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BIOSKETCH

Daniel H. Chen, Ph.D., P.E., is Professor at Dan F. Smith Department of Chemical Engineering, Director of Photocatalysis & Solar Processing Lab, and Deputy Director of Process Engineering Center. Dr. Chen earned his B.S. from National Cheng Kung University (1970), M.S. from National Taiwan University (1976), and Ph.D. from Oklahoma State University (1981), all in Chemical Engineering. He was a shift supervisor in Hualon-Teijin Corp (1971-73), a project engineer in Chemical Engineering Consultants (1981), a research fellow at DOE Morgantown Energy Technology Center (1990), and a Battelle Summer Faculty Research Fellow at US Army Aberdeen Proving Ground (1995-1999). Dr. Chen was awarded as the University Scholar in 2010 and University Professor in 2016. He was listed in "Who's Who in Academia," (2013).

He has secured > $1.7 million in grants as PI and > $1.8 million as a Co-PI from Federal (NSF, DOD, DOE, EPA, USDA, GCHSRC), State (TCEQ, THECB, HARC, AQRP, TARC, THWRC), Private sector (Nexus Engineering), and Lamar University. Dr. Chen has published 5 book chapters, over 40 articles, and given over 60 invited talks and conference presentations. He is the editor of a 2-volume book set on sustainable water management and sustainable water technologies (Taylor & Francis/CRC Press, to be published in Sep. 2016). Dr. Chen has worked on a series of field sampling/ analysis and water treatment projects aimed at improving the water quality of the Rio Grande Basin. His recent work on computational fluid dynamics (CFD)/response surface and neural network modeling of flare operations has yielded numerous publications and grants.

SPECIALITIES

- Air and water monitoring and Pollution Control (Flare Modeling, Combustion Mechanisms, NO_x/VOC abatement, Sulfur Recovery, Photochemical treatment of Herbicides)
- Process Modeling & Control (Neural network, Dynamic Simulation, Preventive Maintenance, Model Predictive Control)
- Abnormal Situation Management (Monitoring, Diagnosis, and Alerts based on DCS Data)

MEMBERSHIP AND LEADERSHIP ROLES IN PROFESSIONAL ORGANIZATIONS

- **Chair/co-Chair**, Sustainable Water Use and Management, Sustainability Forum, AIChE National Meeting (2011); International Association of Technology, Education and Development (INTED) Conference, 2010, Valencia, Spain; Reaction Engineering for Combustion and Pyrolysis, Liquid Phase Reaction Engineering, Catalysis & Reaction Engineering Division, AIChE National Meeting (2012-Date).
- Director, Photocatalysis & Solar Processing Lab, 2000-Date; Deputy Director, Process Engineering Center; 2004 - Date.
- **Panelist**, National Science Foundation, Arlington, VA, May 2015 & April, 2016.
- Software training certificates for Aspen Hysys Dynamics, Aspen Plus, DMC Plus, Aspen IQ, SimSci-Esscor PROII, ADMC and UPID (2000-2016).
- Project Engineer, Chemical Engineering Consultants, Inc., Stillwater, Oklahoma, 1981 – 1982; Shift Supervisor, Hualon-Teijin Polyester Plant, Tofen, Taiwan, 1971 - 1973.
- Registered Professional Engineer (Texas 60100)
- Society of Financial Services Professionals (SFSP)

SELECTED RESEARCH PROJECTS

>3.5 million funded research (>1.7 million as PI and >1.8 million as Co-PI)

