

CURRICULUM VITAE

NAME: J. Russell Harkay, PhD

RANK: Professor of Physics
Physics Department
Rom S378, Science Center
Keene State College
Keene, NH 03435-2001
Website: <http://academics.keene.edu/rharkay/index.html>

EMPLOYMENT:

1965-67 [Summer]	Color TV Analyst, Westinghouse Electric, Edison, NJ
1968	Electrical Engineer New Product Development Gulton Industries Metuchen, NJ
1969-75	Teaching Assistant Physics Dept. University of Vermont
1976-80	Assistant Prof. of Physics West Virginia Inst. of Technology Montgomery, WV
1980-Present	Assistant, Associate and Full Prof. of Physics Keene State College, Keene, NH

FAMILY: Wife - Kathleen Meyer, M.D.; 1 son (Gregory John), 1 daughter (Kristen Elise)
Home: 220 Hurricane Rd
Keene, NH 03431
(603)-352-6333

EDUCATION: A.B., Rutgers University, 1968
College of Arts & Sciences
New Brunswick, NJ
Major in Physics, Minor in Mathematics

Ph.D. & Teaching Certification in Secondary Physics and
Math Education

University of VT, 1976
Burlington, VT.
Major in Physics [Condensed Matter]
Specialty: Experimental, Thin Films
Physics/Conduction Mechanisms in Ultrathin
Films/Surface Science

AWARDS: Sigma Pi Sigma [Physics Honor Society]
1995 Janet Guernsey Prize for Excellence in and contributions
to Physics Education [AAPT]

PROFESSIONAL SOCIETIES:

American Association of Physics Teachers [President, NES/AAPT 1988-89]
American Physical Society [Executive Board Member, NES/APS, 1989-92],
meeting host, Fall 2001
American Vacuum Society
Materials Research Society
International Planetarium Society
Astronomical League

RECENT RESEARCH ACTIVITIES:

Development of High Resolution UHV-PREL [Plasma Resonance Excited by Light] as an analytical tool, or spectroscopy, for tracking the effect of surface reactions on charge carrier concentration in ultrathin films. Probe also used to identify and analyze various plasmon modes, including multiple plasmons in column one and electron degeneracy removal in column two metals. Established UHV surface science/thin films lab and Hall studies lab with apparatus interfaced to computers. Constructed, in house, a facility for fabricating and testing high-T_c superconductors. Sonoluminescence studies.

PROFESSIONAL OFFICES HELD:

Program Chair, VP and President, AAPT-NES. Section Rep. and Pres., AAPT-Appalachian Section; Executive Council member (4 years) and Chair of Nominating Committee, Educational Outreach Committee, Am. Physical Society - NES.

COMPUTER LANGUAGES:

FORTRAN, Basic, Mathcad, HTML, Powerpoint, Front Page, Word, Adobe Acrobat and Photoshop, Excel, Origin, Labview, Interactive Physics (authoring), some Java

COMPUTER APPLICATIONS:

MS-DOS, MS-Word, MS-Publisher, Excel, Quattro, Reflex, Paradox, Scientific Word, Norton utilities, Graftool, Astronomy Simulation, Software Image Processing, Frequent User and Developer of Internet resources, including downloadable applications and web pages.

RECENT CONSULTING ACTIVITIES:

Legal "expert witness" for accident cases, including preparation of computer models for presentations. Experimental evaluation of structural integrity and thermal performance of energy-efficient glazing custom built for historical structures in the Boston area. Investigating and determining cause of and solving engineering problem relating to infrasound contamination of Science Center leading to resolution of dangerous situation.

NON-PROF. ACTIVITIES:

Member, Secretary, VP, Pres., Westmoreland Lions Club, 1980-present.

Secretary: Cheshire County Extension Council.

Trombonist: KSC Orchestra, band, brass choir, NH symphony.

