

## CURRICULUM VITAE: **Gordon Paul Ramsey**

**Born:** Gary, Indiana, USA

**Citizenship:** United States

### **Education:**

- \* B.A. (1970) Physics and Mathematics - Southern Illinois University
- \* M.S. (1972), Ph.D. (1982)- Illinois Institute of Technology; Advisor, P.W. Johnson.  
Ph.D. Thesis title: "Higher Order Corrections in Perturbative QCD"

### **Professional Society Memberships: Offices Held**

1. American Association of Physics Teachers (AAPT)
  - \* --Vice-President (1983) and President (1984), AAPT Chicago Section
  - \* --Liaison, AAPT/APS College-High School Interaction Committee
  - \* --Member and Secretary of AAPT committee on Computers in Physics (1987-90)
  - \* --Member (1993-98, 2003-06), Chair (1997-98, 2005-06),  
Webmaster (1995-2006): Committee on International Education
  - \* --Member of AAPT Nominating Committee (1998-99)
  - \* --Member, Chicago Section AAPT Nominating Committee (1994-present)
  - \* --Member of AAPT Executive Board & National Committees: Publications, Venture Fund, Audit, Budget, Review, Undergraduate Education, Graduate Education (2007-2010)
  - \* --AAPT representative on the US Liaison Committee to the International Union of Pure and Applied Physics (USLC/IUPAP) - (2009-2014)
  - \*--Member and Chair of AAPT Committee on Interests of Senior Scientists (2010-2013)
  - \*--Editorial Board, The Physics Teacher, (2012-2015)
  - \*--Editorial Board, American Journal of Physics Resource Letters (2014-2016)
  - \*--Chicago Section Representative to National AAPT (2013-2016)
  - \*--Vice-President and member of the Executive Board, AAPT (2016)
2. American Physical Society (APS)
  - \* --Particles/Fields, Forum on Education and Forum on International Physics groups
  - \* --Nominating Committee for the Forum on Education (2007)
3. Sigma Xi, scientific research society
4. Acoustical Society of America (ASA)

### **Honors, Fellowships and Appointments:**

1. Summer Faculty Appointment, Division of Educ. Programs, Argonne N.L. (1985-86)
2. Guest Scientist Appointment, High Energy Physics Division, Argonne N. L. (1980-present)
3. Received \$15,000 Capital Budget Grant to implement program for integrating computers in the introductory physics labs.
4. Elected to "Who's Who Worldwide", "Who's Who in Technology", "American Men and Women in Science".
5. Received travel grant from the Japanese Ministry of Education (1996) for participation in the Circum-Pan-Pacific Workshop on High Energy Spin Physics
6. Received travel grant from the Kobe Univ. for invited talk at the International Workshop on Science Education (1997)

7. Received Loyola University Research Support grant for studies of "Females and Physics: Measurement and Amelioration of Science Anxiety", with J.V. Mallow and M. Udo (Loyola University).

8. Received travel grant from RIKEN (Japan) for invited talk at Circum-Pan-Pacific Workshop on High Energy Spin Physics (1999)

9. Received \$3000 Loyola University Mulcahy grant for directing undergraduate research in "Dynamics of Harmonic Oscillators" (1999)

10. Received \$3000 AAPT Bauder Fund Grant for "Third Eye" Demonstration group visit from China. Presented a demonstration session at the AAPT summer meeting at the University of Guelph, ON, Canada. (2000)

11. Received \$4200 Loyola University Mulcahy grant for directing undergraduate research in "Physics of Dance" (2001)

12. Received \$42500 in Project GEARUP grants to direct summer workshops for AP physics high school teachers (2002-2008)

13. Received \$2700 Loyola University Mulcahy grant for directing undergraduate research in "Physics of Flutes"(2003)

14. Awarded Edwin T. and Vivijeanne Sujack Award for Excellence in Teaching, Loyola University Chicago (2006)

15. Given John Rush Award for contributions to the Illinois State Physics Project (ISPP, 2006)

16. Received \$1500 Loyola University Provost Scholarship for directing undergraduate research in "Physics Pedagogy in High Schools" with Melissa Nemeth (2008)

17. Awarded a Distinguished Service Citation from AAPT (2010), received Jan. 2011 at national meeting in Jacksonville, FL.

