

Capacity Crowds Flock to the MIT CEHS Open House “Got Gunk on your DNA?” held on April 30, 2011

Event organized by Kathleen Vandiver, COEC director, and Bevin Engelward, COEC co-director
Article by Kathleen Vandiver

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CEHS Got Gunk on your DNA? MIT

Yes, the environment can affect your DNA!
Come learn how DNA damage affects your health.



This is some nasty gunk and it can come from your food!



Something for the Whole Family

Come to our kids' activity table, with lab coats, gloves, test tubes and hands-on demos

How can I protect my DNA?

Come learn more about DNA and Health at our Open House

Two exciting shows!
11:30-12:30
1:30-2:30

Grab a ticket here!
Meet us in 56-614 (take this elevator to sixth floor)

Become a detective & learn how to detect gunk on DNA.

See state-of-the-art detectors that can weigh a single atom!

Learn how the Center for Environmental Health Sciences is working to help you improve your health!



MIT CEHS Open House poster.

For the first time in over 30 years, MIT invited the public to a campus-wide Open House in honor of MIT's 150 anniversary, held on April 30th. This was the perfect opportunity to host the Center for Environmental Health Science's (CEHS) Open House as

well. The advantages were many, but there was one drawback. It meant that CEHS had to vie with all the other MIT Departments, Labs, and Centers for visitor attendance! Fortunately, Drs. Vandiver, Engelward and the CEHS leadership had plenty of ideas for how to attract people to the event, especially kids!

In an effort to attract interest to our Open House, we posted a catchy title on the 150th MIT website for the CEHS Open House: “Got gunk on your DNA?” And the posting continued, “Yes, the environment can affect your DNA! Come learn about gene/environment interactions and how DNA damage affects your health.” The CEHS Open House tour included an hour-long program with three different stations (20 minutes each), offered at two time slots during the day (11:30AM and 2:30PM). The first station offered a slide show about interesting environmental health research at MIT as well as the history of the National Institute of Environmental Health Sciences (NIEHS) funded Center, including the story about the famous peanut butter toxin. The second station was a research lab where participants viewed CometChips gels used to measure gunk (e.g., damage) on the DNA of single cells and robotics for automation. At the third station,

participants viewed mass spectrometers, instruments used to weigh atoms and solve the mystery of how good molecules go bad. Running concurrently was the youth activity bench, a lab bench for younger scientists (ages 5-16) where they could perfect their lab skills with plastic pipettes, lab coats, purple gloves, and also a table used to build with LEGO DNA.

Since the CEHS laboratories were not located on the ground floor, we invited passers-by to come up to the 6th and 7th floors of Bldg. 56 by handing out information cards and tickets for a specific time slot. We placed colorful posters in various locations to attract more interest. The visitors arrived slowly at the beginning; but by the middle of the day, most of the CEHS volunteers were very busy managing the continuous flow of participants. The youth activity bench was a popular attraction through the day.

At station one, the CEHS Director, Prof. Leona Samson and the CEHS Deputy Director, Prof. Peter Dedon, took turns presenting information about the MIT Center for Environmental Health Sciences such as the history of the Center as well as the research in environmental health performed by our Center members. Our fearless leaders had just the right mix of new information, such as how DNA can be damaged by the environment and how this activity relates to cancer. They were able to explain in an easy-to-grasp manner many examples of how humans are exposed to toxic substances. They also recounted the now famous tale about the peanut butter toxin at MIT, which is a classic investigative environmental health story.



Marcus Parrish demonstrates at the youth lab bench.

UPCOMING ACTIVITIES

TRANSLATIONAL PILOT PROJECT CALL TO BE ISSUED THIS FALL 2011

TRANSLATIONAL OPEN HOUSE TO BE HELD IN FALL 2011

CEHS NEWS

WELCOME new Center members

We are pleased to announce three new Center faculty members.

Eric J. Alm, Associate Professor of Biological Engineering, who's research interests include both computational/theoretical and experimental approaches to understanding the evolution of microorganisms, emphasizing on a 'systems-level' perspective. Please visit his website for further information of his research and publications <http://alm-lab.mit.edu/eric-alm-phd>.

Elizabeth M. Nolan, Assistant Professor of Chemistry, who's research lies at the interface of chemistry and biology with current focus on metalloproteins and –peptides involved in host/producer immunity, antibacterial action, or neurodegeneration. Please visit her website for further information of her research and publications <http://web.mit.edu/nolanlab/>.

Jonathan Runstadler, Assistant Professor of Biological Engineering, seeks to understand genetic factors that impacts susceptibility to infectious disease, specific or general, and the repercussions for potential epidemics, persistence, and evolution of those infectious agents. Professor Runstadler will start at MIT in August 2011.



People Making a Difference® , a non-profit organization in Boston recognized Dr. **Kathleen Vandiver** as Outstanding Community Partner [in Informed and Responsible Community Service.] “This award is given in recognition of successfully engaging hundreds of volunteers in assembling innovative hands-on LEGO® . Life Science kits invented to strengthen science education by enhancing learning of difficult scientific concepts”.



Welcome new HQ Staff

We are delighted to introduce a new staff of the Center Headquarters, **Matthew Townsend**, IT System Administration Assistant. Matthew is located in room 56-205 and can be reached via email ma22178@mit.edu or by phone 617-452-2072. Please join us in welcoming Matthew to the Center!

MORE PHOTOS FROM FEATURED ARTICLE

Acknowledgements of volunteers for the MIT CEHS Open House: Leona Samson, Peter Dedon, Kathleen Vandiver, Bevin Engeward, Pete Wishnok, Koli Taghizadeh, Julie Hammond Coiro, Amanda Tat, Charles Knutson, David Weingeist, Jing Ge, Steven Goldfless, Marcus Parrish, Michelle Sukup-Jackson, Tong Prasongtanakil, John Jackson, Melody Morris.