Secretary, Cheshire County Extension Council

Soccer Coach, St. Joseph School

Assistant Cross-Country Ski Coach, Keene High School

Certified Level II Nordic Coach and NH State Coach

HOBBIES:

Cross-country and Alpine Ski Racing [USSA - Ranked, Masters] and coaching at Junior level

Woodworking, Carpentry, Music - performance, listening to and history of music

Computer recreations and applications, Electronic music, multimedia, fishing

VITA

Name J. Russell Harkay

1] Has tenure been awarded? yes If yes, effective 1985.

2] For service at Keene State College, state:

Present rank: Full Professor Since: Aug. 1991

Previous rank: Associate Professor Since: Aug. 1985

Previous rank: Assistant Professor Since: Aug. 1980 at KSC

Previous rank: Assistant Professor Since: Aug. 1976-May 1980

at West Virginia Tech

3] Indicate education preparation by giving earned degrees:

Degree: A.B. Field: Physics [Minor, Mathematics

Institution: Rutgers University **Date:** May, 1968

Degree: Ph.D. and Educ. cert. Field: Physics [+ degree/certification,

Institution: University of Vermont **Date:** May, 1976

Of note: received \$82K in grant funds to establish the computer-interfaced lab we now have. Spent much time developing labs, including working with Taylor Pancoast and John Odjer this year. We should emphasize the workshop we did at Wellesley and do it again at C.G.A. & Williams College.

4] What are your main fields of teaching interest and competence?

Physics: all Introductory levels [calculus/non-calculus]
Modern Physics, Quantum Mechanics, Thermodynamics and Statistical
Mechanics, Mechanics, Electricity and Magnetism, Solid-State Physics
Advanced Laboratory. [Have taught all the above over the past eight
years.], Physics 100 (developed and taught for several years), Phys 201,
Phenomenal Science.

Astronomy, some Astrophysics, and Cosmology with General Relativity

5] What courses [by number] have you taught? Indicate credit allocations for each course and contact hours in lectures and laboratories. Include independent study and contract courses.

[Cont. on page 4]

At Keene State College:

Phys 121, 122 [3 ch + 2 labs] Technical Physics I, II
Phys 105 Physics of Music [3 ch, inclu, Lab] - developed course
Phys 141 College Physics [3 ch + 2 labs]
Phys 172 University Physics [3 ch + 2 labs]
Phys 243 University Physics II [3 ch + 1 lab]
Phys 244 University Physics III [3 ch + 1 lab]
Phys 260 Electronics [3 ch + 1 lab] - developed course and labs
Astr 101 Elem Astronomy [3 ch + observing/planetarium sessions @ 0 ch]
Astr 307 Intro Astr [3 ch + observing/planetarium sessions @ 0 ch]
Phys 398 [2] Advanced Laboratory [High Magnetics & Laser Lab]
Phys 490 Special Topics [3] - Computer Interfaced Experimental Solid
State Research
Phys 498 Independent Study [2-4] Theo. and Exp. Solid State Physics
Phys 199 Cosmology & General Relativity [3] - Developed Course
Developed Physics 100 - "Physics for all Seasons" and Phys 255 -
Geophysics [which inclu. some outdoor lab exercises in seismology and
electrical sounding
Phys 201, Phenomenal Science (and wrote textbook)

At West Virginia Institute of Technology:

Phys 101, 201 Technical Phys. I, II [3 ch + labs]
Phys 212 University Phys. [for Engineers & Science Majors] 4 ch + labs
Phys 201, 202 College Phys. I, II [3 ch + labs]
Phys 203, College Phys. I, II [3 ch + labs]
Phys 340 Modern Phys. [3]
Phys 399, 499 Advanced Lab [3]
Phys 350 Mechanics [3]
Phys 352 Electricity and Magnetism [3]
Phys 440 Quantum Mechanics
Phys 442 Nuclear Physics [3]
Phys 450 Solid-State Phys. [3]
Geo 201 Physical Geology + lab [4]

6] For how many undeclared students 2, declared majors 2, and individualized majors are you currently serving as advisor?

7] How many master's committees have you chaired during this period?

Thesis option N/A Non-thesis option N/A

On how many additional master's committees have you served during this period?