18. Appointed to the Scientific Advisory Committee of the World Conference in Physics Education (2011) and serving on the planning committee for the conference

19. Elected Distinguished Member of the National Society of Collegiate scholars (NSCS, 2013)

20. Elected to Fellowship in the first cohort, American Association of Physics Teachers – AAPT (2014)

21. Distinguished mentor, honored by Quality of Life Research Center at Claremont University (2015)

#### **Teaching Experience:** (chronological order)

1. Southern Illinois University (3 yrs) - T.A., mathematics and physics.

2. Illinois Institute of Technology (6 yrs) - Graduate T.A., physics.

3. Univ. of Maryland/European Div. (3 yrs) - Instructor, math.

4. Roosevelt University (3 yrs) - Instructor, physics.

5. Illinois Institute of Technology (1 yr) - Instructor, physics.

6. Loyola University (33 yrs) - Professor of physics.

Designed and introduced courses in Digital Electronics, Microprocessor Interfacing, Physics of Music, Mathematical Methods in Physics and numerous special topics courses. Structured and offered a Web course in Digital Electronics through Mundelein College of Loyola University. Developed multimedia tutorials for classroom and laboratory. Developed and administered summer workshops for AP Physics high school teachers, with M. Lietz. Participant in SEPUP workshops for middle school teachers administered by LUC Center for Science and Math Education.

#### **Professional and Related Experience:**

A. Electronics/Computers

1. U.S. Air Force Radar Maintenance Officer- North Dakota and West Germany. (1972-1977)

2. T.A. for NSF Multimedia Educational Resource Center, Illinois Institute of Technology. Developed computer tutorial modules in physics.
3. Developed (co-PI) and taught NSF Young Scholars' Computer Program: hardware section at Loyola University with E. Hamilton and C. Haught; teaching gifted high school students computer architecture and programming (13 years).
4. Multimedia development: created educational tutorials for classroom, laboratory and commercial use, including "The Oscilloscope Tutorial", with T. Ruubel. (Physics Academic Software)

## B. Physics Research

1. Visiting Scientist, Argonne National Laboratory, High Energy Physics Division. (since 1986)
2. Journal Publications in high-energy physics, physics teaching, computational physics, physics education research and musical acoustics.
3. Invited talks and contributed papers in high-energy physics, physics teaching, computational physics, digital electronics, computers, musical acoustics and interdisciplinary topics.
4. Present research interests: high energy spin physics, physics education research in physics teaching pedagogy, musical acoustics, multimedia and Web development.
5. Past Member, SPIN Collaboration, (A. Krisch, Univ. of Mich., Chair).
6. Past Member, International Advisory Committee for the Circum-Pan-Pacific workshops in high-energy spin physics, 1996-2002.
7. Physics education research: Physics pedagogy in HS physics courses, with M. Nemeth, CPS, Chicago (one paper published, next paper in preparation).
8. Ph.D. thesis co-advisor for N. Hislop-Lawrence, Loyola University Chicago: "Case Study on the elements of a physics program that retain females in the physics major." [Ph.D. received in 2014]
9. Analyzing theoretical aspects of polarized elastic scattering: Candice Choo-Kang and Michelle Lis
10. Conducting research on "Physics of Stringed Instruments" with K. Pomian

## Publications:

1. "The Double Incline", AAPT Apparatus Competition, AAPT Pub. OP-21, College Park, Md., c1984.
2. "The Laguerre Method for Solving Integro-Differential Equations", J. Comp. Phys., 60, 97 (1985).
3. "Delta sigma<sub>L</sub>(pp) and Jet Physics", (with D. Richards and D. Sivers), Phys. Rev. D37, 3140 (1988).
4. "Spin Models of the Proton", Proceedings of the 8th International High Energy Spin Physics Symposium, Univ. of Minn., AIP Conference Proc. No. 187, c1989, p. 786.
5. "Orbital Angular Momentum, Spin Fractions and Scenarios for the Proton's Spin-Weighted Parton Distributions", (with J-W Qiu, D. Richards and D. Sivers), Phys. Rev. D39, 361 (1989).
6. "Modeling Parton Spin-Transfer Densities", (with J-W Qiu, D. Richards and D. Sivers), Phys. Rev. D41, 65 (1990).
7. "Experimental Tests of Proton Spin Models", Physics of Polarized Beams on Polarized Targets, eds.: J. Sowinski and S. Vidor, c1990, World Scientific Press, p. 263.
8. "Valence Spin Observables in Hard Scattering QCD and the Measurement of the Gluon Spin Density", (with D. Sivers) Phys. Rev. D43, 2365 (1991).
9. "Reflective Properties of a Parabolic Mirror", The Physics Teacher, April, 1991, p. 240.
10. "Spin Observables for Nucleon-Nucleon Elastic Scattering at Large Momentum Transfer", Proceedings of the 9th International Symposium on High Energy Spin Physics, Eds. K. Althoff and W. Meyer, c 1991, Springer-Verlag, p. 476.
11. "Testing Proton Spin Models with Polarized Beams", Proceedings of the IV Workshop on High Energy Spin Physics, Protvino, Moscow Region, Russia, September, 1992, p. 125.

