FULL-STEAM AHEAD: Beall and Brown design exhibits and programs that draw kids to engineering and computer science at the Museum of Science, Boston.

Curating Curiosity

Say you're taking your daughter to a science museum. Do you expect she'll be drawn to the engineering and computer science exhibits? She will if **Lydia Beall** '02 has anything to do with it.

Beall is the newly appointed manager of the Tech Studio at the Museum of Science, Boston, a space under development that aims to introduce visitors—especially kids from age seven and up—to the fun of computer science. For the past dozen years, Beall has run the engineering design workshop at the museum.

"She's really creating a new standard in science museums for science engagement," says Paul Fontaine, vice president of education for the museum. "Lydia is an incredible inventor of original activities and environments for learning engineering." Now the museum is looking to her to help them spark for visitors the same excitement about computer science and other technology.

"I think one of the challenges both of these fields are faced with is people think of them as being too complicated for younger kids, so we want kids to get this on their radar sooner rather than later," says Beall.

Engaging Girls

Lydia Beall shares these tips for encouraging girls' interest in science and math:

Engage girls in play that fosters spatial learning. Traditional "girls' " toys—such as dolls, stuffed animals, and tea sets—develop social skills, while "boys' " toys encourage spatial learning. Both boys and girls can benefit from toys that develop social and spatial reasoning. Girls should be encouraged to play with blocks and building sets like Kapla blocks, K'Nex, and Legos. Research suggests that playing with construction sets can be an early indicator of students' success in academic subjects like geometry and math.

Examine the messages your daughter receives about science and math. Often, I'll overhear mothers say things like "I was bad at math, too" or "An engineering project? Let me get your dad." Such statements may send a message to girls that certain fields are not for them.

Engage your daughter in practical applications of science and technology in your daily lives. Have your daughter help with a home repair, a computer update, fixing a broken toy, or assembling furniture. Point out the connections between what you're doing and what scientists and engineers do—using specialized tools, taking measurements, repurposing a material in a creative way, etc.

Show that science is for girls. Check out books and biographies about women scientists and talk about research and new technologies being developed by women.

Encourage your daughter to experiment and take risks. Girls can often be discouraged if they don't "get" something right away. Scientists and engineers learn from mistakes and failures and rarely get something right on the first try. Being willing to experiment with a new idea builds problem-solving skills and fosters creative confidence.

Beall recommends the guide *Science Can Take Her Places! Encouraging Your Daughter's Interests in Science, Math, and Technology* by Sally Ride (Sally Ride Science), a resource that influenced her list.

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And she is particularly focused on getting girls involved. "A lot of times if someone is lucky enough to take a computer science or engineering course before college, they do it in high school—and a lot of data shows that girls fall out of the math-science pipeline around fourth grade," she says. "We're trying to make sure girls know that engineering and computer science are things they can be successful in."

The museum—which drew almost 1.5 million visitors last year—is doing that in part by making its engineering and computer science exhibits appealing to kids of all sorts, and emphasizing the fun and creativity involved in pursuits that are too often depicted as dry and precise. For Beall and colleague **Christopher Brown** '09, an interactive software developer working on the museum's Science Behind Pixar exhibition, opening in June, creativity is a key, if often overlooked, component of engineering and computer science.

The exhibition explores how Pixar Animation Studios merge computer science, technology, and math with artistry. Brown hopes it will encourage people to see just how creative technology fields can be.

"STEM"—science, technology, engineering, and math—"is everywhere, and I don't think people realize that. It is in the music you listen to, the car you drive, the video games you play, the sports you cheer for, the movies you watch, the advertisements you look at, the buildings you live in, the phones you call, and the computer you type on," says Brown. "Almost no meaningful product was built solely from one domain of knowledge. Most things require a team of artists, designers, engineers, scientists, mathematicians, and more."

Activities in the museum are also influenced by the notion of STEAM, a recent twist on STEM that adds art to the mix. "It's the new push, incorporating elements of design. And that's important. If you're designing a car, it has to look good or no one is going to buy it. It's the human dimension of design," says Beall.

Vital to drawing kids into engineering and computer science is designing accessible, engaging exhibitions, both say.

"We're really cognizant about the language we use," says Beall. "When we say we're developing engineering projects, we don't say 'build,' we say 'create,' because create is a word girls already relate to from art and design."

The look of exhibition space is deliberate, too. "When you think of technology exhibits, they're gray, blue, metallic, angular—we do orange, green, purple, rounded shapes. I have a lot of things that are pink, too. The boys are going to build no matter what. But it might bring girls over who were on the fence. And it's a message to parents, too. If parents had a bad experience in math or science, they might be hesitant to take their daughters over."

The Tech Studio is expected to open next year. For now, activities are on the floor, and Beall and colleagues are soliciting feedback. They're looking into teaching both the hardware and software ends of computer science, including electronics and circuitry, subjects kids aren't typically exposed to in elementary school.

"Lydia and Chris are bringing originality, energy, and creativity to both of their fields that's transforming this museum—and the museum professionals who come to visit are really blown away by what they see these folks do," says Fontaine. Months and even years go into developing exhibits that are engaging and intuitive, thanks to prototyping, iterative design, visitor feedback, and experimentation.

"It looks simple, but there's a lot that happens behind the scenes—and that's what Lydia and Chris do," Fontaine says.

—KATHLEEN MCGARVEY

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LIVES

Pulling Teeth?

Last summer, the Harvard School of Dental Medicine gave special recognition to **John Manhold** '41, who returned to the school on the 70th anniversary of his graduation. Witness to a long stretch of the history of modern dentistry, Manhold shared many of his observations in an essay in the summer 2014 edition of the *Harvard Dental Bulletin*.

Manhold spent much of his career as a dental reformer. A pioneer in the now established subspecialty of psychosomatic, or biobehavioral, dentistry, he recalled early, skeptical reactions to his first studies. He persevered, publishing a textbook, *Introductory Psychosomatic Dentistry*, in 1956. "Dentistry was hesitant to accept my studies, while medicine and psychiatry embraced them," Manhold says. He later became a fellow in the Academy of Psychosomatic Medicine as well as president of the group.

After dental school, he returned to Rochester for a fellowship in pathology. He worked with the School of Medicine and Dentistry's founding dean, George Whipple, briefly, before serving in World War II. After the war, he taught at Tufts and then at Washington University. In the mid-1950s, he left St. Louis for New Jersey, to become one of the first faculty members at the new Seton Hall College of Medicine and Dentistry. For 31 years, he remained at the school, now the Rutgers School of Dental Medicine, helping establish and leading its pathology department and serving as dean.

HONORED: Manhold, pictured with his wife, Kit, was recognized by Harvard School of Dental Medicine for his role as a reformer.

At Rutgers, Manhold pressed for greater integration of dental and medical education. "Numerous physical problems provide early indicative symptomatology in the oral cavity. If a dental practitioner is alert and knowledgeable, he or she is in a prime position to discern a budding medical problem," he says.

Dental and medical education have indeed grown more integrated over the years. Says Eli Eliav, director of the Eastman Institute for Oral Health, "The two professions use similar bases of knowledge and the separation between them is quickly shrinking." Faculty and residents at the Eastman Institute work closely with multiple departments within the Medical Center.

Manhold says he's "gratified" by the changes in modern dentistry. "Recognition by one's peers always is most heartwarming," he adds, "and even more so when you have been away from the profession for some time."

—KAREN MCCALLY '02 (PHD)