DATE: May 19, 2019

ABBREVIATED CURRICULUM VITAE OF NICHOLAS A. PEPPAS

Professor Nicholas A. Peppas

Nicholas A Peppas, ScD, NAM, NAE, AAAS, CAE, NAI
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SUMMARY OF ACCOMPLISHMENTS IN EDUCATION, RESEARCH, ADMINISTRATION AND SERVICE:

Nicholas A. Peppas, PhD, is the Cockrell Family Regents Chair in Engineering with joint appointments in Chemical Engineering, Biomedical Engineering and Pediatrics, and courtesy appointments in Surgery and Perioperative Care, and Pharmacy at the University of Texas at Austin. Professor Peppas is a world leader in biomaterials, controlled drug delivery, biomaterials and bionanotechnology. Because of his research activities and achievements, he has been elected a member of 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. He is the only Texan to have been elected in the National Academies of the United States for sciences, engineering and medicine.

Professor Peppas received a Dipl. Eng. from NTU Athens (1971) and a Sc.D. from MIT (1973). 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.

RESEARCH AND INNOVATION:

Innovation

Professor Nicholas A. Peppas is the leading researcher, inventor and pacesetter in the field of drug delivery and controlled release. He is an international leader in biomaterials and bionanotechnology, and has contributed seminal work in the field of feedback controlled biomedical devices. The multidisciplinary approach of his research in bionanotechnology and biomolecular engineering blends modern molecular and cellular biology with materials engineering to generate next-generation systems and devices, including bioMEMS with enhanced

applicability, reliability, functionality, and longevity. Millions of patients worldwide have benefited from several lines of therapeutic products developed by Professor Peppas.

More than anyone else in the field, Professor Peppas has set the fundamentals and rational design of drug delivery systems and biomaterials over the past 43 years. Until the 1970s drug delivery was an empirical field where the selection of components for successful formulations was based on a heuristic approach. Peppas was the first to set the theories and equations that led to the design of a wide range of new systems. For example, using biomedical engineering principles and new biomedical transport theories, Nicholas developed the equations that describe Fickian and non-Fickian diffusion in controlled release devices. The "Peppas equation" has become the standard method of analysis of diffusion through any pharmaceutical device. Using the modeling similarities of phase erosion and state erosion, he developed a unified model for all drug delivery systems. Similarly, he developed the theoretical framework for the analysis of transport through crosslinked biomaterials (the Peppas-Reinhart theory), ionic hydrogels (the Brannon-Peppas theory), and gel-tissue interactions via tethers (the Huang-Peppas theory and the Sahlin-Peppas equation). For the profound impact of these theories and analyses, Nicholas has ranked as one of the most cited scientists and engineers (over 108,000 citations total) with an H-index of 154. The H-index recognizes the most highly prolific and cited authors and researchers in the world.

Applications of these theories have been profound 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 in 1975. These gels became very successful ***articular cartilage replacement systems.***

In 1978, he 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 (for the company Medicornea Eastern that was eventually merged into Cooper Vision) that provided an improved method of helping patients with astigmatism and hypoxia. In the 1990s he was instrumental in designing important new intraocular lenses.

In 1979 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.*** Peppas worked with the Geomatrix® inventors, Professors Paolo Colombo and Ubaldo Conte of the University of Pavia, Italy, and contributed to the design and performance analysis of the ***Geomatrix ® technology.***

Perhaps the boldest development of Peppas' lab has been the new technologies of ***oral delivery systems for insulin and other proteins.*** These devices release insulin orally, "protecting" the insulin throughout its transport in the stomach, upper small intestine, and, eventually, blood, and bypassing diabetics' need for several daily injections. Nicholas' group has shown that these new systems exhibit very high bioavailability. This is the first time that an oral system has been shown to be effective for oral delivery of proteins, especially insulin. In tests on rats and dogs that were given capsules containing microspheres of this new biomaterial carrier, high bioavailability was determined. The group's discovery was greeted with very enthusiastic comments by the medical community. This "disruptive" technology is estimated to enter the commercial market within 18-24 months.

The same technology is now being used 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 and is expected to launch commercially for multiple sclerosis patients***.

Professor Peppas was one of the pioneers of intelligent biomaterials, and medical devices. Using intelligent polymers as early as 1980, Nicholas and his group were the first to use such pH-sensitive and temperature-sensitive systems for modulated release of streptokinase and other fibrinolytic enzymes.

