VITA

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CURRENT SPECIALIZATION AREAS: Condensed Matter Theory - Properties of Nano-structures; Nanoscience Education

EDUCATION:

Degree	University	Major	Year
Ph.D.	University of Kentucky	Solid State Physics	1971
M.A.	Ball State University	Computer Science	1987
M.S.	University of Kentucky	Physics	1968
B.S.	Eastern Kentucky Univ.	Physics/Mathematics	1965

EXPERIENCE:

2005-present	*George & Frances Ball Distinguished Professor of Physics*
1977-2005	Professor
1974-77	Associate Professor
1970-74	Assistant Professor Department of Physics & Astronomy Ball State University
1980-81	Director, Solar Energy Research & Education Facility Ball State University
Autumn, 1976	Administrative Assistant, Dept of Physics & Astronomy
Summers 1974, 1975	NASA/ASEE Summer Faculty Research Fellow Marshall Space Flight Center, Huntsville, AL
Summer 1973	AEC Summer Faculty Research Participant Ames National Laboratory, Ames, IA.
Summer 1965	Instructor, Eastern Kentucky University

PUBLICATIONS

Journal and Proceedings Articles

- R. Cosby, “Strengthening nanoscience education through multidisciplinary collaborations”, in *Education in Nanoscience and Engineering*, edited by R. Carpenter, S. Seal, N. Healy, N. Shinn, W. Braue (Mater. Res. Soc. Symp. Proc. 931E, Warrendale, PA, 2006), 0931-KK04-03.

- E. R. Hedin, R. M. Cosby, A. M. Satanin, and Y. S. Joe, “Electron wave interferometry through an asymmetric Aharonov-Bohm ring”, J. Appl. Phys. 97 , 063712 (2005).

- Y. S. Joe, J. S. Kim, E. R. Hedin, R. M. Cosby, and A. M. Satanin, “Fano resonances through quantum dots in tunable Aharonov-Bohm rings”, Journal

of Computational Electronics 4: 129-133, (2005).

- E. R. Hedin, R. M. Cosby, A. M. Satanin, and Y. S. Joe, “Electron wave interferometry through an asymmetric Aharonov-Bohm ring”, *J. Appl. Phys.,* J. Appl. Phys. 97 , 063712 (2005).

- Ronald M. Cosby, James A. Hoffmann, and Yong S. Joe, “Electron transport in parallel interacting artificial molecules”, *Proc. 3rd IEEE Conf. on Nanotechnology*, Vol II, pp 766-769, August 12-14, 2003.

- Yong S. Joe, Aphrodite Ahmadi, and Ronald M. Cosby, “Tuning of the transmission resonance in Aharonov-Bohm quantum ring”, *Proc. 3rd IEEE Conf. on Nanotechnology*, Vol II, pp 686-689, August 12-14, 2003.

- Y. S. Joe, D. S. Ikeler, R. M. Cosby, A. M. Satanin, and C. S. Kim, "Characteristics of transmission resonance in a quantum-dot superlattice", *J. Appl. Phys.* **88** (5), 2704 (2000).

- C. S. Kim, A. M. Satanin, Y. S. Joe and R. M. Cosby, "Resonant tunneling in a quantum waveguide: Effect of a finite-size attractive impurity", *Phys. Rev. B* **60** (15), 10962 (1999).

- C. S. Kim, A. M. Satanin, Y. S. Joe and R. M. Cosby, "Collapse of resonance in quasi-one-dimensional quantum channels”*, J. Exp. & Theor. Phys.*, **89** (1), 144 (1999).

- M. Khatun, P.K. Joyner, R.M. Cosby, and Y.S. Joe, “Quantum interference in a stub constriction structure containing an infinite strength potential barrier”, *J. Appl. Phys.*, **84** (6), 15 September (1998), 3409.

- Y.S. Joe and R.M. Cosby, “Resonances in conductance through tunable attractors”, *VLSI Design* **8** (1-4), 295 (1998); also published in *Proc. Fifth Int. Workshop on Comp. Electronics,* U. Notre Dame, South Bend, IN, May 28-30, 1997.

- Ronald M. Cosby, Dustin R. Humm, and Yong S. Joe, “Nanoelectronics using conductance quantization”, *J. Appl. Phys.* **83**(7), 1 April (1998), 3914.

- Y.S. Joe and R.M. Cosby, ”Quantum Nanoelectronics Using an Adiabatic Transport Model and a Green’s Function Method”, *Proceedings of the Korea-U.S. Science and Technology Symposium of Computing and Telecommunications*, Chicago, April 1998.

- Y.S. Joe and R.M. Cosby, “Resonant tunneling in a quantum nanosystem with an attractor”, *J. Appl. Phys.* **81**, 6217 (1997).

- Y.S. Joe and R.M. Cosby, “Effects of tunneling through coupled series attractors in a mesoscopic system”, *Solid State Communications* **101,** No. 10, pp. 731-734, (1997).

- N. Kgwadi, R. Cosby, and J. Watson, “Measurement of the refractive index of a transparent liquid”, *School Science Review*, **78,** 284 (1997).

- Y.S. Joe, M. Khatun and R.M. Cosby, "Quantum transport anomalies in semiconductor nanostructures", *J. Appl. Phys.* **78**, 7120 (1995).

- Y.S. Joe, M. Khatun, and R.M. Cosby, "Quantum Interference in Multichannel Systems", *J. Appl. Phys.* **78**, 2863 (1995).

- Y.S. Joe, M. Khatun, and R.M. Cosby, Ball State University, "Conductance Oscillations through double slits in a quantum wire", *Solid State Communications*, **93**, No. 11, 943-947 (1995).

- J.R. Bower, R.M. Cosby and C.D. Woodfin, "A CLIPS-based expert system for passive solar design assistance", *Proc. SOLAR'95 National Solar Energy Conf.*, July 1995.

- Y.S. Joe, R.M. Cosby, Ball State University, M.W.C. Dharma-wardana, National Research Council, Canada, and S.E. Ulloa, Ohio University, "Conductance oscillations due to a controllable impurity in a quantum box", *J. Appl. Phys.* 76, 4676 (1994).

- R. Cosby, “Natural convection in a stratified fluid”, *The Physics Teacher,* No. 7, 434 (1992).

- R. Cosby and T. Jordan, “Computer graphics, spreadsheets, and expert systems workshop for physics teachers”, *Technology and Teacher Education Annual 1992,* Association for the Advancement of Computing in Education, 452 (1992).

- A. Diallo, R. Cosby and D. Govaer, "Solar Fish Drying in the Republic of Guineau", *SunWorld*, **14**, No.3, 75 (1990).

- R. Cosby, "Modeling and Simulation of a Concentrating Photovoltaic System", *Proc.* of *Fifth Int. Workshop on Physics* of *Semiconductor Devices*, edited by W.S. Khokle and S.C. Jain, Macmillan India Limited, 269 (1989). (Invited paper)

- R. Cosby and D. Petry, "Simple Buoyancy Demonstrations Using Saltwater", *The Physics Teacher*, **27,** 550 (1989).

- Brooks and R. Cosby, "Model of a Nonuniformly Illuminated Concentrator Solar Cell", *Proc. of the 1989 Annual Conf. Amer. Solar Energy Society, 249 (*1989).

- R. Cosby, "College Teachers Should Go Back To College", *Proc. Seventh Annual Miami University Lilly Conf. on College Teaching,* 104 (1987).

- R. Cosby, "Solar Concentration by Curved-Base Fresnel Lenses", *Proc. of the ERDA Concentrating Collector Conference, Vol* 2, 61 (1977).

- R. Cosby, "The Linear Fresnel Lens: Solar Optical Analysis of Tracking Error Effects", *International Solar Energy Society-American Section Conference Proceedings*, Vol 1, p35-14 (1977).

- L. Hastings, S. Allums, and R. Cosby, "An Analytical and Experimental Evaluation of the Plano-Cylindrical Fresnel Lens Solar Concentrator", *Proceedings of the "Sharing the Sun!! Joint Conference of the American. Canadian. and International Solar Energy Society,* Vol 2, 275 (1976).

- R. Cosby, J. Logsdon, and B. Gossick, An Experimental Determination of the Ambipolar Diffusion Coefficient in Germanium", *Solid State Electronics,* Vol. 16, 1441 (1973).

