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HHMI Challenges Universities to Transform Science Teaching

April 15, 2009—The Howard Hughes Medical Institute will challenge research universities to develop compelling new ways to show undergraduate students the excitement and creativity of science by inviting nearly 200 top institutions to compete for individual grants of up to \$2.2 million. HHMI plans to award up to \$85 million in total grants.

“This competition represents the core of our education program and is aimed at the top research universities in the country,” says HHMI President Robert Tjian. “The very best universities are places where leading scientists are encouraged to effectively engage undergraduate students early in their careers in the process of scientific inquiry and discovery.”

As one way of catalyzing more innovative curricula, HHMI is setting aside funds for supplemental grants for universities interested in developing novel solutions to some of the teaching challenges they face. “We want to test new ways of teaching science that no one has tried before,” says Peter J. Bruns, HHMI’s vice president for grants and special programs. “We want to foster creativity and risk-taking.”

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Over the last two decades, HHMI has awarded \$750 million in grants aimed at transforming science education at universities and colleges. David J. Asai, who directs HHMI’s precollege and undergraduate grants program, says the Institute expects universities to be bold and original in developing proposals for their primary grant. These awards typically range from \$1.2 million to \$2.2 million over four years.

But Asai, who came to HHMI with deep experience as a scientist and educator at Purdue University and Harvey Mudd College, wants to encourage

grantees to be experimental and to go beyond the “safe proposals” that may have been submitted in the past. The supplemental grants—up to \$600,000 over four years—will enable scientist-educators to approach an educational problem just as they would in the laboratory, using hypothesis-driven questions with measurable answers. “We want to encourage grantees to research an important challenge in science education even if there is a significant risk of failure,” Asai says. “The key will be to identify experiments whose results will contribute to our understanding of the problem, whether it works out the way they expected or not.”

HHMI has invited 197 institutions to apply for the four-year grants, based on their level of research activity as classified by the Carnegie Foundation for the Advancement of Teaching. The Institute completed a separate competition for programs at liberal arts colleges and other undergraduate-focused institutions last year.

As in the past, HHMI’s applications for its primary undergraduate grants emphasize four areas: student research, faculty development, curriculum development, and outreach to schools or the local community. Schools must register their intent to apply for the new grants by May 14, 2009, and their grant proposals are due on October 1, 2009. Applications will be evaluated through a competitive peer review process by top scientists and educators, and awardees will be notified in May 2010. The new supplemental grants will be evaluated separately and the awards announced at the same time. Applicants must apply for a primary grant to be able to apply for the supplemental grant.

Faculty who teach at large research universities like those in this competition face major challenges, particularly given the demand for lecture classes and the complexity of providing hands-on research opportunities for a large number of students. Previous grants have enabled research universities to develop novel approaches that enhance lecture and introductory courses, as well as to engage scientists directly in teaching undergraduates. “We think that research scientists bring an important and unique perspective to science education that often is not accessed enough,” Bruns says.

Many research university grantees also use their funding to reach out to their local community and nearby schools. Among many projects, the HHMI grants have included research opportunities for high school students, specialized science training for teachers, community lectures on science, and programs to successfully transition students from high school or community college to a university. “Without encouragement through HHMI’s grants, I suspect they wouldn’t be doing nearly as much outreach work,” Asai says.

HHMI hopes that all eligible universities will apply during this competition. Asai noted that of the 48 schools selected during the most recent competition for liberal arts colleges and other undergraduate institutions, fully one quarter had never received HHMI funds and another quarter had been unsuccessful in the past. “We want to have new schools become part of HHMI’s education

initiatives,” Asai says.

HHMI is the nation's largest private supporter of undergraduate science education. Since 1988, its undergraduate program has enabled more than 72,000 undergraduate students to participate in hands-on research, more than 10,000 new or revamped science courses to be developed, and more than 540,000 pre-K-12 students and 86,000 current or future teachers to take part in science education training.