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ROBERT EHRLICH (Professor Emeritus)

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EDUCATION

1959 B.S. Physics, Brooklyn College
Phi Beta Kappa, Magna Cum Laude
1964 Ph.D. Physics, Columbia University

ACADEMIC POSITIONS

1963-66	University of Pennsylvania, Postdoctoral Research Associate, Department of Physics,
1966-70	Rutgers University, Assistant Professor of Physics
1970-77	State University of New York at New Paltz, Associate Professor ('70-'73)
	Professor of Physics and Chairman ('73-'77)
1977-	George Mason University, Professor of Physics (’77 --) and Chairman ('77-'89 & ’06 – ‘09)
2013	Retired (Professor Emeritus)

HONORS:

Elected a Fellow in the American Physical Society, 1991
Distinguished Faculty Award, George Mason University, 1992
Awarded Epstein Prize of the American Association of Physics Teachers, 1993
AAPT Annual Award for Undergraduate Teaching, 2001
CAS Award for Scholarship, 2002

GRANTS AWARDED:

Amount	**from**	**year**	**purpose**
$40,500	NSF	82-83	to study continuing education needs in engineering and physics
$30,000	Sloan Fdn	1987	to conduct Nuclear War Education Conference
$30,000	Sloan Fdn	1989	to conduct Nuclear War Education Conference
$890,000	NSF	90-94	to develop software for upper level physics (CUPS), per year amounts: ($242K in 90-91, $223K in 91-92, $277K in 92-93, $148K in 93-94)
$135,000	IBM Corp	1991	equipment donation to CUPS Project
$30,000	Apple Corp	1992	equipment donation to CUPS Project
$23,000	GMU	1994,5,6	"Old Dogs" Project for faculty to learn new teaching "tricks"

SUMMARY OF ACCOMPLISHMENTS

Scholarly work

My first research work as a graduate student was to participate in the Nobel-prize winning "two neutrino experiment" under my advisor Jack Steinberger. My particle physics research since then mostly involved the analysis of elementary particle physics experiments. Some examples of specific accomplishments includes: (a) development of a new method of identifying elementary particle reactions, (b) search for evidence of free quark production in particle reactions, (c) searched for double beta decay reaction, (d) search for evidence of quantization of time in particle physics, and (e) analyzed solar neutrino experiment in light of neutrino oscillation hypothesis. My most recent particle physics work in the late 1990's and early 2000's involved looking at possible evidence for neutrinos being tachyons. Resumed this work in 2011 to currently.

During the 1980's I explored national policies on nuclear weapons, the effects of nuclear weapons ("nuclear winter"), and the role of nuclear war education at the university level and initiated and organized three national conferences on nuclear war and peace education. Some fairly recent research interests include a study of how humans extrapolate motion, and a new theory involving the cause of quasiperiodic glaciations involving solar diffusion waves. I also continue to be interested in writing science for a broad audience, and studying physics education methods, and have written or edited 20 books on various subjects. During the past few years I conducted research and writing on renewable energy, culminating in a textbook on renewable energy (2013).

Administrative

At SUNY-New Paltz, I Chaired ten-person department during a difficult period of retrenchment at the University. Revised curriculum so as to improve enrollments while maintaining program quality and thereby preventing loss of positions. Initiated two-year engineering program which later evolved into a four-year degree program. After moving to George Mason University in 1977, I Chaired the department until 1989. During that time I oversaw the growth of department from eleven to twenty-two full-time faculty prior to the splitting off of electrical engineering in 1984. Made personnel decisions and recommendations regarding hiring, tenure, reappointment, annual evaluation, and salary increments. Advanced affirmative action goals by hiring capable female and minority candidates, and by supporting programs for young women considering careers in science. Supervised clerical and technical personnel, and managed the department budget. Initiated and developed new programs: three engineering programs, including one at the masters level, and a masters program in applied physics. Resumed the role of department chair Fall 2006 to Jan 2009, and retired in June 2013..

