

Calling for New Perspectives in Engineering

By Brad Stager

As a materials engineer, Justin Schwartz, understands the need to harness technology to solve problems and create things that improve people's lives. In his Eminent Scholar Lecture Series presentation titled "Redefining Engineering in the Modern Age," he makes the case that engineers need to consider the social impact of their work because of its effect on social and human development.

Schwartz is the Harold and Inge Marcus Dean of Engineering at The Pennsylvania State University. The College of Engineering is the largest academic unit at Penn State.

"For over a millennium the story of human society is the story of engineering," Schwartz says, citing the development of safe water systems which separate potable water from wastewater and the printing press which led to the spread of ideas and democratization, as examples where engineering played a role in advancing civilization.

According to Schwartz, along with that progress new problems have emerged that likewise attract the attention of engineers.

"Today, when you think of where we are, we have this amazing spectrum of new opportunities," he says. "But at the same time we face a wave of challenges and threats that are as big as any we've had before."

Schwartz cites advancements in how people are able to communicate ideas as an example of how technical changes create societal changes.

"We have this 700-year path from the printing press to the smartphone as this transition of how humans communicate and interact with each other in terms of ideas."

Schwartz, who earned his PhD in nuclear engineering at the Massachusetts Institute of Technology, says some modern advances like the Internet present concerns about the legitimacy and accuracy of information available to users and the loss of privacy from the collection and monetizing of personal information by social media platforms such as Facebook. With that in mind, he posed a question to the audience.

“Is it the Internet of Things or the Internet of Threats? It was only a few years ago that we were talking about the Information Age but now we’re asking if it’s the Misinformation Age.”

Nonetheless, it is engineering that is still uniquely qualified to deal with challenges that range from building bridges to managing data and resources says Schwartz who adds that problems that may seem unrelated, may have common solutions. He says the two problems of the opioid crisis and the existence of “food deserts” in communities where there are no food stores, exemplify a need for better supply chain engineering in both the food and pharmaceutical industries.

“Those industries have not been forced to look at it from the supply chain perspective because they’re only focusing on the immediate drivers of their shareholders and their profit,” says Schwartz, who adds that a shift in perspective could be a first step.

“Those are not things we don’t know how to do, it’s simply the way that we are currently structured.”

Schwartz characterizes his presentation as a “call to action,” and looking ahead as to what will require attention, He cites a 2015 NASA study reporting one-third of the planet’s aquifers being in distress as evidence of the ongoing need for engineers to ensure safe water supplies for a growing population, much like when they first became involved in separating drinking water from wastewater.

Besides the big problems, engineers will be even more engaged on a smaller scale, “This call to action isn’t just ‘save the planet,’” says Schwartz. “It’s how do we do life improvement for everyone.”

According to Schwartz, meeting that challenge and the others down the road will require expanding the pool of potential engineers, developing their skills and providing professional opportunities that take advantage of different perspectives. Of particular concern to Schwartz is the state of gender equity in engineering.

“It’s hard to talk about changing the world and leaving out 40 to 50 percent of the people.” Schwartz adds that improving gender equity in engineering is a “community problem,” requiring broad support to correct.

Like all of this year’s Eminent Scholar lectures, Schwartz presented his ideas to a live audience in the USF Tampa campus’ Advanced Visualization Center. People could also watch a live-stream of the lecture online and can still view it by visiting the USF College of Engineering Facebook page.