

VITA

I. Personal Data

Name:	Harry D. Downing
Date of Birth:	April 17, 1946
Marital Status:	Widower, no children
Citizenship:	United States
Address	1502 Terracewood Lane Nacogdoches, Texas 75965
Telephone:	Home (936) 569-0067 Office (936) 468-3001

II. Academic History

May 1964	H.S. Diploma (Valedictorian) Manila High School Manila, Arkansas 72442
June 1968	B.S. Physics (Summa cum laude) Arkansas State University
December 1970	M.S. Physics
August 1973	Ph.D. Physics Florida State University

III. Honorary and Professional Societies, Honors, and Awards

Societies

American Physical Society
Texas Section American Physical Society (TSAPS)
Optical Society of America
American Association of Physics Teachers (AAPT)
Texas Section American Association of Physics Teachers (TSAAPT)
Sigma Xi - The Scientific Research Society
Society of Physics Students (SPS)
Sigma Pi Sigma

Honors

- ◆ Four Year Scholarship, Arkansas State University, 1964-68
- ◆ Kappa Mu Epsilon - Honorary Mathematics Society, 1966

- ◆ Senior Physics Award, Arkansas State University, 1968
- ◆ Oak Ridge Nuclear Science Fellowship (did not accept), 1968-69
- ◆ Nuclear Science Fellowship, Florida State University, 1968-69
- ◆ Sigma Pi Sigma - Honorary Physics Society, 1976-present

Awards

- ◆ **Director of Outstanding Thesis (SFASU Sigma Xi Award - 1986)**
- ◆ **Best Pedagogical Paper (1989 Fall Meeting TSAAPT)**
- ◆ **1st Place Low-Cost Apparatus Competition (June 1990 AAPT)**
- ◆ **Outstanding Society of Physics Students Chapter Advisor for 1994 (National)**
- ◆ Finalist for SFASU Club Advisor of the Year, 1994
- ◆ SFASU Physics and Astronomy Teaching Excellence Award, 1998-99
- ◆ **College of Sciences and Mathematics Teaching Excellence Award, 1998-99**
- ◆ Was a Finalist for the 2000 Student Life Award, 1999-00
- ◆ **Robert N. Little Award - Outstanding Contributions to Physics Higher Education in Texas, presented by TSAAPT, 2005 (state award)**
- ◆ **Stephen F. Austin State University Regents Professor 2013-2014**

IV. Work Experience

- ◆ Laboratory Instructor, Arkansas State University, 1966-68
- ◆ Nuclear Science Fellow, Florida State University, 1968-69
- ◆ Research Assistant, Florida State University, 1969-73
- ◆ Teaching Assistant, Florida State University, 1971-73
- ◆ 2nd Lt., Ordinance School-U.S. Army Aberdeen Proving Grounds, MD, 1971
- ◆ 1st Lt., U.S. Army Reserve (Standby), 1973-78
- ◆ Research Associate, Kansas State University, 1973-75
- ◆ Instructor, Kansas State University, 1974-75
- ◆ Assistant Professor, Stephen F. Austin State University, 1975-81
- ◆ Captain, U.S. Army Reserve (Standby), 1978
- ◆ Honorably Discharged from U.S. Army, June 1978
- ◆ Associate Professor, Stephen F. Austin State University, 1981-87
- ◆ **Professor, Stephen F. Austin State University, 1987-present**
- ◆ **Chair, Department of Physics and Astronomy, Stephen F. Austin State University, 1988-2019**

Teaching Summary

- ◆ Teaching physics all levels, 1975-Present
- ◆ Teaching physical science for teachers, 1975-1993
- ◆ **Conducted 27 workshops in physical science**
- ◆ Wrote several lab experiments and edited four lab manuals

