



THE OFFICE FOR UNDERGRADUATE RESEARCH

Learning communities for future scientists, teachers and citizens: a model for science education in research universities

As the first public university in the nation, the University of North Carolina at Chapel Hill is committed to providing “high quality undergraduate instruction to students within a community engaged in original inquiry and creative expression” (Mission Statement, 2003). We seek funding from HHMI to enhance our science learning communities by enabling undergraduates to become full participants in the research culture that surrounds them on our vibrant campus.

The Advisory Board of research-active faculty and talented administrators who assembled this proposal and who are committed to its implementation and evaluation began with a common vision. We wanted to define roles for faculty, graduate students, and postdoctoral fellows that would enable them to coach, mentor, and teach undergraduates in ways that would contribute positively to all involved. In addition, we wished to build on existing strengths at Carolina and weave the new high-profile HHMI programs into the fabric of the university to ensure sustainability. We began with a culture of assessment, because we are justifiably proud of our past accomplishments in undergraduate education and welcome the opportunity to document the influence and importance of our initiatives so that they can serve as models for lasting change.

With HHMI support, we will create the HHMI Undergraduate Research for Future Scientists and Clinicians (HHMI-FSC) program, which will empower high-ability Carolina Covenant© Scholars to undertake original research under the supervision of research-active faculty with additional graduate students and postdoctoral fellows as mentors. Over two consecutive summers, these Scholars (low-income students who are 61% minority, 60% female, and 55% first-generation) will engage in research experiences and associated programming designed to help them overcome financial, social and cultural barriers as they prepare for careers in biomedical fields.

We will also create the HHMI Undergraduate Internships for Future Teachers (HHMI-FT) program, which will enable future high school teachers to develop first-hand understanding of the nature of science through summer internships. This program will also involve research-active faculty, graduate students and postdoctoral fellows, but here the focus is on guiding the undergraduates to develop online learning modules to explain the processes, value and excitement of ongoing research to undergraduate students, advanced high school students, and high school teachers. These future teachers will develop a deep appreciation of scientific inquiry, evidence-based pedagogy, and an

enriched understanding of how students learn, which will enable them to become reflective school leaders.

Finally, we will create the HHMI First Year Seminars in Science for Non-scientists (HHMI-FYS) program to convey the excitement and utility of applying scientific approaches to solving the greatest problems of our time, especially to students who do not intend initially to major in a scientific field. Here we will create highly focused learning communities involving research-active faculty, collaborating graduate student or postdoctoral instructors, and additional graduate students or postdoctoral fellows who will serve as “consultants” to coach the undergraduates as they learn to distinguish between ideas and evidence, develop a sense of agency toward specific goals, and gain confidence in their abilities to adopt a scientific approach to complex problems.

We will assess the benefits to the continuum of learners as they interact in these communities, and we will disseminate our results widely through campus symposia, presentations to policy-makers and scientific societies. We believe that our learning community approach is an appropriate national model for lasting changes in science education in research universities.