12. "Spin Observables for NN-NN at Large Momentum Transfer" (with D. Sivers), Phys. Rev. D45, 79 (1992).
13. "Proton-Proton Elastic Spin Observables at Large  $t$ , (with D. Sivers), Phys. Rev. D47, 93 (1993).
14. "Spin Observables in Large  $t$  Elastic N-N Scattering", Proceedings of the 10th International Symposium on High Energy Spin Physics, Nagoya, Japan, c 1993, Universal Academy Press, Inc., Tokyo, p. 599.
15. "Elastic Spin Observables and Proton Wave Function Normalization at Large  $t$ .", Proceedings of the V Workshop on High Energy Spin Physics, Protvino, Russia, September 1993, p. 161.
16. "N-N Scattering Amplitudes from  $90^\circ$  c.m. and into the Landshoff Region", (with D. Sivers) Phys. Rev. D52, 116 (1995).
17. "Polarization and N-N Elastic Scattering Amplitudes", Proceedings of the XI International Symposium on High Energy Spin Physics, Bloomington, IN., AIP Conference Proceedings #343, 1995, p. 383.
18. "Parton Distributions From SLAC and SMC Data", (with M. Goshtasbpour, Tehran) Proceedings of the VI Workshop on High Energy Spin Phenomena, Protvino, Russia, September, c1996, p. 55.
19. "Using Spin to Probe Hadronic Structure", Particle World, 4, 11 (1995).
20. "x-Dependence of Polarized Parton Distributions for CERN and SLAC", (with M. Goshtasbpour, Shahid Beheshti Univ., Iran), Proceedings of the VI Workshop on High Energy Spin Physics, Protvino, Russia, September, c1996, p. 66.
21. Theoretical Aspects of Spin at HERA" (with S. Troshin, Protvino, Russia); section 4 of SPIN@HERA Proposal, SPIN@HERA collaboration, November, 1996.
22. "Polarized Parton Distributions: Theory and Experiment", Proceedings of the Circum-Pan-Pacific Workshop on High Energy Spin Physics, T. Morii and S.N. Mukherjee, Eds., October, 1996, p. 142.
23. "Concluding Remarks", Proceedings of the Circum-Pan-Pacific Workshop on High Energy Spin Physics, T. Morii and S.N. Mukherjee, Eds., October, 1996, p. 243.
24. "Nucleon Spin Distributions from Recent SMC and SLAC Data" (with M. Goshtasbpour), Proceedings of the 12th International Symposium on High Energy Spin Physics, Amsterdam, c1997, World Scientific, p. 522.
25. "x-Dependence of Polarized Parton Distributions and Leading Order Fit to Recent  $A_1(x)$  and  $g_1(x)$  Data" (with M. Goshtasbpour), Proceedings of the 12th International Symposium on High Energy Spin Physics, Amsterdam, c1997, World Scientific, p. 337.
26. "What We Can Learn About Nucleon Spin Structure From Recent Data", (with M. Goshtasbpour, Tehran Univ.) Physical Review D55, 1244 (1997).
27. "The Oscilloscope Tutorial" (with T. Ruubel), software, published and distributed by Physics Academic Software, American Institute of Physics, c1997. Awards: Honorable Mention in "Computers in Physics Software Contest", 1993 and Award of Recognition in the "Society for Technical Communication Multimedia Contest", 1994.
28. "A Simplified Approach to Collision Processes", Am. J. Phys. 65, 384 (1997).
29. "Probing Nucleon Spin Structure", (review paper), Prog. Part. Nucl. Phys. 39, 599 (1997).
30. "Science Education in the United States and its Future", published in the proceedings of the International Workshop on Science Education, Kobe University, March, 1997.
31. "Physics Results from Polarized DIS", Proceedings of the DIS'97 conference, Chicago; AIP Conference Proceedings No. 407, p890, 1997.
32. "x-Dependent Polarized Parton Distributions", (with L. Gordon and M. Goshtasbpour), Phys. Rev. D58, 094017 (1998).
33. "Spin Distributions for Polarized Gluons at RHIC", proceedings from the RIKEN BNL Research Center Workshop, April 27-29, 1998. G. Bunce, et.al., editors; BNL 65615, vol. 7, p.106.
34. "Polarized Parton Distributions for Spin Observables", hep-ph/9810213, to be published in the proceedings of the 13th International Symposium on High Energy Spin Physics, Protvino, Russia, Sept. 1998.

