

*You are
cordially invited
to attend*

The 38th Annual

Harry G. Fair Memorial Lecture in Chemical Engineering

Thursday, February 16, 2012
Seminar – 3:00 P.M.
Room M-204
Sarkeys Energy Center
100 East Boyd
University of Oklahoma
Norman, Oklahoma

Coffee and refreshments will
be served prior to the lecture.

Accommodations on the basis of disabilities are
available by calling (405) 325-5811.

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Harry G. Fair Memorial Lecturers

- 2012 Charles Zukoski, University of Illinois at Urbana-Champaign
- 2011 Peter C. Stair, Northwestern University
- 2010 Juan J. de Pablo, University of Wisconsin-Madison
- 2008 Donald R. Paul, University of Texas at Austin
- 2007 David Mooney, Harvard University
- 2007 John Prausnitz, University of California, Berkeley
- 2006 George Georgiou, University of Texas at Austin
- 2005 James A. Dumesic, University of Wisconsin
- 2004 Robert C. Armstrong, Massachusetts Institute of Technology
- 2003 Nicholas Peppas, University of Texas at Austin
- 2002 Richard C. Alkire, University of Illinois
- 2001 Ralph T. Yang, University of Michigan
- 2000 Enrique Iglesia, University of California, Berkeley
- 1999 George Stephanopoulos, Massachusetts Institute of Technology
- 1998 Stuart L. Cooper, University of Delaware
- 1997 Keith E. Gubbins, Cornell University
- 1996 H. Scott Fogler, University of Michigan
- 1995 Gary L. Haller, Yale University
- 1994 Christopher W. Macosko, University of Minnesota
- 1993 Larry V. McIntire, Rice University
- 1992 Dan Luss, University of Houston
- 1991 E. N. Lightfoot, University of Wisconsin
- 1990 George A. Samara, Sandia National Labs
- 1989 James Wei, Massachusetts Institute of Technology
- 1988 C. Judson King, University of California, Berkeley
- 1987 Eli Ruckenstein, SUNY Buffalo
- 1986 Stuart W. Churchill, University of Pennsylvania
- 1985 John M. Campbell, John M. Campbell & Co.
- 1984 Richard G. Askew, Phillips Chemical Co.
- 1983 B. H. Sellers, Sellers Chemical Co.
- 1982 Lynn T. Reed, Warren Petroleum Co.
- 1981 Robert S. Purgason, Perry Gas Processors
- 1980 A. B. Slaybaugh, Conoco Inc.
- 1979 Charles R. Perry, Perry Gas Cos.
- 1978 Raymond W. Lowe, E. I. DuPont de Nemours
- 1977 Laurance S. Reid, Ball-Reid Engineers Inc.
- 1976 Harry L. Blomquist Jr., Coastal States Gas Co.
- 1975 Stanley Learned, Phillips Petroleum Co.

School of Chemical, Biological and Materials Engineering
College of Engineering
University of Oklahoma
100 E. Boyd, T-335, Sarkeys Energy Center
Norman, Oklahoma 73019-1004 USA
405-325-5811

The 38th Annual

Harry G. Fair Memorial Lecture in Chemical Engineering 2012



Charles Zukoski

Chemical and Biomolecular Engineering
University of Illinois at Urbana-Champaign
Urbana, Illinois, USA

*Nanocomposites:
Structure and
Function*



Harry G. Fair

Each year, a special lecture is given in memory of Harry G. Fair, an outstanding OU alumnus. Fair was born in Okmulgee, Oklahoma on June 3, 1916, and earned his bachelor of science degree in chemical engineering in 1939. He joined Phillips Petroleum Co. in 1939 and worked his way up to vice president for supply and transportation, with responsibility for worldwide exchange of crude oil and all transportation facilities. In 1966, Fair joined M.W. Kellogg Co. as executive vice president in charge of all engineering activities. He was named executive vice president of Coastal States Gas Corp. in 1971, a post he held until his death on July 27, 1974. A member of a number of professional societies and a licensed professional engineer, Fair was active in service to society and his alma mater.

This lecture is made possible by the Harry G. Fair Memorial Fund established by his widow, Jane Swift Fair. Arrangements for the lecture are made by the School of Chemical, Biological and Materials Engineering in OU's College of Engineering.

Nanocomposites: Structure and Function

Charles Zukoski

Chemical and Biomolecular Engineering
University of Illinois at Urbana-Champaign
Urbana, Illinois, USA

Mixing particles with sizes in the sub 100 nm range with polymers results in many unique properties that are not sums of the properties of the constituents. The presence of particles alters polymer dynamics and packing properties while the polymer acts to alter the potential of mean force felt by the particles thus changing their state of aggregation. The result is very useful materials. Engineering the desired properties is, however, somewhat of a mystery. Controlling the degree of particle aggregation and the mechanics of the resulting composites remain materials design challenges. In this seminar I discuss advances in understanding particle and polymer properties that lead to unique nanocomposite properties. As a reference point I start with one of the largest applications of nanocomposites - tires, and discuss how altering the degree of particle dispersion can have profound impact on the fuel consumption of the nation's long haul trucking fleet.

Charles Zukoski biography

Charles F. Zukoski is the William H. and Janet G. Lycan Professor of Chemical and Biomolecular Engineering at the University of Illinois at Urbana-Champaign.

Zukoski received his undergraduate degree in Physics from Reed College in 1977 and his Ph.D. in Chemical Engineering from Princeton University in 1985, after which he joined the faculty at Illinois. Zukoski's accomplishments in the study of suspensions are recorded in greater than 150 research publications and have been recognized through numerous awards. He is a member of the National Academy of Engineering.

From 1994-2002 Zukoski was the Head of the Department of Chemical Engineering at the University of Illinois at-Urbana-Champaign. He led the effort to change the Department's name from Chemical Engineering to Chemical and Biomolecular Engineering.

From 2002-2008, Zukoski was Vice Chancellor for Research at Illinois, where he focused on accelerating the commercialization of innovative research, including establishing the Office of Technology Management and serving on the founding Board of Illinois Ventures, a public/private venture capital organization.

Zukoski is Chairman of the Science and Engineering Research Council in the Agency of Science Technology and Research, Singapore, and sits on the Board of Singapore's Agency for Science, Technology and Research, which has responsibility for setting directions for the Science and Engineering Research Council, including creating mechanisms to pre-position the Singapore technology community to attract private sector manufacturing and research activities through partnerships.