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2001 Workshop for New Physics and Astronomy Faculty

This fall, the American Association of Physics Teachers will host a Workshop for New Physics and Astronomy Faculty on November 8-11, 2001. Now in its fifth year, this annual conference helps new faculty understand how students learn physics and astronomy and suggests how this information can impact a new professor's teaching methods. AAPT is pleased to announce the addition of topics in astronomy curriculum and pedagogy to its regular physics program this year.

Location: The American Center for Physics, College Park, MD

Dates: November 8-11, 2001

Nomination Deadline: October 5, 2001

Lodging: In past years, our NSF grant has paid for all participant costs other than travel to the conference site. We have submitted a renewal request to NSF and are awaiting a decision on its funding. While NSF has provided support for the previous workshops in this series and we are hopeful that such support will again be forthcoming, our plans for the workshop are necessarily conditioned on a favorable funding decision. In the meantime, we want to receive your nominations as soon as possible so that our plans and scheduling can proceed.

Transportation: Travel support to the conference should be provided by the department chair as an expression of the department chair's commitment to the objectives of the conference.

How to qualify:

Participants must be first- or second-year faculty in either physics or astronomy at a four-year college or university. They must be in their initial tenure-track appointment, but may be senior faculty members who have recently entered academia after careers in industry or government laboratories. Each participant must supply a department chair nomination and a letter of interest.

Selected program topics:

- Active Learning and Interactive Lectures
- Addressing Conceptual Misunderstandings
- Technology in the Classroom
- Minority and Gender Issues
- Developing and Funding Innovation
- Physics as a Liberal Art
- Mentoring Research Students
- Training the Next Generation
- Pre-college Outreach Activities

Speakers will discuss new developments in both physics and astronomy curricula and pedagogy and will serve as resource leaders throughout the conference. A notebook with extensive background materials and bibliographies will be distributed to all conference participants.

For more information, please contact AAPT at **301-209-3344**.



This program is funded by a grant # DUE-9554738
from the National Science Foundation.

- [A Vision for Tomorrow- The Two-Year College in the Twenty-First Century](#)
- [Chicken Soup Conference](#)
- [What Is TYC21?](#)
- [What Region Am I In?](#)
- [What Are The Goals Of TYC21?](#)
- [Why Is There A Need For TYC21?](#)
- [How Can You Get Involved In TYC21?](#)
- [National Vision and Ideas for Action](#)
- [Who Will TYC21 Reach?](#)
- [TYC21 Leadership](#)
- [TYC21 Meeting Dates](#)
- [CONNECTIONS Newsletter](#)



This program is funded by a grant # DUE-9450160 from the National Science Foundation.

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US Physics Team

Team Training Camp:

May 19 - 28, 2001

XXXII International Physics Olympiad Competition

Antalya, Turkey

June 28 - July 6, 2001

Barbara Lotze Sponsored Scholarship

Scholarship for future high school physics teachers

Application Deadline: December 1, 2001

Outstanding Student Certificates

Awarded to outstanding physics students by physics instructor at end-of-year assembly

Outstanding Teaching Assistant Program

Nominate your outstanding teaching assistant to be awarded a free student membership in AAPT

AAPT High School Physics Photo & Video Contests

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2000 Department Chair Conference
April 14 - 16, 2000
American Center for Physics, College Park, MD

- [Background and Focus](#)

- [Program](#)
[Program \(.pdf format\)](#)

- [Presenters Abstracts](#)
[Presenters Abstracts \(.pdf format\)](#)

- [1997 Department Chairs Proceedings](#)

- [2000 Department Chairs Proceedings](#)



Powerful Ideas in Physical Science aspires to play an important part in improving the relationship between student and teacher and in guiding how instructors view the entire learning process. This 1000 page, undergraduate course model allows college/university faculty to build an introductory physical science course for preservice elementary teachers using flexible materials that guide your students personal conceptual development.

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This program is funded by a grant # DUE-9554625 from the National Science Foundation.

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The Council of Graduate Schools (CGS) and the American Association of Colleges and Universities (AAC&U) have received a grant from NSF entitled “Shaping the Preparation of Future Science and Mathematics Faculty.” The project builds on and extends the Preparing Future Faculty program led by AAC&U and CGS since 1993 with support from the PEW Charitable Trusts. The goal of the project is to create model graduate programs to prepare future faculty for emerging and evolving roles in five academic disciplines-chemistry, computer science, mathematics, microbiology, and physics. The American Association of Physics Teachers (AAPT) will be participating as a subcontractor to this grant along with the American Chemical Society, the American Society of Microbiology, the American Mathematical Society, the Mathematical Association of America, and the Special Interest Group on Computer Science Education of the Association of Computing Machinery.

