

CURRICULUM VITAE

Name: Raj Wilson
Title: Professor of Mathematics
Address: Department of Mathematical Sciences
The University of Texas at San Antonio
6900 North Loop 1604 West
San Antonio, Texas 78249
Education: Ph.D; Stevens Institute of Technology, New Jersey; 1972
M.Sc; University of Madras, Madras, India; 1964
B.Sc; University of Madras, Madras, India; 1962
Appointments: Research and teaching

2003 - Professor
The University of Texas at San Antonio, Texas
1989 - 2003 Associate Professor
The University of Texas at San Antonio, Texas
1987 - 1989 Assistant Professor
The University of Texas at San Antonio, Texas
1986 - 1987 Lecturer
The University of Texas at San Antonio, Texas
1984 - 1986 Visiting Assistant Professor
The University of Texas at San Antonio, Texas
1983 - 1984 Lecturer
The University of Georgia at Athens, Georgia
1982 - 1983 Visiting Assistant Professor
Drexel University, Philadelphia, Pennsylvania
1979 - 1982 Visiting Assistant Professor
Southern Illinois University, Carbondale, Illinois
1977 - 1979 Forschungstipendiat
Max-Planck-Institut and
Universität München, München, Germany
1975 - 1977 Research Scholar
Institute for Advanced Studies, Dublin, Ireland
1973 - 1975 Research Associate
The University of Colorado at Boulder, Colorado
1972 - 1973 Research Collaborator
Brookhaven National Lab., Upton, New York
1964 - 1968 Lecturer
Scott Christian College, Nagercoil, India

PUBLICATIONS:

Refereed Articles :

1. *Proton structure functions in an infinite resonance $O(4,2)$ model*,
Ann. Phys., **81** (1973), 15-48; – R.F. Peierls.
2. *A generalized Dirac current in $O(4,2)$ theory*,
Nucl. Phys., **B68** (1974), 157-176
Mathematical Reviews, **51** (1976), 1046; 51 #7508.
3. *Unitary symmetries in particle theory*,
SCC Annual Review, (1966), 10-25.
4. *Deep Inelastic Scattering of Proton in an Infinite Component Field Theory*,
Thesis, Stevens Institute of Technology, 1972.
5. *Inelastic transition form factors in the Hydrogen atom*,
Phys. Rev., **A13** (1976), 918-926; – A.O. Barut.
6. *Infinite component fields-I: Electromagnetic inelastic form factors and structure functions of the proton*,
Phys. Rev., **D13** (1976), 2629-2646; – A.O. Barut.
7. *Infinite component fields-II: Electromagnetic structure of bosons*,
Phys. Rev., **D13** (1976), 2647-2655; – A.O. Barut.
8. *Clebsch-Gordan coefficients, Racah coefficients, and Hypergeometric functions*,
DIAS preprint, 1977.
9. *Some new identities of Clebsch-Gordan coefficients and representation functions of $SO(2,1)$ and $SO(4)$* ,
J. Math. Phys., **17** (1976), 900-915; – A.O. Barut
Mathematical Reviews, **53** (1977), 2099; 53 #15123.
10. *Kl_3 form factors*,
Phys. Rev., **D19** (1979), 260-267; – A.O. Barut.
11. *Quantum theory of infinite component fields*,
J. Math. Phys., **20** (1979), 2244-2256; – A.O. Barut, C.K.E. Schneider
Mathematical Reviews, **81a** (1981), 322; 81a:81034.
12. *Inelastic form factors of a composite dynamical system*
Univetsita Munchen preprint, 1980.
13. *Ladder operators of group matrix elements*,
J. Math. Phys., **20** (1979), 2380-2390; – C.K.E. Schneider
Mathematical Reviews, **81f** (1981), 2157; 81f:22040.
14. *Path integral treatment of the Morse oscillator*,
Phys. Letts., **96A** (1983), 117-120; – P.Y. Cai, A. Inomata
Mathematical Reviews, **85g** (1985), 3159; 85g:81058.

