceedings of the Special Year in Ergodic Theory and Dynamical Systems, U. of Maryland, 1979-80, 1-64.
2. **Inner and Barely Linear Time Changes of Ergodic  $\mathbb{R}^k$  Actions**, Conf. in Mod. Anal. and Prob., *Contemp. Math* (Kakutani conf.) Vol. 26, 1983, 351-372.

3. with V. Bergelson, **Weakly Mixing Actions of  $F^\infty$  have Infinite Subgroup Actions Which are Bernoulli**, Proceedings of the Special Year in Dynamical Systems, University of Maryland, 1986-87, 7-22.
4. **Rectangular Tilings of  $\mathbb{R}^n$  and Free  $\mathbb{R}^n$ -actions**, Proceedings of the Special Year in Dynamical Systems, University of Maryland, 1986-87, 689-705.
5. **Markov Tilings of  $\mathbb{R}^n$  and Representations of  $\mathbb{R}^n$ -actions**, Contemp. Math (Stone conf.) Vol. 94, 271-290.
6. **Residuality and orbit equivalence**, in *Topological dynamics and Applications* Contemp. Math (Ellis Volume), Vol. 215, 1998, 243–253.

### C. Preprints and Articles submitted to Scholarly Journals

1. with A. Danilenko **Relative entropy theory for infinite amenable actions**, submitted.
2. with A. del Junco and B. Weiss **Measured Topological Orbit and Kakutani Equivalence**, submitted.
3. with M. Roychowdhury **Nearly Continuous Kakutani Equivalence of Adding Machines**, submitted.
4. with A. Dykstra **Any two Irrational Rotations are Nearly Continuously Kakutani Equivalent**, submitted.

### BOOKS

1. **Fundamentals of Measurable Dynamics, Ergodic Theory on Lebesgue Spaces**, 1990, Oxford University Press.
2. with J. Kammeyer **Restricted orbit equivalence for actions of discrete amenable groups**, Cambridge Tracts in Mathematics, Number 146, ISBN: 0521807956.

### GRANTS, CONTRACTS, AWARDS AND PRIZES

E. T. Bell UG Research Prize,	Caltech,	1972
Sloan Fellow		1981-82
NSF summer Contracts		1976-2002, 2003-present
Distinguished Scholar-Teacher	Univ. of Maryland	1987-88
CNRS Grant	Univ. of Paris VI	Spring 1989
Wilson Fellow of the IAS	Hebrew U. of Jerusalem	1996-97

Co-PI, Maryland VIGRE Program	2003–2008
PI, Maryland STAND GRP Grant	2003–2006
Co-PI CRDF grant	2002–2004
Co-PI NSF Dyn. Sys. Conf. Grant	Park City, UT June 2008

## INVITED LECTURES

1. Rennes Conference in Dynamical Systems, U. of Rennes, France Aug. 1975.
2. Lecture series on Nonequivalence, Inst. for Adv. Studies, Hebrew U. of Jerusalem, spring, 1976.
3. AMS Summer session in Ergodic Theory and Dyn. Syst., U. of New Hampshire, Durham, NH, June 1982.
4. Special Session in Ergodic Theory and Dyn. Syst., Winter meeting of the AMS, Cincinnati, Jan. 1982.
5. Special Session in Ergodic Theory and Dyn. Syst., Summer meeting of the AMS, Toronto, Aug. 1982.
6. Principle Speaker, Two Week Seminar in Ergodic Theory, SUNY Albany, Mar. 1983 (six lectures).
7. Chern Colloquium, Math Sci. Research Inst. at U. C. Berkeley, Nov. 1983.
8. Geometry and Dynamics Seminar, Courant Institute, Jan. 1986.
9. Special Session in Ergodic Theory, Winter meeting of the Canadian Mathematical Society, Ottawa, Dec. 1986.
10. Invited address, "Love, Money and Combinatorics," Seventh Annual U. of Md. High School Mathematics Competition Awards Ceremony, 1986.
11. Dorothy M. Stone Retirement Conference, Univ. of Rochester, Aug. 1987.
12. Departmental Colloquium, Rice University, Oct. 1987.
13. Departmental Colloquium, UNC, Chapel Hill, Nov. 1987.
14. Public lecture "From Calculus to Chaos; the Mathematics of Motion and Change" Distinguished Scholar-Teacher Series, Univ. of Maryland, Apr. 1988.
15. Colloquium de Mathematiques Des Universites Parisiennes, University of Paris VI-VII, Feb. 1989.