Teaching

Taught physics courses at all levels from introductory to graduate. Developed and taught innovative physics course, including: "How Things Work", "Computer Applications in Physics", and "The Life and Work of Einstein". Developed and taught interdisciplinary course, including: "The Nature of Time", "Survival in the Year 2000", "Nuclear War", and "The Decision-making Process and The Choice of Technologies," and Introduction to Renewable Energy."

Instructional Material Created

Relativity, a series of eight short computer-animated films explaining special relativity, distributed by

Houghton-Mifflin Company (1975)

.Computer Applications in Physics, a series of twelve self-paced instructional modules and computer programs for use in college-level physics course, published by Michigan State University Press (Project PHYSNET)

.The Ehrlich Vibration Table, a patented device for doing many mechanics experiments, (patent 4,358,276)

.Nine Texts and Associated Computer Software, a series of simulations and nine texts for nine specific junior-senior physics major courses -- the CUPS Project which I directed together with M. Dworzecka and W. MacDonald. (See publication list for details)

.Six Other Books and numerous Articles (see publication list) for use in teaching courses in computer applications in physics, physics demonstrations, physics for liberal arts students, physics for a general audience, and physics and society (relating to nuclear and other issues)

An interactive video: "Relativity: the Adventures of Albert and Marie – chosen as a finalist in the 2005 Pirelli Relativity Challenge.

A text on renewable energy – see below.

PUBLICATION LIST

BOOKS Authored:

1. Ehrlich, R., Physics and Computers, Houghton Mifflin Company, 1973

2. Ehrlich, R., Waging Nuclear Peace, State University of New York Press, 1985

3. Ehrlich, R., Turning the World Inside Out and 174 Other Simple Physics Demonstrations, Princeton University Press, 1990. (Also translated into Portugeuse [1992] and Japanese [1995].)

4. Ehrlich, R., The Cosmological Milkshake, Rutgers University Press, 1994
   also: Ehrlich, R. and Majewski, I., Problems for The Cosmological Milkshake, Rutgers University Press, 1994

5. Ehrlich, R., Roelofs, L., Stoner, R., and Tuszynski, J. Electricity and Magnetism Simulations, John Wiley and Sons, 1995, (being translated into Japanese)

6. Ehrlich, R., What If You Could Unscramble an Egg?, Rutgers University Press, 1996

7. Ehrlich, R., Why Toast Lands Jelly Side Down: Zen and the Art of Physics Demonstrations, Princeton University Press, 1997

8. Ehrlich, R., What If? Mind-Boggling Science Questions for Kids, John Wiley & Sons, 1998. Translated into Japanese and Sovenian.

9. Ehrlich, R., Nine Crazy Ideas in Science: A Few Might Even Be True, Princeton University Press, 2002.

10. Ehrlich, R., Eight Preposterous Propositions: From the Genetics of Homosexuality to the Benefits of Global Warming, Princeton University Press, Fall 2003.

11. Ehrlich, R. & A. Wyczalkowski, Lab Manual for "Physics Matters," John Wiley & Sons, 2004.

12. Ehrlich, R., Renewable Energy: A First Course, Taylor & Francis, 2013, 2018 (2nd ed. With Harold Geller).

BOOKS Edited:

1. Ehrlich, R., Perspectives on Nuclear War and Peace Education, Greenwood Press, 1987
2. Dworzecka, M., Ehrlich, R. and MacDonald, W., Electricity and Magnetism Simulations, John Wiley and Sons, 1995
3. Ehrlich, R., MacDonald, W., and Dworzecka, M. Astrophysics Simulations, John Wiley and Sons, 1995
4. MacDonald, W., Dworzecka, M. and Ehrlich, R., Quantum Mechanics Simulations, John Wiley and Sons, 1995
5. Dworzecka, M., Ehrlich, R. and MacDonald, W., Classical Mechanics Simulations, John Wiley and Sons, 1995
6. Ehrlich, R., Dworzecka, M., and MacDonald, W., Nuclear and Particle Physics Simulations, John Wiley and Sons, 1995
7. Ehrlich, R., Dworzecka, M., and MacDonald, W., Waves and Optics Simulations, John Wiley and Sons, 1995
8. Ehrlich, R., Dworzecka, M., and MacDonald, W., Thermal Physics Simulations, John Wiley and Sons, 1995
9. Ehrlich, R., Dworzecka, M., and MacDonald, W., Modern Physics Simulations, John Wiley and Sons, 1995
10. Ehrlich, R., Dworzecka, M., and MacDonald, W., Solid State Physics Simulations, John Wiley and Sons, 1995