35. "Spin Structure of the Proton and Large  $p_T$  Processes in Polarized pp Collisions", with L. Gordon, Phys. Rev. D59, 074018, 1999.
36. "A Comparison of Spin Observable Predictions", RIKEN Review 28, 86, 2000, proceedings of the Circum-Pan-Pacific RIKEN Symposium on High Energy Spin Physics, Waco (Tokyo), Japan.
37. "Does Physics Teaching Affect Gender-based Science Anxiety?", with M. Udo, S. Reynolds-Alpert and J. V. Mallow, Journal of Science Education and Technology, 10, 237 (2001).
38. "The Shape and Experimental Tests of the Q<sup>2</sup>-Invariant Polarized Gluon Asymmetry", hep-ph/0101044, AIP Proceedings 570, 437 (2001), proceedings of SPIN 2000, Osaka, Japan, Eds. K. Hatanaka, T. Nakano, K. Imai and H. Ejiri.
39. "Gender, Science Anxiety and Physics Teaching", with M. Udo and J. V. Mallow, Proceedings of GASAT 10, Copenhagen, Denmark, 2001.
40. "Determining Spin-Flavor Dependent Distributions", hep-ph/0211004, AIP Conference Proceedings, 675, 348 (2003). <http://dx.doi.org/10.1063/1.1607157>
41. "Polarized Parton Distributions and the Polarized Gluon Asymmetry", hep-ph/0201041, Int. J. Mod. Phys., 18, 1211 (2003).
42. "Science Anxiety and Gender in Students taking General Education Science Courses", with M. Udo and J. Mallow, Journal of Science Education and Technology, 13, 435 (2004).
43. "Building a Better Bed of Nails", The Physics Teacher 42, 438 (2004).
44. "The gluon spin asymmetry as a link to the polarized gluon distribution and orbital angular momentum," hep-ph/0501038, proceedings of SPIN2004, Trieste, Italy c2005, World Scientific, p. 310, et. seq.
45. "Probing orbital angular momentum through the polarized gluon spin asymmetry," hep-ph/0601141 (e-archives) and ANL-HEP-PR-06-3, Proceedings of SPIN2005, Dubna, Russia, c2006, World Scientific, p. 120.
46. "Spin-Orbit Dynamics from the Gluon Asymmetry", Proceedings of SPIN2007, Dubna, Russia, c2008, A. A. Efremov and S. V. Goloskokoov, Eds., JINR, Dubna, p. 138. (arXiv: 0801.1128)
47. "Phenomenological Determination of the Proton's Orbital Angular Momentum", Proceedings of SPIN2008, University of Virginia, AIP Proc. 1149, p. 353-356, c2009, D.G. Crabb, Y. Prok, M. Poelker, S. luitin, D. Day and X. Zhang, Eds. <http://dx.doi.org/10.1063/1.3215663>
48. "Study on Spin-Orbit Dynamics using measurements of the proton's polarized gluon asymmetry", with Yevgeny Binder and Dennis Sivers. [arXiv 1107.5292].
49. "Probing Lz with the Gluon Asymmetry", published in the Proceedings of the Workshop in High Energy Spin Physics, SPIN2011, Dubna, Russia, c 2012.
50. "The Physics of Music Course as an Introduction to Science", J. Acoust. Soc. Am., **132**, 1957 (2012) [abstract].
51. "The Harmonica as a Blues Instrument", J. Acoust. Soc. Am., **132** 1190 (2012) [abstract], with Joe Wiseman and Chris Banaszak (students).
52. "Unintended consequences of imprecise notation: An example from mechanics", A. Gangopadhyaya and G. Ramsey, Am. J. Phys., **81** 313 (2013) [arXiv 1210.7345]
53. "Physics Pedagogy and Assessment in Secondary Schools in the U.S.", Gordon P. Ramsey, Melissa M. Nemeth (alumnae) and David Haberkorn (student); WCPE 2012 proceedings (peer reviewed), p. 1033, et. seq., World Conference on Physics Education, Ed. Mehmet Tasar, Pub. Pegem Akademi, ISBN: 978-605-364-658-7 [arXiv 1305.4576] [www.wcpe2012.org/proceedings.html](http://www.wcpe2012.org/proceedings.html)
54. "Physics of Stringed Instruments", ASA (Acoustical Society of America) paper for public distribution, with Katarzyna Pomian (student), [Acoustical Society of America - 167th Lay Language Papers](http://www.asa-acoustical.org/167thLayLanguagePapers)
55. "A Comparative Study of Stringed Instruments" (with Katarzyna Pomian), J. Acoust. Soc. Am., **135** 2184 (2014) [abstract]. <http://dx.doi.org/10.1121/1.4877112>

