William G. Lowrie Lectureship
Honors and Awards Banquet
March 31, 2016

Honoring
Nicholas A. Peppas
University of Texas at Austin

The Ohio State University
College of Engineering
Nicholas A. Peppas, Sc.D.
Cockrell Family Regents Chair in Engineering
Director, Institute of Biomaterials, Drug Delivery and Regenerative Medicine
Professor, McKetta Department of Chemical Engineering, Department of Biomedical Engineering, Department of Surgery and Perioperative Care, Dell Medical School, and Division of Pharmaceutics, College of Pharmacy
The University of Texas at Austin

Nicholas A. Peppas is the Cockrell Family Regents Chair Professor in the Departments of Chemical, Biomedical Engineering, Surgery and Pharmacy, and Director of the Institute of Biomaterials, Drug Delivery and Regenerative Medicine of the University of Texas at Austin. His work in biomaterials, polymer physics, drug delivery and biomanufacturing follows a multidisciplinary approach by blending modern molecular and cellular biology with engineering principles to design the next generation of medical systems and devices for patient treatment. Over the past 40 years he has set the fundamentals and rational design of drug delivery systems and developed models of drug and protein diffusion in controlled release devices and biological tissues.

In 2012 he received the Founders Award of the National Academy of Engineering (NAE), the highest recognition of the Academy, for these contributions to the field. Peppas is a member of the NAE, National Academy of Medicine, National Academy of Inventors, the National Academy of France, the Royal Academy of Spain, the Academy of Athens and the Academy of Texas. He has been recognized with awards from AIChE (Founders Award, William Walker Award, Institute Lecture, Jay Bailey Award, Bioengineering Award, Materials Award), the Biomedical Engineering Society (Distinguished Scientist Award), the American Institute of Medical and Biological Engineering (Gallelli Award), the Society for Biomaterials (Founders, Clemson and Hall Awards), the Controlled Release Society (Founders, Heller and Eurd Awards) and other societies.

In 2008, AIChE named him one of the One Hundred Chemical Engineers of the Modern Era. He is President of the International Union of Societies of Biomaterials Science and Engineering, Chair of the Engineering Section of the American Association for the Advancement of Science, and Past-Chair of the Council of BME Chairs.

Previously, he served as President of SFB and the Controlled Release Society. He is a fellow of AAAS, AIChE, APS, ACS, MRS, SFB, BMES, AIMBE, CRS, AAPS, and ASEE. He has supervised the research of more than 100 PhDs and about 180 postdocs and graduate students.

Peppas holds a Dipl. Eng. from the NTU of Athens (1971), a Sc.D. from MIT (1973), and honorary doctorates from the Universities of Ghent, Parma, Athens, Ljubljana and Patras, and an honorary professorship from Sichuan University.

Lecture 1 (Specialized): Advances in Protein and siRNA Delivery Through Smart Polymers

Thursday, March 31, 2016: Reception: 11:00 am, CBEC Lobby
Lecture: 11:30 am - 12:30 pm, 130 CBEC

Engineering the molecular design of intelligent biomaterials by controlling structure, recognition, and specificity is the first step in coordinating and duplicating complex biological and physiological processes. Recent developments in siRNA and protein delivery have been directed towards the preparation of targeted formulations for protein delivery to specific sites, use of environmentally-responsive polymers to achieve pH- or temperature-triggered delivery, usually in modulated mode, and improvement of the behavior of their mucosal adhesive behavior and cell recognition. We address design and synthesis characteristics of novel crosslinked networks capable of protein release as well as artificial molecular structures capable of specific molecular recognition of biological molecules. Molecular imprinting and microimprinting techniques, which create stereo-specific three-dimensional binding cavities based on a biological compound as the template, can lead to preparations of these fields and development in tissue engineering. We have been successful in synthesizing novel glucose- and protein-binding molecules based on non-covalent directed interactions formed via molecular imprinting techniques within aqueous media. We have also developed structurally superior materials to serve as effective carriers for siRNA delivery to combat Crohn disease and ulcerative colitis.