- "MRI: Acquisition of an LC/MS/MS System for Multidisciplinary Research and Educational Projects," Daniel H. Chen (PI), David L. Cocke, Che-Jen Lin, Paul Bernazzani, Andrew Jewel Gomes, **NSF** CBET-1338088, $456,549, 09/01/2013-08/31/2017. 3 Other MRI grants as Co-PI.
- "Computational Fluid Dynamics, Response Surface, and Neural Network Modeling of Industrial Flares," 10 grants from 05/01/07-07/15/17, $886,765, **TCEQ**, AQRP, HARC, and TARC, with K. Li, H. Lou, X. Li, C. Martin, and P. Richmond (D. Chen served as PI for 6, K. Li for 2 and H. Lou for 2).
- "Field Sampling, Chemical Analysis, and Photochemical Treatment of Herbicides/ Pharmaceuticals-Contaminated Water and Sediment in the Rio Grande Basin," 6 **USDA** grants spanning from 07/01/04 to 08/31/13, $265,000, D. Chen (PI), with A. Gomes, K. Urbanczyk, B. Wang, H. R. Yoder, D. Flaherty, K. Sternes, and R. Tadmor.
- "ALEP Fuel Cell Catalyst & Hydrogen," 6 grants, David Cocke (PI), Daniel H. Chen, Sidney Lin, Peyton Richmond, Tracy Benson, **DOD** US Army Missile Defense Command, $7,250,000, 2005-2012.
- "Titania-Coated Concrete for NOx Abatement," 4 grants from 09/01/06-08/31/09, $140,277, D. Chen (PI) with R. Yuan, H. Lou, K. Li, TARC, **USEPA/HARC** Joint Air Quality-Transportation Center, THWRC, and LU Research Enhancement Grant.
- "TexAQS II Remote Sensing VOC Data Analysis," and "Leaks Detection Using Infrared Camera and GPS system," D. Chen (PI), D. Furry, **TCEQ**, $112,170, 2005-2006.
- "Controller Performance Diagnostics, Process/Controller Parameter Identification, and Predictive Maintenance," 4 grants, Nexus Engineering, $76,160, 2001-2005.
- "Visible-Light-Responsive Photocatalyst Synthesis and Photoreactor Development for VOC Destruction in Air" seven (7) multi-year grants from 1994-2004, $677,318, D. H. Chen (PI in 5), K. Y. Li (PI in 2), C. A. Linkous, and T. C. Ho, **ARP/ATP THECB**, GCHSRC, and THWRC.
- "Fluid-Bed Modeling for the Direct Sulfur Recovery Process," **DOE**, DE-RP21-93MC30010, RTIS/C1-96U-5666, $40,469, 1993-1995.

PROFESSIONAL AWARDS AND/OR GRANTS (RESEARCH)

- **University Professor** (2016); **University Scholar** (2010)
- Battelle Faculty Associate, US Army PMCD, Aberdeen Proving Ground, Maryland, 1995-1998
- **Research Fellow**, Morgantown Energy Technology Center in Morgantown, WV, 1990.
- Twenty-two (22) Federal grants: DOE (1), USDA (6), EPA/HARC (1), NSF (1), GCHSRC (4) as PI and DOD (6), NSF (3) as Co-PI.
- Twenty (20) State grants: TCEQ (4), AQRP (1), ATP (2), TARC (8), THWRC (3) as PI and TCEQ (2) as Co-PI
- Nexus Engineering (4 as PI)
- Lamar University Research Enhancement Grant Awards (1984, 1985, 1987, 1988, 2006)

RESEARCH PUBLICATIONS

1 Book (in press); 4 Book Chapters; 1 Book Chapter in press; 37 Refereed Journal and Trade Magazine Articles; >60 Conference Presentations & Invited Talks.

<u>Book & Book Chapters</u>

- Sustainable water management and sustainable water technologies, Two-Volume Set: Volume I-Management; Volume II - Technology, Editor, D. H. Chen, **Taylor & Francis/CRC Press**, Boca Raton, FL (in press, Sep. 2016).

- Cynthia Loeffler, Leslie Hartman, & Daniel Chen, CRC Water Sustainability Handbook, Volume I, Chapter 14, "Water, Energy, and Ecosystem Sustainability," Editor, Daniel H. Chen, Taylor & Francis/CRC Press, Boca Raton, FL (In press, 2016).
- Thermophysical Properties of Chemicals and Hydrocarbons, "Density of Solid-Organic/Inorganic Compounds," Ed. Carl L. Yaws, William Andrew, Norwich NY, 2008.
- Fluid Flow Handbook, Chapter 16:" Flow Control", Editor: Jamal Saleh, McGraw-Hill, New York, 2002.
- Chemical Properties Handbook, Chapter 20: Soil Sorption Coefficient, McGraw-Hill, New York, 1999.
- Thermodynamic and Physical Property Data, with Yaws, C. L.; Gulf Publishing Co., Houston, Texas (1992).

