



Preface to the Edgar Special Issue

This special issue of *Industrial and Engineering Chemistry Research* is to celebrate the 65th birthday of Thomas F. Edgar, the George T. and Gladys H. Abell Endowed Chair in Engineering and Professor of Chemical Engineering at the University of Texas at Austin. This issue mirrors the varied contributions by Professor Edgar, with topics ranging from relay feedback tests for controller design to knowledge management in pharmaceutical development.

Professor Edgar earned his B.S. Degree in Chemical Engineering from the University of Kansas in 1967, his M.A. Degree in Chemical Engineering from Princeton University in 1968, and spent one year as a process engineer at Continental Oil Company in Baltimore. He earned his Ph.D Degree from Princeton in 1971, working with Professor Leon Lapidus on the development of optimal control techniques for chemical processes.

Tom first arrived at the University of Texas in 1971, at the beginning of a previous “energy crisis”, and initiated research in underground coal gasification. This line of research activities lead him to become the founding editor of *In Situ*, a journal devoted to underground coal gasification. Also, when he realized that solving optimal control problems for linear, eight-stage distillation columns, with full state measurement, did not completely satisfy the needs of the process industries, he diversified his research to include nonlinear and distributed

parameter problems. Tom established, with Jim Rawlings and David Himmelblau, the Texas Control Consortium in 1993, to help provide a tighter connection between process systems and control theory and industrial practice. The consortium expanded its activities in 1995 to include the University of Wisconsin and again in 2007 to include the University of Southern California, and is now known as the Texas–Wisconsin–California Control Consortium (TWCCC), with 13 corporate sponsors. The consortium has two conferences each year, rotating between Austin, TX, Madison, WI, and Los Angeles, CA.

Professor Edgar has made outstanding contributions to the technical literature, education, and professional society service. Tom has had a substantial impact on the systems and control field, having graduated over 43 M.S. and 64 Ph.D. students that are now in industry and academia. His fundamental contributions range from adaptive control to data reconciliation and control of nonlinear systems, with applications from traditional chemical processes to microelectronics manufacturing. Professor Edgar has published over 250 refereed journal articles, 23 book chapters, and three books.

Professor Edgar has had major leadership roles in a multitude of chemical engineering, control, and education societies. He served as the President of the American Automatic Control Council, President of the AIChE, President of CACHE Corpora-

tion, Chair of the Council for Chemical Research, and Chair of the Board of Trustees of the AIChE Foundation. He is currently the Executive Officer of the CACHE Corporation. At the University of Texas, he has served as Department Chair (1985–1993), Associate Dean for Academic Affairs (College of Engineering, 1993–1996), and Associate Vice President for Academic Computing and Instructional Technology Services (1996–2001).

Tom has been recognized by his peers for his many contributions in research and education. His major awards include the Allan P. Colburn Award (AIChE, 1980), Katz Lectureship, University of Michigan (1982), George Westinghouse Young Educator Award, (ASEE, 1988), Distinguished Engineering Service Award (University of Kansas, 1990), Merriam–Wiley Distinguished Author Award (ASEE, 1990), American Automatic Control Council Education Award (1992), Eckman Education Award (ISA, 1993), AIChE Fellow (1994), Computing in Chemical Engineering Award (AIChE, 1995), Phillips Lectureship, Oklahoma State University (1999), ASEE Fellow (2005), IFAC Control Engineering Prize (2005), Warren K. Lewis Award in Chemical Engineering Education (AIChE, 2006), Process Automation Hall of Fame (*Control Magazine*, 2007), and International Federation of Automatic Control (IFAC) Fellow (2008).

Tom's numerous editorial activities include serving on the Editorial Boards of *Chemical Engineering Reviews* (1985–present), *AIChE Journal* (1984–1985, 2003–present), *Computers and Chemical Engineering* (1987–present), *Journal of Process Control* (1990–1999), *Transactions Control, Automation and Systems Engineering* (Korea, 2000–present), and the *Interactive Journal of Robust and Nonlinear Control* (2008–present). As noted earlier, he was the Founding General Editor of *In Situ* (1977–1990). He has served as the Area Editor for *Chemical Engineering Education* (1990–2004), and on the Chemical Engineering Advisory Boards of John Wiley and Sons (1990–present) and McGraw–Hill (1998–2004). In addition, he has served as the Chemical Engineering Editor of the *Encyclopedia of Science and Technology* (7th Edition, 1995).

