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Stephanie Mitchell/Harvard University News Office

A strong partnership between President Lawrence H. Summers and Mayor Thomas M. Menino is strengthening the ties between Harvard and the City of Boston.

links to labs & learning:

Harvard supports Boston science

Harvard and its affiliated hospitals play a key role as partners in science education and innovation in Boston. Harvard research leads to better understanding of chronic diseases and the discovery of life-saving treatments. Harvard's science enterprise supports the local economy and helps Boston maintain its preeminence in the life sciences. And Harvard trains tomorrow's doctors, researchers, innovators and science teachers.

This publication celebrates another important aspect of Harvard's science enterprise — one that links Harvard researchers and health services with science learning in local schools and communities. Thousands of Boston Public School children, area teachers and community residents benefit from these science programs each year.

We invite you to learn more about these and other resources by visiting **www.community.harvard.edu**

Boston students get a taste of doctor's life at Harvard

The chorus of "eeews" when the microsurgery port punched its way into the patient's abdomen quickly gave way to an awed silence as the surgical tools passed through the port and began their work.

After a moment of watching the magnified images on a large screen, the 30 Boston and Cambridge high school students attending Harvard's Crimson Summer Academy (CSA) began asking questions: "Is the gall bladder a vestigial structure?" "How come it doesn't bleed?" "Is it possible to take out just part of it?"

Vivian Sanchez, Harvard instructor and surgeon in Beth Israel Deaconess Medical Center's Division of Minimally Invasive Surgery, and CSA instructor Rami Alwan took turns answering: The gall bladder is not vestigial, they told the group. There is no bleeding because the ports were inserted in a way that didn't sever any blood vessels, and no, it's not possible to take out just part of the gall bladder, the whole thing has to come out.

The gall bladder surgery was just part of a daylong outing to Harvard teaching hospital Beth Israel Deaconess this summer by CSA students. The students spent the day learning about surgery in lectures and tours of the operating room, through hands-on microsurgery demonstrations, and by watching the gall bladder operation as it happened, projected onto a big screen in a hospital classroom.

"It's a rare opportunity," said Madelyn Voong, a junior at John D. O'Bryant High School in Boston. "I've never watched [surgery] before."

Students also got to try their hands using the microsurgery tools. Beginning with moving blocks and beans, they progressed to stitching and tying knots. The students soon discovered that manipulating the tools can be tricky, gaining a new respect for the surgeon's precise movements on the screen.

Jon Chase/Harvard University News Office

Students from the Crimson Summer Academy at Harvard University visit Beth Israel-Deaconess Hospital in Boston to view a live gall bladder operation and to practice suturing techniques. Jeanson Estime from Cambridge Rindge and Latin H.S., right, and Sabrina Antoine from Fenway H.S., second from right, operate a "bean drop," or laproscopic simulation, as they practice what surgeons do during surgery. Behind them are Steve Hilaire from Fenway H.S., second from left, and Anton Wintener, Harvard College undergraduate, far left.

The Crimson Summer Academy is an innovative three-year summer program at Harvard aimed at academically talented local youth. Part of Harvard President Lawrence H. Summers' emphasis on improving access to college for economically disadvantaged students, the program also provides yearlong mentoring by Harvard students and offers support, including a laptop computer, a stipend to replace lost summer earnings, and the promise of a $3,000 scholarship to the college of their choice on completion.

Sanchez, who helped run the day at Beth Israel Deaconess, said a similar summer program she attended in the late 1980s inspired her to attend Harvard and, ultimately, to become a doctor.

"It gave me the confidence that I could take Harvard courses and pass," she said.•

Real research through internships

Richard Peng's keen interest in science got him a job and real world science experience at Harvard this summer. The West Roxbury resident and Boston Latin School sophomore worked in a Harvard School of Public Health (HSPH) lab led by Dr. David Christiani that has focused on researching lung and esophageal cancer, as well as acute respiratory distress syndrome.

"I always thought public health was about air quality and random stuff no doctor would do, but public health has practical applications," said Peng, who ran samples through a DNA extraction machine and provided a helping hand in the lab's day-to-day activities.

"Researchers are doing a lot of stuff that's pretty cool, like research in different countries, cancer studies and studies of the respiratory tract. They are even studying the impact of arsenic-laced water on people in Bangladesh. I didn't know how extensive public health was until the Research Apprenticeship Program."

Since its inception 21 years ago, the Research Apprenticeship Program (RAP), a paid internship program that gives high school students work experience in a lab or behavioral science setting, has changed the lives of over 150 Boston teens.

