

New England Science Symposium Keynote Speaker

Donald E. Ingber, MD, PhD

“THE BOUNDARIES BETWEEN disciplines are breaking down,” says Donald E. Ingber, MD, PhD, who will be the keynote speaker at the New England Science Symposium on April 6. It is by working across disciplines, he maintains, that scientists can achieve — and are achieving — transformative breakthroughs. As the founding director of the Wyss Institute for Biologically Inspired Engineering at Harvard University, Judah Folkman Professor of Vascular Biology at Harvard Medical School and the vascular biology program at Boston Children’s Hospital, and professor of bioengineering at the Harvard John A. Paulson School of Engineering and Applied Sciences, Ingber is uniquely positioned to address this topic. It is the core of his career and, he believes, the primary reason he was chosen to lead the Wyss Institute, which is focused on discovering nature’s design principles and on harnessing these insights to create bioinspired technologies to advance human health and create a more sustainable world.

The breakthroughs coming out of the Wyss Institute result from the convergence of many disciplines, including biology, medicine, physics, computer science, design and engineering. Though he has never formally studied engineering, Ingber says, “I learned on the fly. I learned from my students. I learned from my collaborators.”

Ingber also has helped to break down boundaries between science, art and design. His Organs-on-Chips, created with microchip manufacturing methods and lined by living human cells, are being used to replace animal testing as a more accurate and

affordable *in vitro* platform for drug development and personalized medicine. In 2015, the technology was named Design of the Year by the London Design Museum and was also acquired by the Museum of Modern Art (MoMA) in New York City for its permanent design collection. Organs-on-Chips were also named one of the Top 10 Emerging Technologies of 2016 by the World Economic Forum.

He credits a freshman year art class at Yale University, from which he earned his BA, MA, MPhil, MD and PhD, for the light bulb moment that set his future course. Ingber recounts that his professor brought in a “tensegrity” sculpture, made of sticks and elastic strings, a system first described by architect Buckminster Fuller and the sculptor Kenneth Snelson. Watching the professor push the sculpture flat then release it to let it pop up reminded Ingber of the way he had seen cells behave in a lab when he learned to culture them. He relates that he then assumed cells must be tensegrity structures. This juxtaposition of science and art led him to think about biology in an entirely different way than his peers or mentors, believing mechanical forces are as important bioregulators as chemicals and genes.

While he was in medical school, Ingber says, “I loved seeing patients. I loved surgery, medicine and even psychiatry. But I thought I could have a greater impact on more people through science.” After receiving his MD/PhD, Ingber conducted cancer research in the lab of Judah Folkman, MD, at Harvard, studying cell shape and growth control in the context of tumor angiogenesis — the



DONALD E. INGBER, MD, PHD

growth of capillary blood vessel cells that solid cancers require for their sustained expansion. Over the years as he worked to test his hypotheses about physical forces regulating cell and tissue development, Ingber sought out specialists in other fields — physics, chemistry, engineering, magnetism, computer science. And his multidisciplinary group was able to confirm that cells are indeed built like tensegrity structures and that mechanical forces are critical to the control of cell growth and function, as well as wound healing, organ formation and many different disease processes, including cancer.

In 2005, the provost of Harvard asked Ingber to co-chair a committee to envision the future of bioengineering across the university and its hospitals. The faculty group noted that engineering had transformed medicine over the past 50 years by applying engineering principles to solve medical problems. However, they also recognized that we were approaching a tipping point because our knowledge about how nature builds, controls and manufactures has expanded enormously. As a result, they realized that it is now possible to leverage biological principles to develop new



DONALD E. INGBER, MD, PHD

CONTINUED FROM PAGE 1

engineering innovations. They called this “biologically inspired engineering,” which they believed could transform medicine as well as non-medical areas. This concept led to the founding of the Wyss Institute, which

Ingber has led for the past 10 years, since its birth in 2009.

Ingber first participated in the New England Science Symposium in 2016 when one of his students was an award recipient, and members of his staff regularly meet with BSCP students. Ingber advises anyone

interested in a career in biomedical sciences, “Follow your passion. Don’t try to map out what you think you need to do to succeed.”

His path has been anything but preordained. ■

2018 Skills Workshops for College and High School Students

THE 2018 SKILLS WORKSHOPS for College and High School Students, co-sponsored by the Biomedical Science Careers Program (BSCP) and the Harvard Medical School (HMS) Minority Faculty Development Program of the Office for Diversity Inclusion and Community Partnership, took place on Saturday, October 27 at the Harvard Medical School Daniel C. Tosteson Medical Education Center. The workshops, for post-baccalaureates, college and community college students, and high school sophomores, juniors and seniors, had 369 student participants and 71 parents/caregivers.

The Skills Workshops began with opening remarks by Joan Y. Reede, MD, MPH, MS, MBA, professor of medicine, and dean for Diversity and Community Partnership at Harvard Medical School, and president and chair of BSCP. Alden Landry, MD, MPH, assistant professor of emergency medicine and staff physician at Beth Israel Deaconess Medical Center, delivered the keynote address. Landry is also a senior faculty member in the Disparities Solution Center at Massachusetts General Hospital; faculty assistant director in the Office for Diversity Inclusion and Community Partnership, associate director and advisor of the William B. Castle Society, and director for

health equity education at Harvard Medical School; and a BSCP student advisor.