The overarching purpose of the project is to enhance the way academic departments prepare graduate students aspiring to an academic career for the full range of faculty roles and responsibilities in teaching, research, and service. Ultimately the project is expected to:

1. Increase knowledge, broaden perspectives, and develop skills of graduate faculty members and graduate students about how to incorporate research, teaching, and service components into doctoral education for aspiring faculty.
 2. Develop model programs for the preparation of graduate students for faculty roles and responsibilities and to assess their effectiveness.
 3. Disseminate within the disciplines alternative models and promising practices for reshaping doctoral education for the future professorate.
- [Four sites](#) selected to participate in AAPT's PFPF Project.
 - [Preparing Future Faculty](#) Web site
 - [Workshops](#) for New Physics Faculty
 - [Web Guide to Enhancing the Postdoctoral Experience for Scientists and Engineers](#)
 - [Resource Letter EPGA-1: The Education of Physics Graduate Assistants](#)
 - [Building the Faculty We Need Executive Summary](#)



This program is funded by a grant # DUE-9813876 from the National Science Foundation.

Innovative High School Physics Teachers Grants

Deadline for entries is November 1, 2001

The American Association of Physics Teachers (AAPT) has budgeted \$1,000.00 to continue its INNOVATIVE HIGH SCHOOL PHYSICS TEACHERS Grants Program. This program enables high school physics teachers to compete for small grants that will support the operation of innovative physics programs or activities that seek to increase student enrollment or to enhance student achievement in physics.

High school physics teachers are invited to write the AAPT Office for an application packet or to submit a proposal which contains the following items for the project:

- title and contact person
- objective
- plans
- schedule
- itemized budget request
- an evaluation

Please attach a letter of support from your school administrator which affirms the intent of your school system to implement the project if you receive the grant. A copy of the completed form or proposal is due by November 1, 2001.

A committee of physics educators will award the grants which can range from \$100 to \$500, on or before January 1, 2002. Each teacher who receives a grant will be given one year to complete the project and to submit a final report to the High School Chairperson. The awards will be announced during the Ceremonial Session at the 2002 AAPT Winter Meeting in Philadelphia, PA.

We encourage all high school physics teachers to participate. If you create your proposal with the guidelines mentioned above, please contact Deborah Rice, Chair, Committee on Physics in High Schools first and then mail copies to the following address:

Deborah Rice
6051 Kingbury St.
St. Louis, MO 63112-1303
(314)862-2845
debrice@swbell.net

For an application packet contact the:

AAPT- High School Grants

One Physics Ellipse

College Park, MD 20740-3845

Email at aapt-prog@aapt.org

Innovative High School Physics Teaching Grants

[2000 Award](#)

[Winners](#)

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The mission of the PTRA program is to improve the teaching and learning of physics and physical science in precollegiate education for all teachers and students in the United States. PTRA workshops give practicing teachers an opportunity to improve themselves professionally. At these workshops, teachers grow in the knowledge and skill associated with teaching physics and physical science. The knowledge and skills include, but are not limited to, leadership, classroom organization, physics content, teaching techniques, trends in science education and equity issues. External funding for the PTRA program is provided by the [National Science Foundation](#) and the Campaign for Physics.

- [Goals of the PTRA Program](#)
- [PTRA Interactive](#)
- [Available PTRA Workshops](#)
- [Contact Information](#)
- [Post upcoming PTRA Workshops](#)
- [Upcoming PTRA Workshops](#)
- [Contact a PTRA in Your Area](#)
- [2001 PTRA Application Form](#)
- [PTRA: RIT 2001 Summer Schedule](#)



This program is funded by a grant # ESI-9619041 from the National Science Foundation.

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Physics Revitalization Conference

Building Undergraduate Physics Programs for the 21st Century

October 2-4, 1998

Arlington, Virginia

More than 250 physicists organized into teams from physics departments across America gathered in Arlington, Virginia for a weekend of dialogue about the status and possible futures of the American undergraduate physics enterprise. This group represented more than 100 colleges and universities from all geographical regions and Carnegie classifications and account for about one-fifth of the undergraduate students taking a physics course in America. They represented physicists with a wide variety of research and teaching interests at all stages of their careers united by a conviction that strong undergraduate programs in physics are essential to the health of the physics community in the next century.