Thesis option N/A Non-thesis option N/A

8] Publications and Presentations; Reprints or copies of those published or submitted are included in that section of the package. Several others are in preparation for immediate submission. .Titles include:

1. "Measurement and Analysis of Temperature-Dependent RF Impedance of Discontinuous Metal Films on Glass Substrates," Journal of Applied Physics 46, 1976.
2. "RF Studies of Electrical Conductivity in Discontinuous Films as a Function of Temperature and Surface Contamination" under revision as a follow-up to the above in J. Appl. Phys.
3. "A Simplified Approach to Classical Current-Photon Interactions" [Using a Forced Quantum Harmonic Oscillator Model] previously submitted to J. Math Phys and presently being typed in revised form for American Journal of Physics, using a Scientific Software Package [Scientific Word] in Spring, 1993.
4. "Use of Cenco Moment of Inertia Apparatus as a Compound Pendulum for Measuring g by Kater's Method" presented at Nov., 1977 meeting of the Am. Assoc. of Physics Teachers, Appalachian Section, Marshall Univ.
5. "Fresnel Ether Drag as a Manifestation of Relativistic 'Classical' Doppler Shift Calculations" Presented to and subsequently published by Am. Assoc. of Phys. Teachers, Appalachian Sect., Bethany College.
6. "Adaptation of Atomic Absorption Spectrophotometer to Thin Film Measurements in Ultra-high Vacuum,; presented at Nov.. 5, 1983 meeting of the Am. Physical Society, N.E. Section, and published in APS Bulletin.
7. "Washboard Roads as a Manifestation of resonance in Auto Suspension Systems," in prep for publication in The Physics Teacher. Photos and data complete, awaiting some technical data from Ford Motor Co. using Math Cad package and Compaq 386/20 to perform statistics and produce graphics and plots, Spring, 1993.
8. "Snow Patterns in the Thermal Flow" a response to A. Bartlett's "Thermal Patterns in the Snow" in The Physics Teacher, based on pictorial evidence taken during winter and treatments of Time Ice Formation found in Meteorology texts.

Assisted following students with research and preparation of papers presented at the 38th Annual Eastern Colleges Science Conference, April 12-14, Providence College, based on my experimental research program:

9. "Design Aspects of the UHV/Optical Interface and Sample Manipulation in Thin Film Photometry. [R. Crowdes]
10. "Electronics for Interfacing A Microcomputer to Vacuum system Components and a Spectrophotometer. [L. Artz]
11. "Polarization and Optical Activity of Sapphire Viewpoints in UHV Spectrophotometry" [B. Franck]

12. "Application of an Apple II Microcomputer to UHV/Thin Film Photometric Measurements" [R. Carter]
13. Plasmon Absorption and Polarization Phenomena in UHV Spectrophotometry using Sapphire Viewpoints, presented to American Physical Society, April 7, 1985 Conference, Brown University; abstract published by APS.

Grant Proposal to Purchase Thickness/Deposition Rate Monitor or Buy Oscillator Head for Sloan Monitor to Alumni Assoc., 1988 Denied-Equipment not funded by agency.
14. Cosmology and the Inflationary Universe, presented at KSC Science Colloquium, 1986.
15. Optically Stimulated Plasma Resonance in Bismuth and Thallium Films as a function of surface contamination, presented at Am. Phys. Soc. Conference, April 23, 1988, Abstract published by APS.
16. UHV Plasma Resonance Detection as a Diagnostic Tool for Surface Reactions, APS Bulletin, 31, 1 p. 121 [1986].
17. Newton's Law of Cooling and Thermal Conductivity Quantified, presented to AAPT and published by New England Section, L. Cadwell, ed.
18. The Use of Beats to Measure an Acoustical Doppler Shift: an analogy to radar Speed Traps, presented at AAPT conference at Choate/Rosemary Hall.
19. Solar Green House Thermodynamics, a Computer-Interfaced Study, presented as KSC, 1987, in preparation for publication in the Physics Teacher.
20. Photons and Plasmons, presented at the University of Vermont as invited Colloquium Speaker, March 2, 1988.
21. Optically Stimulated Plasma Resonance Studies at KSC, presented as Invited Science Colloquium Speaker, Norwich University, January 25, 1989.
22. Grant proposal to KSC Faculty Development Fund for Deposition Monitor Head and Quartz window for Reflectance Studies, 1989.
23. Free Charge Carrier Concentrations in Clean Ultrathin Films from Optically Stimulated Plasma Resonance, APS Bulletin, 33, 6, p. 1260 [1988].
24. High resolution PREL using IGOR for Optical Constants and Carrier Concentrations in Thin Films, presented at Am. Physical Soc. Conference, Fairfield, CT., April 8, 1989; APS Bulletin, 34, 8, p. 1855 [1989].
25. Determination of Optical constants of Alkali Metals using PREL, R. Andosca* and P. Chapman. Presented to APS.