In the 1990s and in this century, Nicholas Peppas became the main proponent of the use of intelligent systems in the medical field. Physiologically-controlled and disease-responsive, feedback control-based devices require the operation/function of electrical and mechanical parts as a result of on-line measurement of physiological variables of the body, blood or other biological fluids. Nicholas utilized the basics of biomedical transport phenomena, control theory, and kinetic behavior to design novel devices and to optimize their behavior in the body or in contact with the body. Adjustment of appropriate components of these devices was based on simple or sophisticated control or other physiological based models. To this end, Nicholas and his group have investigated the biocompatibility of all components of these devices and have provided knowledge of cellular response mechanisms that may be related to changes in immunological status, physical tissue damage.

Research in physiologically-responsive devices has sought to show how it is possible to use classical and biomedical engineering principles, mathematics, transport phenomena and control theory to design devices and artificial organs, often based on "intelligent materials," which are responsive to changes in the surrounding environment. Nicholas developed feedback control devices, such as glucose-sensitive microsensors that can respond to abnormal glucose levels by releasing incorporated insulin to the blood at desired rates. Such feedback control systems could be perfected for use in treatment of diabetes. In addition, he developed temperature-sensitive devices that can be used for treatment of malaria by release of antipyretics. A natural consequence of this work was his founding of three companies – Appian Labs, Mimetic Solutions, and CoraDyn Biosystems.

Economic Impact of Innovations

Professor Peppas' contributions have been translated into more than twenty medical products with multibillion dollar markets. It is estimated that 700 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.

Public Understanding of Innovations

Almost everyone has had occasion to use combination therapies (e.g., oral, topical, implantable) involving the incorporation of drugs and biomaterials to control the rates, tissue placement, efficacy and safety of drug delivery. The public at large has little understanding of the importance of engineering to the pills they take, the patches they use or the implants they receive. The global market for drug delivery systems in 2010 was $131.6 billion and increased by 50% to $197.8 billion by the end of 2018, or 27% of the worldwide pharmaceutical market of $880 billion. The drug delivery market is expected to rise at a compound annual growth rate (CAGR) of 7.5% and reach nearly $215.6 billion by 2019.

Teamwork

Every section of this analysis has described how Nicholas Peppas has harnessed the expertise and efforts of his colleagues (fellow professors, clinicians, industrialists, students, investors, internal staff members) to achieve

the biomedical breakthroughs reported here. This field absolutely requires (to the extent that few other fields do) interdisciplinary collaboration to have successful products.

The many successes enjoyed by Professor Peppas, by 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. It should not go unreported that Peppas' inspiring example to his students and colleagues will certainly enhance the collaborative environment in the engineering and medical/biomedical disciplines. His many emissaries to "carry the torch" already occupy many disciplines: 110 PhDs, a total of 980 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. He has educated thousands in other countries and around the world with 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), 3 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.

Innovation Leadership

Professor Peppas' patents have been licensed or sublicensed to a number of pharmaceutical, chemical, biotechnology and medical device companies. A number of these companies were launched on the basis of these patent licenses. He served in numerous US government panels of NSF, NIH and other Federal Agencies. Among others he serves in the National Board of Materials and Manufacturing and was a member of the Nanotechnology Technical Advisory Board to the President's Council of Advisors on Science and Technology from 2003-06. In addition he has served as a member of the Advisory Boards of eleven companies and as a consultant of more than 60 companies, law firms and brokerage firms.

He has been recognized with more than 150 international awards. These include 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, and the 2007 Institute Lecture, along with the 1994 Food, Pharmaceuticals and Bioengineering Award, the 1984 CME Stine Materials Engineering and Sciences Award, and the 1994 Best Paper Award of the AIChE Meeting), the ***highest research recognitions from the Society for Biomaterials (the 2005 Founders Award*** for life time contributions, and the 1992 Clemson Award for Basic Research), the ***Herman Mark*** and the ***Applied Polymer Science Award*** from the American Chemical Society, both the Pritzker Medal and the Distinguished Biomedical Scientists Awards of BMES, the highest educational recognition in the USA, the Benjamin Carver Lamme Award of the American Society for Engineering Education, the 2017 Inaugural Pioneer in Nanotechnology Award from Johns Hopkins University, the 2010 Acta Biomaterialia Gold Medal, the ***highest recognitions of the American Association of Pharmaceutical Scientists (the 2018 Distinguished Pharmaceutical Scientist Awad, 2002 Dale E. Wurster Award in Pharmaceutics***, and the 1999 Research Achievement Award in Pharmaceutical Technology), the ***highest scientific recognitions of the Controlled Release Society (the 1991 Founders Award,*** the 2002 Eurand Award for Outstanding Contributions in Oral Drug Delivery, the 1999 J. Heller Award, and the 2003 Capsugel Award), the 1998 and 2003 Materials Research Society Best Paper Awards, the 1997 Whitaker Award from the International Society for Artificial Organs, the ***2002 Newsmaker of the Year Award of the American Chemical Society,*** the 2002 Pioneer in Biomedical Engineering Award and the 1996 Whitaker Award from the IEEE Engineering in Medicine and Biology Society, and the ***1995 APV Medal for Distinguished Pharmaceutical Contributions from the International Pharmaceutical Association***. He has received the highest scientific recognitions from both Universities with which he has been associated (the 2007 Research Excellence Career Award and the 2004

