Richard K. Miller was appointed president and first employee of Olin College of Engineering in 2005. He came to Olin from the University of Iowa, where he served as dean of the College of Engineering since 1992, having spent the previous 17 years on the engineering faculty at USC in Los Angeles and UCB in Santa Barbara. With a background in applied mechanics and current interests in innovation in higher education, Miller is the author of more than 100 reviewed journal articles and other technical publications. Together with two Olin colleagues, he received the 2013 Bernard M. Gordon Prize from the US National Academy of Engineering (NAE) for innovation in engineering and technology education. A member of the NAE, he received the Marlow Award for creative and distinguished administrative leadership from the American Society for Engineering Education in 2011.

Miller served as chair of the Engineering Advisory Committee of the US National Science Foundation and has served on advisory boards and committees for Harvard University, Stanford University, the NAE, and the US Military Academy at West Point. He has also served as a consultant to the World Bank in the establishment of new universities. A frequent speaker on engineering education, he received the 2002 Distinguished Engineering Alumnus Award from the University of California at Davis, where he earned a BS degree. He earned his MS from MIT and his PhD from the California Institute of Technology.

What would you like to see other schools and organizations learn from Olin? We would like schools and organizations to learn from our culture—the set of beliefs, values, and commitments that drives Olin students and faculty. We have discovered that students are capable of learning much more independently. We have also discovered that a successful education has to do with sparking on real-world problems—where failure is an option—that with mastering certain equations. By the time they graduate, Olin students believe they can make a positive difference in the world, and they have the skills and vision to make it happen. Having spent our first decade developing an innovative learning program and culture as a kind of lab school, we'd like to spend the next decade and beyond helping to lead the transformation of engineering education in America and throughout the world. That's not a mission that you can achieve by sitting in your classroom and teaching your students alone. You have to collaborate with others to catalyze change. And our model has already attracted a lot of attention. In the past three years, we've had more than 1,000 representatives from various institutions come and visit us. So something is happening here.

Olin College has a 99 percent engineering graduation rate over six years—much higher than the average. What are you doing differently that is contributing to this? We are redefining what it means to be an engineer. We don't think that engineering is just about applied science and a list of content, but it's about a set of attitudes, behaviors, and motivations that define people who become innovators. We believe an engineer is a person who envisions what has never been and does whatever it takes to make it happen. That approach, which emphasizes vision and passion, seems to attract students who are intrinsically motivated and enjoy our experiential learning approach. It should also be noted that our faculty rarely present to the class in a lecture format; faculty members act as mentors and coaches as they answer questions and guide students through their projects. This is a more engaging way to learn engineering. If you ask our students what is it about Olin that makes it successful, they will tell you two things without hesitation. First, it's the people, and second, it's the culture. It's required for students at Olin to live on campus for all four years. Ultimately, we believe that an education is not just what happens in the classroom but what happens in the residence hall, as well. It seems to work.

Why does Olin focus exclusively on engineering? And will it add business and other disciplines in future? Olin College focuses on engineering because the Olin Foundation recognized that there was a problem with engineering education in this country. Less than 5 percent of the bachelor's degrees in the United States are awarded to students who major in engineering, and less than 20 percent of engineering students, on average, are women. About half the students who enter engineering school will not graduate in engineering, and the ones who leave often have higher grades than the ones who stay. Yet, it's clear that in order to solve the global grand challenges in healthcare, security, and the environment, we will depend on engineers. So it was a need-based decision to create an engineering school that would redefine engineering education.

We need to prepare the next generation to be able to take a broader approach toward engineering—considering the whole context of a problem and bringing multiple disciplines and perspectives to bear on it. We want people to see engineering not only in its technical aspects, but also as a process that includes consideration of people's needs and the realities of the marketplace. We do already include other fields, such as liberal arts and business, in our definition of engineering.

In proving STEM education has been a priority for some time, but it does not appear to be the way to fix things in the academic world. What is really missing, and what should be changed at each level of education in the US (and elsewhere)? Our educational system unintentionally helps to create obstacles to communication across disciplines, contributing to the perception that problems arrive with labels on them announcing that they are engineering problems, business problems, or more—general motivational or societal problems. This system produces significant barriers to student awareness, interest in, and ability to address complex problems that require a multidisciplinary approach. And yet, the foundation for a broad and integrated education is awareness and interest in complex problems and the ability to communicate with experts across many disciplines. It is imperative that we address these barriers to communication across disciplines as a first step toward providing a more integrated education for not just engineers, but everyone.

How do you define design thinking, and what role does it play at Olin? In design-based thinking, the problem hasn't been defined yet. Students are called upon to define the problem, and then focus time and energy on solving it. Framing the problem and diagnosing the problem turns out to be one of the most important and most overlooked aspects of education. So if a high fraction of your undergraduate experience involves designing problems to work on, you exercise those muscles a lot and you become really quite good at developing the context and developing the problem that you're going to work on. Design-based education is not completely new. The difference at Olin is that we incorporate it into everything we do.