16. Univ. of Wroclaw Conference in Erg. Th. and Dyn. Sys., Poland, June, 1989.
17. Conference on Nonsingular Dynamics, Universite de Paris Nord, June, 1989.
18. Journees Arithmetique, Luminy, July, 1989.
19. Conference in Topological and Measurable Dynamics, IMA, Univ. of Minn., Jan. 1990.
20. Seminaire Analyse Harmonique et Theorie Ergodique, Univ. de Paris Nord, three lectures on interval exchanges, June 7, 11, and 18, 1990.
21. Departmental Colloquium, Univ. of Pennsylvania, Sept. 12, 1990.
22. Dynamics Seminar and Undergraduate Colloquium, Williams College, Sept. 24, 1990.
23. Special Session in Ergodic Theory, Meeting of the AMS at U. Mass. Amherst, 20 minute talk, Oct. 20, 1990.
24. Journee Arithmetique, Luminy, June, 1991.
25. Special Session in Ergodic Theory, Meeting of the AMS at U. of N.D. Fargo, N.D., 20 minute talk, Oct., 1991.
26. Workshop on Ergodic Theory of Amenable Group actions, MSRI, U.C. Berkeley, Feb. 1991.
27. Dynamics seminar, Univ. of Colorado, Boulder, April, 1992.
28. Math. Dept. Colloquium, Northwestern, Jan. 1993.
29. Dynamical systems seminar, Univ. of Paris VI, Feb. 1993
30. Harmonic analysis seminar, Univ. of Lyon, Feb. 1993.
31. Dynamics Seminar, Lab. de Math. Discrete, Luminy, May, 1993
32. Harmonic Analysis Seminar, Univ. d'Aix-Marseille, June, 1993
33. Invited Lectures (2), Univ. de F. Rabelais, Tours, July, 1993.
34. Maryland-Penn State dynamics conference, PSU, Nov. 1993.
35. Journee Tourangelles de Mathematique et Physique Mathematique, June 22-23, 1994, invited lecture.
36. Invited lecture series (3) "A tour in 3 parts of Bernoulli-city", Special Year in Dynamics, Math. Inst., Univ. of Warwick, June, 1994.

37. Maryland-Penn State dynamics conference, PSU, Nov. 1994.
38. Dept. Colloquium, Feb. 10, 1995, Univ. of Texas at Austin.
39. Invited lectures (3, one was dept. Colloquium) “The multiple-term return times theorem” as Visiting Scholar, Mar. 20-24, North Dakota State Univ.
40. Dept. Colloquium, June 13, 1995, University of New South Wales.
41. Dept. Colloquium, June 23, 1995, University of Sydney, Australia.
42. Dept. Colloquium, City College of NY, Mar. 8, 1996.
43. Colloquium of the Institute for Advanced Studies, Hebrew Univ. of Jerusalem, Sept. 23, 1996.
44. Dept. Colloquium, Hebrew Univ. of the Negev, Beer Sheva, Nov. 12, 1996.
45. Schrödinger Institute, three one hour lectures, Jan. 14, 16, and 20 1997. “Restricted Orbit Equivalence for amenable group actions.”
46. Hour lecture, Conference on Modern Ergodic Theorems, Technion, Haifa, Mar. 16-21, 1997.
47. Hour lecture, Dynamics seminar, Math. Inst, Hebrew U., June 1998.
48. Hour invited, Penn State Dynamics Workshop, Oct. 10, 1998.
49. Hour invited, Penn State Dynamics Workshop, Oct. 23, 1999.
50. Hour lecture, Ergodic Theory Workshop, U. of Memphis, Jan. 29, 2000.
51. Hour lecture, Northwest Dynamics Symposium, U. of Victoria, May 6, 2000.
52. Hour lecture, Conference on Topics in Ergodic Theory Probability, and Analysis in honor of Jacob Feldman, Penn State, April 21, 2001.
53. Hour lecture, Conference on Topics in Ergodic Theory and Topological Dynamics in honor of Jan Kwiatkowski, Math Institute, Univ. N. Copernicus, Torun Poland, Jan. 18, 2002.
54. 45 minute invited lecture, International Congress of Mathematicians, Beijing, August 2002.
55. Hour lecture, Departmental Colloquium, Univ. of Maryland, Oct. 25, 2002.
56. Hour lecture, Departmental Colloquium, Univ. of Memphis, Nov. 20, 2002.