Selected Journal Articles (Refereed)

- Anan Wang, Helen H. Lou, Daniel Chen, Anfeng Yu, Wenyi Dang, Xianchang Li , Christopher Martin, Vijaya Damodara, Ajit Patki, "Combustion Mechanism Development and CFD Simulation for the Prediction of Soot Emission during Flaring," in press, Frontiers of Chemical Science and Engineering, 2016.
- A. Patki, X. Li, D. Chen, H. Lou, P. Richmond, V. Damodara, L. Liu, K. Rasel, A. Alphones, J. Zhou, "Numerical Simulation of Black Carbon (Soot) Emissions from Non-Premixed Flames," *J. Geoscience and Environment Protection*, v. 2, pp. 15-24, 2014.
- K. Singh, P. Gangadharan, D. Chen, H. Lou, X. Li, & P. Richmond, "Computational fluid dynamics modeling of laboratory flames and an industrial flare", *Journal of the Air & Waste Management Association*, 64:11, (2014), 1328-1340 DOI: 10.1080/10962247.2014.948229.
- R. Sadu, D. Chen, A. Kucknoor, Z. Guo, A. Gomes, "Silver Doped -TiO2/Polyurethane Nano-Composites For Antibacterial Textile Coating", *BioNanoScience*: Volume 4, Issue 2 (2014), Page 136-148, DOI: 10.1007/s12668-014-0125-x.
- K. Singh, P. Gangadharan, D. Chen, H. Lou, X. Li, P. Richmond, "Parametric Study of Ethylene Flare Operations and Validation of a Reduced Combustion Mechanism," *Engineering Applications of Computational Fluid Mechanics*, Vol. 8, No. 2, pp. 211–228 (2014).
- H. Gu, J. Guo, R. Sadu, Y. Huang, N. Haldolaarachchige, D. Chen, D. P. Young, S. Wei, Z. Guo, " Separating Positive And Negative Magnetoresistance For Polyaniline-Silicon Nanocomposites In Variable Range Hopping Regime," *Applied Physics Letters*, 102/21, 102, 212403 (2013).
- K. Singh, T. Dabade, H. Vaid, P. Gangadharan, D. Chen, H. Lou, X. Li, K. Li, C. Martin, "Computational Fluid Dynamics Modeling of Industrial Flares Operated in Stand-By Mode," *Ind. & Eng. Chem. Research*, **51** (39), 12611-12620, , October, 2012.
- R. Asapu, M. Palla, B. Wang, Z. Guo, R. Sadu, D. Chen, "Phosphorus-Doped Titania Nanotubes with Enhanced Photocatalytic Activity," Journal of Photochemistry and Photobiology A: Chemistry, 225 (1), pp. 81-87 (2011).
- X. Ye, D. Chen, K. Li, B. Wang and J. Hopper, "Photolytic Treatment of Atrazine-Contaminated Water: Products, Kinetics and Reactor Design," *Water Environment Research, 79 (2007).*
- K. Vajifdar, D. Chen, J. Gossage, K. Li, X. Ye, G. Gadiyar and B. Ardoin , "Photocatalytic oxidation of PCE and Butyraldehyde over Titania modified with perovskite optical crystal BaTiO3" *Chemical Engineering and Technology*, **30** (4), 474-480 (2007).
- X. Ye, D. Chen, J. Gossage, and K. Li, "Photocatalytic Oxidation of Aldehydes: Byproduct Identification and Reaction Pathway," *Journal of Photochemistry and Photobiology A: Chemistry*, **183** (1-2), pp. 35-40 (2006).

- S. Devahasdin, C. Fan, K. Li, and D. Chen, "TiO2 Photocatalytic Oxidation Of Nitric Oxide: Transient Behavior And Reaction Kinetics" Journal of Photochemistry and Photobiology A: Chemistry, 156/1-3 pp 161 – 170 (2003).

Selected Trade Magazine Articles

- Daniel H. Chen, Patrick Lo, William P. Swan, "Zero-Lag Exponential Moving Average for Real-Time Control and Noisy Data Processing," *Hydrocarbon Processing, 61-70, October 2007.*
- P. Lo, W. Swan, D. Chen, P. Wetuski, S. Stout, "Detection of Interacting Controllers Using Fast Fourier Transform and Correlation Coefficient," *Hydrocarbon Processing,* April 2006.
- P. Lo, D. Chen, W. Bean, and W. Thompson, "Simulation of Distillation Tower Pump Failures with HYSYS Dynamic Models," *Control*, October 2000.