Hamilton Best Paper Award from the University of Texas at Austin; and the 2002 Sigma Xi Award for Best Research and the 2000 Herbert McCoy Research Award from Purdue University)

In 2018, Peppas was elected a member of the Chinese Academy of Engineering, in 2017 of the American Academy of Arts and Sciences and in 2016 of the International Academy of Medical and Biological Engineering. In 2013 he was elected to the ***Academy of Athens***. IN 2012, Professor Peppas was elected to the ***Royal Academy of Pharmacy of Spain (Real Academia Nacional de Farmacia)*.** In 2010, he was elected to *the* ***National Academy of Medicine*;** in 2006 to the ***(U.S.) National Academy of Engineering*,** *and* ***the Academy of Medicine, Engineering and Science of Texas (TAMEST),*** and in 2005 to the ***Académie Nationale de Pharmacie (France)*.** An international ambassador of chemical and biomedical engineering, he has received honorary doctorates from the Universities of Ghent (Belgium, 1999), Parma (Italy, 2000), Athens (Greece, 2000), Patras (Greece, 2016), Thessaloniki (Greece, 2019), National Technical University of Athens (Greece, 2018), Santiago de Compostela (Spain, 2019) and Ljubljana (Slovenia, 2012) and honorary professorships from Sichuan University in Chengdu (China, 2012), Peking Union Medical College (2017), the PLA Hospital and Medical School of Beijing (2018) and Beihang University in Beijing (2018). In addition, he has been a Visiting Professor at the Universities of Geneva, Paris-Sud (Orsay), Parma, Pavia, Naples, Berlin (Free University), Santiago de Compostela, Complutense (Madrid), Hoshi (Tokyo), Hacettepe (Ankara), Athens, Hebrew (Jerusalem), Nanyang (Singapore) and California Institute of Technology.

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). He was elected an inaugural Fellow of the Biomedical Engineering Society, a founding Fellow of AIMBE, a Fellow of the American Institute of Chemical Engineers, the American Physical Society, the American Chemical Society, the Materials Research Society, the Society for Biomaterials, the Controlled Release Society, the American Association of Pharmaceutical Scientists, and the American Association for the Advancement of Science, and an Honorary Member of the Italian Society for Natural Sciences and Medicine.

TEACHING, EDUCATION AND MENTORSHIP:

Peppas is also a recognized teacher and educator. He has taught numerous courses in chemical engineering, biomedical engineering and pharmacy and has taught undergraduate and graduate courses in thermodynamics, kinetics and reaction engineering, transport phenomena, mass transfer, organic chemical technology, polymers, materials, biomaterials, bionanotechnology, transport processes in biomedical engineering, quantitative physiology, and other areas. His philosophy of teaching is best described in a recently published UT article entitled “the Peppas factor”. http://www.engr.utexas.edu/features/peppas-2013-teaching-award . He has supervised the theses of 110 graduate students of which 55 are now professors in other Universities. He has also nurtured more than 840 postdocs, visiting scientists and undergraduates who have worked in his laboratory. Many of them have become leading biomedical scientists, engineers, physicians and medical professionals.

For this reason, the American Association of Engineering Education (ASEE) has recognized Peppas with its highest recognition for an educator and administrator, the 2013 Benjamin Carver Lamme Award, which is considered by many the highest educational recognition in the USA. Also ASEE has recognized him with all its

major awards including the 2000 General Electric Senior Research Award recognizing the best engineering researcher of the USA, the 1992 George Westinghouse Award recognizing the best teacher, the 1988 Curtis McGraw Award for best engineering research under the age of 40, and the 2006 Dow Chemical Engineering award. He has also received numerous counselor and teaching awards, the latest being the 2007 Most Outstanding ChE Faculty Member Award.