- ◆ **Served on 31 Master of Science in Natural Science defenses**
- ◆ Served on several (more than 10) Jamison Bill Committees
- ◆ Developed a physics course for home economics (human science now) majors
- ◆ Advised majors in physics, pre-engineering, pre-architect, physical science, and natural science, 1975-85
- ◆ Served as Director of In-Service Teacher Courses in Physics, 1976-88
- ◆ Supervised Physics Seminar 1976-79, 2016-2018
- ◆ Sponsored the SFASU Engineering Club, 1976-80
- ◆ Served as Chairman of the Physics Freshman Scholarship Committee, 1983-1988
- ◆ Served as major advisor for all pre-engineers and pre-architects, 1984-1988
- ◆ Serving as major advisor for all M.S. in Natural Science candidates with the graduate emphasis in physics, 1984-2019
- ◆ Served as advisor for physics majors and students seeking physics teaching certification, 1988-2000
- ◆ Served on Fabulous Friday Programs, 1982-86, 1990-92, 1995
- ◆ **Have attended well over 60 regional and national pedagogical conferences, 1975-present**
- ◆ Received six departmental merits, five school merits, one chair's merit, and two promotions from 1979 to 1988 (this was under the old merit system)
- ◆ Vice-President TSAAPT, 1994-95
- ◆ President Elect TSAAPT, 1995-96
- ◆ **President TSAAPT, 1996-97**
- ◆ Immediate Past President TSAAPT, 1997-98
- ◆ President before the Immediate Past President TSAAPT, 1998-99
- ◆ Reviewed introductory physics text, 1989-90
- ◆ Wrote questions for MCAT, 1990
- ◆ Have become quite proficient in the production of PowerPoint shows, 2000-present
- ◆ Run reviews the night before exams for all courses for at least 20 years or so
- ◆ Hold office conferences with each student in courses in our major
- ◆ Readily accessible to all my students (My office door is rarely closed when I am not in class.)
- ◆ Have been trained in the use of clicker response systems
- ◆ **Have created for PHY 108 and PHY/EGR 321 over 500 YouTube video solutions of homework problems and video posting of exam keys from 2008-Present. Continue to produce over 100 per year.**

Research Experience

- ◆ Three years experience with high resolution infrared spectroscopic studies of gases including intensity measurements
- ◆ 17 years experience with the infrared spectroscopic studies of acids, salts, and crystals including the determination of optical constants by the Kramers-Kronig phase shift analysis of near-normal incidence reflectances
- ◆ Supervised several undergraduate research projects

- ◆ Served as Program Chair for SFASU Sigma Xi Club, 1984-1986
- ◆ Served as a Sigma Xi Judge at the International Science Fair in Shreveport, Louisiana, May 1985
- ◆ Served as President of SFASU Sigma Xi Club, 1986-1988
- ◆ Delegate to the Annual Meeting of Sigma Xi, 1987 and 1988
- ◆ Served on SFASU University Research Council, 1987-1990 and 1992-95
- ◆ Possess computer programming skills and machine shop skills
- ◆ **Served on 58 MS theses committees**
- ◆ **Major professor for 8 MS theses in physics, one of which won the Outstanding Thesis Award and the only winner ever in physics**

Service Activities

- ◆ Served on search committee for the Chair of the Chemistry Department, 1989
- ◆ Chaired the search committee for the Chair of the Chemistry Department, 2003
- ◆ Chaired the search committee for the Chair of the Biology Department, 2005-06 (Failed search)
- ◆ Chaired the search committee for the Chair of the Biology Department, 2006-07
- ◆ Served on search committee for the Chair of Computer Science Department, 2008-09
- ◆ Served on Dean's search committee for the School of Sciences and Mathematics, 1987
- ◆ Served on Dean's search committee for the College of Sciences and Mathematics, 2004-05
- ◆ Served on Dean's search committee for the College of Sciences and Mathematics, 2012
- ◆ Served as Chair Elect of the SFASU Chairs' Forum 1995-96
- ◆ Served as Chair of the Chairs' Forum 1996-97
- ◆ Faculty Senate, 1991-94
- ◆ Chair of the Biotechnology Taskforce to review the biotechnology program at SFA
- ◆ Directed the Departmental Self Studies for 1988 and 1998
- ◆ **Participated in over 90% of the summer orientations since 1975**
- ◆ **Conducted 60 magic shows for Nacogdoches area students**
- ◆ **Participated in 33 presentations for the Gear-Up Program**
- ◆ Presented a Parent's Day Program, 1990, 1991, 1994-97, 2000-02
- ◆ Presenter at the Science and Technology 2000 program at McCullough High School in Conroe, 1991
- ◆ Accompanied SFASU Admissions to recruitment programs in Arlington, Shreveport, Houston, and Tyler
- ◆ Judge for Nacogdoches Middle School Science Fair, 1991-92
- ◆ Judge for Etoile Elementary School Science Fair, 1993, 1994
- ◆ Judge for Texas Junior Academy of Science, 1991

