

## VITAE

### DENNIS CHARLES HENRY

Professor Emeritus of Physics  
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Education: Ph.D. in Physics, University of Iowa (1978)  
Thesis: *Magnetic Susceptibility Study of the Alloy System  $SmP_xS_{1-x}$*   
M.S. in Physics, Purdue University (1970)  
A.B. in Physics, Wabash College (1967; Honor Scholar)

#### Academic Positions:

1979-2009 Professor of Physics 1991-2009, Associate Professor 1982-1991, Assistant Professor 1979-1982). Department Chair 1988-97, fall 1999, 2002-2007

1993 Visiting Professor of Physics, School of Physics and Astronomy, University of Minnesota

1979 Instructor of Physics (half-time), Dept. of Physics and Astronomy, University of Iowa

1976-79 Teaching and Research Assistant in Physics, University of Iowa

1970-76 Instructor of Physics and Mathematics, Highland Community College, Freeport, IL

#### Research, Consulting and Industrial Positions:

1980- Consulting Physicist in the areas of applied physics, electromagnetic compatibility and interference, magnetic measurements and materials, and railroad gravity retarder yard control systems; Guideline-Teltech-Intota Expert

1989-92 Research Consultant, High Performance Inorganic Materials, Technology Development Laboratory, 3M Co., St. Paul, MN  
fall 2000

1985-89 Visiting Scientist and Senior Research Physicist, Transportation and Control Program, SRI International, Menlo Park, CA (sabbatical and adjunct appointment)

1981-96 Physics Text Reviewer to: Addison-Wesley, Prentice-Hall, McGrawHill Publishing Co., Worth Publishing, Wm. C. Brown Publishers, Kendall/Hunt Publishing

1981-84 Senior Analyst and Editor, A. J. Hendry, Inc., Consulting Engineers to Railroads and Utilities, St. Paul, MN (part-time contracts)

- 1982-89 Physics Test Author, American College Testing Service (ACT)
- 1979 Space Physics Engineer II (half-time), Dept. of Physics and Astronomy, Univ. of Iowa
- 1969 Scientific Programmer, High Energy Physics Group, Purdue University (summer)
- 1968 Physicist, Quantum Electronics Group, 3M Co., St. Paul, MN (summer)
- 1967 Physicist, SNAP Project, 3M Co., St. Paul, MN (summer)
- 1966 Circuit Designer, Signal Department, Northern Pacific Railway Co., St. Paul, MN (summer)
- 1964 Electronics Instructor and Technician, Hoosier Crown Corp. (summer)
- 1960-67 Self-employed electronics technician and photographer during high school and college

Research and Consulting Interests:

Applied physics and electromagnetics  
Magnetic materials and measurements  
Electromagnetic compatibility measurements and shielding materials  
Problems in railroad control systems and gravity retarder yards  
Railroad passenger operations and equipment (mass transit & intercity)  
North American railroad history: 1934-present

Grants:

Principal Investigator, "Electronics and Instrumentation Laboratory Development Project", NSF-ILI Grant. July 1992-94. NSF share \$23,000.

Proposal author and project coordinator for Physics Department Development Planning Grant from The Research Corporation. 1990. \$6,000.

Co-author and Physics Chair for successful proposal to the F.W. Olin Foundation for \$5.1 million grant for construction of Olin Hall of Physics, Mathematics and Computer Science on the campus of Gustavus Adolphus College, dedicated in June of 1991.

Co-author and editor of successful proposal to the National Science Foundation for CSIP Development of Experimental Modern Physics Laboratory. June 1987-89. Total grant \$57,000.

Grant Administrator and Principal Physics Researcher for J.N. Pew, Jr., Trusts Grant to Gustavus Adolphus College for equipment and support of faculty-student research in science. Five faculty and ten students. 1985-86. Total grant \$108,558, with \$23,630 for physics.

Selected Publications and Commissioned Reports:

"How Humping Works", Dennis C. Henry, Encyclopedia of North American Railroads, Indiana University Press (2007). pp. 287-91.

Planning for Graduate Studies in Physics and Related Fields (Second Edition), Editor, American Association of Physics Teachers, May, 2002. First Edition Editor, August, 1994.

"Resource Letter TE-1 Teaching Electronics", D.C. Henry, *American Journal of Physics*, Vol. 70 No. 1. January, 2002.

"Enhancing Electromagnetism Experiments with Clamp-on Ammeters", D.C. Henry, *American Journal of Physics*, Vol. 69 No. 1. January, 2001.

"Experiments and Demonstrations with Soldering Guns", D.C. Henry and S.A. Danielson, *The Physics Teacher*, January, 1993.