REFEREED ARTICLES, CONFERENCE PROCEEDINGS, AND BOOK CHAPTERS:

1.Ehrlich, R. and Kim, J.K., Experimental Study of Parity Conservation in Lambda Production in Carbon Nuclei Using Incident Pions of 2.0 BeV/c Momentum, Physical Review, 133, B132, (1964)

2.Hagopian, V., Selove, W., Ehrlich,R.,, Leboy, E., Lanza, R., Rahm, D., and Webster, M., Further Search for Fractionally Charged Particles, Physical Review Letters, 13, 280-81, (1964)

3.Ehrlich, R., Selove, W. and Yuta, H., Strange Particle Production in 7.91 BeV/c Pion Proton Interactions, Physical Review,, 152, 1194-98 (1966)

4.Poirier, J.A., Biswas, N.N., Cason, N.M., Derado, I., Kenny, V.P., Yuta, H., Selove, W., Ehrlich, R., and Baker, A.L., Reaction π+p -> π+π+n at 8 GeV/c, Physical Review 163, 1462-70 (1967)

5.Chang, C.Y., Yodh, G.B., Ehrlich, R., Plano, R., and Zinchenko, A., Search for Double Beta Decay of K-

Meon Physical Review Letters 20, 510-13 (1968)

6.Ehrlich, R., Plano, R.J., and Whittaker, J.B., Observation of a ppp (3755) Enhancement in the Reaction π+p -> π+ ppp at 8.4 BeV/c, Physical Review Letters 20, 686-88 (1968)

7.Ehrlich, R., Nieporent, R., Plano, R.J., Whittaker, J.B., Baltay, C., Feinman, J., Franzini, P., p π π Enhancements in the Reaction pp -> pp π π at 24.8 GeV/c, Physical Review Letters 21, 1839-42 (1968)

8.Mischke, R.E., Devlin, T.J., Ehrlich, R., Johnson, W., Norem, J., Vosburgh, K.,and Schimmerling, W., Direct Measurement n-p and n-d Total Cross Sections from 700 MeV/v to 1900 MeV/c proceedings of the XVth International Conference on High Energy Physics at Kiev, 1970

9.Ehrlich, R., Physical Simulations for an On-line Computer-Controlled Oscilloscope,Computers in Undergraduate Science Education Conference Proceedings, 211-22 (1970)

10.Ehrlich, R., A Physics Course Based on a Set of Problems Solved by Computer, Proceedings of the Second Conference on Computers in Undergraduate Curricula (1971)

11.Ehrlich, R., Film Notes for Relativity: A Series of Computer-Animated Films, Houghton Mifflin Co., (1974)

12.Ehrlich, R., Possible Evidence for the Quantization of Particle Lifetimes, Physical Review D., 13, 50-55 (1976)

13.Ehrlich, R., Hypothesis of Quantized Particle Lifetimes Reexamined and Its Connection with the Hypothesis of Quantized Time, Physical Review D, 15 929 (1977)

14.Ehrlich, R., Factors Influencing Secondary School Enrollments, The Physics Teacher, 490-94, November (1977)

15.Ehrlich, R., Are There an Elementary Length L_0 = 0.66 fm and Elementary Time T_0 = 0.66 fm/c Associated with the Strong Interaction?, Physical Review D. 18, 320-25 (1978)

