

Executive Summary

Strategic Programs for Innovations in Undergraduate Physics (SPIN-UP) set out to answer an intriguing question: Why, in the 1990s, did some physics departments increase the number of bachelor's degrees awarded in physics or maintain a number much higher than the national average for their type of institution? During that decade, the number of bachelor's degrees awarded in the physical sciences, engineering, and mathematics declined across the country. Yet in the midst of this decline some departments had thriving programs. What made these departments different? What lessons can be learned to help departments in the sciences, engineering, and mathematics that are—to put it generously—less than thriving? SPIN-UP, a project of the National Task Force on Undergraduate Physics, set out to answer these questions by sending site visit teams to 21 physics departments whose undergraduate programs were, by various measures, thriving. These visits took place mostly during the 2001–2002 academic year. In addition, with the aid of the American Institute of Physics Statistical Research Center, SPIN-UP developed a survey sent to all 759 departments in the United States that grant bachelor's degrees in physics. The survey yielded a 74% response rate distributed broadly across the spectrum of U.S. physics departments.

The site visit reports provided specific insight into what makes an undergraduate physics program thrive. In very compact form, these departments all have

- A widespread attitude among the faculty that the department has the primary responsibility for maintaining or improving the undergraduate program. That is, rather than complain about the lack of students, money, space, and administrative support, the department initiated reform efforts in areas that it identified as most in need of change.
- A challenging, but supportive and encouraging undergraduate program that includes a well-developed curriculum, advising and mentoring, an undergraduate research participation program, and many opportunities for informal student-faculty interactions, enhanced by a strong sense of community among the students and faculty.
- Strong and sustained leadership within the department and a clear sense of the mission of its undergraduate program.
- A strong disposition toward continuous evaluation of and experimentation with the undergraduate program.

In Chapter 4 of this report, each of these themes is further analyzed and illustrated with examples from the site visit departments. Chapter 5 provides a summary of the survey results.

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