ADMINISTRATION:

Nicholas A. Peppas has shown leadership both at the local, state, national and international level. In The University of Texas at Austin, he was the **Chair of the Biomedical Engineering Department** from 2009 to 2015

Peppas has been a main and early force of the establishment of the new Medical School in Austin and has worked with the Vice Provost William Sage and then Dean (now President) Greg Fenves on various aspects of the new School. Peppas has also been in charge of the NSF IGERT Program in Therapeutic and Diagnostic Devices at UT from 2004 to 2011. In 2014, he established the Institute of Biomaterials, Drug Delivery and Regenerative Medicine

In addition, Peppas has been a leader of several major national and international organizations including his election as President of the 26,000-member International Union of Societies for Biomaterials Science and Engineering (2008-16), Chair of the 3,000-member Engineering Section of the American Association for the Advancement of Sciences (AAAS, 2014-15), Vice Chair of the Engineering Section of the Institute of Medicine (IOM, 2013-17) of the National Academies and Vice Chair of the Bioengineering Section of the National Academy of Engineering (NAE, 2014-17). As a Past-Chair of the College of Fellows of the American Institute of Medical and Biological Engineers (AIMBE, 2003-04), 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 56,000-member American Institute of Chemical Engineers (AIChE, 2000-2002) he has run a number of major organizations with national and international impact.

OTHER ACHIEVEMENTS, AWARDS, PATENTS, RECOGNITION, PUBLICATIONS:

Professor Peppas has published more than 1,600 refereed publications, 450 proceedings and 520 abstracts, and is the inventor of 52 US patents and their allied foreign patents. He is the coauthor or coeditor of 37 books and volumes, including the classic, three-volume Hydrogels in Medicine and Pharmacy (CRC Press, 1987), a standard reference in the field of biomaterials with more than 3,000 citations, the monograph Pulsatile Drug Delivery, (WSGS, Stuttgart, 1993), two books on Biopolymers (Springer, 1994), the monograph Physicochemical and Cellular Foundations of Biomaterials Science (Academic Press, 2004), the book Intelligent Therapeutics: Biomimetic Systems and Nanotechnology in Drug Delivery (Elsevier, 2004) and his new monograph Nanotechnology in Therapeutics (Horizon Press, 2007).

His pioneering contributions have received more than 126,000 citations (H=167) making him the second most cited chemical or biomedical engineer in the world according to Google Scholar®. In addition, he has served or is serving in more than 20 advisory boards of journals in his field. Presently he is the Editor of Regenerative Biomaterials (2018-, Oxford University Press), Deputy Editor of Science Advances (2018- , Science), Associate Editor of Biomedical Microdevices (2007- , Elsevier), Associate Editor of Cellular and Molecular Engineering (2014- , Springer) and Associate Editor of Cambridge University Press Book Series in Biomedical Engineering (2008-).

Born
August 25, 1948, Athens, Greece

Education

Dipl. Eng. (Chem. Eng.), National Technical University of Athens, Greece, 1971.
Sc. D. (Chem. Eng.), Massachusetts Institute of Technology, 1973.

Honorary Doctorates

Doc. Hon. Causa, University of Ghent, Belgium, 1999.
Pharm. D. Hon. Causa, University of Parma, Italy, 1999.
Doc. Hon. Causa, University of Athens, Greece, 2000.
Hon. Prof., Sichuan University, People's Republic of China, 2012
Doc. Hon. Causa, University of Ljubljana, Slovenia, 2012.
Doc. Hon. Causa, University of Patras, Greece, 2015.
Doc. Hon. Causa, National Technical University of Athens, Greece, 2016.
Hon. Prof., Peking Union Medical College, People's Republic of China, 2017
Hon. Prof., PLA Hospital and Medical School, People's Republic of China, 2018.
Hon. Prof., Beihang University, Beijing, China, 2018.
Doc. Hon. Causa, University of Santiago de Compostela, Spain, 2019.
Doc. Hon. Causa, University of Thessaloniki, Greece, 2019.

