University of Richmond Physics: Vision and Status

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The goal of the University of Richmond Physics Department is simple: to be among the best undergraduate physics departments in the United States. Here we describe what such a department looks like and where we are now. At the best places the curriculum engages all students from liberal arts majors to physics majors in a demanding, intellectual enterprise. Physics majors are prepared for the top graduate schools, teaching careers, and our inter-disciplinary, technology-based world. Students in introductory courses become ready for the next step in their education (for science majors) or to understand the science behind our increasingly technical world. The Department is the nucleus of a thriving, challenging, and rewarding intellectual community. To be among the best physics departments we should graduate about ten or more physics majors per year with many going on to graduate school or industry in a wide range of technical fields. The research enterprise should be high-quality, engaging and attractive for our students; balancing diversity of fields while maintaining strength.

We now describe how our Physics Department compares with the picture drawn above. The Physics curriculum is solid. A considerable effort has gone into the introductory sequences to create a discovery-based environment (which produces better outcomes than traditional methods) and we have diversified our offerings. The curriculum for our physics majors is typical for institutions like Richmond. We have been able to add two special topics courses in recent years (Cosmology and Nuclear Physics) and updated the Intermediate Lab and Electronics courses. However, we still face a challenge in preparing our students who want to go on to graduate school in physics. Our curriculum does not adequately prepare those students to perform well on the GRE advanced test. We have also been limited by staffing considerations in the number of courses we can offer for liberal arts students and other enrichment courses. We also note that while we have diversified our offerings over the last four years, our technical support staff is still only half of what is was in 2003 when we had fewer faculty. This lack of technical support draws faculty time and effort away from more beneficial pursuits to setup and test teaching laboratories.

The intellectual community in physics is in good, but not excellent health. We will graduate eleven seniors this year which puts us ahead of more than 90% of the undergraduate institutions in the US. Our local chapter of the Society of Physics Students won awards for promoting physics on campus in 2006 and 2007 and the Physics Olympics attracts local high school students and teachers to campus. Nevertheless, we continue to see large fluctuations in the number of majors (we have only five sophomores) and the number of students going on to graduate school in science and technical fields is less than the number at the best institutions. The number of students coming to Richmond to study physics is still small.

The research environment in Physics is in good shape. Out of six tenured or tenure-track faculty all have active research programs that involve undergraduates and five are externally funded. Each summer, 12-16 undergraduates work in our laboratories on campus and elsewhere and those students have presented their work at national and even international conferences. We do note here that our research efforts are now very 'diverse'. The faculty are all working in different areas and collaborations within the Department and the University have been limited.

The Physics Department has made considerable progress developing our curriculum, our research enterprise, and the intellectual community in physics. We are not yet among the best undergraduate physics departments in the country, but we are poised to make that leap. We look forward to working with our colleagues on the faculty and administration as we strive for that goal.