Deputy Director Peter Dedon makes a point about individual susceptibility.



Center Director Leona D. Samson explains the DNA-health connection.

COEC UPDATE

Cambridge Science Festival—A Closer Look at Environmental Exposures

European cities have found Science Festivals to be an enjoyable way to celebrate and inform the public about science and technology. Following this successful tradition, the MIT Museum launched the first American annual Science Festival in April 2007 for the City of Cambridge, MA. This has now become an annual tradition with local businesses, schools, universities and government organizations contributing activities for the week-long event in Cambridge, MA.

The MIT CEHS and the Harvard School of Public Health have jointly hosted an environmental health science activity at the MIT Museum, for the last five years. This year, the May 7th 2011, event titled a "Closer Look at Environmental Exposures," was held at a different venue, the newly constructed Cambridge Public Library (adjacent to the Cambridge Ridge and Latin High School), which was a great setting and a major draw for the entire community.

Building with LEGO®, the local community to our activity first acquainted themselves with DNA structure. Next, they learned that the base pairs in DNA can be damaged by UV radiation. When cells cannot repair this damage, they undergo a process called apoptosis (programmed



The first table invites families to learn about health.

cell death). Most people only recognize this phenomenon as peeling skin layers caused by sunburn. To help create an awareness about the dangers of UV exposure, the local community was invited to use UV sensitive beads to create their own jewelry. The beads changed color serving as a UV exposure reminder.

Additionally, the annual Cambridge Science Festival provides an opportunity for the CEHS Community Outreach and Education Core (COEC) to encourage and mentor MIT graduate students in the important task of communicating science to the general public. The COEC provides both coaching and effective teaching materials so that a young scientist can connect with people on many different levels, from young children to aging adults. The experience is exciting, rewarding, and fun. It is hard to tell who is having the best

time at this event, whether it's the participants or the instructors in these photographs.

We look forward to our next



MIT graduate students enjoy explaining the science.

Cambridge Science Festival and hope to see you there!

Peter Dedon and Steven Tannenbaum named 2011 ACS Fellow

Professors Peter Dedon and Steven Tannenbaum were named the 2011 American Chemical Society (ACS) Fellow. They will be honored at the Society's upcoming fall national meeting in Denver. "The work they are doing will improve all of our lives as they unleash the power of chemistry to solve global challenges like providing clean water, sufficient food, new energy sources, and cures for disease. But that's not all," the ACS President noted. "They're also organizing scientific conferences for their peers, doing outreach with scouts and schools, and being mentors to the next generation of scientists." The fellows program began in 2009 as a way to recognize and honor ACS members from academe, industry, and government for outstanding achievements in and contributions to science, the profession, and ACS.

CEHS FEATURED ARTICLE CONTINUED

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Our visitors came away from this station with a real sense of CEHS's mission.



Jing Ge and David Weingeist with "CometChip" model in Station Two.

At station two, David Weingeist and Jing Ge (*photo on left*), two graduate students, were responsible for illustrating the Center's innovative side. The Engelward lab has developed a high throughput technology that can reproducibly measure DNA damage inside of individual cells. This technique can be used to screen compounds for toxicity. The presenters used posters, models and lab demonstrations to show just how the CometChip technology works. Visitors learned that each isolated cell's DNA will move through a gel, and if the DNA has been damaged, the DNA will leave

a shape in the gel that looks much like a comet in the sky. That's where the CometChip technology got its name!



Charlie Knutson shows mass spec results to Open House participants at Station Three.

At station three, Drs. Pete Wishnok, Koli Taghizadeh, and Charlie Knutson showed the analytical side of CEHS. This group had to do a lot of preparatory safety work to make the instrumentation in the lab accessible for participants, but it all paid off. Participants were able to walk up to a mass spectrometer

instrumentation and saw the results appear on the monitor. A short talk by Pete Wishnok provided the background information and how mass spectrometers have many uses in today's world, including running drug tests on athletes. He also explained how the instruments measured the mass by measuring the speed of the ions flying through the chamber.

Finally, one of the jewels of our Open House was the youth activity bench. It was a major attraction for many young visitors. We estimated about 200 children participated in the activities at the lab bench and/or the LEGO DNA table which were set up in the 6th floor lobby adja-

cent to station one. Michelle Jackson and Marcus Parrish from the Engelward Lab prepared and planned the activities, and were assisted by six or more MIT students. Because most of the visitors came to campus in family groups, the Center



Steven Goldfless teaches about fluorescence at the youth table.

definitely benefited from offering science lessons to all age ranges. One scout troop leader brought his entire troop and waited patiently while kids had fun putting on lab coats and gloves to examine the bacterial plates that fluoresced with the letters "C-E-H-S". The take-away from this was genes can make all sorts of interesting proteins, including cool fluorescent ones! The LEGO DNA also enthralled groups of parents and children, opening up many questions. The nitrogen tank demonstrations were, of course, a total smashing success.



Bioengineered microbes light up a petri dish.

The CEHS Community Outreach and Education Core (COEC) and the CEHS Administrative Core are grateful for everyone's contributions to this successful event. The full hour-long tour with the three informational stations was attended by about 60-80 visitors and the COEC collected visitor feedback forms as an evaluation method. In response to the evaluation prompt "describe something you've learned", participants mentioned learning a lot of new ideas but some of the clear response themes were around the connection between inflammation and cancer, the idea of DNA repair, and an interest in the history of the Center with the aflatoxin story. One participant summed it up using our CEHS catch phrase... [I learned...] "what genetic toxicology is and the relationship between gunk on DNA and cancer." Those words wrapped up a very successful and highly educational CEHS Open House at MIT.

See page 2 for more photos of this event.