Tom's most highly cited paper is "Adaptive Control Strategies for Process Control—A Survey" (*AIChE J.*, 1986), coauthored with Dale Seborg and Sirish Shah. Dale was a senior graduate student at Princeton and the two compadres have maintained a close professional and social friendship over the past 40 years, even lasting through three editions of a coauthored textbook on process dynamics and control. Both have a keen sense of humor, epitomized by the tradition of special awards that they "chair" at the Conferences on Chemical Process Control, held every five years. I should note that Tom was the recipient of the "Industrial Achievement Award" at CPC-IV for spending one year at a Conoco plant, from 1968 to 1969.

As a graduate student, I was always impressed that Tom was able to do such a great job of advising so many of us (typically 12–15 graduate students) on a wide variety of projects. Tom would frequently return from a conference, dump reasonably relevant papers on our desks, and ask us to "take a look at them" (meaning: become an expert before the next group meeting). His ability to multitask was particularly impressive. Tom would come to our weekly group meetings armed with a stack of reports, papers, and mail, which he would proceed to go over while one of the students was making a presentation. Midway through the talk Tom would take a short "power nap," waking just in time to ask a thought-provoking question that was often related to the general topic of the talk! As graduate students, we heard rumors about Tom engaged in noon-time pick-up

basketball games, but none of us could bear the thought of jostling with him underneath the basket (we suspected that the excluded volume might be too much for us to handle), so we never joined him in these games.

During the time that I was a graduate student, Professor Edgar managed to simultaneously (i) advise 12–15 Ph.D. students and keep them funded, (ii) serve as Department Chair during a period of major growth in department size and ranking, (iii) chair the 1987 American Control Conference, (iv) coauthor two leading textbooks on optimization and control, (v) serve as President of the CACHE Corporation, (vi) teach undergraduate and graduate control courses (and teach them very well), and (vii) serve as the editor of the journal *In Situ*. Indeed, Professor Edgar excelled in all of these activities. Although he is always very busy professionally, I can say that Tom has also been an outstanding husband and father (and, now, grandfather), as I had a chance to observe (sometimes with direct measurements, other times using inferential techniques) his relationship with his wife Donna, and his children, Jeff and Becky. Occasionally, Tom and Donna would need to both be out of town simultaneously; somehow they trusted me to take care of their house and their children, but especially their prize-winning Rhodesian Ridgebacks (one of my side benefits was use of their pool, a refreshing interlude during the long, hot Austin summers).

During my 24 years post-graduation, as a colleague of Tom's, I have developed an even greater level of respect and appreciation for him, as he has continued his high-level and rate of scholarship, as well as leadership in AIChE and other professional societies. His keen sense of humor continues to make conference planning fun. It is with great pleasure that I present this special issue in honor of Tom. Hook 'em Horns!



List of Books and Book Chapters Authored by Thomas F. Edgar

Books

- (1) Edgar, T. F. *Coal Processing and Pollution Control Technology*; Gulf Publishing Company: Houston, TX, 1983.
- (2) Edgar, T. F.; Himmelblau, D. M.; Lasdon, L. S. *Optimization of Chemical Processes*; McGraw–Hill: New York, 1988 (First Edition), 2001 (Second Edition).
- (3) Seborg, D. E.; Mellichamp, D. A.; Edgar, T. F. *Process Dynamics and Control*; Wiley: New York, 1989 (First Edition), 2004 (Second Edition), 2010 (Third Edition, with F. J. Doyle III).

Book Chapters

- (1) McKetta, J. J.; Edgar, T. F. Synthetics—A New Energy Frontier. In *Social Issues Resources, Series 8*; University of Texas: Austin, TX, 1974.