Professional Experience

University of Texas, Department of Chemical Engineering, Cockrell Family Regents Chair #6, 2014-, tenured 50%.
University of Texas, Department of Biomedical Engineering, Cockrell Family Regents Chair #6, 2014-, tenured 50%.
University of Texas, Department of Chemical Engineering, Fletcher Stuckey Pratt Chair, 2003-14-, tenured 50%.
University of Texas, Department of Biomedical Engineering, Fletcher Stuckey Pratt Chair, 2003-14, tenured 50%.
University of Texas, Department of Surgery and Perioperative Care, Dell Medical School, 2016-, courtesy.
University of Texas, Department of Pediatrics, Dell Medical School, 2017-, tenured, joint, 0%.
University of Texas, Division of Pharmaceutics, College of Pharmacy, Professor, 2003-, courtesy.
University of Texas, Department of Biomedical Engineering, Chair of the Department, 2009-15.
University of Texas, Texas Materials Institute, Professor, 2003-.

Purdue University, School of Chemical Engineering, Showalter Distinguished Professor, 1993-2002.
Purdue University, Department of Biomedical Engineering, Showalter Distinguished Professor, 1999-2002.
Purdue University, School of Chemical Engineering, Professor, 1982-2002.
Purdue University, School of Chemical Engineering, Associate Professor, 1978-82.
Purdue University, School of Chemical Engineering, Assistant Professor, 1976-78.

Peking Union Medical College, considered the best Medical School in China, Beijing, People's Republic of China, *Honorary Professor*, April 2017-present
Sichuan University, Chengdu, People's Republic of China, *Honorary Professor*, June 2012-present.
Nanyang Technological University, Singapore, *Visiting Professor*, January 2005.
Free University of Berlin, Germany, *Mercator Visiting Professor*, Jan-June 2001.
University of Santiago de Compostela, Spain, *Visiting Professor*, February-March 2001.
Complutense University, Madrid, Spain, *Visiting Professor*, March-April 2001.
University of Naples, Italy, *Visiting Professor*, Department of Materials Engineering, May 1996.
Hoshi University, Tokyo, Japan, *Visiting Professor*, Jan.-March 1994; March 1995; March 1997.
Hebrew University, Jerusalem, Israel, *Visiting Professor*, March-May 1994.
University of Parma, Italy, Faculty of Sciences, *Adjunct Professor*, 1987-88; 1993-94.
University of Paris XI, France, Faculty of Pharmacy,*Visiting Professor*, May-December 1986.

California Institute of Technology, Department of Chemical Engineering, *Visiting Professor*, March-July 1983.
University of Geneva, Switzerland, Faculty of Sciences, *Visiting Professor*, Sept.1982-Feb. 1983.

M.I.T., Department of Chemical Engineering and Arteriosclerosis Center, Research Associate, 1975-76.
Research Center for National Defense, Research Associate, 1974-75.
Shell Co., Rotterdam, The Netherlands, Summer 1970.
Beso Co., Patras, Greece, Summers 1968 and 1969.

Member of Academies

National Academy of Engineering (2006)
National Academy of Medicine (2008)
American Academy of Arts and Sciences (2017)
Chinese Academy of Engineering (2018)
Canadian Academy of Engineering (2019)
National Academy of Inventors (2014)
French Academy of Pharmacy (Académie Nationale de Pharmacie) (2005)
Royal Academy of Spain (Academia Real) (2011)
Academy of Athens, Greece (2013)
Academy of Medicine, Engineering and Science of Texas (2006)
International Academy of Medical and Biological Engineering (2016)

RECENT AWARDS

2018 Elected Honorary Professor, PLA Hospital and Medical School
2018 Honorary Doctorate, university of Santiago de Compostela, Spain.
2017 Editor, Regenerative Biomaterials, Oxford University Press.
2017 Elected Honorary Professor, Peking Medical Union University
2017 Elected to the Chinese Academy of Engineering
2017 Elected to the American Academy of Arts and Sciences
2017 Inaugural Pioneer of Nanotechnology Award, Johns Hopkins University.
2017 One of the five “Medicine Makers of 2017” World wide.
2017 List of 100 Best Materials Scientists in the World.
2017 Life Achievements and Service, Controlled Release Society
2016 Honorary Doctorate, National Technical University of Athens
2016 Elected to the International Academy of Medical and Biological Engineering
2016 Robert A. Pritzker Distinguished Lecture Award, Biomedical Engineering Society
2016 Elected to the National Materials and Manufacturing Board, NRC
2015 International Award, European Society for Biomaterials, Krakow, Poland
2015 Controlled Release Society Award for Life Contributions, Edinburgh, Scotland
2015 Honorary Doctorate, University of Patras
2014 Giulio Natta Medal, Polytechnic School of Milan, Italy
2014 Best paper award for 2013, Journal of Drug Delivery Science & Technology
2014 Applied Polymer Science Award, American Chamical Society
2013 Elected to the Academy of Athens, Greece
2013 Fellow, Royal Society of Chemistry, UK
2014 Nanoscale Science and Engineering Award, AIChE
2013 Distinguished Scientist Award, International Journal of Nanomedicine
2013 Benjamin Garver Lamme Excellence in Engineering Education Award, ASEE
2012 Founders Award, National Academy of Engineering
2012 Honorary Doctorate, University of Ljubljana, Slovenia
2012 Elected Honorary Professor, Sichuan University

