

UNIVERSITY OF NEW HAVEN PHYSICS DEPARTMENT, 300 ORANGE AVENUE , WEST HAVEN, CT 06516

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## Education

Ph.D. *EXPERIMENTAL NUCLEAR PHYSICS*

National Superconducting Cyclotron Laboratory / Michigan State University, East Lansing, MI.

B.S. *APPLIED PHYSICS, MATHEMATICS MINOR*, Michigan Technological University, Houghton, MI.

A.A. *PHYSICS*, Miami-Dade Community College, Miami, Florida.

## Experience

**Assistant Professor**, Sept 1998 — Present.

*University of New Haven Physics and Education Departments*

*West Haven, Connecticut.*

- Joint appointment in the Physics and Education Departments. Teaching duties in graduate level education include courses related to the sciences, basic computer skills and applications, and integration of technology and the WWW into the classroom. Physics instruction consist of the core undergraduate physics courses. I will continue development of new and innovative methods for integrating education and the WWW, and be involved with research to determine its effectiveness in the classroom environment.

**Educational Multimedia Development**, June 1996 — Present.

*Several organizations including Princeton Plasma Physics Laboratory,*

*Oak Ridge National Laboratory, COSI Toledo, Worth Publishers, and Science Curriculum Press.*

- Currently developing an educational CD-ROM entitled "Exploration of Physics" that will be aimed at the high school level. The CD will have over 45 detailed simulations including mechanics, electronic circuits, optics, properties of fluids, ideal gas, electricity and magnetism, and a variety of educational "simulation" games. Materials to aid both the students and instructors will accompany the CD.
- Have created "Concept Testing" simulations for the CD-ROM (and WWW) that will accompany the 4<sup>th</sup> edition of Tipler's *Physics for Scientists and Engineers*. The CD will integrate the full multimedia experience available via CD-ROMS, and up-to-date material will be available on the WWW through selected links to topics relevant to each chapter of the textbook.
- Developed educational "modules" (K-12 level) for the IPPEX (Internet Plasma Physics Education eXperience) Site which are being implemented as outreach education. The material is accessible via the WWW and implements Macromedia's Shockwave technology. IPPEX was funded through a NSF grant and is currently being "field-tested" at several high schools in New Jersey. The site has been highly recognized as an innovative method to integrate cutting edge research with basic K-12 education. Similar outreach educational material was created for the ORNL Mouse House which allowed students to breed "virtual mice" on the web and learn about genetics and statistics.
- Authored floppy-based interactive material for COSI Toledo (a science museum) that enabled science teachers (K-8) to introduce "small scale" simulations of science exhibits to students who would later explore the full scale exhibits at the museum. A wealth of pre-visit information was also available to the teachers including maps, answers to common questions, and instructions for many science demonstrations that could be done in their classrooms with common household supplies.
- Design and development of my own interactive science web site that is being extensively used by K-12 and higher education teachers. The site (located at <http://www.explorescience.com/>) has been featured at several teacher conferences as an example of how the web can be used for instructional purposes. The site has been recognized by many organizations including Popular Science (September 1998) magazine as one of the "50 Best Science and Technology Sites of 1998", a USA Today Hot Pick, a featured science site by Wall Street Journal Interactive Edition, a listing as

a “Top Ten Site of the Month” by Exploratorium, and was used on Macromedia’s “Main Attraction” promotional CD which showcased the most innovative use of Shockwave technology available on the internet.

**Lecturer**, Jan 1997 — June 1998.

University of Michigan Physics Department

*Ann Arbor, Michigan.*

- Responsible for teaching calculus-based introductory physics laboratory to ~160 students per semester. Job duties included 20 contact hours/week of lab instruction, development of course material, and grading of weekly quizzes, “research notebooks,” and formal reports required of the students. Four hours/week was devoted to office hours in a physics help room available to all undergraduate students with physics questions – ranging from non-calculus based laboratory analysis to theoretical astrophysics questions.
- Developed web-based interactive simulations of the introductory experiments performed during the laboratory courses. This enabled students to further explore the basic physics concepts at their own pace when in-class time became a constraint, and instructors are able to use the simulations during their own office hours when explaining concepts to their own students.
- Actively participated in educational training courses designed to introduce new graduate students to the many difficulties involved with teaching. Topics included having to deal with a wide diversity of students, plagiarism, ethical issues, grading, and time management skills. Many role-playing exercises were employed to simulate both individual student concerns and the classroom environment.