- ◆ Judged science fair at St. Cyprians school in Lufkin, 1998-99
- ◆ Judged science fair at Center Middle School, 2012
- ◆ Presented four civic club programs
- ◆ Member of Kiwanis, 1988-Present
- ◆ Member of the Nacogdoches Kiwanis Club Board, 1992-95, 2001-03, 2007-2008
- ◆ Secretary, Nacogdoches Kiwanis Club, 2003-07, 2010-2022
- ◆ President Elect, Nacogdoches Kiwanis Club, 2008-2009
- ◆ **President, Nacogdoches Kiwanis Club, 2009-2010**
- ◆ **Recipient of the Kiwanis L. D. Pate Award, 2004 and 2008**
- ◆ **Recipient of the Kiwanis C. T. Bush Award, 2012**
- ◆ **Recipient of the Kiwanis Walter Zeller Fellowship Award, 2016**
- ◆ Worked on Nacogdoches High School Project Graduation, 1989-91
- ◆ Worked with Special Olympics Basketball Tournament, 1989-90
- ◆ Co-chairman of the SFA United Way Drive, 1990
- ◆ Served as charter member of the board of Nacogdoches Hope, Inc.
- ◆ Served on a Jury in District Court 1995
- ◆ **Served on the University Calendar Committee, 2008-2019, Chair of the committee, 2009-2019**
- ◆ **Served as one of the featured speakers at Showcase Saturday program, 1996-2018 (50 of 51 Showcase Saturdays)**
- ◆ **Sponsor, Society of Physics Students, 1981-86, 88-93**
- ◆ **Under my supervision my SPS chapter was selected as an outstanding chapter in the nation seven times in the eleven years, 1982-93**
- ◆ **Served as Zone 10 Councilor of the Society of Physics Students, 1987-1991, Zone 13 Councilor, 1991-1993**
- ◆ Sponsor, Sigma Pi Sigma, 1983-2004

V. Theses

Master's Thesis: Florida State University, Dec. 1970

Title: "Line Intensities of the $10^0 1-00^0 0$ and $02^0 1-00^0 0$ Bands of $C^{12}O_2^{16}$ "

Theses Supervisor: Professor Robert H. Hunt

Doctoral Dissertation: Florida State University, Aug. 1973

Title: "Intensity Perturbations in the 3.0μ Bands of $C^{12}O_2^{16}$ "

Dissertation Supervisor: Professor Robert H. Hunt

VI. Grants

I have applied or co-applied for five Stephen F. Austin State University Faculty Research Grants), one NSF-RIAS grant, one NSF "Honors Workshop" grant, two Welch Foundation grants, three Faculty Development Grants , one College of

Sciences and Mathematics "Mini" Grant, two NSF equipment grants, four Texas Coordinating Board elementary education grants, and two LTV contracts. Four of the Faculty Research Grants, all three Faculty Development Grants, the College "mini" grant, the four Coordinating Board Grants, and the two LTV contracts were funded. Funded grants and contracts are listed below. All total I have been involved with grants and contracts worth \$272,854. A detailed list follows.