Three concurrent sessions of workshops took place during the program: Application Process for College; Application Process for Medical/Dental Schools; Application Process for Graduate/Professional Schools; Interviewing Skills; Internships and Summer Opportunities; Finances and Your Education; Tips for Resume, Cover Letter and Personal Statement; and Transferring from a Two- to Four-Year College. Panelists for the workshops were comprised of volunteers from academic institutions (Boston University, Boston University School of Medicine, Harvard University, HMS, MGH Institute of Health Professions, Northeastern University, Roxbury Community College, University of Massachusetts Lowell, University of Massachusetts Medical School), biotechnology/pharmaceutical companies (Biogen, Merck Research Laboratories, Novartis Institutes for BioMedical Research, Sanofi Genzyme, Vertex Pharmaceuticals), Harvard-affiliated hospitals (Boston Children’s Hospital and Dana-Farber/Harvard Cancer Center), American Student Assistance, Boston Public Health Commission, Carter Consulting, Eastern Bank, Fair Opportunity Project, Joint Committee for Children’s

Health Education Center, L’Oreal, Massachusetts Educational Financing Authority, Massachusetts Life Sciences Center, National Institutes of Health, and BSCP and HMS students. The event concluded with a student panel. In addition to the different offerings for the students, an informational session for parents/caregivers was conducted by Judith Sanford-Harris, PhD, retired student development counselor at the R.J. Murphy K–9 School of the Boston Public Schools. Students who attended the program were provided with a three-ring binder covering each session to take home with them.

The 2018 Skills Workshops was very successful. Students, parents/caregivers and panelists expressed positive comments about their experiences. ■

Where Are They Now

Lauren Powell, PhD, MPA

OVER NEARLY A DECADE LAUREN Powell, PhD, MPA, has maximized the advantages that participation with the Biomedical Science Careers Program (BSCP) can offer, from networking to career advice to the satisfaction of mentoring the next generation. Currently the director of the Office of Health Equity for the Commonwealth of Virginia, Powell first attended a BSCP conference in 2010. “I haven’t stopped being involved ever since,” she says.

A native of Indianapolis, Indiana, Powell received a BS in biochemistry with a double minor in biology and mathematics from Xavier University of Louisiana in New Orleans in 2006. Hurricane Katrina struck during her senior year. Always interested in science, Powell’s experience watching the city struggle to rebuild affected her career path, though it took some time — and help from BSCP associates — to piece it all together.

After college Powell did clinical research at the Johns Hopkins Schools of Medicine and Public Health, the Dana-Farber Cancer Institute and the National Cancer Institute at the National Institutes of Health. Though she had developed an interest in health policy, Powell says she thought she had to go to medical school to be taken seriously in the field. After attending her first BSCP conference, “Joan [Reede], Lise [Kaye], people on the planning board really helped,” she says. “I called the BSCP manual of mentor profiles ‘my career bible.’” She emailed people she had met at the conference to learn about their professional journeys and tried to assess different opportunities.

While she was working at the NIH, Powell looked into clinical research graduate programs. The program at University of Massachusetts Medical School appealed to her because it had a public health focus. By

coincidence, some faculty members from the school were at the BSCP conference that spring. “I even met the dean of the graduate school of biomedical sciences, and he knew who I was!” she says. She was invited to the school and accepted two weeks after applying.

Powell received her PhD in clinical and population health research, with a concentration in racial and ethnic health disparities, in 2016. “I’ve had an interest in that all along, but I never knew what to call it — especially post-Katrina, being in a city that was totally destroyed. Graduate school helped me define that.”

While writing her dissertation and considering her next move, Powell emailed BSCP mentors and spoke to several people affiliated with the program about their careers, some in the private sector, others in government. “I thought, ‘Am I fully equipped to go out and do what I want to do?’” she recalls. She decided she was not. At the 2014 Evening of Hope, where she received a Hope Scholarship, Powell was seated next to Robert Blendon, ScD, Richard L. Menschel Professor and senior associate dean for policy translation and leadership development at the Harvard T.H. Chan School of Public Health (HSPH); and professor of Health Policy and Political Analysis at HSPH and the Kennedy School of Government. He urged her to attend the Kennedy School. “I didn’t feel like I could have the long-lasting health impact on under-resourced populations without fully understanding policy,” she says. “It was the best decision I have made perhaps in my life.”

Powell graduated from Harvard in spring 2017 and has been in her current role since November of that year. The Charlottesville march took place a month after she submitted her application and she frankly admits that she wondered whether to reconsider



LAUREN POWELL, PHD, MPA

and go to a less contentious setting. “Being a young black woman and leader in a state that was a champion for slavery was something I couldn’t ignore,” she says. But she was drawn by the state’s mix of urban and rural populations and the opportunity to establish health equity between the two. “It was the right opportunity at the right time. I get to use all of my talents here. I feel tremendously blessed to get to step into a role that I was singularly prepared for.” Among the milestones of Powell’s first year on the job are Virginia’s Medicare expansion and the creation of the Henrietta Lacks Commission, a group who will create a biomedical cancer research and treatment center in honor of Henrietta Lacks, a native Virginian.

With her growing professional responsibilities, Powell plans to continue active engagement with BSCP. “You cannot make it to this level of success alone,” she says. “I would walk through fire for BSCP.” ■



BSCP

Biomedical Science Careers Program

c/o Minority Faculty Development Program

Harvard Medical School

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Save the Dates

New England Science Symposium

Saturday, April 6, 2019

Harvard Medical School

For information and to register, go to

www.NewEnglandScienceSymposium.org

Evening of Hope

Thursday, April 25, 2019

The Westin Copley Place Boston

REMINDER

Please remember to update your contact information at www.bscp.org.

Click on "Contact Information/Submit Resume" and enter your information in the appropriate window. ■

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The Massachusetts Medical Society

for their support of this newsletter