Other Publications

- C Chatot, R Cosby, and P Lang, “Teaching Laboratory Courses”, Chapter 8 in *Traditions and Innovations* (online book for graduate teaching assistants), The Graduate School, Ball State University; August 2004. Published online: http://www.bsu.edu/gradschool/media/pdf/chapter8.pdf. Authors listed in alphabetical order.

- R. Cosby and C. Morrow, “Designing Research Experiences for Teachers”, http://www.bsu.edu/physics/media/pdf/cosbypaper.pdf, 2004.

- J. Levine, R. Cosby and P. Morris, Instructor's Solutions Manual for Fundamentals of College Physics by Peter J. Nolan, Wm. C. Brown Publishers, 1993.

- J. Levine, R. Cosby and P. Morris, Student Solutions Manual for Fundamentals of College Physics by Peter J. Nolan, Wm. C. Brown Publishers, 1993.

- R. Cosby, "Analysis of a Dispersive Concentrator for Photovoltaic Systems", Center for Energy Research, Education, and Services, Ball State University, 1985. CERES Faculty Fellows Research flyer.

- R. Cosby, "Photovoltaic and Passive Solar Lab Activities for Applied Solar Energy Courses", Center for Energy Research, Education, and Service, Ball State University, 1983. CERES Faculty Fellows Research flyer.

- R. Cosby, “The Rabbit Syndrome”, *Breakthrough-Plus 40 Newsletter*, No. 23, June-July, p. 5, 1980.

- R. Cosby, "Solar Concentration by Curved-Base Fresnel Lenses", *NASA Contractor Report CR-2890,* August, 1977. International distribution by the National Technical Information Service.

- R. Cosby, "The Linear Fresnel Lens Solar Concentrator: Transverse Tracking Error Effects", *NASA Contractor Report CR-2889,* August, 1977. International distribution by National Technical Information Service.

- L. Hastings, S. Allums, and R. Cosby, "An Analytical and Experimental Evaluation of a Fresnel Lens Solar Concentrator", *NASA Technical Memorandum TMX-73333*, August, 1976.

- R. Cosby, "Concentration Characteristics of the Cylindrical Fresnel Lens Solar Concentrator", *1975 NASA-ASEE Summer Faculty Fellow Research Reports,* BER Report No. 202-94, George C. Marshall Space Flight Center/University of Alabama/Auburn University, p. III-I, September, 1975.

- R. Cosby, "Concentration Characteristics of a Fresnel Solar Strip Reflection Concentrator", *1974 NASA-ASEE Summer Faculty Fellowship*

Aeronautics and Space Research Program Research Reports, NASA CR-1020336, (Marshall Space Flight Center/Auburn University), September, 1974, p. 501.

Research Reports

- M. Witty and R. Cosby, "Thermal Energy Reclamation From Process Wastewater -A Delco Remy Energy Conservation Measure", Final Report, March, 1985.
- R. Cosby, "Delco-Remy Plant 17 Solar Applications Study, Phase I -- Preliminary Design Analysis", Final Report, December, 1984.
- R. Cosby, "Performance Limits of the Boner Active Solar Installation", Research Report prepared for the Center for Energy Research, Education, and Services, June 6, 1984.
- R. Cosby, "Solar Concentration Properties of Flat Fresnel Lenses With Large F- Numbers", Final Report, BSU-Marshall Space Flight Center Cooperative Agreement, NCA8-00129, Modification No.5, March, 1978.
- R. Cosby, "The Cylindrical Fresnel Lens as a Solar Concentrator", Final Report, BSU-Marshall Space Flight Center Cooperative Agreement, NCA8-00103, Modification No.1, June 1975.
- R. Cosby, "The Performance, Manufacture, and Protection of Large Cylindrical Fresnel Lenses for Solar Collection", Final Report, BSU-Marshall Space Flight Center Cooperative Agreement, NCA8-00103, Modification No.2, June, 1975.
- R. Cosby, “An RF Method for Determining the Ambipolar Diffusion Coefficient of Semiconductors”, in ORO-3651-9 Special Progress Report to U.S. Atomic Energy Commission, Contract Number AT-(40-1)-3651, University of Kentucky Research Foundation. (Dissertation)

GRANTS/AWARDS RECEIVED

- Atomistix, Inc., R. Cosby, Six-month cluster trial license for Enterprise Edition of Virtual NanoLab and ToolKit Software, July, 2008, value $15,000+.
- Ball State University, M. Khatun, R. Cosby, A. Cancio, “Carbon Nanostructures and Devices Research”, Enhanced Provost Initiative, December, 2007, $9000.
- Ball State University, “Exploring Industrial Applications of Nanotechnology“, Special Leave Application, Salary for Fall Semester 2007, October 2006.
- Ball State University, R. Cosby and R. Wijesinghe, “Pre/Post Assessment Tools for Calculus-Based General Physics Courses”, 2007 Summer Assessment Grant, April, 2007, $2000.

- Ball State University, “Beowulf Computer Cluster”, R. Cosby and Y. Joe, Center for Computational Nanoscience, Office of Information Technology $80,000 and University Computing Services, $11,000, July 2003.

- **State of Indiana, “Center of Excellence in Computational Nanoscience”, Indiana 21st Century Research and Technology Fund, R. Cosby, Co-Principal Investigator (with Yong Joe, PI, and Mahfuza Khatun, Co-PI, and eight other Co-PIs from four universities), 2002-2003, Agency: $1,510,321, Total $2,602,258. February 2003.**

- National Science Foundation, Research Experiences for Undergraduates Program, May 1, 2000 – April 30, 2003, R. Cosby, Project Director, $114,372 NSF; total $207,985.

- National Science Foundation, Research Experiences for Teachers, Supplemental Funding to REU, R. Cosby, Project Director, May 1, 2001 – April 30, 2003, $75,776 NSF; total **$85,925**.

- Ball State University, R. Cosby, 2002-2003 CERES Research Fellows Program, “Electronic transport in interacting quantum wires”, ½ load, graduate assistant, travel funds for academic year.

- Ball State University, R. Cosby and Y. Joe, 2002 Summer Assessment Grant, “Assessing the Needs, Interests, and Impacts of a Multi-disciplinary Educational Program in Nanoscience”, Office of Academic Assessment and Institutional Research, $2200.

- National Science Foundation and U.S. Department of Education, BSU Team Ruth Howes and James Watson, Co-PIs, David Ober, and Ronald Cosby (minimal role), Physics Teacher Education Coalition (PhysTEC), 2001. Total grant on the order of $400,000.

- Indiana Department of Education, R. Cosby, AP Institute Director and AP Instructor, Advanced Placement Physics Workshops for Teachers, participant support, Summer 2001, **$6,600**.

- Ball State University: R. Cosby, Faculty Mentor, *2000-01 Honors Undergraduate Fellowship* with Taran Villoch Harman, “Electronic propagation in a semiconductor nanostructure”, Fall 2000 and Spring 2001, approx. $1900 ($800 per semester for 10 hours per week work by Taran plus $300 for supplies, travel, and publication expenses).

- Indiana Department of Education, R. Cosby, AP Institute Director and AP Instructor, Advanced Placement Physics Workshops for Teachers, participant support, Summer 2000, **$3850**.

- Ball State University, R. Cosby, Research Fellow, Center for Energy Research/Education/Service, 1999-2000, Salary (0.5 load), graduate assistant, travel support.

- National Center for Supercomputing Applications, U. Illinois, Champaign, IL, R. Cosby (Project Director), Y. Joe and M. Khatun, “Electron Transport in Nanoconstrictions”, May 1996 – October 1998, Supercomputer time – 900 service units on Convex Exemplar, **maximum value $183,600**.

- Ball State University, R. Cosby, “Energetics of mesoscopic systems”, Research Fellow, Center for Energy Research/Education/Service, 1996-97,

0.5 load, graduate assistant, travel support.

- Ball State University, R. Cosby (Project Director), Y. Joe, and M. Khatun, “Nanoscale electron devices - a theoretical study”, 1996 Summer Research Grant, salary support (8% academic year).

- Ball State University, R. Cosby, “A study of micro-electronic and nano-electronic semiconductor devices”, Special Leave Fall ’96, salary, full.

- Ball State University, R. Cosby, Faculty Mentor, four Honors College Undergraduate Research Fellowships and two University College Distinction Fellowships for undergraduate student research, 1997-2000.