15. *A unified description of the representation of the graded Lie algebra $gs\ell_2$,*
J. Math. Phys., **25** (1984), 1253-1261; – B. Gruber
Mathematical Reviews, **85k** (1985), 4813, 85k:17020.
16. *On the infinite dimensional Lie algebras and Dynkin diagrams,*
University of Georgia preprint, 1984.
17. *On the dynamical group of the Kepler problem in a curved space of constant curvature,*
Phys. Letts., **110A** (1985), 351-354; – A.O. Barut
Mathematical Reviews, **86k** (1986), 5328, 86k:81166.
18. *On the connection between Dyons, Vortices, and Aharonov-Bohm effect,*
Ann. Phys., **164** (1985), 223-232; – A.O. Barut
Mathematical Reviews, **87h** (1987), 4582; 87h:81244.
19. *Path integral realization of a dynamical group,*
Lect. Notes in Phys., **261** (1986), 42-47; – A. Inomata
Mathematical Reviews, **88g** (1988), 3826; 88g:81032.
20. *Factorization-Algebraization-Path integration and dynamical groups,*
Symmetries in Science, **II** (1986), 255-263; – A. Inomata
Mathematical Reviews, **92e** (1992), 2867; 92e:81057.
21. *Relativistic scattering of composite particles,*
Symmetries in Science, **II** (1986), 555-565.
22. *The generalized Morse oscillator in the $SO(4,2)$ dynamical group scheme,*
J. Math. Phys., **28** (1987), 605-611; – A.O. Barut, A. Inomata
Mathematical Reviews, **88e** (1988), 2552; 88e:58108
23. *A new realization of dynamical groups and factorization method,*
J. Phys.A:Math.& Gen., **20** (1987), 4075-4082; – A.O. Barut, A. Inomata
Mathematical Reviews, **89e** (1989), 2874; 89e:81014.
24. *Algebraic treatment of second Poschl-Teller, Morse-Rosen, and Eckart equations,*
J. Phys.A:Math.& Gen., **20** (1987), 4083-4096; – A.O. Barut, A. Inomata
Mathematical Reviews, **89e** (1989), 2874; 89e:81015.
25. *Algebraic scattering theory of relativistic composite particles,*
Fort. der Physik, **37** (1989), 541-597; – A.O. Barut, A. Inomata
Mathematical Reviews, **91b** (1991), 1145; 91b:81175.
26. *Analytic group theoretical form factors of Hydrogen-like atoms for discrete and continuum transitions,*
Phys. Rev., **A40** (1989), 1340-1350; – A.O. Barut.
27. *Indecomposable representations of $osp(2,1)$,*
Symposia Matematica, **31** (1990), 243-255
Mathematical Reviews, **91d** (1991), 1917; 91d:17042.