"Rail Rapid Transit Electric Network Simulator Algorithms and Circuit Theory", January, 1986, proprietary study prepared for SRI International.

"Measurements of Magnetic Shielding Factors and Permeabilities for Rigid Steel Conduit at Very Low Frequencies." D. C. Henry, J. E. Bolkcom and M. Miller. *Proceedings*, EMC '86 Colloquium of the Electromagnetic Compatibility Society (Santa Clara Valley Chapter), IEEE. San Jose, CA, April 29-30, 1986.

Contributing author to Physics I Exam File-Mechanics and Physics Exam File III-Electricity and Magnetism published by Engineering Press, Inc., San Jose, CA, January, 1986.

"Will Lightning Erase Magnetic Tapes?", *The Physics Teacher*, April, 1985.

Experiments in Light, Electricity and Modern Physics, Second Ed. Henry, Nelson and Shawhan. Kendall/Hunt Publishing Co., July, 1985.

A Study of the Potential for Erasure of Magnetic Recording Media by Lightning Induced Magnetic Fields in a High-Rise Warehouse. Prepared for Setter, Leach & Lindstrom Architects and Planners and Intel Corp., August, 1983.

Inductive Coordination Study of 161/69 kV Transmission and Rock Island Railroad Signal and Communications Lines Between Owatonna and Faribault, Minnesota. A.J. Hendry, D.C. Henry, F. Mahjouri. Prepared for the Chicago and North Western Transportation Co., February, 1983.

Inductive Coordination Study of Pacific Gas and Electric 12.5/57/115 kV Transmission and Distribution Lines and Tri-Met Banfield Light Rail Transit Line at Portland, OR. A.J. Hendry, D.C. Henry, R.E. Judkins. For Louis T. Klauder & Associates., August, 1982.

Selected Publications and Commissioned Reports (concluded):

"Some Physics at the Railroad Hump Yard." (Cover Article), *The Physics Teacher*, Vol. 20, No. 5, April, 1982.

Study of Inductive Interference to Railway Signals/Pipeline by Arizona Public Service Co. - Palo Verde to Yuma 500 kV Transmission Line. A.J. Hendry, D.C. Henry, R.E. Judkins. Prepared for Southern Pacific Transportation and Pipeline Companies, June, 1982.

Inductive Coordination Study/Transmission Line Route Analysis for the Ben Davis-McCree 138/345 kV Transmission Line, Garland Texas. Vol 2. A.J. Hendry, D.C. Henry, R.E. Judkins. Prepared for Black & Veatch Engineers, September, 1981.

"Revisions of Car Speed Control Software and Tuning Procedures - Pasco Hump Yard." Burlington Northern Railroad Internal Report, April, 1981.

"A Study of Car Speed Control Software - Northtown Hump Yard." Burlington Northern Railroad Internal Report., June, 1980.

"Intermediate Valence in Alloys of SmS with SmP," D.C. Henry, K.J. Sisson, W.R. Savage, J.W. Schweitzer, and E.D. Cater, *Physical Review B*, Vol. 20, No. 5, September, 1979.

"Magnetic Susceptibilities of SmP, SmAs, SmSb, SmBi and Their Solid Solutions with SmS." R.B. Beeken, E.D. Cater, D.C. Henry, W.R. Savage, J.W. Schweitzer, and K.J. Sisson. *Proceedings, Fourteenth Rare Earth Research Conference*, 1979.

Experiments in Light, Electricity and Modern Physics. Henry, Nelson and Shawhan. Kendall/Hunt Publishing Co. July, 1978. (Revised July, 1982)

"Numerical Methods for Solving Two Transcendental Equations which Appear in Fraunhofer Diffraction." *American Journal of Physics*, Vol. 44, No. 3. March, 1976.

Papers and Workshops Presented: (representative list from 1981-2009)

"Low-frequency EMI Measurements and Demonstrations", EMC Troubleshooting Workshop and Design Seminar on Electromagnetic Compatibility and Signal Integrity, sponsored by Kimmel Gerke Associates Ltd. and Tektronix, San Diego, CA, Feb. 20, 2008.

"Examining the Role and Content of Physics Electronics Courses", Invited Paper, AAPT Summer Meeting, Boise State University, August 7, 2002.

"Some Magnetics Tales and Demonstrations", D.C. Henry, Twin Cities Chapter IEEE-EMC Society, March 28, 2001.

Papers and Workshops Presented: (continued)

"Some Implications of Electronic-Ballast Fluorescent Lighting for Physics Laboratories", D.C. Henry and C.J. Ginder, AAPT Summer Meeting, University of Guelph, Ontario, Canada, August 2, 2000.