26. Using the IGOR Graphics Package to Increase Resolution of PREL via Computer Enhancement, P. Hornblad* and J. Newcomb. Presented to APS.
27. Observations of Bulk Plasmons and determination of Optical constants for Alkali and Other Metals, presented at Am. Phys. Soc. Conference, April 8, 1989; APS Bulletin, 34, 8 p. 1855 [1989].;
28. Optically Stimulated Plasma Resonance as a Diagnostic Tool Optical constants and Surface Reaction, 36th Nat'l AVS Symposium, October, 1989, Boston, MA; Proceedings published in Journal Vac. Sci. and Technology
29. [presented by Ku-Ding Tsuei] Identification of Multipole Plasmon Modes in Free Electron Metal Films, at the 1991 Winter meeting of the APS, Anaheim, CA.
30. Comets; Solar System Astronomy, published as a contributing author to Magill's Survey of Science, Salem Press, Englewood Cliff, NJ [1989].
- 30 (a) Other presentations to APS, 1991-2002:
 - “An Inexpensive Biophysics Laboratory Apparatus for Acquiring Pulmonary Function Data with Clinical Applications” (with presenter G. J. Harkay)
 - “ Incident Angle dependence of Photoinduced Surface relief gratings on Azobenzene Containing Polymers (presenter- Adam Cooney)
 - “UHV Plasma resonance Studies of Strontium Thin Films” (with students Andrew DeLisle, Adam Kelly, and Jason Bemis)
31. Presentations to NES-AAPT:
 - One every fall and spring meeting for the past several years, including demos. Some include Path of Least Time, Biggest Fritos Rise to the Top, Vampire Stake, Inexpensive Pousseuille's Law Apparatus, Newton's Law of Cooling and Thermal Conductivity apparatus, Modifying the bore of a Trombone to Demonstrate Harmonic Content, A Program for Determining Room Resonances and Comparison with Experiment, An Acoustical Analogy to Radar Speed Determination using the Doppler Shift, collapsing a 55-gal. drum, Light bulbs in LN₂, etc.
 - Invited Paper presented at 1992 summer National Meeting of AAPT, 1992, Orono, ME -- "The Physics and Biomechanics of Cross Country Skiing", an analysis of the kinematics, dynamics, energetics, and relative efficiency of classical and skating techniques based on data collected in biomechanical studies performed in the US and Finland. This was a 1/2 hour invited talk, similar to one presented last year to the NES-APS.
32. 45 minute paper at November 6, 1992 meeting of AAPT-NES at USCGA: "Surveying your campus electrostatically-Lab application from Geophysics."

