

2008-2009 Funded Projects

Applications of Neuroengineering: A Project Class for Inventing Solutions for Brain Disorders - \$32,500

Professor Edward Stuart Boyden, Program in Media Arts and Sciences

The Media Lab is leading a merger at MIT between the teaching of neuroscience and of engineering, so that students will be able to solve intractable disorders of the brain that affect over 1 billion people. Essential to this complex interdisciplinary endeavor are hands-on neurotechnology and lab experiences. Each fall, in Principles of Neuroengineering, a dozen students design new inventions to read and correct brain activity. Each spring, they conduct a lab class, Applications of Neuroengineering, in which students bring their designs to reality in the neurotechnology lab. Professor Boyden seeks funds to support this lab class to yield not only new ideas and inventions, but the first generation of thinkers trained to solve intractable problems of the brain.

Bringing Interactive Learning to 8.012 Lectures - \$16,600

Professor Adam J. Burgasser, Physics

Professor Burgasser proposes to use Alumni Funds to integrate interactive learning techniques into the Physics 8.012 advanced introductory classical mechanics course. This well-established and popular course, taught primarily by junior faculty, is generally organized in a traditional lecture format, with its inherent limitations in student/instructor interactivity. By developing concept-based, in-class, interactive modules coupled with student response system technology, Professor Burgasser hopes to improve student learning and participation in lectures, improve instructor teaching and ability to assess student performance, and create a more interactive lecture environment that could be readily adopted by future junior (or senior) instructors in 8.012 and other courses.

Composing for Jazz Orchestra - \$5,500

Dr. Mark Sumner Harvey, Music Theatre and Arts

This project is directly related to a new course titled, "Composing for Jazz Orchestra" (21M.342), to be offered in the fall semester of 2008. This course provides an exploration of composing and arranging approaches for the large jazz ensemble from 1920's foundations to current postmodern practice. In addition to classroom study of scores and recordings, there will be open rehearsals, workshops, and performances of student works by the MIT Festival Jazz Ensemble and the Aardvark Jazz Orchestra.

Developing World Prosthetics - \$21,900

Mr. Goutam G. Reddy and Ms. Amy Smith, Edgerton Center

Developing World Prosthetics (DWP) is a collaboration between MIT and the Jaipur Foot Organization (JFO), the leading orthotic and prosthetic organization in the world. In the DWP class, MIT students learn about patient care in the developing world as well as prosthetic and orthotic technologies. They will apply their engineering skills to develop new prosthetic and orthotic aids, and manufacturing and testing equipment. They will also learn about the anatomy and biomechanics of human walking and how they are affected by disabilities. As a follow-up to the class, there will be funded fellowships for students to travel to India to participate in an intensive two-week on-site introduction to orthotic and prosthetic fitment and to implement their projects with JFO.

Enhancing Student Teaching and Learning through Student-Based Courseware Design and Delivery - \$30,000

*Professors Thomas L. Magnanti, Institute Professor
Mr. Chris A. Kennedy, Chemistry*

This project seeks to support active learning (in content creation and organization, pedagogy development, and communication of technical material) through student-based design, use, evaluation, and dissemination of high quality, multimedia educational content in the Educational Studies Program (ESP) and the dissemination of material through ESP and the newly established MIT OpenCourseWare Highlights for High School (OCW HHS) initiative. The project will not only contribute to the learning experiences of MIT students, but also permit MIT to enhance its contributions to the education and inspiration of a large population of regional, national, and international high school students and provide compelling educational material for high school teachers. Ten ESP courses will be created and disseminated through the on-site ESP teaching program (to about 200 students per year) as well as to world-wide learners through the OCW HHS web site.

Evolution of 2.007 - \$12,480

Professor Daniel Frey, Mechanical Engineering

2.007 is a core Mechanical Engineering subject that supports the Department's educational objectives, especially those related to design and manufacturing. Motivated by the potential changes in the General Institute Requirements and by issues and opportunities within the current course, Professor Frey proposes to relax the prerequisites and emphasize design more generally to a greater degree than machine elements specifically. He believes that if 2.007 were evolved in some new directions, the subject might become accessible in the freshman year and could therefore serve as a useful offering to fulfill the proposed design requirement.

iHouse Student Leadership Development - \$8,000

*Professor Wesley Harris and Mrs. Sandra Harris, Housemasters, New House
Ms. Sally Susnowitz, Director, Public Service Center*

The purpose of iHouse is to build a sense of collaboration and community, to foster experiential education, to enhance problem-solving and communication skills, to enrich understanding of global issues, and to cultivate confidence, competence, leadership ability and intellectual engagement. Embracing the Institute's vision of educating the next generation of leaders with international competencies, iHouse draws on the synergistic energy of students, faculty, administrators, and staff. The objective of this component is to enable students to learn leadership skills that enable them to carry out their international development work, to understand leadership competencies in themselves and others, and to establish a framework for lifelong leadership development knowledge and practices.