16.Ehrlich, R., Possible Evidence for Neutrino Oscillations in the Brookhaven Solar Neutrino Experiment, Physical Review D, 18, 2323-28 (1978)

17.Ehrlich, R., and Helms, R., A Most Unnatural Rhythm, The Physics Teacher, January (1981)

18.Ehrlich, R., and Black. W.M., Continuing Education: Needs of Physicists and Needs in Physics, Virginia Journal of Science 32, Fall 1981

19.Ehrlich, R., Possible Time Variations in ^{37}CI Solar-Neutrino Data and Neutrino Oscillations, Physical Review D, 25, 2282-86 (1982)

20.Ehrlich, R., We Must Teach About Nuclear War -- and How to Avoid It, The Chronicle of Higher Education, May 5, 1982

21.Ehrlich, R., Nuclear War: An Interdisciplinary Course at George Mason University, Journal of College Science Teaching, 336-37, March/April 1983

22.Ehrlich, R., The Link Between Radioactive Fallout and SAT Scores is Nonexistent, Phi Delta Kappan, 729-730, June 1983

23.Ehrlich, R., The Role the Press and Public Play in Nuclear Policy, Journal of Defense and Diplomacy, 2, 38-44, May 1984

24.Ehrlich, R., Air Table Experiments Without an Air Table, The Physics Teacher, 23, 113-16, February 1985

25.Ehrlich, R., Industry Support for Local Physics Education, Journal of College Science Teaching, 230, February 1985

26.Ehrlich, R., Stability of a Pile of Meter Sticks, The Physics Teacher, 23, 489, November 1985

27.Ehrlich, R., Star Wars Spillover?, Journal of Civil Defense, 12-13 February 1986

28.Ehrlich, R., and Schneider, B., Star Wars: SPACE THREATS or LIFE INSURANCE?, Journal of Defense and Diplomacy, 15-20, March 1986

29.Ehrlich, R., Accuracy in Academia: the Chief Thing to Fear Is Our Own Hysterical Reaction, The Chronicle of Higher Education, 32, 96, May 21, 1986

30.Ehrlich, R., We Should Not Overstate the Effects of Nuclear War, International Journal on World Peace, Vol III, No. 3, 31-44, July-September 1986

31.Ehrlich, R., What Price Academic Freedom?, Arizona English Bulletin, 29, 1, 26-31, Fall 1986

32.Ehrlich, R., "The Scientific Community's Role to Educate on National Security: The Future of Arms Control," ed: W. Thomas Wander etal, American Association for the Advancement of Science, Washington, DC, 1986, 183-85

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35.Ehrlich, R., "Is the USSR's Opposition to SDI Real or a Soviet Disinformation Initiative?," Journal of Defense and Diplomacy, September 1987

36.Ehrlich, R., "Nuclear Winter," in Would the Insects Inherit the Earth?, Jack C. Greene and Daniel J. Strom (eds.), Health Physics Society, Pergamon Professional Publishers, McLean VA, 1988, 21-22

37.Ehrlich, R., "Pitfalls of Final Solutions to the Nuclear Problem," International Journal on World Peace, Spring 1989, 41-53

38.Ehrlich, R., "Threats to Academia and Society," in Points of View on American Higher Education, Volume II, Stephen H. Barnes, ed., Edwin Mellen Press, Lewiston, NY, 1990, 119-32

39.Ehrlich, R., "Opposition to Civil Defense," Journal of civil Defense, February 1990, 12-15

40.Ehrlich, R.,"Three Mechanical Demonstrations of Chaos," The Physics Teacher, January 1990, 26-9

41.Ehrlich, R., and Orient, J., "The Case for Civil Defense in Nuclear War Education," Physics and Society, April 1990, 3-4

42.Ehrlich, R., "A Collection of Simple Physics Demonstrations," The Physics Teacher, October 1990, 492-93