33. Co-chaired 1 hour session on Pre-Secondary Physics Teaching Curricula and certification at the 11/6/1992 AAPT-NES meeting, USCGA.
34. Developed and presented a workshop for Secondary and College Physics Teachers: "Novel Computer-Interfaced Experiments using the Champ DOS System" twice. Joint APS-NES/AAPT-NES meeting, November, 1992 at USCGA.
35. Workshops attended: at least one at each AAPT-NES meeting for the past 10 years, most of which have related to computer interfacing and novel methods for physics teaching.
36. Attended conference on novel approaches to science teaching and integration of new technologies at Union College, March, 1992.
37. Modified a 386/PC computer to convert VGA graphics to NSTC and developed script multimedia astronomy presentations based on "Dance of the Planets" software using projections TV in large lecture halls. Will also be presented at the AAPT Regional meeting, Nov. 11-13, 1993.
38. Have constructed a "repertoire" of over 100 physics demonstrations, most of which are on VHS format tape. Many have been distributed to other institutions by electronics B.B. request, including Purdue University.
39. Presented Professional Development [PEPT] Seminar at KSC, May, 1991: "The Role of Demonstration in Science Teaching."
40. Have developed a naval course and materials [exam banks, study guide, computer presentations, demonstrations] entitled "Physics for All Seasons" currently [1993] working on a text for Little, Brown, & Co.
41. Physics and Astronomy Resource Person for Keene Sentinel, Manchester Union Leader, WKNE and WKNH.
42. PEPT presenter, 1995: Use of Computer Multimedia in the Classroom and Lab.
43. Have attended APS and AAPT meetings [3/year] every year to date, usually as a presenter.
44. Fall, 1996 -- Developed entirely new set of 10 labs for College Physics II, including several computer interfaced labs using probes to measure temperature, sound, light and magnetic fields.

Fall, 2003—developed new lab exercise and built apparatus for teaching non-conservation of energy and damped harmonic motion
45. Summer 2001 and 2002—worked on NSF Project inspire grant and evaluated commercial kits for teaching by inquiry and began development of my own curriculum

46. Fall 2002 (sabbatical) – fall 2003—Authored textbook, entitled “Phenomenal Physics, A Guided Inquiry Approach (ISBN 1-59399-098-7) At the same time, developed 28 exercises for Phys 201, Phenomenal Science and beta tested several with elementary students in NJ.
47. Spring 2004-developed an additional 20 exercises for the above, edited text, and doubled the size. Publication of second edition scheduled for December, 2004.
48. A few more presentations to AAPT:
 April, 1999- “Modified Vena Contracta Experiment”
 “Dynamic Rubber Band Hysteresis”
 April 2000- “Teaching Electricity to Biology Majors via Frog Nerve
 Conduction Studies using an interfaced Computer”
 “Cooling Curves of Hot Potatoes vs. Surface to Volume Ratio”
 and “Validity of Newton’s Law of Cooling”

“This Spud’s for you II” –why and how food continues to cook after removed from the source of heat (based of interfaced computer measurements of thermal gradients)

“Educational Opportunities at the Penn State NNF” fall 2003, Bates College

“EM Noise and dancing nightlights” spring 2004, Phillips Exeter

“The Use of ‘Quantum Boards’ in teaching Quantum Numbers at the Elementary Level” (fall, 2004)

“A new Blinky-How to Build and use an Improved miniature Strobe for Visualizing Motion” (with workshop presentation) (spring, 2005)

“The Versatile Soda Straw Wave Machine”, fall 2004, Univ. of Hartford (article also submitted to “The Physics teacher”, journal of AAPT.

Textbook published 2004 (second edition of original published 2003): “Phenomenal Physics, A Guided Inquiry Approach”, ISBN 1-59399-171-1, 377 pp., illustrated.

RESEARCH

"Discovery of Multipole Plasma Resonances as verification of correct mathematical model of the electron profile at the surface of metals."

Presented to APS-NES

" " APS National for me by Ku-Ding Tsuei, a post-doc, now at Brookhaven in prep. for Phys Rev B & J Appl Phys. and Journal Vac. Sci. Tech. [when T3 for windows arrives]

Paper presented to the AM. Vacuum Soc., National Meeting, October, 1990 on “Use of UHV-PREL to detect Changed in Charge Carrier Concentrations.

[Presented by Ku-Ding Tsuei] Identification of Multiple Plasmon Modes in Free Electron Metal Films, at the 1991 Winter meeting of the APS, Anaheim, CA.