Staff Workshop on Gravity Retarder Yard Physics, Belt Railway Company of Chicago, November 13, 1998.

Invited paper, "Preparing and Applying for Faculty Positions at Baccalaureate Degree Institutions", D.C. Henry, AAPT Winter Meeting, Reno Nevada, January, 1996.

"Redevelopment of Two Electronics and Instrumentation Courses", D.C. Henry, American Association of Physics Teachers, Gonzaga University, August, 1995.

"Degaussing and other Demonstrations with CRT Monitors", D.C. Henry and Kari Treichel, American Association of Physics Teachers, Notre Dame University, August, 1994, and MAAPT at Gustavus Adolphus, October, 1994.

"Enhancing Electromagnetism Experiments with Clamp-on Ammeters", D.C. Henry and C.F. Niederriter, American Association of Physics Teachers, Boise State University, Boise, ID, August 12, 1993.

"Unusual Laboratory and Demonstration Applications of the Weller Soldering Gun", D.C. Henry and S. Danielson, American Association of Physics Teachers, University of Maine at Orono, August 14, 1992; Minnesota Area Association of Physics Teachers, College of St. Thomas, St. Paul, MN. Bruce Eaton Award for Best Paper on Lecture Demonstrations. April 1992.

"Audio Frequency Characteristics of the Sargent-Welch Helmholtz Coil", D. C Henry and J. Kavanaugh, American Association of Physics Teachers, University of British Columbia, June 29, 1991; Minnesota Area Association of Physics Teachers, College of St. Catherine, St. Paul, MN, April, 1991.

"Our Electromagnetic Environment", Sigma Xi Lecture, Mankato State University, April, 1991.

"Magnetic Shielding Factor Measurements of Rigid Steel Conduits, A.M. Phillips and D.C. Henry, American Association of Physics Teachers, University of British Columbia, June 29, 1991; Minnesota Area AAPT, Mayo Clinic, Rochester, MN, May 5, 1990.

"How Much and What Kind of Electronics Should be a Part of the Undergraduate Physics Major Curriculum?", chaired panel for the Fall 1989 Meeting of the Minnesota Area Association of Physics Teachers, Gustavus Adolphus College.

"Measurements with the KORGE Chromatic Tuner in a Physics of Sound and Music Laboratory." American Association of Physics Teachers, San Francisco, CA, Jan. 18, 1989.

Papers and Workshops Presented: (concluded)

"Measurements of Magnetic Shielding Factors and Permeabilities for Rigid Steel Conduit at Very Low Frequencies." D.C. Henry, J.E. Bolkcom and M. Miller. EMC '86 Colloquium of the Electromagnetic Compatibility Society (Santa Clara Valley Chapter), IEEE. San Jose, CA (April 29-30, 1986). Also presented to Minnesota Area Association of Physics Teachers, Carleton College, October 24, 1987.

"A Study of the Potential for Erasure of Magnetic Recording Media by Lightning Induced Magnetic Fields." American Association of Physics Teachers, College Park, MD, June 28, 1984. Also to Minnesota Area Association of Physics Teachers, October, 1984.

"Transmission Line Modeling of Railroad Track Circuits at Audio Frequencies." American Association of Physics Teachers, San Francisco, January, 1982. Minnesota Area Association of Physics Teachers, May, 1982.

"Some Physics at the Railroad Hump Yard." American Association of Physics Teachers, New York, NY, January, 1981. Minnesota AAPT, May, 1981.

Memberships in Professional Organizations and Honor Societies:

American Association of Physics Teachers (since 1966)  
Institute of Electrical and Electronic Engineers (since 1985)  
Electromagnetic Compatibility Society of IEEE (since 1985)  
Minnesota Area Association of Physics Teachers (since 1979)  
Sigma Xi Scientific Research Society (elected 1978)  
Sigma Pi Sigma Physics Honor Society (inducted 1967)  
Delta Phi Alpha, National German Language Honor Society (inducted 1965)

Courses Developed and Taught at Gustavus Adolphus College:

Electronics and Instrumentation I and II with Laboratory, Classical Physics Sequence with Laboratory, Modern Physics, Experimental Modern Physics, Advanced Mechanics, Electromagnetic Theory, Statistical and Thermal Physics, Condensed Matter Physics, Advanced Topics in Physics: Magnetic Measurements and Materials, Quantum Mechanics, Life Science Physics with Calculus, Senior Seminar, Microprocessors and Instrumentation, Modern Physics Laboratory, Causes and Effects of Electromagnetic Interference, Concepts of Physics: Age of Newton, Concepts of Physics: 20<sup>th</sup> Century Physics, Physics of Sound and Music, Fortran for the Physical Sciences, Railroads in American History, A Short History of Radio & Television Technology with Laboratory. Independent Study Courses in: Numerical Analysis; Theoretical Acoustics.

