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 Chaired 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 bionanotechnology 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 (Galletti Award), the Society for Biomaterials (Founders, Clemson and Hall Awards), the Controlled Release Society (Founders, Heller and Eurand 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 mucoadhesive 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 of interest can lead to preparation of biomimetic materials for intelligent drug delivery, drug targeting, and 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 Ethier: Elected delegate of the university-wide Council of Graduate Students. *(Advisor: Ho)*

Anshuman Fuller (graduated): North American Catalysis Society 2015 Kokes Award. *(Advisor: Ozkan)*

Varsha Gopalakrishnan: International Travel Scholarship, 2015 ISIE Conference, University of Surrey, UK. *(Advisor: Bakshi)*

Kilho Lee: First place, Hayes Graduate Research Forum. *(Advisors: Winter, Wyslouzil)*

Nicholas Liesen: Research Scholar Award, OSU Undergraduate Research Office. *(Advisor: Kusaka)*

Yensil Park: American Association for Aerosol Research (AAAR) Poster Competition Award. *(Advisor: Wyslouzil)*

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)*

Varun Vakharia: North American Membrane Society (NAMS) Annual Meeting, Membrane Processes category, Poster Paper Competition. *(Advisor: Ho)*

~AIChE STUDENT CHAPTER OFFICERS~

Presidents: **Hussein Alkhatib** (Spring), **Mitch Anderskow** (Autumn); *Internal President:* **Lynn Bakes**; *External President:* **David D'Iima**; *Treasurer:* **Viraj Shah**; *Secretary:* **Courtney Prebul** (Autumn); *Event Coordinator:* **Dennis Tran**; *Intramural Chair:* **Thomas Menker** (Autumn); *Mentorship Chair:* **Nick Braun**; *Marketing Chair:* **Cynthia Sanchez**; *Senior Class Representative:* **Kevin Beyersdorf**; *Junior Class Representative:* **Mike Jindra** (Autumn), **Tori Krebs**; *Sophomore Class Representative:* **Eric Collins**; *Freshman/Survey Class Representative:* **Yara Mohamad**; Webmaster: **Lena Tata**. *(Advisor: J. Rathman)*

~CHEM E CAR OFFICERS~

President: **Ben Heimbach**; *Treasurer:* **Lauren Crall**; *Secretary:* **Trevor Wendt**; *Chassis 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. Tomasko)*

~CEGC OFFICERS~

Academic Officer: **Nick Wood**; *Business Officer:* **Sourabh Nadgouda**; *Facilities Officer:* **Hyuntae Sohn**; *Graduate Research Symposium Officer:* **Abhilasha Dehankar**; *Recruitment Officer:* **Jeff Ethier**; *Social Officer:* **Atefeh Alizadehbirjandi**.

~GRADUATE RESEARCH SYMPOSIUM~

Co-Chairs: **Sumant Patankar, Abhilasha Dehankar**; *Core Committee:* **Elena Chung, Matt Gallovic, Varsha Gopalakrishnan, Ankita Majumdar, Viraj Modak, Sourabh Nadgouda, Jenny Park, Mariah Whitaker**. Additional help provided by **Amoolya Lalsare, Yaswanth Pottimurthy** and **Yensil Park**.

~CHEMICAL HYGIENE COMMITTEE (CHYCOMM) AWARDS~

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

~CBE DEPARTMENT AWARDS~

Outstanding Undergraduate Award for Research Excellence:

Hussein Alkhatib	*Advisor:*	**Fan**
Cailin Buchanan	*Advisor:*	**Ozkan**
Elena Blair	*Advisor:*	**Fan**
Abbey Empfield	*Advisor:*	**Fan**
Michael Jindra	*Advisor:*	**Fan**
Nathaniel Kramer	*Advisor:*	**Ozkan**
Lagnajit Pattanaik	*Advisor:*	**Brunelli**
Christopher Poore	*Advisor:*	**Zakin**
Lucas Watson	*Advisor:*	**Zakin**

Outstanding Graduate Award for Academic Achievement:

Andrew Amaya	*Advisor:*	**Wyslouzil**
Chi Cheng	*Advisor:*	**Yang**
Matthew Gallovic	*Advisor:*	**Wyslouzil**
Minkyu Kim	*Advisor:*	**Asthagiri**
Ankita Majumder	*Advisor:*	**Fan**
Andrew Maxson	*Advisor:*	**Zakin**
Kuldeep Mamtani	*Advisor:*	**Ozkan**
Gauri Nabar	*Advisor:*	**Winter**
Witopo Salim	*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: **Erica Brackman**
AIC Outstanding Graduate Student Award: **Mandar Kathe** *(Advisor: Fan)*
AIC Outstanding Postdoctoral Award: **Seval Gunduz** *(Advisor: Ozkan)*

~AIChE STUDENT AWARDS~

AIChE Central Ohio Section Outstanding Student Award: **Hussein Alkhatib**
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 Wei,** *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 Technoogy*

-2008 Lecturer- **Carol K. Hall,** *North Carolina State University*

-2009 Lecturer- **Gabor A. Somorjai,** *University of California, Berkeley*

-2010 Lecturer- **Rakesh K. Jain,** Harvard Medical School

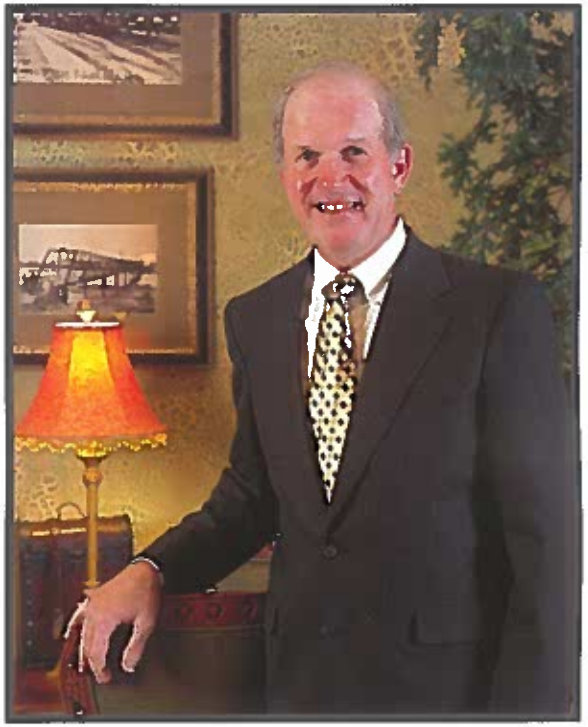
-2011 Lecturer- **Frank S. Bates,** *University of Minnesota*

-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 Iglesia,** *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 anually to an individual who has made outstanding contributions to fundamental or applied research in the field of chemical engineering.