28. *Topological charge quantization via path integration: An application of the Kustaanheimo-Stiefel transformation*,
Found. of Physics, **23** (1993), 969-984; – A. Inomata, G. Junker
Mathematical Reviews, **94h** (1994), 4835; 94h:81084.
29. *Noncompact Lie Groups and Some of their Applications*,
Proceedings of the NATO *Advanced Research Workshop*, – E.A. Tanner,
Mathematical Reviews, **95f**, 3280; 95f:22004.
30. *Noncompact Lie groups, their algebras and some of their applications*,
NATO Mathematical and Physical Sciences, **429C** (1995), 1-54; –
E.A. Tanner
Mathematical Reviews, **95h** (1996), 4578; 95h:22021.
31. *Invariant measures on locally compact groups*,
PanAm. Math. J., **10** (2000), 1-18; – E.A. Tanner.
Mathematical Reviews, (2001), 1 801 526.
32. *Topological star-algebras and modular functions*,
–submitted for publication – E.A. Tanner
UTSA preprint 2000.
33. *Irreducible Unitary representations of $SU_{p,q}$ -I: The discrete series*,
Inter. J. Math., **12** (2001), 1-36 – E.A. Tanner.
34. *Irreducible Unitary representations of $SU_{p,q}$ -II: The continuous series*,
Inter. J. Math., **12** (2001), 37-47 – E.A. Tanner.
35. *Invariant eigendistributions on $SU_{p,q}$* ,
J. Geometry and Phys., **41** (2002), 13-56 – E.A. Tanner.
36. *Composition series for analytic continuations of holomorphic discrete series representations of $SU_{p,q}$* ,
Diff. Geometry and Appl., **15** (2003), 221-252.
37. *The uncertainty principle in pseudo-Riemannian symmetric space*,
(submitted August 2004)
38. *Cohomological spaces for pseudo-unitary groups*
(submitted June 2005)
39. *Indecomposable representations of the conformal group $SU_{2,2}$* .
(to be submitted)
40. *A generalization of Moyal quantization*,
(under preparation)
41. *On locally compact quantum groups*.
(under preparation)

Books, Journals, and Lecture Notes :

1. *Noncompact Lie Groups and Some of their Applications*,
Proceedings of the NATO *Advanced Research Workshop*, – E.A. Tanner,
Mathematical Reviews, **95f**, 3280; 95f:22004.
ISBN 0-7923-2787-X
Kluwer Academic Publishers, Dordrecht, Holland, 1995.
2. *Dynamical Groups*,
Five special issues of *Foundations of Physics* – A.Inomata and van der
Merwe,
FNDPA 23(2–6), 173–970pp; ISSN 0015-9018
Plenum Press, New York, 1993.
3. Lecture Notes in Modern Algebra – MAT 3233.
4. Lecture Notes in Number Theory – MAT 4253.
5. Lecture Notes in Algebra – MAT 5173 & MAT 5313.
6. Lecture Notes in General Topology – MAT 5243 & MAT 5253.
7. Lecture Notes in Differential Geometry – MAT 6973.
8. Lecture Notes in Operator Theory – MAT 6973.
9. Lecture Notes in Differentiable Manifolds – MAT 6973.
10. Lecture Notes in Galois Theory – MAT 6973.
11. Lecture Notes in Geometrical Mechanics – MAT 6973.
12. *Geometric Algebra*,
Book, under preparation.

GRANTS, AWARDS and CONTRACTS:

1. Awarded the UTSA Faculty Development Leave for the Fall 2000 semester.
2. NATO Grant ARW920847 of BF 900,00 + \$1683 (Total: \$27,846) to direct the
Advanced Research Workshop on *Noncompact Lie Groups and Their Applica-*
tions, San Antonio, 1993.
3. Grant of \$6000 from Technical Concepts Corporation, San Antonio, to support
the above NATO Workshop, San Antonio, 1993.
4. Collaborating investigator
NSF Grant No. PHY-H304868, Drexel University, 1982-1983.
5. Collaborating investigator
NSF Grant No. GP-39308X, The University of Colorado at Boulder, 1974-1975.

INVITED LECTURES:

