Dr. David V. Guerra

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EDUCATION:

The American University, Washington, D.C.
Ph.D., Physics (August 1993)
Thesis: "SRS in Molecular Hydrogen Pumped By A Tunable Alexandrite Laser. "
M.S., Physics(August 1990)
Project: "Design and construction of a Pulsed Nd:YAG Laser System."

Middlebury College, Middlebury, VT.
B.A., Physics / minors in Computer Programming and Economics (June 1986)
Thesis: "A Model of Stellar Orbits in Rotating Elliptical Galaxies."

TEACHING

Saint Anselm College, Manchester, NH.
Associate Professor of Physics (December 2001 – Present)
Tenured (December 2000)
Assistant Professor of Physics (September 1998 – December 2001)
Chair of the Department (August 2001 – present)
Courses taught: Conceptual Physics I and II (+ labs) ,
Classical (Calculus) Physics I and II (+ labs),
General (Algebra) Physics I and II (+ labs), Modern Physics
Statics, Strength of Materials, Dynamics, Circuits, Thermodynamics.
New course proposed and taught: Meteorology, Special Topics in Physics (Fluid Dynamics)
Summer School: General Physics I & II (2000 (night), 2001(night), 2004, 2005)

College of Life Long Learning (CLL)
University of New Hampshire System, Manchester, NH
Lecturer (September 2002)
Courses taught: Meteorology

Western Maryland College (WMC), Westminster, MD.
Assistant Professor of Physics (September 1994 - May 1998)
Courses taught: Introductory Physics I and II (+ labs), Optics,
Mathematical Physics, Modern Physics (+ labs), Spectroscopy (+ labs), Dynamcis
Intermediate E&M, Astronomy (+ labs), Computer Modeling, Meteorology

Montgomery College, Germantown, MD.
Lecturer of Physics (September 1992 - January 1994)
Course taught: Optics and Modern Physics, for three semesters.

The Bullis School, Potomac, MD.
Teacher (September 1986 - June 1990) Physics, Conceptual Physics, and Economics.
Varsity Lacrosse Coach Head (1987 - 1988), Assistant (1989 - 1990)
Assistant Junior Varsity Football Coach , Defensive Coordinator (Sept. 1986 - Nov. 89)

Middlebury College, Middlebury VT.
Teaching Assistant (September 1983 - June 1986) Physics I and II and the Physics of Sports

CONSULTING:
CPO – Science, Peabody, MA
Consultant – Science Education (September 2002 – September 2004)
Writing four chapters (light, geometric optics, physical optics, and electronics), questions, and other materials for a new physics textbook. Editing of chapters for a physical science text and the physics text.

COLOR - COrporation for Laser Optics Research, Portsmouth, NH
Consultant - Laser System Development (February 2001 – October 2001)
Participating in the development of high-power, Q-switched, diode-pumped, lasers for commercial applications.

Technology and Engineering Inc., VA
Contractor (May - August 1995)
Research at NASA/GSFC on the Raster Scanning Laser Altimeter (RASCAL).
Design and assembly of a CW diode pump, high rep. rate, Q-switched, Nd:YAG laser.

Laser Systems Devices, Alexandria VA
Consultant (December 1994 - January 1995)
Designed a cw Nd:YAG laser and specified vendors for the components.

RESEARCH:
Saint Anselm College, Manchester, NH.
On Campus Project Leader (September 1998 - 2004)
1. *Prototype Holographic Atmospheric Scanner for Environmental Remote Sensing (PHASERS) with NASA - GSFC:* Responsible for the maintenance, operation, and upgrade of the Holographic Optical Telescope and Scanner (HOTS) lidar system. Specifically this includes development of hardware and software algorithms for data collection and analysis.
2. *Solar Irradiance Network* ; A site for the measurement of solar has been established and operated at Saint Anselm College with funding from NASA-Goddard Institute for Space Studies.

Western Maryland College, Westminster, MD.
On Campus Project Leader (September 1995 - May 1998)
Same description as at Saint Anselm College excluding the Solar Irradiance Network.