- National Center for Supercomputer Applications, University of Illinois at Champaign-Urbana, IL, R. Cosby (Project Director), Y. Joe and M. Khatun, "Electron Transport in Nanoconstrictions", Sept 1, 1994 - Sept 1, 1995; computer time. (**$90,000**)

- Ball State University, R. Cosby, Intergraph TD-3 Workstation, *Intergraph Center for Mapping Excellence*, February 1995.

- Ball State University, R. Cosby, Project Director, "Conductance of a Semiconductor Nanochannel with Potential Barriers", 1994 Summer Graduate Research Assistantship.

- Ball State University, R. Cosby, Co-Principal Investigator, "Effects of Impurities on the Conductance of a Semiconductor Nanochannel", 1994 Summer Research Grant, salary, (0.40 summer load).

- Ball State University, R. Cosby, "Electron Transport in Quantum Electronic Devices", 1993-94 CERES Research Fellow, Center for Energy Research, Education and Services, (0.33 load during summer 1993, 0.5 load during 1993-94 academic year, graduate assistant, administrative support).

- Ball State University, R. Cosby, Co-Principal Investigator, "Electron Transport in Ultra-Small Semiconductor Devices", Provost Initiative, Summer 1993. ($2000)

- National Center for Supercomputer Applications, University of Illinois at Champaign-Urbana, IL, "Electron Transport in Nanoconstrictions" R. Cosby and M. Khatun, May, 1993 - May, 1994, computer time. **($10,000)**

- American Physical Society, R. Cosby, Travel Grant for Minority Colloquium Speaker, 1992 (**$500**).

- Ball State University, R. Cosby, Special Leave, Fall Semester 1990.

- National Science Foundation through Brown University (J.J. Loferski, PI) and the hosts of The Fifth International Workshop on the Physics of Semiconductor Devices, New Delhi, India, December 11-15, 1989. R. Cosby, Travel support for invited presentation. Approx. **$4000**.

- Link Foundation and Ball State U., R. Cosby with Clarence Brooks, "Modeling and Simulation of a Concentrating Photovoltaic System", 1987. $7000 (Link); BSU, approx. **$18,000**.

- Delco Remy, Inc., Anderson, IN, R. Cosby, "Delco Remy Plant 17 Solar Applications Study", 1984-85. **$26,245**.

- Delco Remy, Inc., Anderson, IN, R. Cosby, "Thermal Energy Reclamation From Process Wastewater", 1984-85. **$4440**.

- National Science Foundation and Ball State University, R. Cosby, "Laboratory Courseware Development for Applied Solar Energy Courses", 1980-82. $**20,500** NSF and $10,614 BSU.

- **State of Indiana, "Solar Educational Center", R. Cosby, Lead investigator and co-proposer with Paul Errington, 1979. Approx. $1.4 million funded to BSU for solar energy facility construction integrated with building addition ($7.8 million total) for College of Architecture and Planning.**

- National Aeronautics and Space Administration (NASA), R. Cosby, Principal Investigator, "A Joint Project for Study of the Cylindrical Fresnel Lens as a Solar Concentrator", 1974-78. Five grants under one project title, total **$57,000** from NASA.

- Ball State University, 15 internal grants, 1971-1989.

    - “A concentrating spectral divider for photovoltaic applications”, Summer 1984; salary (0.25).
    - “Experimental study of concentrating photovoltaic system”, Undergraduate Fellows Program (with Mr. Bruce Bailor), 1983-84; $1200.
    - “Analysis of a dispersive concentrator for two-junction photovoltaic systems”, Summer 1983; salary (0.5).
    - “Photovoltaic and passive solar lab activities for applied solar energy courses”, Summer 1982; salary (0.5).
    - “A novel design for a solar space heating system”, Special Leave for collaborative research at Indianapolis Center for Advanced Research, September-November 1979; salary.
    - “Analysis of a silicon cell - Fresnel lens concentrating photovoltaic system”, Summer 1979; salary.
    - “An advanced solar concentrator concept for photovoltaic applications”, September 1979 - June 1980; salary (0.33) plus student assistant.
    - “An automated solar insolation measuring system”, 1978; $1200.
    - “Curvature optimization of a line-focusing Fresnel lens solar concentrator”, Summer 1977; salary.
    - “The Fresnel lens solar concentrator - axial tracking error effects”, September 1977 - June 1978; salary (0.33) + $792 project funds.
    - “Optical analyses of solar concentrators with the aid of computer graphics”, 1977, $1200.
    - “Studies on ultra-pure germanium”, 1973-74.
    - “Precipitation of lithium in neutron-irradiated germanium”, 1972-73.

- o "Experimental study of the lateral surface injection effect on traveling light spot methods for measuring diffusion lengths in semiconductors", 1971-72.
- o "Surface boundary condition on the injected excess carrier concentration in elemental semiconductors", Summer 1971, salary.

PRESENTATIONS AT PROFESSIONAL MEETINGS AND PUBLISHED ABSTRACTS (1972-2005)

2009-

- F. Alzubi and R. Cosby, "*Conductance and elastic modulus of a strained carbon nanotube",* March National Meeting of the American Physical Society, Pittsburgh, PA, March 10-16, 2009. Submitted.

2008-

- F. Alzubi and R. Cosby, "*Calculating Young's modulus for a carbon nanotube",* Ohio Section of the American Physical Society Fall Meeting, BAPS C6.00003, Dayton, OH, October 11, 2008.
- E. Wilson and R. Cosby, "Atomistic Modeling of Carbon Chains", Indiana Academy of Science, Fall Meeting, Evansville, IN, October 24, 2008.
- R. Cosby, "Carbon Nanotube Electrical Interconnects", Indiana Academy of Science, Fall Meeting, Evansville, IN, October 24, 2008.
- R. Cosby, "Computation as a Learning Tool in an Undergraduate Nanoscience Course", 2008 Winter National Meeting of American Association of Physics Teachers, Baltimore, Maryland, January 19-23, 2008.

2007-

- R. Cosby, "Nanotechnology Research at Ball State University", Joint Meeting of the Indiana Chapters of the International Microelectronics and Packaging Society and Surface Mount Technology Association, Indianapolis, IN, April 30, 2007. Invited presentation.

2006-

- R. Cosby, "Introducing the nanoscale with Fermi questions", Indiana Academy of Science Annual Meeting, Ball State University, Muncie, IN, November 3, 2006.
- R. Cosby, "Nanotechnology, today's fad or tomorrow's revolution?", Nanoscience Session, Indiana Academy of Science Annual Meeting, Ball State University, Muncie, IN, November 3, 2006. Invited presentation.
- R. Cosby, "Strengthening nanoscience education through multidisciplinary collaborations", Materials Research Society National Meeting, San Francisco, CA, April 17-21, 2006.
- A. Satanin, Y. Joe, and R. Cosby, "The wavefunction topography in the regime of Fano interference", American Physical Society March National Meeting, BAPS Q1.000141, Baltimore, MD, March 13-17, 2006.

- M. Varanasi, M. Lisowski, and R. Cosby, “Geometries of small cadmium selenide clusters”, American Physical Society March National Meeting, BAPS Q1.000140, Baltimore, MD, March 13-17, 2006.

2005-

- 2005 American Physical Society March National Meeting, Los Angeles, CA, March 21-25:
    - R. Cosby, A. Satanin, and Y. Joe, “Undergraduate Instruction in Nanoscience: Visualizing quantum confinement and resonance effects in 2DEG nanostructures”, BAPS S17.00011.
    - Satanin, R. Cosby, and Y. Joe, “Probing of wavefunctions in 2D-electron waveguides: an exact approach”, BAPS K1.00062.

2004-

- E.R. Hedin, R.M. Cosby, Y.S. Joe, and A.M. Satanin, “Transmission resonances through an asymmetric Aharonov-Bohm ring with an embedded quantum dot”, CSUI Conference on Graduate Student Research and Research in Nano-Science and Technology, Argonne National Laboratory, November 5-6, 2004.

- Y. S. Jo**e**, J. S. Kim, E. R. Hedin, R. M. Cosby, and A. M. Satanin, “Fano resonances through quantum dots in tunable Aharonov-Bohm rings”, International Workshop on Computational Electronics, Purdue University, West Lafayette, IN, October 24-27, 2004.

- A Satanin, F Hu, R Cosby, Y Joe, “Luminescence and exciton transfer in close-packed array of quantum dots”, 4th International Conference on Amorphous and Microcrystalline Semiconductors, St. Petersburg, Russia, July 5-8, 2004.