1. *Seminars on Dynamical Groups*,
Universität München, München, Germany, 1975.
2. *Seminar in Mathematical Physics*,
Institute for Advanced Studies, Dublin, Ireland, 1976.
3. *Seminars on Spectrum Generating Algebras*,
University of Madras, Madras, India, 1976.
4. *Seminars in Space-Time Structure*,
Max-Planck-Institut, Starnberg, Germany, 1977.
5. *Symposium on Relativistic Wave Equations*,
Rijksuniversiteit Utrecht, Utrecht, Holland, 1978.
6. Series of lectures on *Group Representations and Dynamical Groups*,
Universität München, München, Germany, 1978.
7. NATO *Advanced Research Institute in Mathematical Physics*,
Istanbul, Turkey, 1979.
8. *Workshop in Dynamical Groups*,
Universität München, München, Germany, 1980.
9. *Seminars on Group Representations*,
Università di Trento, Trento, Italy, 1983.
10. Series of lectures on *Infinite-dimensional Lie-Kac-Moody Algebras*,
University of Georgia, Athens, USA, Spring 1984.
11. Chairman for the session on *Dynamical Groups* in the International Conference
in Group Theory, Maryland, USA, 1984.
12. *Symposium on Conformal Groups and Related Symmetries*,
Arnold Sommerfeld Institut, Clausthal, Germany, 1985.
13. *Symposium on Symmetries in Science*,
Southern Illinois University, Carbondale, USA, 1986.
14. *Seminars on Group Representations*,
Università di Trento, Trento, Italy, 1987.
15. *Conference on Indecomposable Representations of Lie Groups and their Physical
Applications*,
Istituto Nazionale di Alta Matematica Francesco Severi, Rome, Italy, 1988.
16. *Seminars on Group Representations*,
Università di Trento, Trento, Italy, 1990.
17. *International Wigner Symposium in Mathematical Physics*,
Technische Universität Clausthal, Goslar, Germany, 1991.
18. *Workshop on Conformal Groups*,
International Center for Theoretical Physics, Trieste, Italy, 1992.
19. *International Symposium on Symmetries in Science*,
Bregenz, Austria, 1992.
20. *Conference on the Frontiers in Theoretical Physics*,
Trakya University, Edirne, Turkey, 1993.
21. Director of the NATO Advanced Research Workshop on *Noncompact Lie Groups
and Their Applications*, San Antonio, 3-7 January 1993.

22. *Seminars on Group Theory*,
International Center for Applied Mathematics and Physics, Edirne, Turkey,
1994.
23. *Seminars on Group Representations*,
Università di Trento, Trento, Italy, 1994.
24. *Barut Memorial Conference on Group Theory*,
International Center for Applied Mathematics and Physics, Edirne, Turkey,
1995.
25. *American Mathematical Society Special Session and Mini-Conference in Group
Representations*,
University of Iowa, Iowa, USA, 1996.
26. *Seminars on Group representations*,
State University of New York at Albany, 1999.
27. *Seminars on Group representations*,
Università di Trento, Trento, Italy, March 2000.
28. *XXIII International Colloquium in Group Theory*,
Dubna, Moscow Region, Russia, 31 July - 5 August 2000.
29. *IX International Conference on Symmetry Methods in Physics*,
Yerevan, Armenia, 3-8 July, 2001.
30. *Seminars on Group representations*,
Università di Trento, Trento, Italy, January 2002.
31. *Symposium in Mathematical Physics*,
Rome, Italy, 4-5 January 2002.
32. *XXIV International Colloquium in Group Theory*,
Paris, France, 15-20 July, 2002.
33. *Seminar in Mathematics*,
University of Madras, India, 21 July 2003.

SERVICE:

Department :

1. Catalog Committee; 1987 - 1988
2. Chair, Comprehensive Exam Committee; 1987 - 1988
3. Coordinator of Math/Engineering Courses; 1987 - 1988
4. Chair, Library Committee; 1989 - 1994
5. Mathematics Faculty Search Committee; 1990 - 1991
6. Comprehensive Exam Committee; 1990 -1995
7. Graduate Screening Committee; 1990 - 1992
8. Coordinator of TASP Courses; 1992 - 1993
9. Calculus Course Coordinator; 1992 - 1994
10. Chair, Graduate Studies Committee; 1993 - 1994
11. Chair, Mathematics Faculty Search Committee; 1993 - 1994
12. Mathematics/Statistics Ph.D Committee; 1993 - 1994
13. Faculty Advisory Committee; 1994 - 1995
14. Catalog Committee; 1995 - 1996
15. Chair, Comprehensive Exam ad hoc Committee; 1995 - 1996
16. Chair, Calculus Course Committee; 1996 - 1997
17. Calculus Course Committee; 1997 - 1998
18. Ad hoc Committee on the Real Analysis sequence; 1997 - 1998
19. Graduate ad hoc Catalog Committee; 1997 - 1999
20. Faculty Search Committee; 1998 - 1999
21. Faculty Advisory Committee; 1998 - 1999
22. Graduate Steering Committee; 1996 - 1999
23. Ad hoc Graduate Catalog Committee; 1999 - 2000
24. Ad hoc Graduate Program of Study Committee; 1999 - 2000
25. Member, MS Thesis Committee in pure mathematics; 2002
26. Member, Graduate Admissions Committee; 2002-
27. Ad hoc Graduate Assistants Appointment Committee; 2003 - 2004
28. Library Liaison; 2004 -

