

Dr. Robert E. Davis
Professor of Physics
Taylor University
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Education:

Doctor of Philosophy, granted by Purdue University, West Lafayette, Indiana, May, 1988.

Areas of specialization - theoretical acoustics, mathematical modeling.

Thesis title: "Mathematical modeling of the orchestral timpani, " Advisor: Dr. A. Tubis

Master of Science, granted by Purdue University, West Lafayette, Indiana, May, 1982.

Area of specialization - general physics.

Bachelor of Science, granted by Illinois State University, Normal, Illinois, May, 1976.

Double major in mathematics and physics.

Talks at professional meetings:

1. Davis, R.E. and Tubis, A. (1982). "The musical saw - operational features and simple dynamical theory", J. Acoust. Soc. Am. 71, Suppl. No. 1: S(82,83).
2. Christian, R.S., Davis, R.E. and Tubis, A. (1983). "Theoretical analysis of timpani modes for arbitrary kettle shapes", J. Acoust. Soc. Am. 73, Suppl. No. 1: S(85).
3. Davis, R.E., Koshigoe, S., and Tubis, A. (1983). "Calculations of the external-ear directional filter function of the KEMAR mannequin", J. Acoust. Soc. Am. 74, Suppl. No. 1: S(110).
4. Davis, R.E. and Tubis, A. (1984). "Dynamical equations for sound generation in wind instruments", J. Acoust. Soc. Am. 75, Suppl. No. 1: S(17).
5. Davis, R.E. and Tubis, A. (1985). "Timpani normal modes for arbitrary shaped kettles", J. Acoust. Soc. Am. 78, Suppl. No. 1: S(74,75).
6. Davis, R.E. and Tubis, A. (1986). "Timpani normal mode calculations for arbitrary shaped kettles", 12th International Congress on Acoustics, Toronto, Canada, paper K2-7.
7. Davis, R.E. and Tubis, A. "Calculations of timpani normal modes for arbitrary kettle shapes", J. Acoust. Soc. Am. 85, Suppl. No. 1: S(). (Invited talk, May, 1989)
8. Davis, R.E., Moser, K., White, A., and Voss, H.D. (1996). "First Results from the Source/loss-cone Energetic Particle Spectrometer (SEPS) on the NASA POLAR Satellite", Proceedings of the Indiana Academy of Sciences
9. Lerch, A. and Davis, R.E., (1999). "Setup, Calibration, and Data Collection with a Very Low Frequency Receiving Station", Proceedings of the Indiana Academy of Sciences

Publications:

1. Calculation of timpani normal mode frequencies (with R.S. Christian and A. Tubis), J. Acoust. Soc. Am. 71, 1416 (1982).
2. Timpani normal mode calculations for arbitrary shaped kettles (with A. Tubis), Proceedings of the 12th International Congress on Acoustics, 1986, Volume 1.
3. Mathematical Modeling of the Orchestral Timpani, Ph.D. thesis, Physics Department, Purdue University, 1988.

Professional Affiliations:

1. American Physical Society, (APS), member, 1975 to present
2. Acoustical Society of America (ASA), member, 1986 to present
3. Catgut Acoustical Society (CAS), member, 1997 to 2003 (organization defunct)
4. Indiana Academy of Science, (IAS), member, 1996 to present; Chair, Physics section, 1998 and 1999
5. Indiana Space Grant Consortium (ISGC), participant, 1996 to 2007; Associate Director, starting 1999 through 2003

Research Grants & Experience:

National Science Foundation November 2006 – November 2011

Received a 5-year, \$12,000 per year grant from the NSF in conjunction with Stanford University to operate the VLF receiving station at Taylor University, and to train students in associated data analysis.

Indiana Space Grant Consortium August 2006 – March 2007

Received a 1-year, \$3,000 grant from the INSGC to operate the VLF receiving station at Taylor University, and to train students in associated data analysis.

Research Assistant, Taylor University June 1996 - Present

Assist in various research projects as part of the research program in the physics department at Taylor. These include:

1. Data analysis for the SEPS instrument on board the NASA POLAR satellite
2. Data analysis for the ADS instrument on board the ARGOS satellite
3. Administration of Taylor's participation in the Indiana Space Grant Consortium, including the first "Symposium on Indiana Aeronautics and Space Science".
4. Bringing a VLF receiving station on line for detecting waves associated with the dynamics of the magnetosphere.

Specific tasks include writing data analysis software in IDL (Interactive Data Language) and supervising student workers.