- "The Optical Constants of Sodium Sulfate in the Infrared" (SFASU Faculty Research Grant) (1976) (\$2167)
- "The Optical Constants of a Ternary Acid Solution in the Infrared" (SFASU Faculty Research Grant) (1979) (\$1750)
- "The Optical Constants of Sulfur in the Infrared" (SFASU Faculty Research Grant) (1981) (\$2550)
- "The Optical Constants of Molten Sulfur in the Infrared" (SFASU Faculty Research Grant) (1983) (\$3000)
- Consulting with Dr. Marvin Querry at the University of Missouri at Kansas City (College of Sciences and Mathematics Mini Grant) (1984) (\$400)
- "Instructional Leadership In-Service Training Program in Physical Science for Elementary School Teachers" (with Milton Payne and Thomas Callaway) (Texas Coordinating Board Grant) (1986) (\$75,077)
- "Improving the Teaching of the Essential Elements and Descriptors of the Physical Science Curriculum in Grades 3-6" (with Milton Payne and Thomas Callaway) (Texas Coordinating Board Grant) (1986-87) (\$45,426)
- "Improving the Teaching of the Essential Elements and Descriptors in Astronomy and Space Science in Grades K-6 and 8" (with Milton Payne, Charlene Crocker, and Thomas Callaway) (Texas Coordinating Board Grant) (1987-88) (\$46,543)
- "Improving the Teaching Effectiveness in Weather and Atmospheric Science in Grades 5, 6, and 8" (with Thomas Callaway, Milton Payne, and Charlene Crocker) (Texas Coordinating Board Grant) (1988-89) (\$45,355)
- "1990 American Association of Physics Teachers Summer Meeting" (1990) (SFASU Faculty Development Grant) (1990) (\$768)
- "Vapor Phase Absorption Bands For Commonly Found Atmospheric Pollutants" (with Wayne C. Boring) (LTV Electronics and Missiles Group) (1990-91) (\$16,964)
- "1991 American Association of Physics Teachers Summer Meeting" (SFASU Faculty Development Grant) (1991) (\$1415)
- "Vapor Phase Absorption Bands For Commonly Found Atmospheric Pollutants" (with Wayne C. Boring) (LTV Electronics and Missiles Group) (1991-92) (Renewed) (\$17,000)
- "1993 American Association of Physics Teachers Summer Meeting" (SFASU Faculty Development Grant) (1993) (\$945)
- Participated on an Texas Accelerated Science Achievement Program (Texas ASAP) Grant with the Diboll ISD (2005) (\$5494.24)
- Participated on an Texas Accelerated Science Achievement Program (Texas ASAP) Grant with the Diboll ISD (2008) (\$8000.00)

VII. Professional Papers and Seminars Presented

I have presented several seminars at each institution that I have attended as well as at Kansas State University, Southern Arkansas University, the University of Texas at Arlington, Arkansas State University, and the University of Central Arkansas. Below are listed 38 presentations (36 individual papers, 32 presented while at SFA) that I authored or co-authored and that were presented at professional meetings. (I personally delivered the ones indicated by *'s)