See above: Thin Film Studies - Electrical conduction via tunneling -
Probing Surface Contamination using
HVPREL
Multiple Plasmon Detection in Column I
Metals

Most recently: [1995 to present] Experimental Verification of an Anomalous
Plasmon Absorption Mode in Ca Films

Electron Degeneracy Removal in Sr Films
using HVPREL spectroscopy

Verification of tribological models for dry and
lubricated friction including the velocity
dependence of wax and structure with
applications for Nordic and Alpine Racers (in
collaboration with Z. Caldwell, Olympic Ski
Technician

Application of plasma resonance spectroscopy
(developed by JRH) to biological systems and
medical imaging applications (in collaboration
with the PSU NNF)

GRANTS AWARDED

U.S. Dept of Energy: "Ultrahigh Vacuum Studies of metals on coal surfaces
with Poputical Applications in Liquefaction Process" - Equipment Grant (total
\$95K)

IBM/Peerless Insurance: \$30K Grant to establish a Computer - Interfaced
Physics Lab at Keene State College

Two Presidential Research Grants, Three Faculty Development Grants, One
Talent Grant, five student research grants, KSC

NSF grant "Project INSPIRE", approximately \$300K, coauthored with Sally
Jean, KSC Chemistry

HONORS

Recipient of the 1995 Janet Guernsey Prize for Excellence in, and contributions to physics in teaching in New England. Awarded by the American Association of Physics Teachers.

RESEARCH PERFORMED WITH UNDERGRADUATES AT KEENE STATE COLLEGE:

1. PhD: Electrical Conduction Mechanisms in Discontinuous Ultrathin Metallic Films and Effects of Surface Reactions

Past Several Years at Keene State College: Development of High Resolution UHV-PREL [Plasma Resonance Excited by Light] as an analytical tool, or spectroscopy, for tacking the effect of surface reactions on charge carrier concentration in ultrathin films, including computer-interfaced data collection and analysis.

2. Detection of the existence and determination of the energy value of multipole surface plasmons in four column one alkali metals - Na, K, Cs, Rb (only lab to do so using optical methods-results verified by collaboration with Plummer, et.al. at Univ. Penn. Have also detected "extra" resonances in Ca and Sr indicating a removal of heretofore undiscovered electron degeneracy and disproving validity of current theoretical models for the behavior of the electron profile at the surface of clean metals.. Values for multipole resonances obtained substantiate the supercomputer model for the electron profile at metal surfaces recently developed by a German-American collaboration. This was one of three models. Since the other two are ruled out by the existence of and values for multiple plasmons, a 30-years old argument among surface scientists has finally been resolved. Nearly identical results were obtained for the two metals they studied by a group at the University of Pennsylvania headed by Ward Plummer, using an entirely different spectroscopy -- electron energy loss. The post-doc who did the actual research, Ku-Ding Tsuei, reported their results and mine at the 1991 Winter meeting of the APS in Anaheim. Our results have also been published in the journal THIN SOLID FILMS.

3. Interfacing a personal computer to a Jarrel-Ash spectrophotometer taken from an old Atomic Absorption Spectrophotometer for data collection and analysis. Software was written in-house for this purpose. Data was later sent to the VAX via modem, then to the MAC lab for graphical analysis using a program called IGOR. This increased resolution by nearly two orders of magnitude. The spreadsheet program EXCEL was learned and used to rearrange data to be used by IGOR. All data now collected directly via Das-16 board and Keithly Easyest software and analyzed directly in Excel with export to Origin for graphing. Have also added ability to perform reflection spectroscopy in S2000.

4. A technique was developed for determining the specific rotatory power of biaxial xtals in any direction [along any axis] by fitting experimental data to the Auchy Equation. I am still seeking a geologist or geology student who would like to co-author a publication in a journal of optical techniques in geology. I presented this, along with

plasmon results, in an invited talk to the faculty and students of Norwich University. The geologists in the audience found the technique very exciting and are interested in co-authoring, if no one at Keene State does this.