Indiana Section of the American Association of Physics Teachers (AAPT), DePauw University, Greencastle, IN, May 1, 2004:

- J. Schmoll (undergraduate), R. Cosby, Y. Joe, and A. Satanin, “Modeling Colloidal CdSe Quantum Dots using Gaussian 98”.
- J. Kim, E. Hedin, R. Cosby, A. Satanin, and Y. Joe, “The theoretical investigation of resonance characteristics of coupled quantum dots in an Aharonov Bohm ring”.
- F Hu, R Cosby, A Satanin, and Y Joe, “Resonance transfer of electronic excitations in closed-packed quantum dot arrays”.

- E Hedin, R Cosby, A Satanin, Y Joe, “Electron wave interferometry through an asymmetric Aharonov-Bohm ring”, Ohio Section – American Physical Society Meeting, Ohio University, Athens, OH, April 16-17, 2004.

2004 American Physical Society March National Meeting, Montreal, Canada, March 22-26:

- R. Cosby and Y. Joe, “Undergraduate instruction in nanoscience and nanotechnology”, BAPS **49** No 1 Part 1, 618 (2004).
- Y. S. Joe, J. S. Kim, E. R. Hedin, R. M. Cosby, and A. M. Satanin,

"Transmission resonance through the coupled quantum dots in Aharonov-Bohm rings", BAPS **49** No 1 Part 1, 254 (2004).

- M. Satanin, Fan Hu, R. M. Cosby, and Y. S. Joe, "Exciton transfer in close-packed arrays of quantum dots", BAPS **49** No 1 Part 1, 543 (2004).

2003-

Ohio Section American Physical Society Meeting, Cleveland, OH, October 18, 2003: The published abstracts may be found in the Bulletin of the American Physical Society (BAPS).

- R Cosby and Y Joe, "Teaching an introductory course in nanoscience and nanotechnology"; published abstract only.
- R Cosby, Y Joe, and R McClay, "Nanoscience instructional activities for introductory physics courses"; published abstract only.
- R McClay, R Cosby, Y Joe, "Teaching volumetric expansion using carbon nanotube thermometers", presentation and published abstract.

- Ronald M. Cosby, James A. Hoffmann, and Yong S. Joe, "Electron transport in parallel interacting artificial molecules", *Proc. IEEE Conf. on Nanotechnology*, San Francisco, CA, August 12-14, 2003. Paper also listed in II.B.
- Yong S. Joe, Aphrodite Ahmadi, and Ronald M. Cosby, "Tuning of the transmission resonance in Aharonov-Bohm quantum ring", *IEEE Conf. on Nanotechnology*, San Francisco, CA, August 12-14, 2003. Paper also listed in II.B.
- Ahmadi, R. M. Cosby, and Y. S. Joe, "Transmission through a quantum dot in an Aharonov-Bohm ring", NCN NSF Review, Purdue U., June 26, 2003.
- Anand Raj, Ronald Cosby, and Yong Joe, "Quantum states for quantum computing", SERC Spring 2003 Showcase, May 15-16, 2003, West Virginia University, Morgantown, WV.

American Physical Society National Meeting, Austin, TX, March 3-7, 2003:

- Y. Joe, A. Ahmadi, and R. Cosby, "Tuning of the resonance in a nanoscale quantum ring", BAPS **48**, No. 1, J1 64, 503 (2003)
- R. Cosby, J. Hoffmann, and Y. Joe, "Electrical conductance of coupled artificial atomic wires", BAPS **48**, No. 1, J1 65,503(2003)

2002-

50th Midwest Solid State Conference and Workshop on Solid State Quantum Computation, University of Illinois at Urbana-Champaign, October 18–20, 2002:

Electron transport in coupled quantum wires. Ronald Cosby, James Hoffman, and Yong Joe, Department of Physics & Astronomy, Ball State University, Muncie, IN; and Rebecca Fliehler [2], Department of Physics, Taylor University, Upland, IN

Transmission resonance through an asymmetric Aharonov-Bohm ring. A.

Ahmadi, R. M. Cosby, and Y. S. Joe, Department of Physics and Astronomy, Ball State University, Muncie, Indiana 47306.

Indiana Academy of Science: Indianapolis, IN, October 11, 2002

Electrical conduction properties of 1,4 benzene dithiolate. Donovan Harshbarger*, Frankfort Senior High School, Frankfort, IN; Ronald M. Cosby and Yong S. Joe, Department of Physics & Astronomy, Ball State University, Muncie, IN.

Conduction properties of atomic-scale gold wires. Darrell A. Norrick*, New Castle Crysler High School, New Castle, IN; Ronald M. Cosby, and Yong S. Joe, Department of Physics & Astronomy, Ball State University, Muncie, IN.

Characteristics of resonance in a quantum nanoscale wire with double-coupled attractive impurities, James W. Longacre*, Ronald M. Cosby, and Yong S. Joe, Department of Physics and Astronomy, Ball State University, Muncie, Indiana 47306.

A. Platt, R. Cosby, and Y. Joe, "Fano Resonance in a Quantum Wire with an Asymmetrically Located Attractive Impurity", American Association of Physics Teachers, University of Indianapolis, Indianapolis IN, April 19-20, 2002.

Ronald M. Cosby, "Designing a research project to benefit both the teacher and mentor", RET 2002 Conference, Bringing Research into the Science Classroom (BRISC), San Francisco, April 19-20, 2002. Invited talk and subsequent panel participation. Funded by the National Science Foundation.

Y.S. Joe and R.M. Cosby, "Breit-Wigner and Fano resonances in a quantum nanoscale system", American Physical Society – Ohio Section, Youngstown, OH, April 12-13, 2002.

Y.S. Joe and R.M. Cosby, "Transmission resonances and zeros in multi-barrier resonant-tunneling structures", American Physical Society National Meeting, Indianapolis, IN, March 18-22, 2002.

A. Platt, Y. Joe, and R. Cosby, "Transmission resonances in one-dimensional multibarrier and two-dimensional single well resonant-tunneling structures", Seventh Annual Student Symposium, Ball State University, March 26, 2002.

2001-

117th Annual Indiana Academy of Science Meeting, Nov. 9, 2001 at IUPU-Fort Wayne, Fort Wayne, IN:

"An RET Project in Nanoscience: Interacting Quantum Wires", Gregory P. Roberts, Hamilton Southeastern High School, Ronald M. Cosby and Yong S. Joe, Department of Physics & Astronomy, Ball State University.

"Fano resonances in electron transmission in 1D and 2D nanosystems", Andrew D. Platt, Bryan James, Ronald M. Cosby, and Yong S. Joe, Department of Physics & Astronomy, Ball State University.

Ronald M. Cosby, Yong S. Joe, and Thomas H. Robertson, "REU[1], RET[2], and AP Physics at BSU"

Y. S. Joe and R. M. Cosby, "Level-Inversion and Collapse of Fano Resonance in Nanoscale Structures", Pan American Advanced Study Institute (PASI), Costa Rica, June 25 – July 3, 2001.

Ronald M. Cosby, Kevin Tajkowski, Taran V. Harman, and Yong S. Joe, “Nanoelectronics design and the correspondence principle”, Ohio Section of the American Physical Society Meeting, April 20-21, Kent State University, Kent, OH. Abstract published.

Gregory T. Ryshen, Ronald M. Cosby, and Yong S. Joe, “Electron transmission through one-dimensional model of Fibonacci sequence”, Ohio Section of the American Physical Society Meeting, April 20-21, Kent State University, Kent, OH.

James Watson, David R. Ober, Ronald M. Cosby, and Paul R. Errington, “Summer Updating/Retraining Programs for Elementary, Middle School, and High School Teachers”, National Meeting of the American Association of Physics Teachers, San Diego, CA, January 8, 2001.

David R. Ober, James Watson, Ronald M. Cosby, and Paul R. Errington, “Master’s Degree Programs for Teachers of Physics and General Science”, National Meeting of the American Association of Physics Teachers, San Diego, CA, January 8, 2001.

2000-

Ronald M. Cosby, Hsiu-Lien Hu, Taran Villoch, and Yong S. Joe, “Designing electronic nanodevices using Bohm stream lines”, Proceedings of NanoSpace 2000 – The International Conference on Integrated Nano/Microtechnology for Space Applications, January 23-28, 2000, The Institute for Advanced nterdisciplinary Research, Houston, TX, ISBN 0-9661324-8-3. Abstract Published; Refereed Presentation. (Proceedings published on compact disk, Fall 2000)

Taran Villoch, Ronald Cosby, and Yong Joe, “Conductance characteristics of a modified electronic stub tuner”, Texas Section of the American Physical Society, Houston, TX, October 28-29, 2000.