Research Interests:

Magnetospheric Physics, especially related to lightning

Theoretical Musical Acoustics

Physics Education - Microcomputer Applications, Curriculum Development,
Teacher Training

Calculational and Computational Physics, Mathematical Modeling

Teaching and Professional Experience:

Taylor University, Upland, Indiana

Aug. 1995 - present

Aug 2005 – present: Professor of Physics, with primary responsibility for the year-long calculus-based University Physics course, the year-long algebra-based General Physics course, and associated laboratory sections. Upper division courses taught include Statics & Dynamics, Mathematical Methods for Physics & Engineering, Electricity & Magnetism, Analytical Mechanics, Optics & Waves, and Thermodynamics & Statistical Mechanics. Lower division courses taught include laboratory sections for Survey of Physical Science, Experiences in Physical Science, and Astronomy

Aug 2003 – Aug 2006, June 2012 - present: Chair, Department of Physics & Engineering, with primary responsibility for the administrative functions of the Physics & Engineering department, including representing the department to the University administration, doing annual faculty evaluations, overseeing major department curricular changes, making course and room schedules and teaching assignments, and budgetary matters

Aug 2000 – July 2005: Associate Professor of Physics, duties as listed above for Professor

Aug 1998 – Aug 2000: Assistant Professor of Physics, duties as listed above for Associate Professor

Aug. 1995 – Aug 1998: Assistant Professor of Computing and System Sciences, with primary responsibility for the general education Computing and Information Concepts courses. Also taught Problem Solving Methodologies and Systems Seminar.

Textbook Author

2003 - present

I am the primary author of the “Instructor Solutions Manual (ISM)” for the introductory physics textbooks written by Douglas Giancoli. In particular, I authored the ISM for the 6th edition of Physics: Principles with Applications (finished in 2004), the 4th edition of Physics for Scientists and Engineers (finished in 2008), and am currently assisting with the 7th edition of Physics: Principles with Applications (anticipated finishing in 2013). With each subsequent ISM, I have been given more responsibility for other features of the textbook, especially problem selection, chapter reviewing, and fact checking.

AP Physics Exam Grader 2002 - present

Grader for AP Physics Examinations. Was a standard grader in 2002, 2003, 2004, and 2006. Was a Table Leader in 2005, and was a Question Leader (with primary responsibility for rubric preparation and sample selection from 2007 through 2012.

Indiana Wesleyan University, Marion, Indiana

Adjunct professor for the following courses: MAT 255, Calculus III, Fall of 2001 and Fall of 2003; and MAT 353, Differential Equations, Spring of 2000.

Ball State University, Muncie, Indiana

Adjunct professor for the following courses: PHY 346, Acoustics, 2001; and PHY 372, Mathematical Methods II, 2002.

Frontier High School, Chalmers, Indiana Aug. 1982 - July 1995

High school teacher, teaching classes in physics, chemistry, computer literacy, computer applications, computer programming, and mathematics. Also was computer director for school corporation administrative offices and high school, overseeing purchasing, maintenance, user training, and daily operation of over 80 microcomputers and associated hardware and software, including networking.

Awards:

Recipient of Taylor University "Provost's Grant" for Innovative and Experimental Course Design, 2009

Recipient of Taylor University Technology Mini-Grants, Summers of 2008, 2006, 2005, and 2004.

Recipient of Taylor University GEM award ("Going the Extra Mile"), May, 2006

Recipient of Taylor University "Fund for Faculty Scholarship" Grant, Summer, 2000.

Recipient of Eli Lilly Foundation "Teacher Renewal Grant", Summer, 1988.

Workshops and Meetings Attended:

Hulman Meeks Memorial Acoustics Workshop

2009 – Third annual workshop, Rose-Hulman Institute of Technology, Terre Haute, IN

Activity-Based Physics Workshop using the "The Physics Suite"

2006 – Dickinson College, Carlisle, PA

Institute in P-KAL (Project Kalidescope)

2005 – National Colloquium, "Translating How People Learn into a Roadmap for Institutional Transformation"

Indiana Academy of Science Annual Fall Meeting

1999 - University of Southern Indiana, Evansville, IN (served as Section Chair)

1998 - Park Tudor High School, Indianapolis, IN (elected Section Chair - 1999)

1997 - St. Joseph's College, Rensselaer, IN (elected Section Chair - 1998)

1996 - DePauw University, Greencastle, IN (elected Section Vice-Chair - 1997)

Acoustical Society of America Meetings

1997 - 133rd meeting, Pennsylvania State University

1996 - 131st meeting, Indianapolis, Indiana

Indiana Space Grant Consortium Annual Meetings

2001 - Purdue University Calumet

2000 - The Children's Museum of Indianapolis, Indianapolis, Indiana

1999 - Rose-Hulman Institute of Technology, Terre Haute, Indiana

1998 - Taylor University, Upland, Indiana

1997 - Ball State University, Muncie, Indiana

American Association of Physics Teachers Meetings

2004 – Miami Beach, Florida

2003 – Madison, Wisconsin

Taylor University Faculty Workshops

Banner Finance, Banner Student, Microsoft Word for Automatic Grading,

Microsoft Front Page 2000, Blackboard