

The Peppas Factor: Educating Future Leaders

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Nicholas Peppas' teaching style is a true combination of old-fashioned elements and modern engineering concepts. He still relies on a white board in the classroom and works hard to commit each student's name to memory.

At the same time, Peppas has a decidedly contemporary take on engineering education, wanting all students to walk out of his class not only understanding the basic principles of engineering, but also ready to make a difference in health care, industry, academic research and society.



"You need to educate students to the modern needs of industry and society," said Peppas, who is chair of the Department of Biomedical Engineering and holds professorships in the McKetta Department of Chemical Engineering and UT Austin's College of Pharmacy. "My belief is that the nation and the world need better solutions."

A pioneer of oral drug delivery systems, the Greece native has founded three companies and filed 35 national and international patents. It's this entrepreneurial spirit that he tries to impart to his students.

"I try to identify the new Michael Dells," he said.

His ability to mix modern engineering with old-school personal touches is one of the reasons why Peppas earned the American Society for Engineering Education's top teaching award this spring. The ASEE award, called the Benjamin Garver Lamme Excellence in Engineering Education Award, is given to honor excellence in teaching, contributions to technical literature and achievements that advance engineering college administration.

With this ASEE award, Peppas joins an elite group of major engineering figures. Peppas may be the first biomedical engineer to receive the award, which is not surprising considering he helped to define the field. Peppas will receive the award at the ASEE Annual Awards Banquet on June 26 in Atlanta, Georgia. This latest distinction comes on the heels of his National Academy of Engineering's Founders Award in 2012. NAE honored his contributions to engineering, calling him the "most influential scientist in the utilization of hydrogels as biomaterials, in bionanotechnology and in molecular recognition processes."

Training the Next Generation

Having taught for more than 30 years, Peppas has created a constellation of leaders in the biomedical, chemical and pharmaceutical engineering fields.

"Under Peppas' guidance and mentoring, his students have gone on to become outstanding scientists, invent products, lead companies and become dynamic educators," said Gregory L. Fenves, dean of the Cockrell School of Engineering.

Indeed, of the more than 800 undergraduate, graduate students or postdoctoral and visiting scientists who have studied under him, 55 are now professors, 23 are professors of medicine, 31 are attorneys and more than 110 are now high-ranking executives at major companies.

Inside his industrious lab, Peppas and his students have together developed treatments that have improved the lives of people dealing with serious medical conditions, as well as invented health care products that are used by millions of people everyday.

"I'm very proud of the problems we have solved here," Peppas said. "This laboratory, in a synergy with teaching, has solved problems all the way from vocal cord disorders, contact lenses, intraocular contact lenses, drug delivery devices and materials for artificial hearts."

In addition to Peppas' lab discoveries, it's his genuine passion for teaching and concern for his students that have endeared him to so many of his past students.

Take the story of Jennifer Sinclair Curtis, who met Peppas when she was an undergraduate at Purdue University. He mentored her during critical junctures in her career, such as going to graduate school, getting a faculty position, writing successful proposals and getting promotions in academia. She is now an associate dean for research and facilities the University of Florida's engineering school.

"There could be no greater supporter or mentor. When you work with Nicholas, you are 'his' for life. He keeps up with your career, your family, your life," Curtis said. "As an example, two weeks ago, he sent me an e-mail regarding my son's birthday. What other advisor or former professor would do that?"

As many of his students know, he spends a good deal of time nominating undergraduate and graduate students for awards, writing letters of recommendation and helping them secure internships where they can further their careers.

Without Peppas' help and encouragement, "I would not have been able to get where I am today — studying a type of cancer therapeutic as I work toward my Ph.D. in chemical engineering at MIT," said his former student Katie Maass, a UT Austin graduate.

During his career, Peppas has made a point of hiring promising undergraduates to work in his lab.

One major reason that Rebekah Scheuerle wanted to go to UT Austin was to work with Peppas on oral drug delivery. This spring, she was one of a small group of students nationally to receive the prestigious Gates Cambridge Scholarship.

“I was really passionate about getting into a research lab at a really young age and wanted to work with Dr. Peppas, specifically,” Scheuerle said. “He likes talking to freshmen and training them, so that at the end of the four years they’re independent scientists.”

Whether he’s leading a Socratic discussion in class or explaining to a group of freshmen the fields of chemical, biomedical and pharmaceutical engineering, Peppas naturally captures an audience with his dynamic presence.

“I think I can teach the most difficult mathematical equations, but I always connect it to a real case,” Peppas said. “You excite them not only with engineering, but with health care policy and lowering the costs. How much does this product cost? Why \$10, why not \$2?”

Instead of just delivering dry curriculum, he engages with real-life examples of people struggling with a disease, or a particular treatment that takes a toll on a body.

“When you have a diabetic patient taking injections, we all assume that this is a way of life. I come in and I say, ‘No, we should not accept that this is the best way or the only way,’” he said. “Let’s come up with something else.”

For all his contributions to medicine and engineering, Peppas said seeing his students succeed has been the most rewarding part of his career.

“Of course I’m proud of the products and the medical devices and seeing patients use them,” Peppas said. “But, still, the students are more important to me.”

Dr. Nicholas Peppas

- Fletcher Stucky Pratt Chair in Engineering
- Director of Center on Biomaterials, Drug Delivery, Bionanotechnology and Molecular Recognition
- Professor of biomedical engineering, chemical engineering and pharmacy at The University of Texas at Austin

Academies

- National Academy of Engineering, 2006
- Institute of Medicine of the National Academies, 2008
- French Academy of Pharmacy, 2005
- Royal Academy of Spain, 2011
- The Academy of Medicine, Engineering and Science of Texas, 2006

Teaching Awards

- American Society for Engineering Education (ASEE) Excellence in Engineering Education Award, 2013
- Most Outstanding Chemical Engineering Faculty Member, UT Austin Student Engineering Council, 2007
- Dow Chemical Engineering and Lectureship Award, American Society for Engineering Education, 2006
- Outstanding Chemical Engineer Award, Purdue University School of Chemical Engineering, 2002
- Marion B. Scott Award, Purdue University, 1999
- Potter Award for Best Engineering Teacher, Purdue; 1994, 1985 and 1978
- Shreve Prize for Best Chemical Engineering Teacher, Purdue; 1994, 1985, 1982, 1980 and 1978
- ASEE George Westinghouse Award, 1992
- American Institute of Chemical Engineers (AIChE) National Best Counselor Award, 1982
- ASEE Western Electric Fund Award, 1980

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