ELMER L. GADEN JR., widely known as the "father of biochemical engineering," received all of his degrees from Columbia. Shortly after receiving his doctorate in 1949, he became a faculty member and remained at Columbia, often serving as department chair, until 1979. He was the founding editor of *Biotechnology and Bioengineering* (1959 –1974) and retired as Willis Johnson Professor from the University of Virginia in 1994. He received many awards throughout his career for scholarship, outstanding teaching, and service to the many professional organizations he served. In 2009 he was awarded the NAE Fritz and Delores Russ Prize, one of engineering's highest honors, in recognition of the profound effect of his work and leadership on the large-scale production of antibiotics following the Second World War. Professor Gaden died on March 10, 2012.

THE GADEN MEMORIAL LECTURE is an annual examination of the changing interface between chemical engineering, cognate sciences, and society.

PAST GADEN LECTURERS

George Georgiou	2007
Frank Bates	2008
Frances Arnold	2009
John H. Seinfeld	2010
Chaitan Khosla	2011
Manfred Morari	2012
Enrique Iglesia	2013

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The Fu Foundation School of
Engineering and Applied Science

The Department of Chemical Engineering
Columbia University

2014 Gaden Memorial Lecture

presented by

Nicholas A. Peppas

Cockrell Family Regents Chair in Engineering #6;

Professor of Biomedical Engineering, Chemical Engineering and Pharmacy; and

Director of the Institute of Biomaterials, Drug Delivery and Regenerative Medicine

The University of Texas at Austin

NICHOLAS A. PEPPAS is the Cockrell Family Regents Chair in Engineering #6; professor of chemical engineering, biomedical engineering, and pharmacy; chairman of the Department of Biomedical Engineering; and director of the Institute of Biomaterials, Drug Delivery, and Regenerative Medicine of the University of Texas at Austin. He is known for his pioneering research in biomaterials, polymer physics, drug delivery, bionanotechnology, and medical devices.

He is the inventor of numerous medical products, including contact and intraocular lenses; artificial kidney membranes, cartilage, and devices for oral delivery of insulin for treatment of diabetics; calcitonin for osteoporosis and interferon beta for multiple sclerosis; and of recognitive delivery systems. He is the 2012 Founders Award recipient of the National Academy of Engineering. Peppas is an elected member of the National Academy of Engineering, the Institute of Medicine of the National Academies, the National Academy of France, the Royal Academy of Spain, the Academy of Athens (Greece), and the Academy of Medicine, Engineering & Science of Texas. In 2008, AIChE named him one of the 100 Chemical Engineers of the Modern Era. He is currently the president of the International Union of Societies of Biomaterials Science and Engineering and chair of the Engineering section of the American Association of the Advancement of Science. He is also a fellow of the American Chemical Society, American Physical Society, Materials Research Society, American Association of Pharmaceutical Scientists, American Institute of Chemical Engineers, and the American Society of the Engineering Education. Peppas holds a Dipl. Eng., National Technical University of Athens (1971), a Sc.D. from MIT (1973), honorary doctorates from Ghent University (Belgium), University of Parma (Italy), University of Ljubljana (Slovenia), and University of Athens (Greece), and an honorary professorship from Sichuan University, China.

Abstract: "First, it should be recognized that chemical engineering, or any branch of engineering for that matter, does not comprise a distinct body of knowledge, like what is normally associated with the various sciences such as physics, chemistry, or biology. Rather, it embodies a general attitude and approach to practical problems, which recognizes the need for getting something done with reasonable expediency even in the absence of complete information. Engineering, like medicine, is a practical art. It is firmly based on the constantly expanding pool of scientific knowledge and, in fact, frequently contributes to this pool through its associated research activities. Nevertheless, the basic engineering function is to provide solutions to the practical problems of technology." Thus did Elmer Gaden address emerging problems in "Chemical Engineering and Bioengineering" as he was prefacing one of his better known contributions (EL Gaden Jr., *Appl. Microbiol.* 8(2), 123 (1960). Many things have changed in these fields in the last 55 years. Of

The Department of Chemical Engineering
at Columbia University
is pleased to announce

THE EIGHTH ANNUAL GADEN MEMORIAL LECTURE:

Responsive & Intelligent Biopolymers for Recognitive, Biosensing and Protein Delivery

presented by

Professor Nicholas Peppas

Department of Chemical Engineering and
Chair of Biomedical Engineering at The University of Texas at Austin

Tuesday October 28th, 2014
4:00 p.m.

Davis Auditorium
412 Center for Engineering and
Physical Science Research (CEPSR)
Columbia University

course, engineering advances are now based on solid scientific principles, and the field has matured beyond the wildest imagination of its players. There is no field where this is more evident and celebrated than biomedical materials and their use for better treatment of diseases. For example, recent developments in delivery of drugs, proteins, and active agents have been directed toward the preparation of targeted formulations and products for delivery to specific sites, use of environmentally responsive polymers to achieve pH- or temperature-triggered delivery, usually in modulated mode, and improved behavior of their responsive behavior and cell recognition. We can now engineer the molecular design of intelligent biopolymers by controlling their recognition and specificity as the first step in coordinating and duplicating complex biological and physiological processes. We address design and synthesis characteristics of novel biopolymers capable of protein release as well as artificial molecular structures capable of specific molecular recognition of biological molecules. We address molecular imprinting and micro-imprinting techniques, as methods for creating stereo-specific, three-dimensional binding cavities based on a biological compound of interest and for preparation of biomimetic materials for intelligent drug delivery, drug targeting, and tissue engineering.