- ◆ "Line Intensities of CO₂ Absorption Bands in the 2.0 and 2.7 Micron Regions" 27th Symposium on Molecular Structure and Spectroscopy (1972)*
- ◆ "Coriolis Interaction in the Fermi Triplet 05¹0-00⁰0, 13¹0-00⁰0, and 21¹0-00⁰0 of ¹²C¹⁶O₂" 28th Symposium on Molecular Structure and Spectroscopy (1973)*
- ◆ "The Influence of Solute Ions on the Infrared Absorption of Water" 29th Symposium on Molecular Structure and Spectroscopy (1974)*
- ◆ "Optical Constants of Ammonium Sulfate" 30th Symposium on Molecular Structure and Spectroscopy (1975)*
- ◆ "Optical Constants of Ammonium Sulfate" Texas Section American Association of Physics Teachers (Fall 1975)*
- ◆ "Coriolis Intensity Perturbations in Π-Σ Bands of CO₂" Texas Academy of Science (1976)*
- ◆ "Infrared Reflectance of Ammonium Hydroxide" 31st Symposium on Molecular Structure and Spectroscopy (1976)*
- ◆ "Subtractive Kramers-Kronig Phase Shift Analysis" Texas Section American Association of Physics Teachers (Fall 1976)*
- ◆ "Infrared Optical Constants of Aqueous Solutions of Electrolytes" Texas Academy of Science (1977)*
- ◆ "Infrared Optical Constants of Aqueous Solutions of Nitric Acid" Texas Section American Association of Physics Teachers (Fall 1979)
- ◆ "The Infrared Optical Constants of Aqueous Solutions of Sodium Sulfate" Texas Section American Association of Physics Teachers (Fall 1980)
- ◆ "The Infrared Optical Constants of Orthorhombic Sulfur" Texas Section American Association of Physics Teachers (Fall 1981)
- ◆ "An Electricity and Magnetism Course for Physical Science Teachers" Texas Section American Association of Physics Teachers (Fall 1982)*
- ◆ "An Electricity and Magnetism Course for Physical Science Teachers" American Association of Physics Teachers (Summer 1983)*
- ◆ "INTERACT - A Video Approach to Teaching the Physical Sciences" Texas Section American Association of Physics Teachers (Fall 1984)*
- ◆ "IR Optical Constants of Selected Amino Acids" Texas Section American Physical Society (Spring 1985)*
- ◆ "IR Optical Constants of a Ternary System of 75% Sulfuric Acid, 10% Nitric Acid, and 15% Water" Texas Section American Physical Society (Spring 1985)*

- ◆ "The Infrared Optical Properties of Orthorhombic Sulfur" Texas Section American Physical Society (Fall 1985)
- ◆ "IR Optical Constants of Molten Sulfur" Texas Section American Physical Society (Fall 1985)
- ◆ "IR Optical Constants of Aqueous Nitrate Solutions" Texas Section American Physical Society (Fall 1985)
- ◆ "How to Build a Better Chapter" Zone 10 Meeting Society of Physics Students (Spring 1986) (Invited Panel Participant)*
- ◆ "Experiments With Disposable Hypodermic Syringes" Texas Section American Association of Physics Teachers (Fall 1986)*
- ◆ "IR Optical Constants of Aqueous Carbonate Solutions" Texas Section American Physical Society (Fall 1986)
- ◆ "A Leadership Workshop in Physics for Elementary Teachers" Texas Section American Association of Physics Teachers (Spring 1987)
- ◆ "A Leadership Workshop in Physical Science for Elementary Teachers, The Second Year" American Association of Physics Teachers (Summer 1987)
- ◆ "A Leadership Workshop in Astronomy for Elementary Teachers" Texas Section American Association of Physics Teachers (Fall 1987)*
- ◆ "Teacher Preparedness for Teaching Astronomy in Elementary School" Texas Section American Association of Physics Teachers (Spring 1988)
- ◆ "A Team Approach for Providing In-Service Training in Astronomy for Elementary Teachers" American Association of Physics Teachers (Summer 1988)
- ◆ "SPS Leadership Training" Zone 10 Meeting Society of Physics Students (Fall 1988)*
- ◆ "A Team Approach to Training Elementary Teachers in Atmospheric Science" Texas Section American Association of Physics Teachers (Fall 1988)
- ◆ "Improving Physics Education in Elementary School" Texas Section American Association of Physics Teachers (Spring 1989)
- ◆ "Ray Tracing for a Few \$" Texas Section American Association of Physics Teachers (Fall 1989)*
- ◆ "Infrared Optical Constants of Aqueous Solutions of K_2HPO_4 and KH_2PO_4 " Texas Section American Physical Society (Fall 1989)
- ◆ "Inter-Room Rubber Band Ballistic Missile (IRRBBM)" Texas Section American Association of Physics Teachers (Spring 1990)*
- ◆ "Ray Tracing for a Few \$" American Association of Physics Teachers (Summer 1990)*
- ◆ "How to be an Outstanding Chapter" Zone 13 Meeting Society of Physics Students (Fall 1991)
- ◆ "The Gear-Up Program at SFA" Texas Section American Association of Physics Teachers (Spring 2002)
- ◆ "Optical Properties of Ammonium Nitrate Aerosols" Texas Section American Physical Society (Spring 2002)

VIII. Professional Publications

The following is a list of professional articles: 20 have been published and work has been done that will eventually lead to the submission of 1 more pedagogical and 5 more research articles. All of the published articles are in refereed journals. Two articles were each published in two different journals.