Ronald M. Cosby, Kevin Tajkowski, Gregory Ryshen and Yong S. Joe, “Nanodevice design using a one-dimensional model of electron transmission”, Indiana Academy of Science, Richmond, IN, November 3, 2000.

Yong S. Joe, Hsiu L. Hu, and Ronald M. Cosby, “Fano resonances in a quantum wire with a tab”, Indiana Academy of Science, Richmond, IN, November 3, 2000.

1999-

C.S. Kim, A.M. Satanin, Y.S. Joe, and R.M. Cosby, “Collapse of Fano resonances in a quantum nanowire”, American Physical Society-March National Meeting, Atlanta, GA, March 20-26,1999.

Taran Villoch, Mahfuza Khatun, Yong Joe, and Ronald M. Cosby, “High Energy Electron Transport in Semiconductor Nanostructures”, Butler University Undergraduate Research Conference, April 9, 1999.

T. Kuhlman, B. Case, M. Khatun, R. Cosby, and Y. Joe, “Architectures for Nanodevices: Quantum Dots and Molecular Wires”, Butler University Undergraduate Research Conference, April 9, 1999

1998-

Y.S. Joe, D.S. Ikeler, R.M. Cosby, C S. Kim, A. M. Satanin, “Miniband transport in quantum Fibonacci superlattices with a modulated potential”, American Physical Society-March National Meeting, Los Angeles, CA, March 16-

20,1998.

Y.S. Joe and R. M. Cosby, “Quantum nanoelectronics using an adiabatic transport model and a Green’s function method”, *Korea-U.S. Science and Technology Symposium*, Chicago, IL, April 23-25, 1998.

G.A. Anduwan, M. Khatun, R.M. Cosby, and Y.S. Joe, “Quantum interference in a ring structure containing an impurity scatterer”, Joint Meeting of the Ohio Section of the American Physical Society and the Indiana & Southern Ohio Sections of the American Association of Physics Teachers, Ball State University, May 2, 1998.

R.M. Cosby, R.H. Howes, and D.R. Ober, ”Advanced Placement Physics Institutes at Ball State University”, Joint Meeting of the Ohio Section of the American Physical Society and the Indiana & Southern Ohio Sections of the American Association of Physics Teachers, Ball State University, May 2, 1998.

R.M. Cosby, R.H. Howes, P.R. Errington, and D.R. Ober, “Initiatives to promote the physics major”, Joint Meeting of the Ohio Section of the American Physical Society and the Indiana & Southern Ohio Sections of the American Association of Physics Teachers, Ball State University, May 2, 1998.

R. Howes, R. Cosby, P. Errington, D. Ober, “Planning for a thriving physics major in 2000 and beyond”, American Association of Physics Teachers National Meeting, Lincoln, Nebraska, Summer 1998.

R. Howes, R. Cosby, D. Ober, “Promoting the physics major at Ball State University”, Physics Revitalization Conference, Arlington, VA, October 2-4, 1998.

R. Howes, R. Cosby, D. Ober, “A plan for revitalization and reform”, Physics Revitalization Conference, Arlington, VA, October 2-4, 1998.

1997-

R.M. Cosby, R. H. Howes, and D. R. Ober, “Summer Teacher Institutes in Advanced Placement Physics at Ball State University”, Programs and Abstracts, Indiana Academy of Science Meeting, Rensselaer, IN, October 30-31, 1997.

R.M. Cosby, T. Xie, and Y.S. Joe, “Electron transport in nanochannels with tunable potentials”, Mar97 Meeting of the American Physical Society, Kansas City, MO, March 17-21. 1997.

Y.S. Joe, T. Xie, and R.M. Cosby, “Resonances in conductance through tunable attractors”, International Workshop on Computational Electronics, U. Notre Dame, May 28-30, 1997.

1996-

American Physical Society March Meeting, St. Louis, MO, March 18-22, 1996:

R.M. Cosby, J. Bowman, Y.S. Joe and M. Khatun, “Coupling and confinement effects on the conductance of a double quantum dot”.

Y.S. Joe and R.M. Cosby, “Effect of quasi-bound states on conductance peaks of a quantum nanosystem with an attractor”.

M. Khatun, R.M. Cosby and Y.S. Joe, “Symmetric and asymmetric

conductance oscillations in semiconductor nanosystems”.

1995-

Programs and Abstracts, Ind. Acad. Sci., November 2-3, 1995:

T. Xie, Y.S. Joe, R.M. Cosby, and M. Khatun, “Electron eigenvalues and eigenfunctions for a nanochannel with an attractive potential well”.

M. Khatun, P.K. Joyner, R.M. Cosby, and Y.S. Joe, “Electron transport in mesoscopic systems”.

J.L. Kim, M. Khatun, R.M. Cosby, and Y.S. Joe, “Electron conductance in a nanochannel containing delta potentials”.

23rd Midwest Solid State Theory Symposium, Manhattan, KA, October 14-15, 1995:

R.M. Cosby, J. Bowman, Y.S. Joe, and M. Khatun, “Conductance spectroscopy of quantum pseudo-dot nanostructures".

Y.S. Joe, M. Khatun, and R.M. Cosby, “Interference in a quantum wire modulated with variable double-bend structures”.

American Physical Society - Ohio Section Meeting, Dayton, OH, Oct. 7, 1995; abstracts to appear in Bulletin of American Physical Society:

D.R. Humm*, R.M. Cosby, Y.S. Joe, and M. Khatun, “Speculations on semiconductor nanostructure devices”.

Y.S. Joe, M. Khatun, and R.M. Cosby, “Quantum electron interference in a four-parallel system”.

M. Khatun, P.K. Joyner, R.M. Cosby, and Y.S. Joe, “Impurity effects in mesoscopic systems”.

American Association of Physics Teachers - Indiana Section Meeting, Indianapolis, IN, April 8, 1995:

J.V. Bowman, R.M. Cosby, Y.S. Joe and M. Khatun, "Electron Transport and Series Quantum Dots in a Semiconductor Nanochannel".

J.L. Kim, M. Khatun, R.M. Cosby and Y.S. Joe, "Electronic Energy Levels and Wavefunctions in a Nanochannel Containing Delta Impurities".

P.K. Joyner, M. Khatun, R.M. Cosby and Y.S. Joe, "Conductance of a Nanochannel With a Tab and a Constriction".

J.R. Bower, R.M. Cosby and C.D. Woodfin, "Modeling Direct Gain Passive Solar Systems".

M. Khatun, R.M. Cosby, Y.S. Joe, "Conductance modulations with variation of impurity position in a nanosystem", American Physical Society National Meeting, San Jose, CA, March 20-25, 1995. BAPS **40**, No. 1, p.361, March 1995.

1994-

Y.S. Joe, M. Khatun, and R.M. Cosby, Ball State University, M.W.C. Dharma-wardana, National Research Council of Canada, and S.E. Ulloa, Ohio University, "Quantum Transport in Nanochannel Systems Containing a Controllable Impurity

or Slits", *American Physical Society Meeting*, Pittsburgh, PA, March 21-25, 1994. BAPS **39**, No. 1, p.354, March, 1994.

American Physical Society-Ohio Section Fall Meeting, Toledo, OH, Oct. 14-15, 1994; abstracts in BAPS:

R.M. Cosby, Y.S. Joe and M. Khatun, "Conductance of a Quantum Wire With Series and Parallel Slits".

Y.S. Joe, M. Khatun and R.M. Cosby, "Superlattice Effects and Additivity on Conductance in a Quantum Wire with Multi-slits".

M. Khatun, Erwin, Y.S. Joe, and R.M. Cosby, "Electronic Conductance in a Quantum Wire With a Finite/Infinite Scatterer".

American Physical Society-Ohio Section Spring Meeting, Cleveland, OH, May 13-14, 1994; Abstracts in BAPS:

R.M.Cosby, Y.S.Joe and M.Khatun, "Quantum Interference in a Nanochannel Containing a Quantum Box".

Y.S.Joe, M.Khatun and R.M. Cosby, "Conductance Oscillations through Double Slits in a Quantum Wire".

