



**HARRY G. FAIR**

Each year a special lecture is given in memory of Harry G. Fair, an outstanding OU alumnus. Harry G. Fair was born in Okmulgee, Oklahoma, on June 3, 1916. He received his B.S. in Chemical Engineering in 1939. He joined Phillips Petroleum Company 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, he joined the M.W. Kellogg Company as Executive Vice President, in charge of all engineering activities and became Executive Vice President of Coastal States Gas Corporation from 1971 until the time of his death on July 27, 1974. Harry G. Fair was active in service to society and to his alma mater. He was a member of a number of professional societies and was a licensed professional engineer.

This lecture is made possible by the Harry G. Fair Memorial Fund contributed by his widow, Jane Swift Fair. Arrangements are made by the School of Chemical Engineering and Materials Science.



**Richard C. Alkire**  
Charles and Dorothy Prizer Professor  
of Chemical Engineering,  
University of Illinois,  
Urbana-Champaign, Illinois

## Early Stages of Pitting Corrosion, or The Beginning of The End

Corrosion resistant alloys can fail unexpectedly because of events that can be traced to the formation of harmless small pits that grow into dangerous large pits, cracks, and crevices. We report observations on the onset of pitting corrosion, which often begins near surface inclusions, made with use of microelectrochemical cells. Examples will be given for aluminum, stainless steel and nickel alloys. These experimental studies have led to various hypotheses of mechanism for how inclusions trigger early stages of pitting corrosion. These hypotheses draw upon reaction and transport processes involving several dozen chemical species that participate in a dozen or more homogeneous and heterogeneous reactions. An integrated experimental/computational approach will be described that utilizes tools including object oriented programming, robust parallel computing architectures, efficient numerical software libraries and data structures, and sparse matrix storage techniques. We discuss the use of these methods for testing multiple reasonable hypotheses of mechanism.

## Richard C. Alkire

Degrees: B.S., Lafayette College, 1963; Ph.D. University of California at Berkeley, 1968

**Biographical:** Richard Alkire is internationally recognized in the field of electrochemical science and engineering. He focuses on analysis of well-characterized systems with use of novel experimental methods and numerical simulations. A member of the National Academy of Engineering, his research results have been used in applications of significant technological importance in a variety of electrochemical processes. Alkire holds an appointment in the National Computational Science Alliance, where he interacts with others in the development of infrastructure for using Grid based resources for collaborative problem-solving in multi-scale multi-phenomena applications that link scientists, engineers and computer experts. He began his chemical engineering training at Lafayette College, where Z. D. Jastrzebski introduced him to corrosion research as an undergraduate, and continued at the University of California at Berkeley with Charles Tobias and the Max Planck Institute for Physical Chemistry in Göttingen with Carl Wagner. He has been on the faculty of the University of Illinois at Urbana-Champaign since 1969.

**Memberships, Professional Activities and Honors:** Carl Wagner Award, Electrochemical Society, 1985; Professional Progress Award, Amer. Inst. of Chem. Eng., 1995; E. V. Murphee Award in Industrial and Engineering Chemistry, Amer. Chem. Soc., 1991; Fellow of the American Association for the Advancement of Science, 1996; National Academy of Engineering.

**Selected Publications:** Alkire, R. C. and E. D. Eliadis, Electrodeposition of copper. The effect of various organic compounds, *Zeitschrift fuer Physikalische Chemie* 208:1-15 (1999); Palk, C-H, H. S. White and R. C. Alkire, Scanning electrochemical microscopy detection of dissolved sulfur species from inclusions in stainless steel, *Journal of the Electrochemical Society* 148(1):B36-B42 (2001); Papanayiotou, D., R. N. Nuzzo, and R. C. Alkire, Adsorption of thionine on copper electrodes monitored by in situ infrared spectroscopy, *Journal of the Electrochemical Society* 145(10):3366-3373 (1998); Palk, J. O., C-H, Palk, Y-H, Huang, and R. C. Alkire, Influence of Fe-rich intermetallic inclusions on pit initiation on Al-6061 alloy in aerated NaCl, *Journal of the Electrochemical Society* 146(2):517-523 (1999); Verhoff, M. and R. Alkire, Experimental and modeling studies on pure aluminum in pH 11 NaCl solutions. Part I: Laser initiated single pits, *Journal of the Electrochemical Society* 147(4):1349-1358 (2000) and Part II: Stability of single pits, *Journal of the Electrochemical Society* 147(4):1359-1365 (2000).

YOU ARE  
CORDIALLY INVITED  
TO ATTEND

THE 28<sup>TH</sup> ANNUAL

## Harry G. Fair Memorial Lecture

IN CHEMICAL ENGINEERING  
AND MATERIALS SCIENCE

**April 25, 2002,  
3:30 P.M.**

THE LECTURE WILL BE GIVEN  
ON CAMPUS,  
IN SARKEYS ENERGY CENTER,  
ROOM M-204.

ACCOMMODATIONS FOR SPECIAL NEEDS ACCESS  
MAY BE ARRANGED BY CALLING 325-4393.

COFFEE AND REFRESHMENTS WILL BE SERVED

## Harry G. Fair Memorial Lecturers

- 2002 Richard C. Alkire, University of Illinois
- 2001 Ralph T. Yang, University of Michigan
- 2000 Enrique Iglesia, Univ. of California, Berkeley
- 1999 George Stephanopoulos, M.I.T.
- 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, Univ. 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, M.I.T.
- 1988 C. Judson King, Univ. of Calif., Berkeley
- 1987 Eli Ruckenstein, SUNY, Buffalo
- 1986 Stuart W. Churchill, Univ. 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 Companies
- 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.

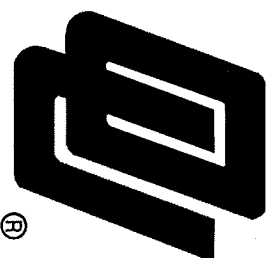
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THE 28<sup>TH</sup> ANNUAL

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in



CHEMICAL ENGINEERING

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