Guest Editorial

PhysTEC – Teacher Preparation and Our Community Response

I appreciate the opportunity to respond to Bernie Khoury's Executive Officer's Report1 published in the 2002 Summer Announcer. Five member societies within the American Institute of Physics (AIP) signed the Statement on the Education of Future Teachers2 (or Future Teachers Statement) mentioned in Khoury's report. This statement recognizes the need for improvements in the preparation of teachers and our responsibility as professional societies to help bring this about. In his closing paragraph Khoury stated, "the physics community must become even more engaged in addressing the issues of teacher preparation and professional development." WELL, WE HAVE, and we need everyone's help. The Physics Teacher Education Coalition (PhysTEC)3, a joint venture of AAPT, AIP, and the American Physical Society (APS), is a three-society answer to the entreaties in the Future Teachers Statement: "for departments and their faculty to take an active role in improving the preservice training of K–12 physics/science teachers." This project, supported with funding from the National Science Foundation (NSF), the Fund for the Improvement of Postsecondary Education (FIPSE), and APS, provides a formal mechanism for our professional societies to launch a national effort to improve physics/physical science teaching in the United States by forming a national coalition of physics departments. The first stage involved selecting six Primary Program Institutions (PPIs) as the first members of the Coalition (Ball State University, Western Michigan University, Oregon State University, Xavier University, University of Arkansas, University of Arizona), universities whose physics departments in collaboration with their colleagues in education and the local schools agreed to create model programs for improving the science preparation of future K–12 teachers. These programs will begin at the preservice level and extend into the induction and mentoring phase of the new teachers' careers. The ultimate goal is to have at least 17 model programs serving at the core of the Coalition, seven supported with national funding and ten supported through APS corporate funding. Program Components associated with Primary Program Institutions are:

(1) A long-term, active collaboration among the physics department, the department of education, and the local school community

(2) A Teacher-in-Residence (TIR) program that provides for a local K–12 master teacher to become a full-time participant in assisting faculty in course revisions and team-teaching, and to act as a "reality check" for both preservice teachers and university faculty

(3) The redesign of content and pedagogy for targeted physics courses based on results from physics education research and utilizing appropriate interactive technologies

(4) 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

(5) The participation of physics faculty in the improvement and expansion of school experiences for their students

(6) The establishment of a mentoring program conducted by TIRs and other master teachers to provide a valuable induction experience for novice science teachers

Two additional categories of physics department coalition involvement are Resource Institutions and sites recognized as Coalition Members. Resource Institutions are physics departments with individuals or programs that inform the programs of the PPIs and PhysTEC in general. The broader participation will come from departments that pursue improvements in K–12 teacher preparation but without the in-depth commitment of the PPIs and Resource Institutions.

PhysTEC will sponsor formal sessions and programs at regular meetings of APS and AAPT, with separate programs addressing teacher preparation needs. I want to make another very important point about PhysTEC. The three organizations, in creating this program, worked with NSF and FIPSE prior to the NSF publishing their changes in science education programs, especially the emergence of the NSF Math and Science Partnerships Program. We were sensitive to the many formal reports (National Academy of Sciences' National Science Education Standards4, NSF's Shaping the Future5, Glenn Commission Report, National Research Council's Educating Teachers, etc.) and to their recommendations for reform of teacher preparation. We were building on past programs such as the NSF collaboratives in which Fredrick Stein and John Layman were involved. We were capitalizing on Jack Hehn's insights from his time at NSF as a program officer and Warren Hein's experience as AAPT Associate Executive Officer. We were cognizant of the AAPT Physics Teacher Resource Agents (PTRA) program and the many high school physics teachers poised to become TIRs if our program occurred in their geographical areas. We had the capacity to deal with these programs and issues from a national perspective, and to create a national effort based in the three societies, to address the issues of physical science teacher preparation. We can encourage institutions across the country to simultaneously begin to address these issues. Many national reports formally recognize a role for professional societies in the reform efforts. One example is presented below. Educating Teachers of Science, Mathematics, and Technology6, a report from the National Research Council (NRC) of the National Academy of Sciences (NAS), offers a series of recommendations for professional and disciplinary organizations based on extensive evidence from research that shows how various stakeholders might contribute individually and collectively — even systemically — to the improvement of teaching in these subject areas. The NRC/NAS recommendations for professional and disciplinary organizations include the following:

(1) Organizations that represent institutions of higher education should assist their members in establishing programs to help new teachers.

(2) Professional disciplinary societies in science, mathematics, and engineering, higher education organizations, government at all levels, and business and industry should become more engaged as partners (as opposed to advisors or overseers) in efforts to improve teacher education.

(3) Professional disciplinary societies in science, mathematics, and engineering, and higher education organizations also should work together to align their policies and recommendations for improving teacher education in science, mathematics, and technology.

PhysTEC is our response. We provide access to individuals within the physics community through APS, access to institutions of higher education with programs in teacher preparation through AAPT, and access to the industrial community, the undergraduate student community (SPS), and other member societies through AIP. We also have access through internal society programs to the APS Education Forum, and Education Committee, the newly formed Teacher Preparation Committee, the PTRAs as well as the Pre-High School and High School Committees within AAPT, the resources of the AIP Statistics Research Center and avenues of communication through AIP's connections to all member societies.

Special thanks to the other members of the PhysTEC leadership group, Fredrick Stein, Jack Hehn, and Warren Hein, for review and suggestions.

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1. See http://www.aapt.org/aaptgeneral/eoreport/sum02.html.
2. Statement on the Education of Future Teachers, signed by AIP, APS, AAPT, the American Astronomical Society, and the Acoustical Society of America. See http://www.aip.org/education/futeach.htm
3. See http://www.phystec.org.
4. National Science Education Standards (National Academy Press, 1996). See http://bob.nap.edu/readingroom/books/nses.
5. Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology (National Science Foundation, 1996). See http://www.ehr.nsf.gov/ehr/due/ documents/review/96139/start.htm.
6. Educating Teachers of Science, Mathematics, and Technology: New Practices for the New Millennium (National Academy of Sciences, Washington, DC, 2001). See http://www.nap.edu/books/ 0309070333/html.