NASA-Goddard Space Flight Center, Greenbelt MD

Mesoscale Atmospheric Branch, Laboratory for Atmospheres,

1. NASA-ASEE Summer Faculty Fellow (May. 1997 - Aug. 1997)

Lidar research with the PHASERS system at WMC and at NASA-GSFC. The system was operated on a daily basis and atmospheric data was analyzed. Continual upgrades were made to the system, such as computer system integration with Labview and daytime operation requirements. Testing of new HOEs and development of a new source laser was also conducted at NASA-GSFC

2. NASA-ASEE Summer Faculty Fellow (May. 1996 - Aug. 1996)

Lidar research with the HOTS system at WMC and a Scanning Raman Lidar system deployed at NASA Wallops as part of the TARFOX program.

NASA-Goddard Space Flight Center, Greenbelt MD
Photonics Branch: Laser Ranging and Altimetery Section.

1. National Research Council Postdoctoral Researcher (Nov. 1993 - Sept. 1994)

a. *Gain Switched Ti:Sapphire*: Responsibilities include the theoretical and bread-board design of a completely solid-state, compact, frequency-doubled Nd:YAG pumped, gain switched Ti:Sapphire laser.

b. *HOTS Lidar System:* Responsible for the design, assembly, integration, and operation of a frequency doubled diode pumped Nd:YAG as the primary source laser for a Holographic Lidar system.

2. GSRP Research Associate (September 1990 - August 1993)

a. *SRS Project*: Responsibilities included theoretical modeling, bread-boarding, system analysis, and operation and maintenance of an Alexandrite pump laser.

b. Alexandrite Ring: Member of a team which constructed and analyzed an AO Q-switched, BRT tuned, injection seeded ring laser as a possible lidar source.

c. Diamond Photoconductivity: Participated in the design and implements of tests for the measurements of the photoconductivity of diamond thin films in consideration of there use as possible UV detectors.

The Charles Stark Draper Laboratories, Cambridge, MA.

Student Intern (January 1985 and Summer 1985)

Participated in the test and evaluation of guidance systems. Responsibilities included the generation of data reduction programs for the test and presenting overviews of the test concept to government and private industry personnel.

FELLOWSHIPS

1. NASA Research Training Grant, through The American University: 1990.
2. NASA Research Training Grant, through The American University: 1991.
3. NASA Research Training Grant, through The American University: 1992.
4. National Research Council (NRC), Post Doctoral Research Fellowship, NASA-GSFC: 1993
5. NASA - ASSE Summer Faculty Fellowship, Lidar Research, Summer 1996.
6. NASA - ASSE Summer Faculty Fellowship, Lidar Research, Summer 1997

GRANTS AND FUNDING AGREEMENTS:

While at **Saint Anselm College**:

1. Service Learning integration grant from Campus Compact: ($4000.00)
   Proposal written by Dan Forbes and David Guerra (2004-05)
2. Cooperative Agreement between NASA-GSFC & Saint Anselm College, ($16,500.00)
   Operation and development of the PHASERS Lidar System, Summer 2001-2002.

3. Cooperative Agreement between NASA-GSFC & Saint Anselm College, ($15,500.00)
   Operation and development of the PHASERS Lidar System, 2000-2001.

4. Grant from NASA-Goddard Institute for Space Studies, ($17,000.00)
   to establish an MFR site for the Solar Irradiance Research Network. 1999

5. Cooperative Agreement between NASA-GSFC & Saint Anselm College, ($19,200.00)
   Operation and development of the PHASERS Lidar System, 1999-2000.