Ashlie Tyler, a 17-year-old senior from the Media and Technology Charter High School in Boston, is still excited as she talks about her summer RAP apprenticeship. "I would definitely recommend RAP to anyone who is seriously interested in science. It was a really enlightening experience where everybody got to experience something different."

Tyler, who lives in Roxbury, spent her summer working with researchers in the Nutrition Department at HSPH, where she read pathology reports for colon and other types of cancer, helped organize and prepare medical records, and sent out permission forms and other correspondence to research participants and other hospital departments.

"I was always interested in science," Tyler said, "but [the program] helped me narrow down what will be my major in college." She is considering either pathology or law.

Rick Rogers, a senior scientist in the physiology program and a RAP mentor for the past 15 years, says RAP provides "the opportunity to mentor someone and make a true impression on their life… It gives me a chance to demonstrate to the community what Harvard is about — students go away with a clear understanding of what we're about and what public health is about."•

Harvard Molecular Epidemiology Lab

Richard Peng is one of seven Boston area high school students to work in Harvard labs this summer through the Research Apprenticeship Program.

Arnold Arboretum:

A living, breathing classroom for Boston children

On Hemlock Hill in Harvard's Arnold Arboretum, a life-and-death struggle is playing out between the native hemlocks that give the hill its name and an insect called the woolly adelgid that is killing the trees. The hill is also the setting for a living, breathing classroom for Boston area fifth-graders who conduct scientific studies in a new Arnold Arboretum class, "Hemlock Hill: A Changing Ecosystem."

Working in small groups led by volunteer guides, children study the woolly adelgid through hand lenses and look for signs of decline in infested trees. While observing the decline of the hemlock, the children also see first-hand the resulting opportunities for new plant species. The aspiring scientists conclude their research by making predictions about the future of Hemlock Hill.

The two-hour forest excursion, fully funded by the Arboretum through a private donor, is just one of several hands-on research opportunities that draw nearly 2,000 grade-school children from the Greater Boston area to the Arnold Arboretum each year. Through the field studies program children can also study how flowers develop into fruit, observe the dispersal of seeds in the fall, and learn how indigenous people relied on native trees to survive.

Richard Schulhof/Arnold Arboretum

Boston area fifth-graders investigate emerging plant growth on Hemlock Hill.

The outdoor classrooms are "a rare and wonderful opportunity for children from our urban schools," said Nancy Sableski, who runs the Arboretum's education programs for children.•

NASA / JPL-Caltech / J. Bally (University of Colorado)

research matters

World of science is only a click away

Did you know that astronomers recently found a new object in space that looks like a cosmic tornado? Or that if your teenager watches a lot of TV, it's likely he's eating fewer fruits and vegetables? You would if you read Research Matters, a Harvard science research Web site (www.researchmatters.harvard.edu) that covers a wide range of topics and provides a valuable resource for teachers, students, and anyone with a curious mind.

Science assignments can be a challenge for both teachers and students because of the abundance of information and the technical language of sources, but Research Matters makes finding and understanding science easy.

More than 1,000 articles in its navigable database cover mind, body, society, earth, space, and technology. Research Matters synopsizes articles, in easy-to-understand language, from Harvard Medical School and the Harvard School of Public Health and affiliates including Brigham and Women's Hospital, Beth Israel Deaconess Medical Center, Dana-Farber Cancer Institute, Massachusetts General Hospital, Children's Hospital Boston, and Joslin Diabetes Center. Visitors will also find links to scientific journals and researchers' sites.

Research Matters provides a usable foundation of information that will satisfy both academic assignments and intellectual curiosity. In a tangible way it is expanding Harvard's educational outreach to its nearest neighbors and around the globe.

For more information, visit:

www.researchmatters.harvard.edu

Tales of the torso:

Public Health researcher brings hands-on science into the classroom

Marshall Katler's torso is a necessary burden, even if he drops it on the way to the elevator and has to drag it hurriedly along Huntington Avenue. He doesn't complain, though. He quickly makes his way to the Farragut School in Roxbury, where 24 fifth-graders await Katler's — and his torso's — arrival.

Katler, a research specialist at the Harvard School of Public Health (HSPH), is bringing his model torso and head to teach these students in Thomas Kelton's class about science, particularly how the environment can affect one's health.

Since 1986, the HSPH's Environmental Health Education Program (EHEP) has been partnering with Boston schools, including the Farragut, to bring science and health education into classrooms to supplement the schools' programs.