56. "The Physics of Music Course as an introduction to Science.", POMA, **18**, 035001 (2014) [Proceedings of Meetings on Acoustics, peer reviewed] <http://dx.doi.org/10.1121/1.4905247>
57. "The harmonica as a blues instrument.", POMA, **18**, 035003 (2014), with Christopher Banaszak and Joseph Wiseman [Proceedings of Meetings on Acoustics, peer reviewed]
58. "Teaching Physics with Music", invited paper, *The Physics Teacher* **53**, 409-412 (2015), for the special issue on "The Art, Craft and Science of Physics Teaching".
59. "Correlating Properties of Stringed Instruments", POMA **21**, 035006 (2015) [Proceedings of Meetings on Acoustics, peer reviewed paper], <http://dx.doi.org/10.1121/2.0000072>

### **Selected Invited Talks:**

1. "Evolution of Quarks and Gluons in Deep-Inelastic Scattering", Marquette Univ, 1985.
2. "Delta sigma\_L and Jet Physics", seminar at Northwestern University, 1988.
3. "Modeling the Nucleon Spin", High Energy Physics Seminar at Argonne National Laboratory, 1988.
4. "Spin Models of the Proton", Eighth International Symposium of High Energy Spin Physics, University of Minnesota, 1988.
5. "Experimental Tests of Spin Models", High Energy Physics Seminar, Argonne National Laboratory, 1989.
6. "Testing Nucleon Spin Models with Polarized Beams", seminar at the Indiana University Cyclotron Facility, 1989.
7. "Spin Observables in Elastic NN and ND Scattering", Theory Institute Workshop for Nuclear and Particle Physics, Argonne National Laboratory, 1990.
8. "The Application of QCD to Elastic Scattering Processes", University of Edinburgh, Scotland, 1990.
9. "Spin Observables for Nucleon-Nucleon Elastic Scattering at Large Momentum Transfer", Ninth International Symposium of High Energy Spin Physics, Bonn, Germany, 1990.
10. "From Whence Cometh Proton Spin?", Colloquium, U. of Iowa, 1990.
11. "Elastic Scattering Spin Observables: A Test of QCD", seminar at University of Iowa, 1990.
12. "The Use of Computers in Science Teaching: Present and Future", Illinois Science Teachers Association, Governor's State U., 1990.
13. "Computer Technology for Junior High School Science Teaching", workshop leader, Argonne National Laboratory.
14. "What Happened to the Spin Crisis?", University of Illinois Chicago, 1991.
15. "Spin Observables in High pT2 Elastic Scattering", University of Michigan, Ann Arbor, 1992.
16. "Polarization and N-N Elastic Scattering Amplitudes", XI International Symposium on High Energy Spin Physics, Bloomington, IN., 1994.
17. "PP Elastic Scattering Observables", R7 RHIC Workshop, University of Iowa, 1994.
18. "Generating Polarized Parton Distributions from Recent Data, Univ. of Michigan, 1995.
19. "What We Can Learn from High Energy Spin Physics", Kobe University, Japan, 1997.
20. "Science Education in the United States and its Future", Kobe University, Japan, 1997.
21. "Comparison of x-Dependent Polarized Parton Distributions to Data", Ringberg Castle (c/o Max Planck Institute, Munich), Germany, 1997.
22. "Extracting Polarized Structure Functions from Theory and Experiment", seminar at Jefferson Lab (CEBAF), VA, 1998.
23. "Christianity and the Natural Sciences I: Physics", Loyola Workshop with J. Dykla and J. Mallow, Loyola U., 1998.
24. "Integrating the Energy and Emotions of Music", Loyola University Open Houses, 1999 and 2000.
25. "Status of High Energy Spin Physics: What Makes the Proton Spin?", colloquium at the Illinois Institute of Technology, 1999.