2012 Hocott Distinguished Engineering Research Award, University of Texas at Austin
2012 Elected to the Royal Academy of Spain (Academia Real)
2012 Nature and BioNIUM Distinguished Researcher and Educator Award, Nature Conferences
2011 Fellow, American Chemical Society
2011 Excellence in Surface Science Award, Surface in Biomaterials Foundation
2010 Distinguished Achievement Award, Biomedical Engineering Society
2010 Acta Biomaterialia Gold Medal
2010 Inaugural Fellow, Controlled Release Society
2010 William H Hall Award for Contributions to Society, Society for Biomaterials
2010 Distinguished Scientist, Southern Universities Research Association
2010 Maurice Marie Janot Award, Pharmaceutical Sciences, APGI
2010 George Mitchell Award for Excellence in Graduate Research, University of Texas

SELECTED ENDOWED/HONORARY LECTURESHIPS

2017 Plenary Lecturer, European Sociaty for Biomaterials, Athens, Greece.
2017 Plenary Lecturer, Biomedical Engineering Society of China, Beijing, China.
2017 Key Lecturer, International Meeting of the Portuguese Materials Society, Aveiro, Portugal
2017 Distinguished Lecturer, University of Florida, Gainsville, Florida.
2016 ***Plenary Lecturer***, World Life Science Conference Beijing, China
2016 ***Pritzker Distinguished Lecturer***, Biomedical Engineering Society, Minneapolis, MN
2016 ***Plenary Lecturer***, Research Forum on Frontiers in Materials, Sichuan University, Chengdu, China.
2016 ***Lowrie Lecturer***, Ohio State University, Columbus, OH
2016 College of Engineering Distinguished Lecturer, University of California Davis, Davis, CA
2016 ***Pritzker Lecturer***, Illinois Institute of Technology, Chicago, Illinois.
2016 Plenary Lecturer, NanoDay 2016, Bilkent University, Ankara, Turkey
2016 ***TAMEST Materials Lecturer***, TAMEST, Dallas, TX
2015 ***Plenary Lecturer***, Chinese Biomaterials Congress, Haiku, China
2015 Invited Lecturer, US-China Entrepreneurship Symposium, Guangzhou, China
2015 ***International Award Lecturer***, European Society for Biomaterials, Krakow, Poland
2015 Plenary Lecturer, 10th Panhellenic Research Congress of Chemical Engineering, Patras, Greece
2015 Simpson Querrey Institute for BioNanotechnology Lecturer, Northwestern, Evanston, IL
2015 ***Katz Lecturer***, City College of New York, NY
2015 ***Kelly Lecturer***, 50th Anniversary, Purdue University, West Lafayette, IN
2015 ***Johnson & Johnson Lecturer***, Rutgers University, Piscataway, NJ
2015 ***Reilly Lecturer***, University of Notre Dame, South Bend, IN
2015 ***Invited Lecturer***, Chinese Academy of Engineering, Beijing, China
2015 ***National Academy of Inventors Lecture***, Pasadena, CA
2014 Strategic Research Theme Lecturer, Univerity of Hong Kong.
2014 ***Giulio Natta Lecture,*** Polytechnic School of Milan, Italy
2014 *Sangalli Lecture**,*** University of Milan, Milan, Italy
2014 ***Gaden Memorial Lecture***, Columbia University, New York, NY.
2014 ***Materials Today Asia Plenary Lecturer***, Hong Kong
2014 Keynote Lecture, US-China Symposium on Nanobiology and Nanomedicine, Washington, DC
2014 Plenary Lecturer, International Institute for Nanotechnology, Northwestern, Evanston, IL
2014 ***Plenary Lecturer***, Recovery of Biological Products XVI, Rostock, Germany
2014 ***Polymer Award Address***, American Chemical Society, Dallas, TX
2014 ***Kammermeyer Lecturer***, University of Iowa, Iowa City, IA
2014 ***Skalak Lecturer***, University of California at San Diego, CA
2013 ***Hoffman Lecturer***, University of Washington, Seattle, WA
2013 ***Plenary Lecturer***, 5th Asian Arden Conference, Nagoya, Japan
2013 International Journal of Nanomedicine Lecturer, MRS Meeting, Boston, MA