57. Hour seminar lecture, Stanford University, Jan. 24, 2003.
58. Hour lecture, Departmental Colloquium, Morehouse College, Feb. 27, 2003.
59. 40 minute invited lecture, Special Session in topological dynamics and ergodic theory, Joint Meetings, Phoenix, Jan. 9, 2004
60. Departmental Colloquium, Colo. State U., Jan. 21, 2004
61. Departmental Colloquium, Spelman College, Feb. 23, 2004
62. Hour lecture, Dynamics Seminar, Stony Brook, Mar. 5, 2004
63. Colloquium, Courant Institute, Mar. 8, 2004
64. PIMS Distinguished Chair Lectures, three lectures, U. of Victoria, Oct. 25, 27, 28, 2004. Colloquium Lecture, U. of B.C., Oct. 29. Two lectures, U. of Washington, Nov. 9, 11.
65. Three lecture series at the retirement conference for Roger Jones, Dec. 1–3, 2005.
66. Invited talk, workshop on ergodic theory and dynamical systems, Sklarska Poreba, Poland, June 22, 2006.
67. Dynamics Seminar, Northwestern, Jan. 30, 2006.
68. twenty minute invited talk, session on ergodic theory and topological dynamics, joint AMS-Polish Math. Soc. meeting, U. of Warsaw, Aug. 1, 2007.
69. Colloquium, Brigham Young U., Nov. 13, 2007.

### III. TEACHING AND ADVISING

#### THESES DIRECTED

J. Kammeyer	Phd	June '87
<b>Classifying the two point extensions of Bernoulli <math>\mathbb{Z}</math> actions</b>		
A. Johnson	Phd	June '90
<b>Measures on the circle invariant under a non-lacunary subsemigroup of the integers</b>		
W. Bulatek	Phd	June '92
<b>Smooth, weakly mixing, weakly isomorphic but not isomorphic flows</b>		
A. Sahin	Phd	January '95
<b>Tiling representations of <math>\mathbb{R}^k</math> actions and alpha-equivalence in two dimensions</b>		
D. Heicklen	Phd	January '98
<b>Decreasing sequences of <math>\sigma</math>-algebras in ergodic theory</b>		

F. Newberger	Phd	June '98
<b>The ergodic theory of the Bowen-Margulis measure</b>		
J. Matteson	M.A.	August '01
<b>The dynamics of twist maps and trimming operators</b>		
K. Ball	Phd	June '02
<b>Entropy and sigma-algebra equivalence of random walks on random sceneries</b>		
C.-H. Lin	Phd	June '02
<b>Semiconjugacy and Kakutani equivalence for dyadic endomorphisms</b>		
D. McClendon	Phd	June '05
<b>Orbit discontinuities and topological models for Borel semiflows</b>		

#### IV. SERVICE

##### SERVICE TO THE DEPARTMENT OTHER THAN TEACHING

1. Salary Committee, Spring 1984
2. Non-MPSE Advisory Committee, Fall 1984
3. Chairman, organizing committee, Special Year in Dynamical Systems, 1986-87
4. Chairman, ODE/Synamical Systems Field Committee, 1985-88
5. Policy Committee, 1989-90
6. CMPS Service Committee, 1989-90.
7. Chairman, Tenure Committee, Fall '91 thru Fall '92
8. Hiring Committee, 1991-92
9. Undergraduate math major advisor, 1991-92
10. Graduate Financial Aid committee, Spring '94 and Spring '95
11. Dean's Math Chair search committee, Dec. '95-Mar. '96.
12. Policy Committee, 1997-98.
13. Associate Chair for Graduate Studies, June 1998–June 2001.
14. Acting Chair, July 2001–June 2002.
15. Graduate Minicourse Series organizer '02–'03.
16. Academic Director, Math STAND Program, June 2002–June 2004.

17. Director, Maryland VIGRE Program, March 2003–June 2004.
18. Executive Committee, 2005–2008.
19. Graduate Committee, 2005–2008.

#### **SERVICE TO THE MATHEMATICAL COMMUNITY**

1. NSF Reviewer.
2. Editorial Board, Ergodic theory and Dynamical Systems, 1987–1999
3. Editorial Committee in charge of modern analysis, Trans. of the AMS, 1994–1998.
4. Editorial Committee, Ergodic theory and Dynamical Systems, 2000–
5. Referee for numerous journals.