Representative Professional Service:

Referee, *American Journal of Physics* (1992-present), *The Physics Teacher* (various years),  
*Journal of Applied Physics* (1990)  
APS Spin-up Site Visitation Team Member (2002)  
Associate Editor, *American Journal of Physics* (1995-97)  
Committee on Graduate Education in Physics, AAPT (1991-94)  
President (1990-91) and Program Chair (1988-90) Minnesota AAPT  
Proposal Evaluator and Panel Chair, National Science Foundation (1988-97)  
Gustavus Sigma Xi Club (vice-pres. and president, 1980-82; 1986-88), treasurer (1990-95)  
Judge, Physics Apparatus Competition, AAPT 1984 Summer Meeting  
Judge, Regional and City School Science Fairs (various years)

Representative Campus Committee Service:

Academic Operations Committee (2003-06)  
Chair, Instructional Infrastructure Advisory Committee (2003-05)  
Personnel Committee on Tenure and Promotions (1994-97), Chair 1995-96  
Academic Probations and Suspensions Committee, various years  
Olin Hall of Science Proposal and Project Committee Department. Chair (1988-91)  
Ad Hoc Committee on Post-tenure Evaluation of Faculty (1995)  
Chair, Ad Hoc Committee on Role of Department Chairs (1991-93)  
Ad Hoc Committee on Partners in Scholarship Program Operations (1988)  
Advising Committee on Academic Computing (1986-88 & previous years)  
Undergraduate Research Committee of Sigma Xi (1979-85)  
Committee for Research, Scholarship and Creativity (1984-85, 1987-88)  
Academic Policy and Program & Curriculum/ Review (1980-83, elected at large)  
January Term Committee (1980-83)  
Academic Operations and Achievement Subcommittee (1981-83 and 1986-88, chair 1982-83;  
secretary 1986-87; 1992-93)  
Petitions Committee (1982-83)  
Area D Quantitative and Empirical Reasoning Curriculum Committee (1983-85)

Representative Campus and Department Service:

Research Advisor to Tony Phillips, NSF Predoctoral Fellowship winner (1988-1990)  
Independent study instructor and research advisor for more than two dozen students  
Advisor to Society of Physics Students Club (1979-87)  
Major advisor to an average of 15 upperclass majors per year  
Liaison Officer with dual-degree engineering programs (1988-2000)  
Pre-Engineering Advisor (1980-2001, 2008-09), Pre-Architecture Advisor (1989-95)  
Freshman Advisor (1990-1993)

Representative Campus and Department Service: (concluded)

First-Year Student Registration (multiple years)

Search Committee or outside interviewer for candidates for: Instructional Technology Unit Director; Comptroller; Director of Physical Plant; Director of Academic Computing; Biology faculty; Computer Center staff; Theater faculty; Speech faculty; Mathematics and Computer Science faculty; Psychology faculty

Third-year faculty reviewer (various years)

Host to Nobel Conference, Sigma Xi, and Phi Beta Kappa Lecturers (various years)

Guest lecturer in various courses inside and outside the department

Numerous presentations for admissions events

Recognition addresses for alumni, retiring faculty and administrators

Supervisor of electronics technician (1984-1997, 2002-03)

Arrangements for Minnesota AAPT Meetings on campus (1982, 1989, 1994, 2002)

Short Courses and Workshops Completed:

Electromagnetic Compatibility Troubleshooting Workshop, Kimmel Gerke Associates Ltd. and Tektronix, San Diego, CA, Feb. 20, 2008.

Design Seminar on Electromagnetic Compatibility and Signal Integrity, Kimmel Gerke Associates Ltd. and Tektronix, Roseville, MN, October 4-5, 2007.

AAPT Workshop "Physics on the Web", Univ. of Guelph, Ontario, July, 2000.

AAPT Workshop "Fundamentals of Radio", Boise State University, August, 1993.

FCC Technician Class License Holder N0YVX

AAPT Workshop "Using MathCad" at University of British Columbia, June, 1991.

AAPT Workshop "Experiments in Modern Physical Optics", Bethel College, 1990.

IEEE Short Course "Modern Power System Control Centers", San Francisco, 1985.

AAPT Workshop "Apple Computer Interfacing II", University of Maryland, June, 1984.

NSF Chautauqua Course in Holography at Univ. of Wisconsin-Madison, 1973.

NSF Short Course in Mössbauer Spectroscopy at Argonne National Lab, 1971.