- ◆ "Line Intensities of CO₂ in the 2.0 Micron Region," J. Quant. Spect. Rad. Trans. **13**, 311 (1973) (with R. Hunt)
- ◆ "Line Intensities of CO₂ in the 2.7 Micron Region," J. Quant. Spect. Rad. Trans. **15**, 205 (1975) (with L. Brown and R. Hunt)
- ◆ "Coriolis Intensity Perturbations in Π-Σ Bands of CO₂," J. Mol. Spect. **55**, 66 (1975) (with B. Krohn and R. Hunt)
- ◆ "Optical Constants of Water in the Infrared," J. Geophys. Res. **80**, 1656 (1975) (with D. Williams)
- ◆ "Optical Constants of Solid Ammonia in the Infrared," J. Opt. Soc. Am. **65**, 432 (1975) (with C. Robertson, B. Curnutte, and D. Williams)
- ◆ "Infrared Spectra of Strong Acids and Bases," J. Phys. Chem. **80**, 1640 (1976) (with D. Williams)
- ◆ "Infrared Optical Constants of Aqueous Solutions of Electrolytes. Further Studies of Salts," J. Phys. Chem. **80**, 1950 (1976) (with D. Williams)
- ◆ "Optical Constants of Ammonium Sulfate in the Infrared," J. Opt. Soc. Am. **67**, 186 (1977) (with L. Pinkley, P. Sethna, and D. Williams)
- ◆ "Infrared Band Intensities in Ammonium Hydroxide and Ammonium Salts," J. Opt. Soc. Am. **68**, 429 (1978) (with P. Sethna, L. Pinkley, and D. Williams)
- ◆ "Infrared Optical Constants of Aqueous Solutions of Nitric Acid," J. Phys. Chem. **84**, 2666 (1980) (with T. Boone and K. Fuller)
- ◆ "Wave Demonstration Device," Am. J. Phys. **49**, 375 (1981) (with G. Clayton and T. Callaway)
- ◆ "Physical Science Workshop Course for Elementary Teachers," Am. J. Phys. **50**, 182 (1982) (with G. Clayton and T. Callaway)
- ◆ "Classroom Demonstration of Sunspots," Phys. Teach. **20**, 171 (1982) (with T. Callaway and G. Clayton)
- ◆ "Infrared Optical Constants of Aqueous Solutions of Sodium Sulfate," J. Opt. Soc. Am. **72**, 893 (1982) (with R. Adams and K. Fuller)
- ◆ "Wave Demonstration Device," UNESCO, Bulletin of Low Cost Equipment for Science Teaching, Santiago, Chile (1982) (with G. Clayton and T. Callaway)
- ◆ "Classroom Demonstration of Sunspots," UNESCO, Bulletin of Low Cost Equipment for Science Teaching, Santiago, Chile (1982) (with G. Clayton and T. Callaway)
- ◆ "Infrared Optical Constants of a Ternary System of 75% H₂SO₄, 10% HNO₃, and 15% H₂O," J. Opt. Soc. Am. A **3**, 22 (1986) (with R. Adams)
- ◆ "Experiments with Disposable Hypodermic Syringes," Phys. Teach. **26**, 19 (1988) (with G. Clayton and T. Callaway)
- ◆ "Ray Tracing for a Few \$," Phys. Teach. **29**, 369 (1991) (with W.L. Trikosko and P. Lovell)

- ◆ "The infrared optical properties of orthorhombic sulfur," Appl. Opt. **30**, 4081 (1991) (with K.A. Fuller and M.R. Query)

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