43.Ehrlich, R., "A Project to Develop Computer Software and Supplementary Texts for Nine Upper Level Physics Courses," Conference Proceedings for the Conference on Computing in the Upper Level Physics Curriculum, Appleton WI, July 1990

44.Ehrlich, R. and Scimecca, J., Offensive Speech on Campus, Educational Record, 72, 26-29, Summer 1991

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47.Ehrlich, R., "Cosmic Background Radiation," American Journal of Physics, 60, (6), June 1992, 565-68

48.Ehrlich, R., and Censer, J., "Creativity Contracts: An Idea Whose Time Shouldn't Come," Change, September/October 1992, pp.8,48.

49.Ehrlich, R., Dworzecka, M. Tuszynski, J. and MacDonald, W., "Text Materials to Accompany Simulations for the CUPS Project, Computers in Physics, September/October 1993, 508-18.

50.Ehrlich, R. and Hutchison, M., "Random and Systematic Errors in Timing the Fall of a Coin," The Physics Teacher, 32, January 1994, 1-3.

51.Ehrlich, R., "Ruler Physics: 34 Physics Demonstrations with a Plastic Ruler," American Journal of Physics, 62, (2) February 1994, 111-20.

52.MacDonald, W., Dworzecka, M., Ehrlich, R., and Tuszynski, J., "Authoring on the Internet: The CUPS Series," Computers in Physics, July/August 1994, 386-89.

53.Ehrlich, R., Ehrlich, E., Dworzecka, M., and Moussa, A. "Physics Education and Gender Roles in Two Arab Countries," The Journal of College Science Teaching, September/October 1994, 51-54.

54. Ehrlich, R. and Tuszynski, J., "Motion of a Ball on a Rotating Turntable," the American Journal of Physics, April, 1995, 351-58.

55. MacDonald, W. M., Dworzecka, M. and Ehrlich, R., "The Cups Series : A Resource and a Challenge for Teaching Advanced Physics," Conference Proceedings of the Symposium on Science and Engineering in the 21st Century, held at the American University in Cairo, April 9-12, 1995.

56. Ehrlich, R., "Giving a Quiz Every Lecture," The Physics Teacher, September 1995, 33, 1-2.

57. Ehrlich, R., "Using a Retractable Ball Point Pen to Test the Law of Conservation of Energy," The American Journal of Physics, 64, (176), February 1996.

58. Ehrlich, R., "Guest Comment: Teaching Science Using Hypothetical Reasoning," The American Journal of Physics, 64 (3), March 1996.

59. Ehrlich, R., "Experiments With Newton's Cradle," The Physics Teacher, 34 (181-183), March 1996.

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61. Ehrlich, R., Friedlander, M., Kiley., T., Mose, D., Pasnak, R. Smith, R., and Tayolor, A., "Old Dogs Can Learn New Tricks," The Journal of College Science Teaching, May 1997, 405-407.

62. Ehrlich, R., "Why Would Anyone Major in Physics?," Physics Today, May 1997, 59-60.

63. Ehrlich, R., and Dworzecka, M., "On the Road to Damascus: Technology, Fear, and Fear of Technology," Journal of College Science Teaching, December 1997/January 1998, 179-182 .

64. Ehrlich, R., "Where Are the Physics Majors?" American Journal of Physics, 66 79-86, January 1998.

65. Ehrlich, R., "Long-Term Trends in Physics Bachelor Degree Output," The Physics Teacher, 36, 12-17 (September 1998).

66. Ehrlich, R., "Engineering Deans' Opinion of Physics Courses," The Newsletter of the Forum on Education of the American Physical Society, Summer 1998. (s-bowen1@csu.edu)

67. Ehrlich, R., "What Can We Learn from Physics Departments that Have Experienced Large Recent Changes in Undergraduate Degree Output?", the Physics Teacher, vol 37, March, 1999, 142-46.

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75. Ehrlich, R., "Are People Getting Smarter or Dumber?," Skeptic, 10 (2), 50-61 (2003)

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