BIOGRAPHY AND ACHIEVEMENTS OF PROFESSOR NICHOLAS A. PEPPAS

Nicholas A. Peppas, PhD, is the Cockrell Family Regents Chair in Engineering *with joint appointments in the Departments of Chemical Engineering, Biomedical Engineering and Pediatrics, and courtesy appointments in the Departments of Surgery and Perioperative Care, and Molecular Pharmaceutics and Drug Delivery at the University of Texas at Austin*.

Research Achievements: Professor Peppas is an international leader in the fields of medical devices, biomaterials, advanced controlled drug delivery, biosensors and bionanotechnology. Because of his research activities and achievements, he has been elected a member of 12 US and international academies including the *National Academy of Engineering, the National Academy of Medicine, the American Academy of Arts and Sciences, the National Academy of Inventors, the Chinese Academy of Engineering, the Canadian Academy of Engineering, the National Academy of France, the Royal National Academy of Spain, the Academy of Athens, the International Academy of Medical and Biological Engineering, and the Academy of Medicine, Engineering and Sciences of Texas*. Professor Peppas received a Dipl. Eng. from NTU Athens in 1971. He came to the USA in August 1971 and studied biomedical and chemical engineering receiving his doctor of science (Sc.D.) from MIT in October 1973.

Professor Nicholas A. Peppas is the leading researcher, inventor and pacesetter in the field of drug delivery and controlled release. He is a leader in chemical and biomedical engineering, polymer physics and chemistry, biomaterials, drug delivery and nanotechnology, opening up entirely new fields of science, generating multiple products and their subsequent generations, and collaborating throughout the world. Nationally and internationally, his contributions have had significant impact on scientific discovery and its subsequent benefits to human health. The multidisciplinary approach of his research in bionanotechnology and biomolecular engineering generated the next-generation systems and devices, including bioMEMS with enhanced applicability, reliability, functionality, and longevity. *It was recently determined that 800 million patients worldwide have benefited from Peppas' therapeutic products.*

Peppas has ranked as one of the most cited scientists and engineers (over 136,000 citations total) with an H-index of 170. Applications of these theories have been in the field of biomaterials as applied to medical therapeutic products. Professor Peppas and his students originated the novel muco- and bioadhesive systems that interact molecularly with the mucus and tissue and have been able to prolong bioavailability of proteins and peptides in the blood. As a result of his work, a number of biomedical polymers and commercial delivery devices have been launched. For example, Nicholas was the first to develop novel toxic-free poly(vinyl alcohol) gels by the freezing-thawing technique which became very successful articular cartilage replacement systems. He then developed the same systems for in situ replacement of vocal cords, a successful medical procedure that remained in practice until the late 1990s and assisted numerous patients. In the late 1970s he started working on contact and intraocular lenses. He was one of the first to develop hard, oxygen-permeable contact lenses that provided an improved method of helping patients with astigmatism and hypoxia. In the 1990s he was instrumental in designing important new intraocular lenses. His group pioneered the use of hydrogels in drug delivery applications, including epidermal bioadhesive systems and systems for the release of theophylline, proxyphylline, diltiazem, and oxprenolol. Perhaps the boldest development of Peppas' lab has been the new technologies of oral delivery systems for insulin and other proteins for the transmucosal (oral, buccal) delivery of calcitonin (for treatment of osteoporosis in post-menopausal women) and interferon alpha (for cancer therapy). Additionally, an oral form of interferon beta was developed for multiple sclerosis patients. A natural consequence of this work was his founding of three companies, Mimetic Solutions, CoraDyne and Appian Laboratories.

Economic Impact of Innovations: Professor Peppas' contributions have been translated into more than twenty medical products with multibillion dollar markets. It is estimated that 800 million patients have benefited from the products that have come out of the fundamental principles, translational research, development and commercialization efforts of Professor Peppas via new companies, devices and drug delivery systems.

Education and Teamwork: The many researcher and educational achievements of Professor Peppas, his interdisciplinary leadership, and the example he is setting for his students and professional colleagues serve as powerful incentives for those interested in biomaterials, devices and drug delivery systems to develop strong interdisciplinary teams. His many emissaries to "carry the torch" already occupy many disciplines: 125 PhDs and a total of 990 scientists through the labs (UG and graduate students, technicians, postdocs, research associates, visiting scientists, etc.). Among them, 68 are physicians of which 23 are professors in medical schools. In addition, 28 are lawyers, 27 CEOs or VPs etc. Seven of his former associates are NAE members; five are members of the NAM; 1 of NAS; and 12 are members of NAI. He has educated thousands around the world. He has held 14 visiting professorships in 11 countries, and more than 1,400 lectures in 34 countries. He holds 7 honorary doctorates (Belgium, Italy, Greece, Slovenia, Spain), 4 honorary professorships in China (Sichuan Univ, Peking Union Medical College, Beihang University, PLA Hospital and Medical School) and many of the most prestigious awards in the field. He has been recognized with more than 170 international awards including the highest recognitions from the National Academy of Engineering (2012 Founders Award), and the National Academy of Medicine (2018 Adam Yarmolinsky Award), the American Institute of Chemical Engineers (the 2006 William H. Walker Award, the 2006 Jay Bailey Biological Engineering Award, the 2007 Institute Lecture), the highest research recognitions from the Society for Biomaterials, etc. Professor Peppas served as the President of the International Union of Societies for Biomaterials Science and Engineering, from 2008-2016 and as Chair of the Engineering Section of the American Association for the Advancement of Sciences (AAAS, 2014-15). He was Chair of the Engineering Section of the National Academy of Medicine (NAM, 2015-17) and Chair of the Bioengineering Section of the National Academy of Engineering (NAE, 2015-17). He is a Past-Chair of the College of Fellows of the American Institute of Medical and Biological Engineers (AIMBE, 2010-11), a Past-President of the Society for Biomaterials (2002-2003), a Past-President of the Controlled Release Society (1987-1988), and a past Director of the American Institute of Chemical Engineers (AIChE, 2000-2002).

Philanthropic contributions: Peppas has been a strong supporter of the arts, artistic endeavors in the USA including the Indianapolis and Austin Symphony Orchestras, the NY Metropolitan Opera, as well as a number of organizations including the Archdiocese of North America. In March 2020 he was selected to receive the prestigious ***Ellis Island Medal of Honor***.