2013 ***Plenary Lecturer***, 19th International Symposium on Microencapsulation, Pamplona, Spain
2013 ***Plenary Lecturer***, 25th European Society for Biomaterials Meeting, Madrid, Spain
2013 ***Plenary Lecturer***, 4th International Conference on Biomolecular Engineering, Ft Lauderdale, FL
2013 ***Parr Lecturer***, University of Illinois, Urbana-Champaign, IL
2013 ***Ruckenstein Lecturer***, University of Buffalo, Buffalo, NY
2013 ***Distinguished Lecturer***, College of Engineering, Michigan Tech, Houghton, MI
2013 Keynote Speaker, 4th International Conference on Biomolecular Engineering, Miami, FL
2012 Keynote Speaker, Symposium New Innovations in Polymers and Biomaterials, Maui, HI
2012 Plenary Lecturer, 9th International Polymer Conference (IPC2012), Kobe, Japan
2012 ***Founders Award Lecture***, National Academy of Engineering, Washington, DC
2012 Plenary Lecturer, NanoBioSeattle, Seattle, WA
2012 ***Plenary Lecturer***, 9th World Congress of Biomaterials, Chengdu, China
2012 Plenary Lecturer, The Areces Foundation, Madrid, Spain
2012 ***The Berkeley Lectures***, University of California, Berkeley, CA
2012 Plenary Lecturer, Miami 2012 Winter Symposium: Nanotechnology in Biomedicine, Miami, FL
2012 Plenary Lecturer, 6th International Symposium on Intelligent Drug Delivery, Seoul, S. Korea
2011 ***UNC/Eisai Distinguished Lecturer*** in Drug Delivery, Univ North Carolina, Chapel Hill, NC
2011 Award Lecturer, Excellence in Surface Science, Surface in Biomaterials Foundation, Minneapolis, MN
2011 Centennial Lecture, Centennial, School Chemical Engineering, Purdue University, West Lafeyette, IN
2011 Plenary Lecturer, 7th International Symposium on Controlled Release Systems, Istanbul, Turkey
2011 ***Wohl Memorial Lecturer***, University of Delaware, Newark, DE.
2011 ***Payatakes Lecturer***, University of Houston, Houston, TX.
2011 ***Bashore Lecturer***, Auburn University, Auburn, AL.
2011 ***Skinner and Lautenschlager Memorial Lecturer***, Northwestern University, Evanston, IL
2011 Plenary Lecturer, 10th Congress of the Spanish Society of Industrial Pharnmacy, Madrid, Spain
2010 ***BMES Distinguished Achievement Lecturer,*** Annual Meeting of the BMES, Austin, TX
2010 ***Plenary Lecturer***, 37th Annual Meeting of the Controlled Release Society, Portland, OR
2010 Plenary Lecturer, 3rd International Meeting on Pharmacy & Pharmaceutical Sciences, Istanbul, Turkey
2010 Plenary Lecturer, Grand Challenges Summit of the National Academy of Engineering, Seattle, WA
2010 Distinguished Lecturer, Imperial College, London, England
2010 Distiguished Lecturer, Collège de France, Pris, France
2010 ***Maurice-Marie Janot Award Lecturer***, 7th World Meeting on Pharmaceutics, Biopharmaceutics and Pharmaceutical Technology, Valletta, Malta
2010 Plenary Lecturer, 1st Global Congress on NanoEngineering for Medicine and Biology, Houston, TX

SELECTED RECENT PUBLICATIONS

1. A. K. Ekenseair, R. N. Seidel and N. A. Peppas, "Tuning the Transport Dynamics of Small Penetrant Molecules in Glassy Polymers", *Polymer, 53,* 4010-4017 (2012).
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