In the near term the on-going efforts of this conference will be narrated on this Web page. Links to institutions that served as case studies in the conference and participating departments that have developed plans for local revitalization will be posted here. A listserv has been established to continue the dialogue among participants and some postings from that listserv will also appear on these pages.

All indicators point to a very wide spread interest and enthusiasm for the topic of undergraduate physics revitalization and reform. Please review these pages regularly to stay abreast of the progress to date regarding this important effort within the physics community.

CO-CHAIRS: Robert Hilborn, Ruth Howes, James Stith

A listing of the entire steering committee is available [here](#).

- [Summary](#) paper from the conference
- [Links](#) of Interest to Conference Participants
- [Physics at the Crossroads](#)
- [Department Case Studies](#)
- The [proposal](#) submitted to the NSF.
- [Index of major postings](#) to the Revitalization listserv.
- The conference is over. For more information and to add your name to the mailing list, click [here](#).



This program is funded by a grant # DUE-9816632
from the National Science Foundation.

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National Task Force on Undergraduate Physics

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- [How has the Environment for Physics Changed?](#)
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What is the Purpose of the Task Force?

1. To provide an overview of undergraduate physics revitalization efforts and to coordinate the efforts of physics professional organizations, individual physicists and physics departments, and funding agencies.
2. To identify areas in which revitalization efforts are needed and to catalyze projects addressing those needs. Some of the projects will be national in scope; some local, some regional. Some will be centered in universities; some in professional societies. Some will require extensive external funding; some will leverage local resources. All these efforts will be strengthened if they can be coordinated and if those working on one activity can learn from the others.
3. To raise the visibility of undergraduate physics revitalization by having its members speak and write about the revitalization effort and maintain communications with the entire physics community.
4. To develop contacts with undergraduate revitalization efforts in the other scientific disciplines and to promote physics as a model for undergraduate revitalization efforts.

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Who is Sponsoring the Task Force?

The Task Force was established in the fall of 1999 by the American Association of Physics Teachers, the American Physical Society, and the American Institute of Physics. The Task Force members are appointed for two-year terms by the three physics organizations. The ExxonMobil Foundation has provided a planning grant to assist the Task Force in its first year of activity.

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Who is On the Task Force?

- J. D. Garcia, Professor of Physics, University of Arizona, former program officer at NSF
- S. James Gates, John S. Toll Distinguished Professor of Physics, University of Maryland
- Robert C. Hilborn, Chair. Amanda and Lisa Cross Professor of Physics, Amherst College, former President of AAPT
- Ruth H. Howes, Deputy Chair, George and Frances Ball Distinguished Professor of Physics and Astronomy, Ball State University, President of AAPT
- Kenneth S. Krane, Professor of Physics, Oregon State, former program officer at NSF, PI of the New Physics Faculty Workshops program
- Laurie McNeil, Professor of Physics, University of North Carolina at Chapel Hill
- Jose P. Mestre, Professor of Physics, University of Massachusetts-Amherst
- Thomas L. O'Kuma, Professor of Physics, Lee College, former President of AAPT
- Douglas D. Osheroff, J.G. Jackson and C.J. Wood Professor of Physics, Stanford University
- Carl Wieman, Distinguished Professor of Physics, JILA, University of Colorado
- David T. Wilkinson, Professor of Physics, Princeton University

Society Liasons

- James H. Stith, Director of Physics Resource Center, American Institute of Physics
- Jack Hehn, Manager, Education Division, American Institute of Physics
- Judy Franz, Executive Officer, American Physical Society
- Fred Stein, Director of Education and Outreach Programs, American Physical Society

- Bernard V. Khoury, Executive Officer, American Association of Physics Teachers
- Warren Hein, Associate Executive Officer, American Association of Physics Teachers

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What Do We Mean by Revitalization?

The revitalization of undergraduate physics focuses on providing **constructive and creative responses** to the challenges posed by the changes in the environment in which physics operates. These changes are probably irreversible, and the physics community, if it is to thrive, must respond to those changes.

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How has the Environment for Physics Changed?

1. Physics itself is changing with many new subfields that cross disciplinary boundaries (for example, materials physics, computational physics, biophysics, chemical physics, photonics), most of which are completely absent from undergraduate physics programs.
2. The job market for physicists (and other scientifically trained workers) emphasizes the need for broader training within science and for enhanced skills in communication and the ability to work in teams.
3. Today's undergraduate student body is more diverse both ethnically and economically than that of twenty years ago. These students bring backgrounds and motivations substantially different from those of most current physics faculty when they were undergraduates.
4. Physics education research has established that there is a significant gap between what physics faculty believe they are teaching and what students actually learn. At the same time, physics education research has identified a number of teaching strategies that can help close that gap.
5. The profession as a whole faces a public perception that the most exciting scientific developments are likely to occur in fields other than physics.
6. Physics is increasingly disconnected from societal needs and federal priorities. The result is that potential students do not see the connection between physics and their daily lives and future careers.