While at **Western Maryland College**:

1. Cooperative Agreement between NASA-GSFC & Western Maryland College,
   Operation and development of the PHASERS Lidar System, 1997-1998.
2. NASA Grant : Lidar Research at WMC: Summer 1996.
3. Memorandum of Agreement: NASA-GSFC and WMC, HOTS Lidar System, 1995-97.
4. National Science Foundation, ILI Grant "Laser Based Experiments in Physics" 1995-97

Community Outreach

1. Lecture on "Laser Basics" for Senior Citizens Week: May 31, 2001
2. Development of a local atmospheric sensing network
   a. Several hand-held haze detectors have been built by Saint Anselm Pre-engineering students
   b. One hand-held haze detector has been built and tested by Nick Cordella, a local middle-school student.
   c. Sue Bracy, a teacher at Mountain View Middle School, has been contacted and her class will participate in the project during the 2000-2001 academic year.
   d. I designed and built a new hand-held haze detector based on the evaluation of the data from the previous year.
   e. Sue Bracy's class is now testing the old and new designs of hand-held haze detectors during the 2001-2002 academic year.
3. Service Learning Program with Girl's Inc. of Manchester. (2002 – 2003)
   Developed and administered a program, in which students for upper level physics classes acted as consultants for a group of girls competing in a Lego Robotics Competition. This was carried out over two semesters and resulted in student presentations at the Service Learning conference here at Saint Anselm.

Science Presentations at the Villa Augustina (2002 – 2005)

Soccer Coach – Villa Augustina (Fall 2003, 2004, 2005)

Professional Societies (Membership)

The American Meteorological Society (1998 - 2000), (2005-present)
The American Physical Society (1990 - 1998), (2001 – Present)
Society of Physics Students (SPS) Faculty Advisor (1994 - 1996)
chair of the Zone 4 SPS Meeting on March 1, 1997.
American Geophysical Union (1996 - 1998)
American Association of University Professors (1994 - 1998)

Additional Experience:

1. Department Chair (Sept. 1996 - 1998) Western Maryland College
2. NSF - Undergraduate Faculty Enhancement Workshop in Advance Laboratory Experiments Using Lasers; Workshop participant Univ. of Tenn. 7/31 - 8/11, 1995.
3. Society of Physics Student (SPS) and □□□Faculty Advisor at WMC, Sept. 1994 - 98
4. Chautauqua Short Course: Promoting Active Learning in Physics Courses, Workshop participant Dickinson College, June 3-5, 1999

PUBLICATIONS

Book Chapters:
Foundations of Physics: 2003, (Chapters 16, 17, 18, 24 and an Application Section on lasers)
Referenced as a Science Content Consultant in the title pages of the text.

Refereed Publications

"Holographic Optical Elements as Scanning Lidar Telescopes," Schwemmer, Rallison, Wilkerson, Guerra, Lasers and Optics in Engineering, Vol. 44, Issue 9, September 2006.

"Service Learning in Physics: The Consultant Model," Guerra, D., The Journal of Higher Education Outreach and Engagement, Vol. 10 (3), p. 143, 2006.

"A Bernoulli's Law Lab in a Bottle", Guerra, D., Plainstaid, A., and Smith, M, The Physics Teacher, Vol, 43, No. 7pp. 456-45913, October 2005.

"Horizontal Wind Measurements Using The Harlie Holographic Lidar", T. Wilkerson, I. Andrus, J. Sanders, G.Schwemmer, D. Miller, and D. Guerra: , Lidar Remote Sensing for Industry and Environment Monitoring II, Volume 4484, 64-73, 2002.

"Ground Based Operational Testing of Holographic Scanning Lidars,", Schwemmer, G., Wilkerson, T., Sanders, J., Guerra, D., Miller, D., Moody, S.; *Advances in Laser Remote Sensing*, publisher: Ecole Polytechnique, Editors: Dabas, Loth and Pelon, pp. 69-72, France, 2001.

"Prototype Holographic Atmospheric Scanner for Environmental Remote Sensing", D. Guerra, G. Schwemmer, A. Wooten, S. Chaudhuri, T. Wilkerson, Journal of Geophysical Research, Vol. 104, No. D18, pp. 22,287-22,292, Sept. 27, 1999.

"An Introduction to Laser Modeling Studies with a Nitrogen-pumped Dye Laser", D. Guerra, M. Morgan, and D. Coyle, The American Journal of Physics, Vol 67 (9), pp. 803-810, 1999.

"Emphasizing Environmental Concepts and Policies in an Introductory Meteorology Course", D. Guerra, The Journal of Geoscience Education, Vol 47, pp. 362-366, Sept 1999.