Indiana Academy of Science Fall Meeting, Nov.4, 1994. Abstract to appear in *Proc. Ind. Acad. Sci.*:

Erwin, R.M. Cosby, Y.S. Joe, and M. Khatun, "Electron eigenvalues and eigenfunctions for a nanochannel with a finite rectangular barrier".

Y.S. Joe, M. Khatun, and R.M. Cosby, "Quantum transport anomalies in ballistic nanostructures".

P.K. Joyner, M. Khatun, Y.S. Joe, and R.M. Cosby, "Transverse energy levels in a quantum wire with an infinite scatterer".

J.V. Bowman, R.M. Cosby, Y.S. Joe, and M. Khatun, "Quantum transport in a confined two-dimensional electron gas".

American Association of Physics Teachers - Indiana Section, Terre Haute, IN, April 15-16, 1994.

Y.S. Joe, M. Khatun, and R.M. Cosby, Ball State University, M.W.C. Dharma-wardana, National Research Council of Canada, and S.E. Ulloa, Ohio University, "Quantum Interference in Nanostructures".

R. Cosby, Y. Joe, and M. Khatun, "Conductance Quantization in Semiconductor Nanostructures - A Review".

S. Martin, R. Cosby, Y. Joe, and M. Khatun, "Computing the Conductance of a Confined Two-Dimensional Electron Gas".

1993-

Y.S. Joe, M. Khatun, and R.M. Cosby, Ball State University, and S.E. Ulloa, Ohio University, "Conductance Oscillations in Low Dimensional Systems", *21st Midwest Solid State Theory Symposium*, Detroit, MI, October 3-4, 1993

X. Ying and R. Cosby, "A Statistical Ray Trace Model for Mirror Solar

Concentrators", *Indiana Academy of Science Meeting*, Purdue University, W. Lafayette, IN Nov.5, 1993.

1990-1992

T. Jordan and R. Cosby, "Still-Video Technology in Physics and Astronomy Instruction", *Indiana Academy of Science Meeting*, November 6, 1992, Ball Sate University, Muncie, IN.

T. Jordan and R. Cosby, "Introducing Modern Video Technology to High School Physics Teachers", *1991 American Association of Physics Teachers/American Physical Society Joint Winter Meeting*, January 21-24, 1991, San Antonio, TX; *Announcer* Vol 20, No. 4, p. 68, December, 1990.

R. Cosby and D. Ober, "Introducing Computer Spreadsheets and Graphics to Physics Students and Teachers", *1991 American Association of Physics Teachers/American Physical Society Joint Winter Meeting*, January 21-24, 1991, San Antonio, TX; *Announcer* Vol 20, No. 4, p. 92, December, 1990.

D. Caucci, T. Jordan and R. Cosby, "Enhancing Physics and Astronomy Instruction Using Video Technology", *Program of the 10th Annual Lilly Conference on College Teaching*, Oxford, OH, Nov. 16-18, 1990; p. 101-105, Extended Abstract.

1980-1989

K. Assamagan and R. Cosby, "Two-Dimensional Analytical Model of a Nonuniformly Illuminated Concentrator Solar Cell", *Proc. Indiana Academy of Science,* 105th Annual Meeting, New Albany, IN, Nov. 11, 1989. Abstract.

C. Brooks and R. Cosby, "Preliminary Network Model of a Silicon Concentrator Solar Cell", *Proc. Indiana Academy of Science. 104th Annual Meeting,* Saint Mary's College, Notre Dame, IN, Nov. 11, 1988 (Abstract published.)

Y. Zhan and R. Cosby, "Analysis of Tracking Error Effects for the Fresnel Mirror Solar Concentrator", *Proc. Indiana Academy of Science,* 104th Annual Meeting, Saint Mary's College, Notre Dame, IN, Nov. 11, 1988 (Abstract published.)

R. Cosby and R. Place, "Expert Systems as Tutors in Physics", *Indiana-Illinois Joint Meeting of the American Association of Physics Teachers*, West Lafayette, IN, Apr 15-16, 1988.

R. Cosby, "Research Participation by Young High School Scholars", *Joint National Meeting of AAPT and the American Physical Society*, Crystal City, VA, Jan 23-28, 1988; *American Association of Physics Teachers Announcer*, December 1987, Abstract.

M. Shaheen and R. Cosby, "Physics of Concentrator Solar Cells"; *Indiana Academy of Science Meeting*, Terre Haute, IN, November 5-6,1987; *Proc. Ind. Acad. Sci.,* Abstract.

C. Brooks and R. Cosby, "Optical Analysis of a Reflecting Strip Solar Concentrator"; *Indiana Academy of Science Meeting*, Terre Haute, IN, November 5-6,1987; *Proc. Ind. Acad. Sci.,* Abstract.

Diallo and R. Cosby, "Solar Food Drying in the Republic of Guinea"; *Indiana Academy of Science Meeting*, Terre Haute, IN, November 5-6,1987; *Proc. Ind. Acad. Sci.,* Abstract.

M. Witty and R. Cosby, "Thermal Energy Reclamation From Industrial Process Waste Water", *Proc. Ind. Acad. Sci.,* 1985. Abstract.

R. Cosby, "Laboratory and Demonstration Facilities for Solar Energy Education at Ball State University", *1985 Society of Colleqe Science Teachers Meetinq,* Cincinnati, OH, April 19-21, 1985.

Bailor and R. Cosby, “Experimental Study of a Curved-Base Fresnel Lens for Solar Applications”, American Association of Physics Teachers Meeting - Indiana Section, April 27-28, 1984.

R. Cosby, "Solar Insolation Experiments for an Applied Physics Course", *Bull. Am. Phys. Soc.,* No.6 (1983) p. 903. Abstract.

R. Cosby, "Concentrating Photovoltaics", Renewable Energy Works Conference, Center for Energy Research, Education, and Service, Ball State University, August 13-14, 1983.

R. Cosby, "Software Aids for Solar Energy Courses", American Association of Physics Teachers Meeting - Indiana Section, April 23, 1983.

J. Gough and R. Cosby, "Simulation of the Active Solar System on the Ball State University Energy Center", American Association of Physics Teachers Meeting - Indiana Section, April 23, 1983.

R. Cosby, "Solar Energy Education at the University Level", presented at the *1982 International Energy Information Forum and Workshop for Educators - A World's Fair Proqram*, Gatlinburg, TN, June 9-12, 1982.

R. Cosby, "Laboratory Courseware for Applied Solar Energy Courses", Program and Abstracts, Vol. 2, *1982 Society for Colleqe Science Teachers Meeting*, Chicago, IL, April 1, 1982, p. 30. Abstract.

R. Cosby, "A Technical Course Series in Applied Solar Energy at the Senior/Graduate Level", *Proceedings of 1981 International Conference on Energy Education,* Providence, RI, August 4-7, 1981, p. 307. Abstract.

Heavilin and R. Cosby "Performance Analysis of a Concentrating Photovoltaic System", *Bull. Am. Phvs. Soc.* 26, No.5 (1981) p710. Abstract.

R. Taylor and R. Cosby, "Active Solar Heating Systems for Residential Application in Indiana: A Comparative Optimization Study", *Proc. Ind. Acad. Sci.,* **89**, 1980. Abstract.

R. Cosby, P. Errington, and D. Ober, "An NSTA Energy Curriculum Materials Workshop", American Association of Physics Teachers Meeting - Indiana Section, Ft. Wayne, IN, 1980.

R. Cosby and P. Errington, “The Energy Education Center at Ball State University”, American Association of Physics Teachers Meeting - Indiana Section, Ft. Wayne, IN, 1980.

1972-1979

M. Lloyd and R. Cosby, “Thermal Analysis of Wind-Supplemented Residential Hot Water System”, Indiana Academy of Science, 1978.

R. Cosby, “Solar Energy”, ENACT Alternate Lifestyle Conference, Ball State University, April 15, 1978.

R. Cosby, "An Optical Analysis of the Cylindrical Fresnel Lens Solar Concentrator", Ohio-Section of the American Physical Society Meeting, *Bull. Am. Phvs. Soc.,* **21**, No.2 (1976) p. 150. Abstract.

R. Cosby, "Optimization of the Design Wavelength for Fresnel Lens Solar Concentrators", Ohio-Section of the American Physical Society Meeting, *Bull. Am. Phys. Soc.*, **21**, No.2 (1976) p. 150. Abstract.