26. "Physics Education Research in the United States", seminar at Guangxi Normal University, Guilin, China, 2001.
27. "Polarized Parton Distributions and the Polarized Gluon Asymmetry", SPIN2001, Beijing, China, 2001.
28. "Extracting Proton Structure with Spin", colloquia at Ball State University and Valporaiso University, 2003.
29. "What Makes the Proton Spin and other High Energy Questions", colloquium for the Chemistry Department at Loyola University, 2003.
30. "Science Anxiety in Nursing Students", with M. Udo and J.V. Mallow, Ruth K. Palmer Annual Research Symposium, Loyola University Chicago, 2003.
31. "The Physics of Music", HEP division, Argonne National Laboratory, 2004.
32. "Physics of Cats", colloquium at Marquette University, 2005.
33. "Physics of Music", colloquium at Aquinas College, Grand Rapids, MI, 2005.
34. "Probing orbital angular momentum through the polarized gluon spin asymmetry", SPIN2005, Dubna, Russia.
35. "Physics, Physiology and Sociology of Cats", Sigma Kappa Alumnae Chapter, Park Forest, IL (2006)
36. "Why is the proton spin Exactly  $\frac{1}{2}$ ?", colloquium at Loyola University Chicago (2006)
37. "Ballooning in the Civil War" –South Suburban Civil War Round Table and Salt Creek CWRT, 2006
38. "Physics of Music", Joliet Junior College – (2007)
39. "Ballooning in the Civil War" – Kankakee Civil War Round Table – (2007)
40. "The polarized gluon asymmetry and the proton angular momentum", SPIN 2007, Dubna, Russia. (2007).
41. "Physics of Music", Naperville Kiwanis Club, Naperville, IL (2007)
42. "A laptop program to solve the DGLAP Evolution Equations", presented for Y. Binder in acceptance of his Computational Physics Award, APS April Meeting, St. Louis, MO (2008)
43. "Phenomenological Determination of the Orbital Angular Momentum", SPIN 2008, University of Virginia (2008)
- "Physics, Physiology and Sociology of Cats", Naperville Kiwanis Club, Naperville, IL (2008)
44. "Status and Overview of the LHC", Loyola University Chicago, with J. Cunningham, S.J. and J. Dykla. (2009)
45. "GUTs, TOEs and Stringy Things – Biology or Particle Physics?", AAPT/AAAS winter meeting, Chicago, IL, 2009.
46. Panel discussion of the 2009 Nobel Prize in Physics, Loyola University Chicago.
47. "What Happened to the Spin Crisis?", paper given at the Inaugural Meeting of the Prairie Section of the APS, University of Iowa. 2009
48. "What is High energy Physics All about?", seminar at Loyola University Chicago, 2010.
49. "Status of Particle Physics", talk at Loyola University Chicago, 2010.
50. "Probing Lz with the Gluon Asymmetry", presented at the Workshop in High Energy Spin Physics, SPIN2011, Dubna, Russia.
51. What we can learn from physics pedagogy in the high schools, with M. Nemeth and D. Haberkorn, two posters and one talk presented at AAPT summer meeting in Philadelphia
52. The Physics of Music Course (Invited) as an Introduction to Science, presented at the Acoustical Society of America national meeting in Kansas City
53. The Physics of Harmonicas (one invited and one contributed talk), with J. Weisman and C. Banaszak (students), presented at the Acoustical Society of America national meeting in Kansas City
54. "Physics Pedagogy and Assessment in Secondary Schools in the U.S.", presented at the World Conference in Physics Education, Istanbul, Turkey, Jul, 2012

55. The Use of Woodwinds in Jazz, Invited talk at the AAPT Winter Meeting, New Orleans, LA Jan, 2013, [https://www.youtube.com/watch?v=zh3u\\_LzVa3M](https://www.youtube.com/watch?v=zh3u_LzVa3M) and <https://www.youtube.com/watch?v=Cmau793Reik>
56. The Artistic and Technical Aspects of Music, LU seminar Feb., 2013
57. Making Waves: Music and the NGSS, Invited talk at the ISTA (Illinois Science Teachers Association) Regional meeting, DePaul University, Jun., 2013
58. Guest Lecture on Nuclear Physics and Nuclear Power, LU Freshman environmental course (Sept 13)
59. 2013 Nobel Prize for the Higgs Boson, LU seminar with J. Cunningham, S.J. and R. McNees (Oct-13)
60. Physics of Music: Keynote speaker for the Student Research Symposium, NEIU (Apr14)
61. Physics of Stringed instruments, ASA National meeting, Providence, RI (with K. Pomian, LU student). <http://dx.doi.org/10.1121/1.4877112>
62. Physics and Music: Lecture in the Science and Mathematics Colloquium Series, Columbia College, Chicago (2015)