In the beginning, one-time classes and health fairs were offered, but a variety of components have been added over the years, such as yearlong programs, before-school and after-school science clubs, and teacher workshops. The Farragut is the first school to institute a yearlong program, so Katler, who is the founding director of EHEP, will be visiting for one hour, every other week, for the entire academic year.

As Katler detaches organs from his torso and passes them around Kelton's class, the students shout out the names of the organs and get brief explanations of them. When he gets to the brain, Katler says the soft and squishy organ allows them to do everything, and adds that wearing a bike helmet will help prevent serious injury in an accident.

EHEP students receive a more in-depth understanding of public health and science than they would otherwise. "The kids are learning very good science," Katler says. "They're learning how to think, how to work together, how to analyze things." And the lessons prepare them for the Massachusetts Comprehensive Assessment System (MCAS) test, which Kelton says translates into improved test scores.

But, most importantly, the lessons travel with the kids out of the classroom.

"When we talk about pollution, they use this information — they go home and become advocates at home," says Kelton.•

Kris Snibbe/Harvard University News Office

Marshall Katler, research specialist, Harvard School of Public Health, teaches in Thomas Kelton's fifth-grade classroom at the Farragut School in Boston. Katler uses a torso to explore the anatomy of the human body with children.

Boston students explore science

In a lecture hall at Harvard Medical School, Boston area high school students presented their work of eight long summer weeks, talking of platelets and of stem cells, of intestinal bacteria and of vaccines, of sleep deprivation, and of falls in the elderly.

The onlookers, however, talked of the future.

"This is the future of medicine, right here in this room," said Dr. Robert Sackstein, an associate professor of dermatology at Brigham and Women's Hospital who is in his seventh year advising high schoolers in his laboratory. "Our program shows them how to devise a hypothesis and design tests. It's a fantastic lesson."

The program is "Project Success: Opening Doors to Biomedical Careers" and has been run at Harvard Medical School for 13 years. Students meet with senior researchers at each lab, devise a project, and then are given guidance on how to proceed, developing a hypothesis and testing it through the course of the internship.

"This is not show-and-tell or looking over anyone's shoulder," Sackstein said.

Harvard Medical School's Dean for Diversity and Community Partnership Joan Reede said the program, which had 17 students this past summer, brings interested students back for several summers, building a sense of community and cementing the learning and confidence that the internship fosters.

"They feel a part of their lab," Reede said. "They walk away with a better sense of what's possible."

Greidy Terrero, who graduated from The English High School last spring, was in her third summer with Project Success. Terrero, who plans to study psychology at Lesley University, said the program was important in helping her decide to attend college.

"It really did help me to go to college and not back away," Terrero said.•

Stephanie Mitchell/Harvard University News Office

Project Success takes promising high school students with interest in medicine and science and immerses them in Harvard laboratory environments. Porsha Eden spent time this summer in Dr. Robert Sackstein's lab at Brigham and Women's Hospital.

BOSTON SCIENCE...

Partnership

"The extraordinary possibilities that will come from Harvard's new life sciences campus in Allston will sustain Boston's position as a world leader in R&D well into the 21st century. And having the graduate schools of education and public health next door will offer important opportunities for us to build on today's connections between what's discovered at Harvard and what's taught in the classrooms of the Boston Public Schools and practiced in our community health centers."

Mayor Thomas M. Menino

Innovation

"In the heart of Boston thousands of Harvard scientists are working to understand diseases and identify life-saving treatments. This research world is also being tapped by hundreds of public school students participating in Harvard outreach programs. As Harvard's science efforts grow, this innovation and our connections with Boston schools and communities will only strengthen."

President Lawrence H. Summers, Harvard University

Support

"It's the responsibility of the academic enterprise to support the educational system that surrounds it. [Project Success] really shows what students are capable of. These kids are doing things in science that I never dreamed of [at their age], and they understand what they're doing."

Dr. Joan Reede, Dean for Diversity and Community Partnership, Harvard Medical School

Impact

"Researchers are doing a lot of stuff that's pretty cool, like research in different countries, cancer studies and studies of the respiratory tract. I didn't know how extensive public health was until the Research Apprenticeship Program."

Richard Peng, West Roxbury resident and Boston Latin School student

Learning

"What is interesting is the content and skills that go hand in hand with science. Students make connections between ideas and the real world, gain an increase in perspective in the world around them, are opened up to many vistas and experience tons of new ideas. Science does all this on a daily basis."