R. Cosby, "The Cylindrical Fresnel Mirror as a Concentrator for Solar Thermal Power Plants", Ohio-Section of the American Physical Society Meeting, *Bull. Am. Phvs. Soc.*, **20,** No.7 (1975) p. 889. Abstract.

R. Cosby, "Concentrators for Solar Thermal Power Plants", American Association of Physics Teachers Meeting - Indiana Section, April 26, 1975.

R. Reger and R. Cosby, "A Thermoelectric Facility for Measuring Electrical Characteristics of Semiconductors: An Undergraduate Research Project", American Association of Physics Teachers Meeting - Indiana Section, April 24, 1975.

N. Bendsen and R. Cosby, "Lithium Precipitation in Fast-Neutron Irradiated Germanium", *Proc. Ind. Acad. Sci.,* **84**,(1974) p. 423. Abstract.

R. Cosby, "Source Asymmetry Effects on Traveling Light Spot Measurements of Diffusion Lengths in Elemental Semiconductors", *Bull. Am. Phys. Soc.*, **18**, No.2 (1973) p. 247. Abstract.

R. Wright and R. Cosby, "Evaluation of the Oxygen Concentration in Germanium", American Association of Physics Teachers Meeting - Indiana Section, April 28, 1973.

M. Gibson, R. Place, and R. Cosby, "Fabrication of a Ge(Li) Detector as an Undergraduate Research Project", American Association of Physics Teachers Meeting - Indiana Section, April 28, 1973.

G. Huang and R. Cosby, "Lithium Precipitation in Elemental Semiconductors Containing Disordered Regions", *Proc. Ind. Acad. Sci.,* **82**, (1972) p. 379. Abstract.

DISSERTATION/THESIS COMMITTEE AND RESEARCH ADVISING SERVICE

Over my career, I have served as Chair and Member on many master's thesis committees, as member at-large on doctoral committees at BSU and for foreign institutions (e.g., Indian Institute of Technology), as Research Advisor for master's degree research papers, and Research Mentor for graduate course papers and undergraduate theses, fellowships, and independent research studies. The lists presented below are incomplete representations of this service.

Past (Partial lists):

Chair, Master of Science Thesis Committees, Physics

	M.S. Thesis Completion Date
• Feras Alzubi	July 2008
• Michael Lisowski	April 2006
• Mohan Varanasi	May 2006
• James Hoffman	2003
• Anand Raj	2002 incomplete
• Kevin Tajkowski	2001
• Hsiu Lin Hu	2000
• James Bowman	1995
• Jeff Bower	1996
• Tian Xie	1997, incomplete
• Shashi Martin	1994
• Erwin Erwin	1994
• Xiaomin Ying	1994
• Tim Betzner	1990
• Ketevi Assamagan	1989
• Clarence Brooks	1989
• Kevin Bryan	1989
• Alseyni Diallo	1989
• Yong Zhan	1989
• Momtaz Shaheen	1988
• Jeff Conte	1987
• John Gough	1983, incomplete
• A.J. Heavilin	1981
• Noel Daniel	1977
• Niel Bendsen	1975
• Ron Gentry	1973, incomplete

Member, M.S. Thesis Committees, Physics

▪ Chunghee Roh	2008

- Adam Hinkle 2008
- Scott Little 2007
- Melissa Hendricksen 2006
- Chris Day 2006
- Leonid Isaev 2005
- Travis Barclay 2005
- Fan Hu 2005
- Jiseok Kim 2005
- Andy Platt Summer 2004
- Greg Ryshen February 2004
- Aphrodite Ahmadi July 2003
- Luke Kanuchok December 2003
- Ming-quang Qin 2000
- Gabriel Anduwan 1998
- David Ikeler 1997
- Phil Joyner 1996
- Mike Hosack 1996
- Jong-Lae Kim 1996
- Brent Puck 1993
- Ntata Kgwadi, completed
- Yinghua Lin 1991

Member-at-Large, Doctoral Committees

- George W Brutchen, Adult, Higher, and Community Education, current.
- Scott D Bojrab, Educational Psychology, current.
- Brent S Chapman, Adult, Higher, and Community Education, completed May 2007.
- Richard D. Spivey, Adult, Higher, and Community Education, 2000.
- Mitch Springer, Adult, Higher, and Community Education, completed 1995.

Research advisor, Research Paper (physics) (partial list)

- Sudhendra Vasthari, M.A., 2007
- Brady Koehlinger, M.A.E., 2004
- Randy McClay, M.A.E., 2003
- Stan Johnson, M.A. 1994
- Burnett Burton, M.A. 1979
- Ron Taylor, M.A. 1980
- Mike Lloyd, M.A. 1979
- George Huang, M.A. 1973
- Rhoda Wright, 1973, incomplete

Research mentor (partial list)

- Evan Wilson, *Undergraduate Honors Fellow*, “Electrical properties of carbon nanotubes”, 2008-2009.

- Brianna Pluhar, undergraduate, “Carbon nanotube biosensors”, PHYCS 482, 3 credit hrs, Fall Semester 2008.
- Molly Reber, undergraduate, “Transport properties of decorated carbon nanotubes”, PHYCS 482, 3 credit hrs, Fall Semester 2008.
- Gage Decker, undergraduate, “Electronic structure calculations using Gaussian 03”, PHYCS 482, 3 credit hrs, Fall 2006 and Spring 2007.
- Adam Schmitt, undergraduate, “Exploring Atomistix’s Virtual NanoLab Software Package”, Spring 2006.
- Gage Decker, Undergraduate, “Learning to use Gaussian 03 on the Ball State University Linux cluster”, Spring 2006.
- Davin Leinenbach, Undergraduate, “Depletion island probing of electron density in nanostructures”, Summer 2004.
- Joy Schmoll, *Undergraduate Honors Fellow* and senior chemistry major, Spring 2004. Co-advisor.
- Rohini Silvamurthy, biology graduate student, 1st Summer Term, 2003
- Taran Villoch Harman, *Honors Thesis*, 2001; *Undergraduate Honors Fellow*, 1999-2001.
- James H. McWilliams, undergraduate, *University College Distinction Fellowship,* 1999.
- Matt Powers, undergraduate, *University College Distinction Fellowship,* 1999.
- Dustin Humm, undergraduate, *Honors College Fellowship*, 1995-96.
- Mary K. Wineland, Honors Thesis, 1993.
- Clarence Brooks, undergraduate, 1987.
- Mike Witty, undergraduate, 1985.
- Ron Reger, undergraduate, 1975.
- Mark Gibson, undergraduate, 1973.

COMMITTEES, PROFESSIONAL SERVICE, PUBLICITY

Example: 2003-2005

1. Committees

I have served on many university, college, and departmental committees during my career at Ball State University, including service as Committee Chair (e.g., Undergraduate Education Committee, College Advisory Council, Special Leave Committee). As examples, memberships for 2003-2005 are listed below.

(2004-2005)

University

Member, Environmental Scanning Committee (ESC), Office of Information Technology; Chair, ESC Content Development Subcommittee;
Chair, Graduate School ad hoc committee writing Traditions and Innovations online chapter for Graduate Laboratory Assistants, 2004.

College Member, CSH Promotion and Tenure Committee

Department Chair, Promotion and Tenure Committee
Member: Graduate Committee
Member: Committee on Committees

(2003-2004)

University
Member, University Senate; Environmental Scanning Committee, Office of Informational Technology; Focus Group for Financial and Budgetary Affairs Committee (March 10,,2004); Chair, Graduate School ad hoc committee writing Traditions and Innovations online chapter for Graduate Laboratory Assistants, 2003-2004.

College 2004 Promotion & Tenure Committee; NIH Facilities Grant Task Force

Department 2004 Chair, 2003 Member, Promotion and Tenure Committee; Member: Graduate Committee, Committee on Committees

2. Public relations and/or recruitment

(2004-2005)

Publicity: George & Frances Ball Distinguished Professor of Physics appointment (BSU Outlook, and BSU web site, Muncie Star Press, etc); Cited by Joy Schmoll as a favorite Ball State professor (Daily News, April 28, 2004); Provost's Update - 8/23/04;

(2003-2004)

- Publicity, Kickoff event for Center for Computational Nanoscience(CCN), including 3 separate interviews (TV Channel 13 WTHR, a radio station, the Muncie Star-Press), September 24, 2003.
- Interview for "Computational Nanoscience" basketball halftime report broadcast January 10, 2004.
- Center for Computational Nanoscience and principals cited in President Brownell's Message, Nov 7, 2003.
- Telephone interview and quotes, Atlanta Business Chronicle article, David Allison, Editor, November 3, 2003.
- Cited in Provost Newsletter April 2003 with regard to 21st Century Fund grant and center.
- Advisor for Anand Raj, selected Outstanding Graduate Student Presenter at the 8th Annual Student Symposium by Sigma Xi, March 2003.
- Contribution (with M. Khatun), Departmental Newsletter, "Center for Computational Nanoscience"

3. Professional service (refereeing, officer, etc.)

(2004-2005)

- Research advisor for Luke Crawley, "Photovoltaics", and Chris Banser, "Nano-robots in space applications", poster presentations for PHYCS 483, Spring 2005.