### **Selected Talks given at meetings of the AAPT and APS:**

1. "Development of a Digital Electronics Laboratory", (with J. Collins), AAPT Summer Meeting, Memphis State Univ., 1983. Abstract: AAPT Announcer, May, 1983, p. 79.
2. "Laser Properties using Photography", (with J. Karagiannis), AAPT regional meeting, Moraine Valley College, 1985.
3. "Writing Experience in Physics Courses", AAPT National Meeting, Flagstaff, AZ, 1985. Abstract: AAPT Announcer, May, 1985, p. 60.
4. "What Can We Learn From Physics Teaching Around the World?", Northeastern Illinois University, Chicago, 1992 and AAPT Winter Meeting, New Orleans, LA (1993).
5. "Multimedia in the Physics Classroom", AAPT Chicago Section, Columbia College, 1993.
6. "How Physics Teaching in Germany, Denmark and Russia Contributes to Success in Knowledge Tests", AAPT Winter Meeting, San Diego, CA, 1994.
7. "Multimedia Development for Physics Labs", AAPT Summer Meeting, Notre Dame, 1994.
8. "Enhancing Labs with Multimedia Tools", AAPT Winter Meeting, Orlando, 1995.
9. "Using Design Problems to Teach Physics Concepts", AAPT Summer Meeting, Gonzaga U., Spokane, 1995.
10. "A Demonstration of Optical Computing Logic", (with N. Viswanath), AAPT Chicago Section, Northeastern Illinois Univ., 1999.
11. "A Study of Factors That Affect Science Anxiety of Students in Introductory Physics", AAPT winter meeting, Kissimmee, FL, 2000.
12. "The Dynamics of Harmonic Oscillators", with R.Gall, AAPT summer meeting, Guelph, ON., 2000.
13. "Digital Electronics as a Writing Intensive Course", AAPT winter meeting, San Diego, CA, 2001.
14. "Freshman Projects: the Entrance to Undergraduate Research", AAPT summer meeting, Rochester, NY, 2001.
15. "The Web Version of Digital Electronics", AAPT winter meeting, Philadelphia, PA, 2002.
16. "The Effects of the Stage on Irish Dance Jumps", (with M. Gagliardi, T. Naik and E. O'Shea) AAPT summer meeting, Madison, WI, 2003.
17. "The Physics, Physiology and Sociology of Cats", (invited) AAPT winter meeting, Miami, FL, 2004.
18. "Using Audio Analysis Software in a Physics of Music Course", AAPT summer meeting, Sacramento, CA, 2004.
19. "How do we identify musical instruments?", CSAAPT meeting, Loyola U, 2005.
20. "Present deliberations of the AAPT Executive Board", invited talk for the Chicago Section AAPT fall meeting, Lewis University, Romeoville, IL, 2009.

21. “What Happened to the Spin Crisis in High Energy Physics?” Fall 2009 meeting of the Prairie Section, APS, University of Iowa, Nov. 12-14, 2009.
22. Physics of Stringed Instruments (CSAAPT presentation): freshman project group, Mar. 2013, Oct. 2014
23. Physics of Banjos (CSAAPT presentation): Banjo research group; Mar. 2013
24. “Using sound and music to teach waves”, 170<sup>th</sup> Meeting of the Acoustical Society of America, Jacksonville, FL. Talk 2aED6, Nov. 2015

**Service and Counseling Experience:**

*International:*

- Member of the Circum-Pan-Pacific planning committee (1996-1998)  
 Scientific Advisory Committee: World Conference on Physics Education, Istanbul, Turkey (2012)

*AAPT: chronological*

- President, Chicago Section, AAPT (CSAAPT), 1984
- Member, Computers Committee, 1986-88
- Chair, International Committee 1995-1997
- Hosted CSAAPT meetings at Loyola University Chicago, 1998, 2005.
- Planned AAPT Alaska meeting (paper sort) in College Park, MD, 2005.
- Chair of the AAPT Chairs’ Committee on Meetings, 2006.
- Chair and Webmaster of the International Education committee of the American Association of Physics Teachers (AAPT) 2005-2006.
- Chair of the AAPT Committee to study national meeting structure (2006).
- Elected to three-year term on the Executive Board of AAPT as an At-Large member representing four year colleges and universities. Associated committee service: Audit, Review Board, Venture fund, Undergraduate Education, Graduate Education, Publications Committees; 2007-2010
- AAPT representative on the US Liaison Committee to the International Union of Pure and Applied Physics (USLC/IUPAP)-2008-2014; presented USLC reports to AAPT Executive Board
- Involved in planning, the paper sort and hosting the AAPT Chicago national meeting, held in Chicago, Feb, 2009
- Nominating committee for the Chicago Section of AAPT (2000-present)
- 4-year College Representative to CSAAPT (Chicago Section of AAPT)-2010-present
- AAPT-Executive Officer search committee, 2010
- Chair, Committee on Interests of Senior Physicists, AAPT-2011
- Member of the AAPT Len Jossem funding committee to raise \$100,000 for international physics teaching activities-2012-2014
- Report to the AAPT Executive Board on the World Conference in Physics Education, Istanbul – July 2012
- Member, Editorial Board of The Physics Teacher (TPT) (2012-15)
- Member, Editorial Board of Am. J. Phys. Resource Letters (2013-16)
- Nominating committee for the Chicago Section of AAPT (American Association of Physics Teachers)-2000-2016
- Chaired numerous sessions at national meetings of AAPT, 1993-present.
- Chicago Section Representative to National AAPT (2013-2016)
- Coordinated establishment of AAPT Speakers Bureau: [http://www.aapt.org/Resources/speakers\\_bureau-landing.cfm](http://www.aapt.org/Resources/speakers_bureau-landing.cfm)
- Serving on Len Jossem Fund committee: raising funds for international physics teaching activities

- Vice-President, AAPT (2016)

*Other National:*

- Reviewed papers for Physical Review D, Nuclear Physics, The Physics Teacher and American Journal of Physics
- Participated in a focus group on "Beginning Physics Textbooks", McGraw-Hill Publishers, Inc., 2001.
- Reviewed Modern Physics section for "College Physics" (text) by Giambattista, Richardson and Richardson, McGraw-Hill, 2003.