Lecture 2 (More general): A Historical Perspective of Nanotechnology and Bioengineering in an Evolving Chemical Engineering World

Friday, April 1, 2016: Reception: 10:00 am, CBEC Lobby
Lecture: 10:30 am - 11:30 am, 130 CBEC

Nanotechnology and Bioengineering have evolved out of chemical engineering because of the need to address important societal problems. Emphasis in such areas has led to the solution of complex chemical engineering problems that required non-Newtonian flows, non-ideal thermodynamics, multi-component systems, macromolecular analysis, and diagnostic/intelligent responsive systems. The introduction of these fields also created an emphasis on translational research, product engineering, development of devices/systems and processes, and an associated emphasis on applications and commercialization. An unfortunate result of these changes was a shift of Chemical Engineering from fundamentals to applied sciences. We examine the underlying reasons for this shift with emphasis on changes in societal needs in the 1970s to translational research that started in the late 1980s. We examine the impact of these changes on ChE education, including the academic shift towards applied sciences and the de-emphasis of fundamentals. We address new educational and research directions that will provide a corrective path towards convergence in chemical engineering.
~LOWRIE LECTURESHIP AWARD PRESENTATION~
Nicholas A. Peppas

~SPECIAL STUDENT AWARDS & RECOGNITIONS~
Yuanxin Chen (graduated): One of four finalists for the Science & Technology Award from DSM and the American Institute of Chemical Engineering (AIChE). (Advisor: Ho)
Jeffrey Ether: Elected delegate of the university-wide Council of Graduate Students. (Advisor: Ho)
Varsha Gopalakrishnan: International Travel Scholarship, 2015 ISIE Conference, University of Surrey, UK. (Advisor: Bekshi)
Kiiho Lee: First place, Hayes Graduate Research Forum. (Advisors: Winter, Wyslazil)
Nicholas Liesen: Research Scholar Award, OSU Undergraduate Research Office. (Advisor: Kusaka)
Yensil Park: American Association for Aerosol Research (AAAR) Poster Competition Award. (Advisor: Wyslazil)
Sreshtha Sinha Majumdar: North American Catalysis Society 2015 Kokes Award. (Advisor: Ozkan)
Zi Tong: 2016 Elias Klein Founders' Travel Supplement Award, North American Membrane Society (NAMS). (Advisor: Ho)

~AIChE STUDENT CHAPTER OFFICERS~

President: Hussein Alkhateb (Spring); Mitch Anderskov (Autumn); Internal President: Lynn Bakes; External President: David D’I mafia; Treasurer: Viraj Shih; Secretary: Courtney Prebail (Autumn); Event Coordinator: Dennis Tran; Intramural Chair: Thomas Menken (Autumn); Menorship Chair: Nick Braun; Marketing Chair: Cynthia Sanchez; Senior Class Representative: Kevin Beyersedorf; Junior Class Representative: Mike Jindra (Autumn), Tori Krebs; Sophomore Class Representative: Eric Collins; Freshman/ Survey Class Representative: Yara Mohamad; Webmaster: Lena Taitt. (Advisor: J. Rathman)

~CHEM 5 CAR OFFICERS~

President: Ben Heimbach; Treasurer: Lauren Cral; Secretary: Trevor Wendt; Power Team Co-Leaders: Ben Snyder, Michael Ciccone; Power Source Team Co-Leaders: Kevin Ikeda, Griffin Jenkins; Timing Mechanism Team Co-Leaders: Steven Back, Adrianna Schneider. (Advisor: D. Tomaska)

~CEGC OFFICERS~

Academic Officer: Nick Wood; Business Officer: Sourabh Nadgouda; Faculties Officer: Hyuntae Sohn; Graduate Research Symposium Officer: Abhilasha Dehankar; Recruitment Officer: Jeff Ether; Social Officer: Ali Feleki Altzadehbladad.

~GRADUATE RESEARCH SYMPOSIUM~

Co-Chairs: Sumant Patankar, Abhilasha Dehankar; Core Committee: Elena Chung, Matt Gallowic, Varsha Gopalakrishnan, Anshuman Majumdar, Viraj Modak, Sourabh Nadgouda, Jenny Park, Mariah Whitaker. Additional help provided by Amoloya Lalaks, Yaswanth Potimurthy and Yensil Park.