5. Shifts in the bulk and surface plasma resonance energies were successfully identified using UHV-PREL [a technique never used before -- samples always had to be removed from vacuum and were contaminated by air in a small fraction of a second] when metal film samples were exposed to pure CO, CO₂ O₂ and methane at 10 EE-6 Torr using a Granville-Phillips leak valve. Decreases in conduction electron concentrations on the order of 1-10% have been identified.

6. A \$10,000 thickness and deposition rate monitor was obtained and I received a faculty development grant which I used in 1991 to purchase the necessary cooling head and quartz xtal oscillator holder to get my system. Four research students will be installing and calibrating the monitor this fall. We hope to use it to produce films of known thickness for Hall and magnetoresistance studies this year.

7. With the assistance of Louis Drozd, I rebuilt and modified the 14,000 Gauss magnet from a Varian NMR unit in S332 for use in conjunction with the above. All power and plumbing are also in place, with the unit ready for high magnetic field research. This lab in which students performed all studies as part of their advanced lab work, had been updated to include a large Argon laser for fluorescence studies and was fully functional as of 1995. In 1996, it was dismantled to make room for a faculty office and the promised new facility [old darkroom] has not been remodeled. Thus, the apparatus remains idle as of 11/96.

8. All of the above projects have been performed, without compensation, as part of UNDERGRADUATE RESEARCH. A large number of students have benefited, and at least 10 presentations have been made to APS. I can give you titles and copies of abstracts for inclusion in the report. Several students have also presented papers at ECSC, with funding provided by Dean Leverage. The primary role of my research has been to involve and train students in research techniques, including ultra-high vacuum, computer interfacing, data reduction/analysis and interpretation, elimination of unwanted structure [noise] in data, opto-electrical properties of conducting and semiconducting materials, thin film techniques, even how to present results to a trained audience, rather than the production of publications which might be inaccessible to our undergraduates. This is not to say that publications are not forthcoming -- I am working on several now that I have obtained a suitable scientific publishing software package for the PC. It should be pointed out, as well, that this approach has benefited Keene State College and our program, as well as our students, in that we have gained prominence in the New England region as an undergraduate research institution thanks to our exposure at sectional meetings of the APS. Another result was my election to the Executive Council of NES-APS, along with colleagues from very prestigious institutions, eg. Yale, Fairfield, Harvard, Bates, Smith, Dartmouth, etc. I have chaired the Nominating Committee of APS and served on the Educational Outreach Committee.

9. Current directed research involves installation of a new A/D data collection system and programming language for the PC platform. This includes programming the computer at the base address level, setting interrupts, etc. Students will be performing transmission studies when the system is fully operational.

10. Identification of removal of surface electron degeneracy, requiring refinement of RPA model. This is manifested by a splitting of the bulk plasma resonance dip or peak into two distinct halves when optically exciting resonance in Column II metals using deep UV light in the 280-320 nm range. Worked on this and the Sr project with students Andrew DeLisle, Adam Kelly, Jason Bemis, Matt Gwinn, and Adam Cooney from 2000-2003, when I left for sabbatical. Lab has been shut down since, due to Science center modification. Shifting work to out-of-house as it was decided in spring 2004 that our major would be terminated and no more students would be available to be involved in research. Further, the mission of the Division has been redefined such that "University-level research will no longer be supported". In addition, anomalous magnetoresistance studies will not take place since the electromagnet I modified for this purpose was thrown out during the construction phase, in spite of a space in a project lab being designed to accommodate it, including the necessary power and water supplies. Lab gifted to UCSD (University of California San Diego). Plans are to continue working with the PSU group as a collaborator or with other groups at RPI and U Lowell. There is a possibility that I may be researching solid state physics reaction mechanisms in solids driven by UV light in collaboration with Dr. J. Jasinski, KSC Chemistry. Much time formerly spent performing research will be allocated to textbook authoring.

11. Start-up project just getting underway: "Effects of short-wavelength UV Radiation on Transparent materials Finding Commercial Building and Solar Applications". The production of color centers in solids will also be investigated, using a deuterium lamp funded via faculty research grant.