*Local Outreach and University:*

- Member, Illinois State Physics Project (ISPP) Planning committee, 2000-present
- AP Physics workshop for high school physics teachers 2002-present
- Hosted ISPP (Illinois State Physics Project) meeting at Loyola (outreach) 2005, 2007, 2009, 2011, 2013, 2015
- PROMISE mentor for Proviso Township School District middle school teachers (outreach) 2005-2006
- SEPUP training workshop for CPS teachers (outreach) 2005-present
- Participated in a focus group on "New Developments in Image Processing", Murray-Hill Research, Chicago, IL (2006).
- PHYS 411 for CPS high school teachers [Graduate Course] 2010 (24)
- Visited Bogan HS for talks on scientific careers, 2010
- Wrote recommendation letters for graduate schools, awards, medical schools and summer REU appointments. Cumulative – approx 35/year
- Played in the orchestra for the Loyola production of the musical "Assassins" (2004)
- Served on panel discussion of LU theater production Arcadia – November 2006
- LU open houses: 2006, 2007, 2010, 2011, 2012
- Served on Faculty Council, Loyola University Chicago 2005-2015, Chair 2011-2015
- Co-Chair – Shareholders Advocacy Committee (LU), Coordinated efforts of the Committee to establish an environmental awareness multidisciplinary service course, 2009-2013
- Sujack teaching award, search committee 2010
- Panel Talk on "The importance, meaning and purpose of seminars for the future physicists' professional development" with JJ Dykla, A Gangopadhyaya, R McNees at LU (Feb., 2010)
- Promotion committee for George Thiruvathukal (CS), 2010
- Marshall for Graduation Ceremonies (2010-2012)
- Annual briefings at LU ROTC Military picnics (2012-2014)
- SEPUP Workshop for Middle School teachers – Using music and sound to teach waves: and satisfy NGSS (Madero MS, Chicago-2015)
- Volunteered for open houses PAWS Critter Crossing (wildlife refuge) & helped with fundraising efforts (2006-present)
- Secretary/Treasurer, South Suburban Civil War Round Table (SSCWRT) (2006-present)

*Pre-2000:*

- Scholarship and Financial Aid Committee (9 years).
- Served on Ph.D. thesis committee for Jing-Chen Luo, Chemistry (Ph.D., 1993).
- Physics Club Faculty Advisor (18 years); advisor to Physics Newsletter.
- SPS Chapter Faculty Advisor (4 years).

- Served on Fulbright Interview Committee.
- Chaired task force on Grading Systems at Loyola University.
- Played in theater orchestras in Chicago area for 23 musical productions (woodwinds).
- Participated in a panel discussion on "The Future of Internet Applications in Higher Education", Smith Research, Inc.

**Service to Loyola Physics Department:**

- Department: Curriculum committee (Chair), Web site committee, Search committee for new faculty, Served on Numerous promotion committees for Physics Department
- Undergraduate research advisor and REU coordinator; Assessment coordinator, faculty hiring committee
- Wrote recommendation letters for graduate schools, awards, medical schools and summer REU appointments – average of 25 per year
- Directed undergraduate research in “The effects of the stage on Irish dance jumps”, with M. Gagliardi, T. Niak and E. O’Shea, (2001-2004)
- SPS Chapter Faculty Advisor (2003-2005), Physics Club Advisor (1985-2003).
- Served on departmental Market Equity Committee (2003)
- Directed undergraduate research project in particle physics, (Y. Binder) (2005-2008).
- Member, Physics faculty position hiring committee (2007, 2009, 2012)
- Directed undergraduate research project in physics education research, (M. Nemeth) (2007-2008).
- Attended Jesuit Physics Department retreats: 2007-2013
- Served on Ph.D. thesis committee & advisor for Nelda Hislop, School of Education (2008-2014)
- Chair, Physics lab position hiring committee (2012)
- Member, grievance hearing committee (2012)
- Search Committee for hiring physics lab faculty (2013)
- Tenure and Promotion Committee Chair for Robert McNees (2014)
- Search Committee for hiring physics faculty (2015)

Directed over 50 undergraduate research students, 18 freshman projects and numerous honors projects in numerical computations, laser construction and studies, optical computing, digital electronics design, medical physics, general physics, physics education research, accelerator physics, physics of dance and musical acoustics (woodwinds, brass, percussion, voice and stringed instruments, and room acoustics).

References available upon request.