College :

1. Faculty Review and Advisory Committee; 1990 - 1992
2. Academic Policy and Curriculum Committee; 1993 - 1995
3. Member, M.S. Thesis Committee in E.E.; 1994
4. Ad hoc Scholarship and Awards Committee, 2002
5. Faculty Review and Advisory Committee; 2003 - 2005
6. Academic Policy and Curriculum Committee; 2003 -

University :

1. Member, Library Strategic Planning Group; 1989 - 1991
2. Member, University Assembly; 1991 - 1993
3. University Assembly Nominating Committee; 1991 - 1993
4. Mentor, UTSA Women and Minority Undergraduate Research Program; 1993 - 1994
5. Faculty Senate's Acad. Policy and Req. Committee; 1994 - 1996
6. Faculty Senate's ad hoc Committee to Evaluate Faculty Workload; 1995 - 1996
7. Member, Graduate Council; 1996 - 1997
8. Committee on Graduate Studies of the Master of Science in Math.; 1996 -1998
9. Faculty Mentor for a National Science Foundation Student Scholar; 2003
10. Member, Graduate Council; 2003 - 2005

Service to Profession :

1. Review periodically articles for *Mathematical Reviews* published by the American Mathematical Society
2. Referee for several leading journals in mathematics and mathematical physics.

COURSES TAUGHT:

1. MAT 1214 - Calculus I
2. MAT 1223 - Calculus II
3. MAT 2213 - Calculus III
4. MAT 2233 - Linear Algebra
5. MAT 2243 - Foundations of Mathematics
6. MAT 3213 - Foundations of Analysis
7. MAT 3223 - Complex Variables
8. MAT 3233 - Modern Algebra
9. MAT 3243 - Calculus for Applications
10. MAT 3253 - Engineering Analysis I
11. MAT 3263 - Engineering Analysis II
12. STA 3513 - Probability and Statistics
13. MAT 4233 - Modern Abstract Algebra
14. MAT 4253 - Number Theory
15. MAT 4263 - Geometry
16. MAT 4273 - Topology
17. MAT 4913 - Independent Study
18. MAT 4953 - Special Studies in Mathematics
19. MAT 5043 - Euclidean and Non-Euclidean Geometry
20. MAT 5173 - Algebra I
21. MAT 5223 - Theory of Functions of a Complex Variable I
22. MAT 5233 - Theory of Functions of a Complex Variable II
23. MAT 5243 - General Topology I
24. MAT 5253 - General Topology II
25. MAT 5263 - Applied Algebra
26. MAT 5283 - Linear Algebra and Matrix Theory
27. MAT 5313 - Algebra II
28. MAT 5973 - Directed Research
29. MAT 6953 - Independent Study
30. MAT 6973 - Special Problems
 - (a) Operator Theory, Spring 1990
 - (b) Lie Algebras and Lie Groups, Fall 1991
 - (c) Geometrical Mechanics, Summer 1992
 - (d) Differentiable Manifolds, Fall 1994
 - (e) Galois Theory, Summer 1999
 - (f) From the Calculus to Set Theory, Fall 2003
 - (g) Differential Geometry, Fall 2005