- CCN coordinator and contact person for Beowulf computer cluster, 2004-2005.
- Organized panel on “Hints for Effective Laboratory Instruction”, Seventh Annual Graduate Student Development Conference, Ball State University, August 16, 2004.
- Reviewed research grant proposal for Petroleum Research Fund, American Chemical Society, (S. Liu, “Interpretation of ion-enrichment and ion-depletion effect of nanochannel structures”), September 2004.
- Reviewed new faculty research grant proposal for OARSP, Feb 2005.
- Faculty nominee of Andy Platt’s thesis for BSU Alumni Assoc. Distinguished Thesis award (successful).

(2003-2004)

- CCN coordinator and contact person for Beowulf computer cluster, 2003-
- R Cosby, “Introduction to Nanoscience and Nanotechnology”, Guest speaker, Dr. Ray Montagno’s class, February 18, 2004.
- R Cosby, “Center for Computational Nanoscience”, Colloquium speaker, Department of Computer Science, Ball State University, October 22, 2003.
- Speaker, “Resonant Nanoscale Systems and Quality Control”, CCN quantum transport subgroup meeting, October 28, 2003.
- Seminar speaker, “Coupled Quantum Devices”, BSU-Kyhunghee U Video Conference, APHYS 310/510, April 9, 2003.
- Organized and served as moderator for panel on “Hints for Effective Laboratory Instruction”, Sixth Annual Graduate Student Development Conference, Ball State University, August 18, 2003.
- Discussed nanoscience with visiting members of BSU’s National Development Council, September 19, 2003.
- Wrote “Future Directions in Nanoscience and Nanotechnology at Ball State University” for Associate Dean Van Meter, January 20, 2004.
- Contributed description of my work for BSU’s Building Better Communities Initiative, November 24, 2003.
- Discussed nanoscience curriculum with members of visiting PhysTEC leadership team, November 17, 2003.
- Completed reference information for NASA for astronaut candidate Randall McClay, September 2003.
- Presentation “Introduction to Nanoscience and Nanotechnology” at request of Office of Information Technology, Ball State University, for visiting group from Gateway, Inc, Ball State University, June 11, 2003.

OTHER PROFESSIONAL SERVICE (Representative **examples**)

- Appointed to 7-member judging panel for Philip E. Nelson Prize for Innovation, Indiana Economic Development Corporation, October 15, 2008. By invitation from Governor Mitch Daniels, State of Indiana.

- Director, Advanced Placement Summer Institute, Ball State University, 1998-2005.

- Reviewer for Journal of Optical Society of America (one article), The Physics Teacher (one article), 2002.

- Reviewed proposal for National Science Foundation, Program Director Larry Brown, Education & Interdisciplinary Research, April, 2002.

- External review of research proposal for the Ohio University Research Committee, March, 2002.

- Judge, Bridge and Boomilever events, Science Olympiad, Saturday, February 24, 2001.

- Reviewed article for Journal of Physics and Chemistry of Solids, September 2000.

- Advanced Placement Reader for AP Physics, Lincoln, Nebraska, June, 1999 (7 days of grading AP exams!)

- Reviewed article for Journal of Solar Energy Engineering, April, 1999.

- President, BSU Chapter of Sigma Xi, 1989-90

- Chaired session of Fifth International Workshop on the Physics of Semiconductor Devices, New Delhi, India, December, 1989.

- Chair, Physics Section, Indiana Academy of Science, 1999,1994,1992.

- Introductory Physics Textbook Reviewer, McGraw-Hill, 1999; Wm. C. Brown Publishers, Inc., 1986-1992; Saunders College Publishing, 1986; CRC Press (advanced) 1986, plus others.

- Judge, Excellence in Scientific Publication Award, Indiana University Medical Center Chapter of Sigma Xi; reviewed 22 journal articles, 1990, 1991.

- International Member-at-Large on Doctoral Committees, Center for Energy Studies, Indian Institute of Technology, 1980's. Example: Candidate A. K. Singhal, "Optical Design of Linear Solar Concentrators", IIT, 1982.

- R. Cosby (Physics) and J. Hertz (Architecture), Consultants, "Energy Efficient Design of a U.S. Department of Agriculture Office Building", for Huntington, IN architectural firm, 1980-81.

- Workshop faculty, Energy Teaching Strategies Workshop for College Teachers, Department of Natural Resources, Ball State University, June 15-26, 1981.

- Vice-Chairman, Board of Directors, Indiana Solar Resources Advisory Panel, Indiana Department of Commerce, 1979-80.

- First chairman and founding member of Hoosier Solar Energy Association, a chapter of the American Section of the International Solar Energy Society, 1977.

- Chair, Sessions at Ohio-Section of the American Physical Society Meeting, 1977, 1973.

COURSES TAUGHT (1970-2005)

PHYCS 677	Quantum Theory of Solids
PHYCS 675	Statistical Mechanics
PHYCS 483/683	Seminar in Physics
PHYCS 466/566	Solid State Physics
PHYCS 370/570	Introductory Mathematical Physics 1
PHYCS 372/572	Introductory Mathematical Physics 2
PHYCS 340/540	Physical Optics
PHYCS 434/534	Thermodynamics
PHYCS 330/530	Mechanics
PHYCS 260	Introduction to Modern Physics
PHYCS 262	Modern Physics Laboratory
PHYCS 120, 122	General Physics 1 & 2 (calculus-based)
PHYCS 110, 112	General Physics 1 & 2 (algebra-based)
PHYCS 101	Physical Science Concepts for Teachers
PHYCS 100	Conceptual Physics
APHYCS 420/520	Solar Thermal Systems
APHYCS 422/522	Photovoltaics
ASTRO 100	Introductory Astronomy

……plus the courses listed below under “New Courses Developed” and plus some courses no longer active.

NEW COURSES DEVELOPED

APHYS 310/510	Introduction to Nanoscience and Nanotechnology
APHYS 410/510	Fluid Mechanics
APHYS 420/520	Solar Thermal Applications
APHYS 422/522	Photovoltaics
APHYS 436/536	Heat Transfer
PHYCS 696	Technology of Teaching: Modern Developments in Physics Teaching (video and computer technologies), Summer 1990.
	Technology of Teaching: Modern Developments in Physics Teaching (video technologies), Summer 1991.
PHYCS 685	
	Nanoscience and Nanotechnology Workshop for High School Science Teachers (Summer 2005)
	Topics in AP Physics B & C: Electricity and Magnetism
	Topics in AP Physics B & C: Mechanics
	Topics in AP Physics B: Heat & Thermodynamics, Optics, and Modern Physics
	Introduction to Expert Systems: Special Studies in Physics, Summer 1990.
	Scientific Applications of Computer Graphics, Spreadsheets, and Expert Systems, Summer 1991.

PHYCS 525	Solar Workshop for Teachers
PHYCS 220	Introduction to Solar Energy Technology and Applications
PHYCS 106	Basic Physics for Allied Health Sciences
ASTRO 200	Minicourse on Solar Energy

PROFESSIONAL ORGANIZATIONS

Current
- American Association of Physics Teachers
- American Physical Society (APS)
- Indiana Academy of Science (IAS)
- Phi Kappa Phi
- Sigma Pi Sigma (Physics Honorary)
- Sigma Xi (Scientific Research Society)

Additional Past Memberships
- Materials Research Society
- American Association of University Professors
- Institute of Electrical and Electronics Engineers
- International Solar Energy Society
- American Solar Energy Society
- Society of College Science Teachers

AWARDS AND HONORS RECEIVED

George & Frances Ball Distinguished Professor of Physics, 2005

Fellow, Indiana Academy of Science, 1985

Tech Brief Award, National Aeronautics and Space Administration, 1977