- (2) Kaiser, W. R.; Edgar, T. F. In Situ Gasification of Texas Lignite. In *Geology of Alternate Energy Sources*; Geological Society of America: Houston, TX, 1977; Chapter 8.
- (3) Edgar, T. F. Underground Gasification of Coal. In *Encyclopedia of Chemical Processing and Design*, Vol. 9; McKetta, J. J., Ed.; Marcel Dekker: New York, 1977.
- (4) Edgar, T. F. Processes and Representative Applications. In *Real-Time Computing*; Mellichamp, D. A., Ed.; Van Nostrand: New York, 1982; Chapter 4.
- (5) Edgar, T. F. Advanced Control Strategies for Chemical Processes: A Review. In *Computer Applications to Chemical Engineering Process Design and Simulation*; American Chemical Society: Washington, DC, 1980; Chapter 4.
- (6) Gregg, D. W.; Edgar, T. F. Underground Coal Gasification. In *Chemistry of Coal Utilization*; Elliott, M., Ed.; Wiley: New York, 1981; Chapter 26.
- (7) Edgar, T. F. Models for Dynamic Systems. In *Real-Time Computing*; Mellichamp, D. A., Ed.; Van Nostrand Reinhold: New York, 1982; Chapter 19.
- (8) Wright, J. D.; Edgar, T. F. Digital Computer Control and Signal Processing Algorithms. In *Real-Time Computing*; Mellichamp, D. A., Ed.; Van Nostrand Reinhold: New York, 1982; Chapter 20.
- (9) Kaiser, W. R.; Edgar, T. F. Resources, Properties and Utilization of Texas Lignite: A Review. In *Chemistry of Low-Rank Fuels*, 1984; Chapter 4.
- (10) Edgar, T. F. Process Optimization. In *Encyclopedia of Chemical Processing and Design*, Vol. 31; McKetta, J. J., Ed.; Marcel Dekker: New York, 1989.
- (11) Rawlings, J. B.; Fordyce, A. P.; Edgar, T. F. Control Strategies for Fermentation Processes. In *Computer Control of Fermentation Processes*; Omstead, D. R., Ed.; CRC Press: Boca Raton, FL, 1989; Chapter 12.
- (12) Dalle Molle, D. T.; Edgar, T. F. Qualitative Modeling of Chemical Reaction Systems. In *AI Applications in Process Engineering*; M. L. Mavrouniotis, M. L., Ed.; Academic Press: New York, 1989; Chapter 1.
- (13) Rawlings, J. B.; Edgar, T. F. Process Dynamics and Control. In *Encyclopedia of Chemical Processing and Design*; McKetta, J. J., Ed.; Marcel Dekker: New York, 1990.
- (14) Ling, C.; Edgar, T. F. Process Control. In *Encyclopedia of Microcomputers*; Williams, J. G., Ed.; Marcel Dekker: New York, 1993.
- (15) Huang, Y.; Edgar, T. F. Knowledge-based Design Approach for the Simultaneous Minimization of Waste Generation and Energy Consumption in a Petroleum Refinery. In *Waste Minimization through Process Design*; Rossiter, A., Ed.; McGraw-Hill: New York, 1995; Chapter 14, pp 181–196.
- (16) Muske, K. R.; Edgar, T. F. Nonlinear State Estimation. In *Nonlinear Process Control*; Henson, M. A., Seborg, D. E., Eds.; Prentice-Hall: Upper Saddle River, NJ, 1997; Chapter 6.
- (17) Edgar, T. F. Process Dynamics and Control. In *The Electronics Handbook*; CRC Press: Boca Raton, FL, 1996; Section 18.3.
- (18) Kantor, J.; Edgar, T. F. Computing Skills in the Chemical Engineering Curriculum. In *Computers in Chemical Engineering Education*; CACHE Corporation: Ann Arbor, MI, 1997.
- (19) Edgar, T. F. et al. Process Control. In *Perry's Handbook*, Seventh Edition; Green, D. W., Maloney, J. O., Eds.; McGraw-Hill: New York, 1997; Section 8.
- (20) Hahn, J.; Edgar, T. F. Process Control Systems. In *Encyclopedia of Physical Science and Technology*, Vol. 13; Meyers, R. A., Ed.; Academic Press: San Diego, CA, 2002; pp 111–126.
- (21) Hahn, J.; Edgar, T. F. Process Dynamics and Control. In *Electronics Handbook*; CRC Press: Boca Raton, FL, 2004.
- (22) Zhang, Y.; Edgar, T. F. Multivariate Statistical Process Control. In *New Directions in Bioprocess Modeling and Control: Maximizing Process Analytical Technology Benefits*; Boudreau, M. A., McMillan, G. K., Eds.; International Society of Automation (ISA): Research Triangle Park, NC, 2007; Chapter 8.
- (23) Edgar, T. F. et al. Process Control. In *Perry's Chemical Engineering Handbook*, Eighth Edition; CRC Press: Boca Raton, FL, 2008; Section 8.
- (24) Edgar, T. F.; Hahn, J. Process Automation. In *Handbook of Automation*; Springer: New York, 2009; Section 4.1.

B. Wayne Bequette

Department of Chemical and Biological Engineering,
Rensselaer Polytechnic Institute, Troy, New York
12180-3590 (E-mail: bequette@rpi.edu)

Received for review June 24, 2010

Accepted June 25, 2010

IE1013508