"Teaching the Effects of Air Resistance Using the VideoPoint Movies", V. Pagonis, D. Guerra, S. Chauduri, B. Hornbecker, and N. Smith, The Physics Teacher, Vol 35, September 1997.

"The Human Laser." D. Guerra, The Physics Teacher, Vol. 34, March 1996.

"An Interactive Model of Diode-Pumped, Q-Switched / Cavity Dumped Lasers." B. Coyle, D. Guerra, and R. Kay, J. Phys. D: Applied Physics, 28, 452, 1995.

"Completely Solid State Tunable Ti:Sapphire Laser System of Lidar and Atmospheric Spectroscopy." D. Guerra, B. Coyle, and D. Krebs, Meas. Sci. and Tech. **5**, 1306, 1994.

"Stimulated Raman Scattering in Hydrogen Pumped with a Tunable, High Power, Narrow Linewidth Alexandrite Laser.", D. Guerra and R. Kay, J. Phys. B: Atomic, Molecular & Optical Physics., **26**, 3975, 1993.

"Stellar Orbits in Angle Variables II. Two Dimensional Orbits in a Rotating Potential.", D. Guerra and S. Ratcliff, The Astrophysical Journal., **348**, 127, 1990.

Additional Publications

"NASA lidar uses HOEs for lightweight scanning", Schwemmer, Miller, Wilkerson, Guerra, and Rallison, Laser Focus World, June 2002
web address:
http://lfw.pennnet.com/Articles/Article_Display.cfm?Section=ARCHI&Subsection=Display&ARTICLE_ID=145237&KEYWORD=hoe&p=12

"Large Aperture Scanning Lidar based on Holographic Elements", G. Schwemmer, D. Miller, T. D. Wilkerson, I. Andrus and David V. Guerra, 2001: *International Geoscience and Remote Sensing Symposium*, Sydney, Australia, July 9-13, 2001.

"The HOLO Series: Critical Ground-Based Demonstrations of Holographic Scanning Lidars", Proceedings of the SPIE Conference on Lidar Remote Sensing for Industry and Environment Monitoring, Sendai, Japan, October 2000.

"Ground Based Operational Testing of Holographic Scanning Lidars: The HOLO Experiments", G. Schwemmer, T. Wilkerson, J. Saunders,D. Guerra, D. Miller, S. Moody, Proceedings of the 20th International Laser Radar Conference, July 2000.

"Comparison of Two Lidar Methods of Wind Measurements by Cloud Tracking", J. Saunders, T. Wilkerson, G. Schwemmer, D. Miller, D. Guerra, S. Moody, Proceedings of the 20th International Laser Radar Conference, July 2000.

"Observations of Shear-Induced Turbulence using HARLIE", D. Miller, G. Schwemmer, J. Saunders, T. Wilkerson, D. Guerra, S. Moody, Proceedings of the 20th International Laser Radar Conference, July 2000.

"Holographic Optical Telescope and Scanner (HOTS) for lidar applications", D. Guerra, G. Schwemmer, & T. Wilkerson, International Technology Group Newsletter of the International Society of Engineers (SPIE), June 2000.

"Compact Scanning Lidar Systems Using Holographic Optics", G. Schwemmer, T. Wilkerson, D. Guerra, Proceedings of the SPIE Conference on Optical Remote Sensing for Industry and Environmental Monitoring, Sept. 1998.

"Operation of the Prototype Holographic Atmospheric Scanner for Environmental Remote Sensing (PHASERS).", D. Guerra, A. Wooten, S. Chaudhuri, and G. Schwemmer, Proceedings of the 19th International Laser Radar Conference, June 1998.

"Holographic Solid State LIDAR." G. Schwemmer, B. Coyle, and D. Guerra, Proceedings of the International Conference on LASERS' 95.

"Completely Solid State Tunable Ti:Sapphire Laser System." D. Guerra, B. Coyle, and D. Krebs, Laser Tech. Briefs., Summer 1994.

Presentations

"Service Learning in Physics: The Consultant Model" D. Guerra, Proceedings of the APS-AAPT Spring Meeting, MIT, April 2005.