Britt Parrack, science teacher at Noonan Business Academy in Dorchester and graduate of the mid-career math and science program at Harvard

Hands-On

"The Gardner is thrilled to offer our students such a comprehensive science program. Our hands-on learning laboratories are wonderful environments for our students to actively engage in science questioning, experiments and research. Through our science programming, students are developing into more conscientious citizens, independent thinkers and problem-solvers."

Erica Herman, Principal of Thomas Gardner Elementary School in Allston

Rappin', talkin', chalkin' health

Reflection in Action brings Boston youth to Harvard Medical School to learn, explore

Many children have a natural interest in science and health but are unaware of the resources available to them, including resources that could put them on the path to careers in those fields. Those young students also have a lot to say about health issues in their community, things that adults should be hearing.

From those two simple ideas, an extraordinary annual event was born. Reflection in Action: Building Healthy Communities each spring brings hundreds of middle school students to Harvard Medical School, where they interact with medical professors and students, learn about health topics and careers, and share their own ideas through rap, poetry, dance and visual arts.

"It's designed to give a space for our youth to express their own thoughts about health, to give them a voice," said Harvard Medical School Dean for Diversity and Community Partnership Joan Y. Reede, MD, MPH, MS, whose office sponsors the annual daylong event.

For Shalaya Washington, an eighth-grader from Boston's New Boston Pilot Middle School who participated last year, reflections on youth violence came with rhymes and a dance beat.

"It's not a game. Nowadays it ain't the same, 'cause kids around here don't be usin' their brain and it's a shame. I feel so much pain. Somebody's killed and it drives me insane," rapped Washington.

The annual event celebrates contest participants who have created original artwork expressing their viewpoints about healthy communities, with cash prizes going to first-, second- and third-prize winners, along with lots of other great prizes including gift cards and pizza parties.

The student art includes paintings, sketches, photos, collages, drawings, poems, essays, short stories, skits/plays, songs/raps, dances/steps, and spoken word performances that tie in with the overall theme of health in our community, especially urban health issues; sleep disorders; heart, lung, and blood diseases; oral health; and health disparities.

Reede's office is always busy planning the next Reflection in Action event, scheduled annually for April. For information about Reflection in Action, see **www.mfdp.med.harvard.edu/reflectioninaction** •

Rose Lincoln/Harvard University News Office

Reflection in Action: Building Healthy Communities brings sixth-, seventh-, eighth- and ninth-graders onto Harvard's Medical School campus to use their own creative voices to talk about health care needs in their communities. Uniqua Mason of the James P. Timilty School watches a performance.

It's Elementary, My Dear Einstein

A Celebration of the 100th Anniversary of Einstein's Miraculous Year

More than 300 geniuses-in-the-making from the Boston environs came to Harvard's Science Center in mid-December to see "It's Elementary, My Dear Einstein: A Celebration of the 100th Anniversary of Einstein's Miraculous Year," one of several science lectures Harvard hosts for the public each year.

The family-friendly talk presented by Professor Howard Stone of Harvard's Division of Engineering and Applied Sciences (DEAS), postdoctoral student Dan Blair, and lecturer Daniel Rosenberg paid homage to the world's most famed wild-haired physicist, Albert Einstein. Kids, families, teachers, and the plain curious did more than simply listen about how Einstein revolutionized the way we think about physics and chemistry. The audience left their seats to tackle some of the experiments of the great thinker first hand.

For information about future DEAS lectures, go to: **www.deas.harvard.edu**

For information about upcoming Longwood Seminars, where Harvard researchers present mini-med school classes on current health and medical topics, go to: **www.hms.harvard.edu/longwood_seminars** •

Kathryn Hollar/Harvard University Division of Engineering & Applied Sciences

An interested young scientist gets a personal demonstration of Einstein's theories from lecturer Daniel Rosenberg at "It's Elementary, My Dear Einstein: A Celebration of the 100th Anniversary of Einstein's Miraculous Year."

Tell us what you think!

Email us at:
community@harvard.edu

Many activities, events & lectures on the Harvard campus are open to the public.

learn more at:
www.community.harvard.edu

New science classroom

Support for Boston science goes beyond programs and into the classroom. With help from Harvard, the Gardner Elementary School in Allston now offers its students a completely renovated science classroom to support science learning.

Harvard worked in partnership with the school to update the space for aspiring scientists, adding age-appropriate work spaces and new furniture as well as shelves and storage for science materials.

Jim Barrows/Harvard University Community Affairs

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