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Why Focus on Undergraduate Physics? Isn't K-12 in More Need of Attention?

At the undergraduate level, physics has contact with the students who will go on to be tomorrow's leaders in science, education, and other fields. In many ways, undergraduate physics sets the tone for physics education in the K-12 grades. Tomorrow's K-12 teachers are today's college and university students. Furthermore, today about 70% of American high school students go on to some form of undergraduate education. Colleges and universities are no longer just for the elite. Science education in general, and physics, in particular, must play an important role in educating a scientifically and technologically informed citizenry.

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How Soon Should We Expect to See Results from the Task Force's Efforts?

Revitalizing undergraduate physics is a long-term program that moves the physics community toward continuing experimentation, evaluation, and improvement of undergraduate physics education. The initial stage of this effort will take five to ten years.

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What is Needed for Undergraduate Physics Revitalization and How Do We Know What Works?

Over the past three years, AAPT, APS, and AIP have taken some first steps to address these issues. As a result of the Physics Department Chairs Conferences in May 1997 and April 2000 (both of which focused on undergraduate physics) and the October 1998 conference "Building Undergraduate Physics Programs for the 21st Century," and extensive discussion with a wide spectrum of physicists, four key features of successful undergraduate physics revitalization can be identified:

1. There is **wide recognition and interest** in undergraduate revitalization from **all** kinds of physics departments and indeed from a wide spectrum of the entire physics community. But not by all. We still need lots of persuasion and discussion both within individual departments and in the physics community at

large.

2. **The fundamental element for change is the department.** Real change in undergraduate physics programs demands the support of college and university administrators, but unless a significant number of the department's faculty, including the chair, buy into the effort, any changes are likely to evaporate quickly.
3. **An Undergraduate Physics Program is more than just the curriculum.** An undergraduate physics program is not just pedagogy and courses. Physics departments also need to consider such activities as recruiting able students, mentoring physics students, providing courses appropriate for pre-service K-12 teachers, assisting with professional development for a diversity of physics careers, providing opportunities for undergraduates to participate in research, and making connections with the local industries and businesses that employ graduates.
4. **Effective change is local.** Physics departments have varying missions, sizes, geographical locations and types of students. A one-size program will not fit all.

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What Does the Task Force Plan To Do?

The Task Force efforts are grouped into five categories:

1. Raise the consciousness of the physics community about the problems facing undergraduate physics and why solving those problems is crucial to the health of the physics profession.
2. Develop a catalog of case studies (with analysis) of departments that have successfully improved their undergraduate physics programs.
3. Coordinate and publicize efforts by individuals, departments, and professional organizations to improve undergraduate physics.
4. Provide advice and ideas to professional organization, funding agencies, and the physics community about revitalizing undergraduate physics.
5. Work with similar groups in other scientific and engineering disciplines to improve all aspects of undergraduate science, mathematics, engineering and technology education.

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What Specific Projects Will the Task Force Undertake?

1. Work with AAPT on plans for continuing and enhancing the New Physics Faculty Workshop program. Extend the New Faculty Program to workshops at APS Division Meetings. Perhaps develop ties with the Pew Preparing Future Faculty program, the PKAL Faculty 21 project and Project NeXT.
2. Set up an activist editorial board for the undergraduate part of the Physics Sciences Resource Center (on the AAPT web site) to provide a clearinghouse for information on undergraduate physics programs.
3. Use departmental site visits and other means to develop a catalog of case studies of departments that have undertaken successful undergraduate physics revitalization efforts. Document and analyze these case studies to provide information on "what works" and what is need to produce effective change in undergraduate physics programs.
4. Articulate departmental responsibilities for K-12 teacher preparation and find good case studies of where that effort has been successful. Build on the efforts of PhysTEC, the proposal submitted by APS, AIP, and AAPT to NSF for promoting physics departments to take more responsibility for K-12 teacher preparation. A small conference on the role of physics departments in pre-service K-12 teacher preparation will be held at the University of Nebraska-Lincoln in June, 2000.
5. Develop a colloquium talk on undergraduate physics programs that can be given by Task Force members to physics departments around the country.
6. Plan for a proposal to establish a large-scale funding program to provide seen money for departments that have developed detailed plans for revitalizing their undergraduate physics programs. These departments can then serve as case studies and consultants for other departments.

