The Northeastern University Young Scholars Program

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Overview
The Young Scholars Program at Northeastern University began in 1989 in response to a national shortage of qualified U.S. citizens moving into STEM careers. Resurrected in 2004 through support from The Joyce Foundation, the NU Young Scholars Program (NUYSP) addresses a critical recommendation made in the recent national report, “Rising Above The Gathering Storm”, by providing expanded experiential learning experiences in STEM for K-12 students. NUYSP offers future scientists and engineers a unique opportunity for hands-on experience while in high school.

Program Components
Laboratory Research Experiences – Students are assigned to laboratories in teams of 2-3. Participating faculty are recruited from the Colleges of Engineering, Arts & Sciences, and Health Sciences along with affiliated research centers such as The Bernard M. Gordon Center for Subsurface Sensing and Imaging Systems (Gordon CenSSIS)

Career Exploration – Students participate in a special seminar series, covering a range of topics from an Introduction to Engineering, to Career Pathways in the Health Sciences, to the current debate over Stem Cells, to Biomechanics.

Education and Career Counseling – Students prepare for college by learning how to evaluate a college and the opportunities it offers, while also writing a college application essay. Students hear from admissions counselors, internship advisors, and current college students!

Field Trips – Once a week, the group takes an excursion to a variety of corporate and government sites to see and speak with engineers in action. Destinations have included Biogen IDEC, Genzyme, Harbor Explorations, Haystack Observatory, Intel, Massachusetts General Hospital, Raytheon, and U.S. Army Natick Research, Development, and Engineering Center.

Experience College Life – Young Scholars become acquainted with college life and students at various points in their academic careers, and have access to University recreational and educational facilities.

Northeastern University Young Scholars Program – Research Experience that Matters!!!!
Northeastern’s dedication to encouraging industry-relevant experiences along with classroom education is the major thrust of the program. The University’s outstanding facilities and staff, coupled with Northeastern's hands-on approach, provide a challenging opportunity. The following research assignment documents the progression of a Biomedical Imaging lab as students work for six years developing test targets (tissue phantoms) and measuring their optical and acoustic properties

Research Assignment 2004-2009: Biomedical Imaging
Principal Investigator: Charles DiMarzio
Optical Science Laboratory, Gordon CenSSIS

2004 - Design of Test Targets for Biomedical Imaging
Students develop the targets, testing many different formulas. Once a target has been created, the team measures the optical and acoustic properties to see if it is a close match to human tissue.

2006 - Tissue Phantoms for Biomedical Imaging II
Three more students continue the work from last year’s program, as they continue to develop a functioning double integrating sphere to test the tissue phantoms.

2007 - Tissue Phantoms for Biomedical Imaging III
2007 Young Scholars learn/hone some electrical engineering skills as they work on the circuitry for the double integrating sphere.

2008 - Understanding the Optical Properties of Tissue using Dual-Integrating Sphere Theory
2008 Young Scholars began making major headway. Over the summer students gained a better knowledge of how light interacts with tissues, redesigned the circuit and collected better data, ran tests on sample tissue phantoms. automated the system.

2009 - Clinical Applications of Hyperspectral Imaging
2009 participants continued the work as the lab tries to develop a method to detect cancer non-invasively. Participants also discovered that their work had implications not only in cancer detection, but in other subsurface research such as nanomedicine tracking, mine/explosives detection, and discovery of microorganisms and toxins in food/water.

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