Interdepartmental Subject in Microbial Genetics and Evolution - \$12,500

*Professor Eric J. Alm, Civil and Environmental Engineering
Professor Alan D. Grossman, Biology*

This multi-disciplinary subject will be open to undergraduate (and graduate) students from across the Institute, and will also serve as a core subject in the new interdepartmental Microbiology graduate program. The new subject brings together faculty and perspectives from three departments (Courses 1, 7, and 20), spanning the schools of Engineering and Science. The subject matter impacts emerging fields that have attracted great interest from MIT undergraduates including metabolic engineering and synthetic biology, and it will provide an excellent background for students interested in biotechnological applications related to the MIT Energy Initiative.

Leadership Ethics - \$16,900

Professor Alvin C. Kibel, Literature

The aim of this project is to develop a subject in Leadership Ethics suitable for undergraduates

and taught, to begin with, by one faculty member on an experimental basis but ultimately to be taught by more, hopefully drawn from other departments. The subject will employ as ancillary materials (a) extracts from important works of ethical philosophy, and (b) case studies drawn from areas of professional experience; but major emphasis will fall upon the applicability of ethical concepts to the understanding of decision-making in positions of authority.

Online Magazine to Showcase Writing of Students from CI-HW subjects - \$13,500

Dr. Rebecca Blevins Faery, Ms. Karen Boiko, and Ms. Lucy Todd Marx, Writing and Humanistic Studies

This project will create and produce an annual online magazine that will feature exemplary writing by students in CI-HW subjects (21W.730, -731, -732, -734J). The magazine will serve as a teaching tool for CI-HW instructors as well as a way to honor excellent work done by students in these subjects. It will also be a way to make available to audiences both within and outside MIT examples of fine student work from MIT's introductory writing subjects.

Physical Thinking, Physical Learning - \$5,500

Mr. Noah Riskin, DAPER

Mr. Riskin will create and offer a semester long course to fully build out the core concepts of his Physical Intelligence workshops by connecting traditional academics with physical activity. This course will fully explore the balance, proprioception, perception, and kinesthetic awareness of students' physical being in a lab setting - the gym. Through seminars, connections will be made for students to effectively translate their physical experience in the gym as it pertains to body/movement related problems in various fields of research.

The Creation Controversy in Contemporary America - \$5,230

Professor John Durant, MIT Museum/STS

This 9-unit course will continue and deepen the analysis of the "Creation Controversy in America" that was begun in IAP Course STS.095. Students will explore the place and significance of the Creation Museum in Petersburg, Kentucky, in the wider debate about creation and evolution nationally and internationally. Literature reviews in related fields will be conducted; and students will analyze and report on the results of the visitor survey that they conducted in the Creation Museum in January 2008. A specific aim of the course is to prepare a jointly authored article for publication in a peer review journal; and to this end, the class will prepare and present a colloquium as part of the STS Colloquium Series.

Think Tank: Global Solutions - \$5,000

Professor Alex H. Slocum, Mechanical Engineering

Mr. Zahir Dossa, Management

Ms. Sally Susnowitz, Public Service Center

"Think Tank: Global Solutions" is a pilot of a new form of learning based on a "think tank" model, which engages students fully in a humanitarian problem-solving process using methods from professional consulting. The course brings together a diverse group of passionate students to solve pressing global issues in innovative ways, to teach students problem-solving processes from beginning to end, and to enable students to learn from faculty and other professionals in various fields. Educational objectives include fostering a sustainable and organized way of tackling major problems, teaching students how to network effectively with faculty and others, and helping students learn how to work together in developing feasible, sustainable solutions.

Transmedia Storytelling - \$10,000

Professor Beth Coleman, Writing and Humanistic Studies

Dr. Violeta Ivanova, OEIT

Now more than at any point in our culture, we engage in multiple forms to express ourselves and share information. They span written language to all form of visualization and visual

culture. The point of innovation of this course is to teach in an applied manner how students can utilize different media tools to get their message across. The class looks at different media forms for telling stories. The goal of the course is to investigate in a studio/lab atmosphere how to communicate effectively using language-based and visually-oriented forms. The skills the students will practice include short-fiction writing, screenplay writing, and producing video and 3D animation. The focus of the class is analysis and application in communication across media.

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