"Service Learning in Physics: The Consultant Model" D. Guerra, Proceedings of the Northeast Regional Campus Compact Conference, April 2004. *(invited talk)*

"A Bernoulli's Law Lab in a Bottle", D. V. Guerra, A. Plaisted, and M. Smith, Proceeding of the Spring NE-APS Meeting, April. 2004.

"An Atmospheric Instrument Development Outreach Program.", D. V. Guerra, N. Cordella, and Sue Bracy, Proceeding of the Spring NE-APS Meeting, April. 2002

"A SAASE Outreach Project – Field Tests of Han-Held Haze Detectors", D. V. Guerra, N. Cordella, and Sue Bracy, Proceedings of the 21th International Laser Radar Conference, July 2002

"Spreadsheet Laser Dynamics.", D. V. Guerra, S. Schnick, Proceeding of the Fall NE-APS Meeting, Oct. 2001.

"Factor Analysis of Temperature, Cloud Altitudes, and Tropospheric Ozone", D. Guerra, J. Schnick, J. M^{c}Lain, A. Maurier, J. Pentleton, and J. Snow, Proceedings of the 20th International Laser Radar Conference, July 2000.

"Atmospheric Remote Sensing During the Summer of 1999 in Manchester, NH.", D. V. Guerra, S. Schnick, Adele Maurier, James McLain, Proceeding of the Fall NE-APS Meeting, Nov. 1999.

"An Introduction to Laser Modeling Studies with a Nitrogen Pumped Dye Laser.", D. V. Guerra and M. A. Morgan II, Proceeding of the Chesapeake Section of the AAPT, May 1998.

"Prototype Holographic Atmospheric Scanner for Environmental Remote Sensing (PHASERS).", D. V. Guerra, G. K. Schwemmer, S. Chaudhuri., Proceedings of the 1998 Spring Meeting of the American Geophysical Union (AGU), May 1998.

Mock Congressional Hearing of the Clean Air Act as the Focal Point of a General Science Level Meteorology Course.", D. V. Guerra, Proceedings of the 1998 Spring Meeting of the American Geophysical Union (AGU), May 1998

"Ground Tests of a Holographic Optical Telescope and Scanner.", D. V. Guerra, G. K. Schwemmer, A. D. Wooten Jr. Proceedings of the 1997 Spring Meeting of the American Geophysical Union., May 1997

"Scanning Raman Lidar Measurements of Aerosol Backscatter and Extinction Profiles During TARFOX." R. Ferrare, G Schwemmer, K Evens, D Whiteman, Y Kaufman, D. Guerra, D Wooten, Proceedings of the 1997 Spring Meeting of the AGU., May 1997

"Prototype Holographic Atmospheric Scanner for Environmental Remote Sensing", A. Wooten, D. Guerra, G. Schwemmer, Bull. Am Phys. Soc.- Transactions A**,**1996. [Fall NES-APS.]

"A Convoluted Demonstration." D. Guerra and N. Smith, Proceedings of SEPA / DE / MD AAPT, Spring 1996.

"Effects of Computational Precision on the Modeling of Q-Switched Laser Pulses." E.C. Allman and D.V. Guerra, Bull. Am Phys Soc. Transactions A, July 1995. [Spring NES-APS]

"Completely Solid State Tunable Ti:Sapphire Laser for Lidar and Atmospheric Spectroscopy." D. Guerra, B. Coyle, and D. Krebs, Bull. Am Phys. Soc.- Transactions A, **3**, July 1994. [Spring NES-APS.]

"Bandwidth Measurements of Radiation Shifted by SRS.", D. Guerra and R. Kay, Bull. Am Phys. Soc., **37**, 9, 1992. [Spring NES-APS.]

"Tunable SRS from Alexandrite Pumped Hydrogen Gas.", D. Guerra, R. Kay, and B. Seery, Bull. Am. Phys. Soc., **36**, 7, 1991. [VII APS ILS.]

"Q-Switched Alexandrite Ring Laser.", B. Zukowski and D. Guerra, T.A.U. CAS RC, 1991.