**Graduate Research Assistant**, Sept 1989 — June 1996.

National Superconducting Cyclotron Laboratory (NSCL)

*Michigan State University, East Lansing, Michigan.*

- Proposed, coordinated and performed thesis experiments. Extended the body of knowledge pertaining to projectile fragmentation. Explored possible termination points of the rapid proton capture process, developed systematics to predict momentum transfer of fragmentation pick-up products, and obtained a new parameterization for the “memory” effect.
- Thorough knowledge of many devices used for experimental analysis. Those at the NSCL include the Reaction Product Mass Separator, A1200 Fragment Separator, and S320 spectrometer. I have also participated in experiments performed at Lawrence Berkeley Cyclotron Facility and the Indiana University Cyclotron Facility.
- Actively participated in collaborations with other institutions including: Notre Dame, Argonne National Laboratory, Berkeley National Laboratory, the University of California, and the University of Michigan. Several experiments were international collaborations comprised of scientists from Europe and Japan.
- Extensive experience in particle detector systems and analog/digital signal processing design. Familiar with many standard experimental procedures used in the field of secondary beam development, including spectrometry, Wien separation, and performing beam optics calculation. Experience with the practical use and testing of various detectors including: silicon detectors, BaF<sub>2</sub> and NaI crystals, parallel-plate avalanche counters, and a variety of scintillators.
- Knowledge of many skills necessary for experimentation including practical machining (milling, lathing, and drilling on a wide variety of metals and plastics), basic electronic skills (circuit design, construction, and testing), and high vacuum system implementation ( $\sim 10^{-7}$  torr).

**Teaching Assistant**, Sept 1987—Sept 1989, Jan 1994 — June 1994.

Michigan State University Physics Department

*East Lansing, Michigan.*

- Laboratory instructor for the introductory physics laboratory aimed at pre-medical students. Duties included developing quizzes and questions for use by all teaching assistants, grading, and setting up laboratory equipment for classroom use. I rewrote several of the lab procedures which helped provide clarity for the students, and are now being used in the present laboratory manual.

- Held the position of “Person-in-Charge” for the Competency Based Instruction course. Responsibilities included supervision of 12 undergraduate assistants, grading supervision for ~200 exams/day, regularly updating course material, and dealing with students who had complaints concerning grading.
- Routinely attended national educational conferences to stay informed of the current concepts/ideas being developed across the country at both the college and K-12 levels.

## Professional Skills

- Expertise in making cogent presentations in both formal and casual settings.
- Vast experience with a wide variety of software including FrameMaker, Photoshop, Canvas, Mathematica, Adobe Illustrator, QuarkXPress, DeBabelizer, and all components of Microsoft Office. Practical experience with multimedia software including Strata StudioPro, all components of Macromedia Multimedia Studio, Infini-D, and Adobe Premiere.
- Practical experience programming in FORTRAN and the VAX/VMS operating system and extensive work with LINGO (the OOP associated with Macromedia Director). Working knowledge of programming in C/C++, the UNIX operating system, and the practical application of computer networking within the Macintosh operating environment.
- Extensive knowledge of HTML Web Page design. Have experience with HTML 3.0, forms, graphical mapping, CGI scripts, and recent web tools including RealAudio, Shockwave multimedia, and a vast array of “plug-in” technology.

## Professional Affiliations

American Association of Physics Teachers (AAPT).  
 American Physical Society, Division of Nuclear Physics (APS).

## Publications in Peer Reviewed Scientific Journals

- First Author**
- 1) R. Pfaff, D.J. Morrissey, W. Benenson, M. Fauerbach, M. Hellström, C.F. Powell, B.M. Sherrill, M. Steiner, J.A. Winger, “Fragmentation of  $^{78}\text{Kr}$  Projectiles”, Phys. Rev. C **53**, 1753 (1996).
  - 2) R. Pfaff, D.J. Morrissey, M. Fauerbach, M. Hellström, J.H. Kelley, R.A. Kryger, B.M. Sherrill, M. Steiner, B.M. Young, J.S. Winfield, J.A. Winger, “Projectilelike Fragment Momentum Distributions from  $^{86}\text{Kr} + \text{Al}$  at 70 MeV/nucleon”, Phys. Rev. C **51**, 1348 (1995).
  - 3) R. Pfaff, B.M. Young, W. Benenson, J. Clayton, D.J. Morrissey, N.A. Orr, T. Reposeur, M. Thoennessen, J.A. Winger, “Target Isotope Effect in High Energy Photon Production at  $E/A = 10$  MeV”, Z. Phys. A **347**, 67 (1993).
- Recent**
- 4) A.P. Post-Zwicker, D. Barnes, D. Carroll, W. Davis, R. Pfaff, D.P. Stotler, M. Williams, J. Baron, M. McKay, E.A. Friedman, “Using the Internet for Plasma Physics Education”, presented at 17th IEEE Symposium of Fusion Engineering, San Diego, CA., submitted to Journal of Science Education and Technology.

*(complete publication list available on request)*

## Conference Presentations

- 1) Spring Meeting of the APS/AAPT, Columbus, OH, April 1998.
- 2) Spring Meeting of the APS/AAPT, Indianapolis, IN, May 1996.
- 3) Spring Meeting of the APS/AAPT, Washington, DC, April 1995.
- 4) Spring Meeting of the APS/AAPT, Washington, DC, April 1994.
- 5) Third Int. Conf. on Radioactive Nuclear Beams, East Lansing, MI, May 1993.

*(references available on request)*