~CHEMICAL HYGIENE COMMITTEE (CHYCOMM) AWARDS~

Outstanding Lab Safety Award - Department Wide: Dr. Ozkan's group
Outstanding Lab Safety Award - Bin: Dr. Palmer's group
Outstanding Lab Safety Award - Traditional: Dr. Ho's group

~CBE DEPARTMENT AWARDS~

Outstanding Undergraduate Award for Research Excellence:
Hussein Alkhateb Advisor: Wyslazil
Callin Buchanan Advisor: Ozkan
Elena Blair Advisor: Zhong
Abby Empfield Advisor: Fan
Michael Jindra Advisor: Szekely
Nathanial Kramer Advisor: Ozkan
Lagnajit Pattanaik Advisor: Brunelli
Christopher Poore Advisor: Zakin
Lucas Watson Advisor: Zakin

Outstanding Graduate Award for Academic Achievement:
Andrew Amaya Advisor: Wyslazil
Chi Cheng Advisor: Yang
Matthew Gallowic Advisor: Wyslazil
Minkyu Kim Advisor: Astagiri
Ankita Majumder Advisor: Fan
Andrew Maxson Advisor: Zakin
Kuldeep Mantani Advisor: Ozkan
Gauri Nabor Advisor: Winter
Witop Selim Advisor: Ho
Youngmi Seo Advisor: Hall
Zi Tong Advisor: Ho
Varun Vakharia Advisor: Ho
Dongzhu Wu Advisor: Ho
Xin Xin Advisor: Yang

Outstanding Post Doc Award for Research Excellence:
Zhuo Cheng Advisor: Fan

~AIC (AMERICAN INSTITUTE OF CHEMISTS) FOUNDATION~

AIC Outstanding Undergraduate Student Award: Eric Brackman
AIC Outstanding Graduate Student Award: Mandar Khathe (Advisor: Fan)
AIC Outstanding Postdoctoral Award: Seval Gunz (Advisor: Ozkan)

~AIChE STUDENT AWARDS~

AIChE Central Ohio Section Outstanding Student Award: Hussein Alkhateb
Donald F. Othmer AIChE Sophomore Academic Excellence Award: Anne McAlister
Previous Recipients of the Lowrie Lectureship:

- 1996 Lecturer: John F. Davidson, University of Cambridge
- 1997 Lecturer: William R. Schowalter, University of Illinois at Urbana-Champaign
- 1998 Lecturer: James Whelple, Princeton University
- 1999 Lecturer: Judson King, University of California, Berkeley
- 2000 Lecturer: Robert Langer, MIT
- 2001 Lecturer: Roy Jackson, Princeton University
- 2002 Lecturer: Alexis T. Bell, University of California, Berkeley
- 2004 Lecturer: John H. Seinfeld, California Institute of Technology
- 2005 Lecturer: Charles A. Eckert, Georgia Tech
- 2006 Lecturer: Alice P. Gast, Massachusetts Institute of Technology
- 2007 Lecturer: Greg Stephanopoulos, Massachusetts Institute of Technology
- 2008 Lecturer: Carol C. Hall, North Carolina State University
- 2009 Lecturer: Gabor A. Somorjai, University of California, Berkeley
- 2010 Lecturer: Rakesh K. Jain, Harvard Medical School
- 2011 Lecturer: Frank S. Bates, University of Minnesota
- 2012 Lecturer: Pablo G. DeBenedetti, Princeton University
- 2013 Lecturer: Mark E. Davis, California Institute of Technology
- 2014 Lecturer: William F. Banholzer, University of Wisconsin-Madison
- 2015 Lecturer: Enrique Iglesias, University of California, Berkeley

The William G. Lowrie Lectureship was established in the department of chemical engineering at The Ohio State University on October 1, 1995 to honor distinguished alumnus William G. Lowrie. The lectureship is awarded annually to an individual who has made outstanding contributions to fundamental or applied research in the field of chemical engineering.