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What Other Activities Might the Task Force Consider?

1. Work with Project Kaleidoscope to run several regional conferences on undergraduate physics revitalization.
2. Explore the possibility of developing an accreditation program for undergraduate physics programs.
3. Consult with the Physics Education Research (PER) community on the design of assessment, identification of research needs, and mechanisms for dissemination of PER results that are important for undergraduate physics. Explore the possibility of having a Gordon Conference focused on PER.
4. Work with engineers, life scientists, etc. to coordinate undergraduate revitalization efforts across the disciplines.
5. Investigate connections with industry, business, etc. Focus on the breadth of physics both for the recruitment of potential physics majors and for "marketing" our majors to employers. Coordinate efforts with the APS Committee on Careers and Professional Development.
6. Work with AIP's Physics Programs to develop and disseminate materials promoting undergraduate physics as excellent preparation for diverse careers.
7. Work with the Council on Undergraduate Research to promote opportunities for undergraduate research participation in physics.
8. Set up a working group on evaluation and assessment instruments; perhaps have consultants who can do the evaluation and assessment for various revitalization projects.

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How Can I Contact the Task Force?

Ideas, suggestions, comments, and questions can sent via email to NTFUP@aapt.org or to the chair of the Task Force rchilborn@amherst.edu.

A PowerPoint presentation by Robert Hilborn is available for download.

[Building Undergraduate Physics Programs for the 21st Century](#) (Microsoft PowerPoint file .ppt)

[Building Undergraduate Physics Programs for the 21st Century](#) (downloadable .zip file)

The Physics "Cosmo Quiz," a tongue-in-cheek evaluation of undergraduate physics programs in WORD format is available by clicking [here](#).

You may not be able to download the .ppt file if you are using Netscape Navigator/Communicator browser. If you are having problems, please download the .zip file instead.

If you cannot open the .zip file, please download the [WinZip](#) file manager shareware, or the [BX Zip Compress OCX](#) shareware.

If you have Microsoft PowerPoint 95, and you are having problems opening this file after downloaded, please [download](#) a patch from the Microsoft Website.

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 American Association of Physics Teachers

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NSF Funds New Physics Teacher Preparation Program: Nationwide Pilot Aimed at "Revolutionizing" Science Teaching to Begin at Six Institutions

COLLEGE PARK, MD, September 4, 2001 - A five-year, \$5.76 million grant has been awarded by the National Science Foundation to the [American Physical Society](#) (APS), in partnership with the [American Association of Physics Teachers](#) (AAPT) and the [American Institute of Physics](#) (AIP).

These professional societies will create a nationwide initiative, the Physics Teacher Coalition (PhysTEC), to dramatically improve the science preparation and teaching skills of future secondary and elementary teachers and to establish an Induction/Mentor program for new teachers.

PhysTEC will be established with an initial set of six primary institutions and more than twenty-five universities and colleges that share a strong commitment to revise their teacher preparation programs," according to PhysTEC principal investigator Fredrick Stein. "This includes improving the preparation of both elementary and secondary science teachers."

The program incorporates exemplary components of past NSF-supported projects that have proven to be successful in making long-term positive changes in teacher preparation. These include:

- A Teacher-in-Residence program that provides for a local K-12 science teacher to become a full-time participant in assisting faculty with both team-teaching and course revisions
- A long-term, active collaboration between the physics department, the education department, and the local school community
- The redesign of content and pedagogy of targeted physics courses based on results from physics education research as well as utilization of appropriate interactive technologies
- The redesign of content and pedagogy for elementary and secondary science methods courses with an emphasis on inquiry-based, hands-on approaches to teaching and learning
- The participation of physics faculty in increasing and improving field-based experiences of prospective teachers and in establishing an induction program and a mentor program for novice PhysTEC teachers

In addition to assisting colleges and universities with improving the preparation of future teachers of physical science and physics at all levels, APS/AAPT/AIP will broadly disseminate the best practices developed through these efforts. The program will begin immediately at the following Institutions:

- Ball State University
- Oregon State University
- University of Arizona
- University of Arkansas
- Western Michigan University
- Xavier University of Louisiana

"The NSF grant allows us to provide these institutions with the support and technical assistance necessary to undertake this pioneering task," says Stein. "Now we hope to translate that into better-prepared science teachers who are committed to student-centered, inquiry-based, hands-on approaches to teaching from the moment they hit the classroom."

##

For more information:

Dr. Fredrick M. Stein

Director of Education and Outreach

American Physical Society

(301) 209-3263

stein@aps.org