Selected Presentations/Invited Talks

- A. Alphones, D. Chen, V. Damodara, E. Fortner, S. Evans, M. Johnson, "Response Surface and Neural Network Modeling of Flare Performance," AIChE Spring Meeting, Apr. 10-14, 2016, Houston TX.
- Daniel Chen, Helen Lou, Vijaya Damodara, Anan Wang, Arokiaraj Alphones, Xianchang Li, Christopher Martin, Flaring CFD Simulation and Flaring Performance Modeling using Regression Methods, Austin, TX, Febuary 19-22, 2016.
- A. Alphones, D. Chen, and E. Fortner, "Characterization of incipient smoke point for steam and air assisted flares," AIChE Annual Meeting, November 8-13, 2015, Salt Lake City, UT.
- "CFD Flare Modeling: AQRP/SEP Projects," **Southeast Texas Photochemical Modeling Technical Committee Meeting**, June 29, 2011 and Aug., 2012, Houston, TX.
- "Flare Speciation Study: CFD Simulations, Knowledge Base Organization, & Air Quality Benefits," **Texas Oil & Gas Association Meeting**, October 29, 2009, Austin, TX.
- "NOx Removal over Photocatalytic Concrete Slab: A Texas Study," **Lawrence Berkeley National Lab**, Berkeley, CA, June 29, 2007.
- "Zero-Lag Exponential Moving Average Filter for Real-Time Control and Noisy Data Processing," Webcast/ Telephone Conference, **Aspentech**, Houston, Texas, February 13, 2004.

RESEARCH IN TEACHING FIELD RELATED TO CLASSROOM TEACHING

2 Refereed Journal publications; 2 AIChE learning modules, 3 Conference Proceedings; and 10 Conference Presentations

- Peyton C. Richmond and Daniel H. Chen, "A Model Predictive Control Package for Undergraduate Education," *Education for Chemical Engineers*, 7 (2012), e43-e50.
- S. Munagala, D. H. Chen, and J. R. Hopper, "Experience with a Process Simulator in a Senior Process Control Laboratory," *Chemical Engineering Education*, 27(3), 194-199 (1993).
- D. H. Chen, "Property Data Correlation and Prediction-Viscosity, Thermal Conductivity, and Interfacial tension," AICHE Modular Instruction, Series G: Design of Equipment, Vol. 3, Process Operations, p. 45., James Beckman (editor), Am. Inst. of Chem. Eng., New York, 1987.
- D. H. Chen, CHEMI Process Design Module 36, CACHE, Salt Lake City, Utah, 1983.
- 6 paper presentations in the area of Distributed Control System (DCS), Model Predictive Control (MPC), and Process Simulator to AIChE, ISA , INTED and ASEE.
- 7 paper presentations/proceedings in the area of Computer-Aided Problem-Based Learning, and Multi-Media Classroom to ERC, ICEE, UEFC, ASEE, ICEE.

TEACHING AWARDS AND/OR GRANTS RECEIVED

475 K (250 K as PI and 225 K as Co-PI) funded teaching grants from ExxonMobil (1) and NSF (2).

- "Improving Engineering Curricula by Integrating PBL Pedagogy with Modern Manufacturing Case Studies," P. Richmond (PI), Daniel Chen, Kuyen-Li, X. Xu, J. Gossage, National Science Foundation, CCLI 0737089 $149,897, 03/15/08-02/28/10.
- "Process Modeling, Simulation, and Control Training," **ExxonMobil**, $250,000, D.H.Chen (PI), J. L. Gossage, J. R. Hopper, D. Greenbank (Exxon), D.E. Waterman (Exxon), *to support the computer lab and modeling, simulation, and control education (1998-2007)*.
- "Integrating Best Practice Pedagogy with Computer-Aided Modeling and Simulation to Improve Undergraduate Chemical Engineering Education," **National Science Foundation**, $75,000, D.L. Cocke (PI), K.Y. Li, D. H. Chen, J. L. Gossage, T. C. Ho, 2000-2003.
- Texas Higher Education Coordinating Board **ATP** supplemental grant, sponsored a **West Brook** High School chemistry teacher (Bonnie Ardoin) to participate in the air pollution control project at Lamar University to benefit K-12 teaching, 2001-2003.

SPONSORSHIP OF STUDENT ORGANIZATIONS

- Tau Beta Pi (Engineering Honor Society) Student Chapter Faculty Advisor (1982-2014)
- Omega Chi Epsilon Chemical Engineering Honor Society, Faculty Advisor (1998-2007)

SERVICE TO THE UNIVERSITY

A. Membership and leadership roles in committees, councils, etc.:

- **Chair**, Department Promotion Committee (2009); Department Pre-tenure Review Committee (2008-2013); College Promotion Committee (2003, 2008); Search Committee for ChE Department Chair (2006-2007); Faculty Search Committee (2006-2007); Evaluation Committee for ChE Department Chair (2003)
- Member, University Personnel Committee (2012-Date); University Budget Development Committee (2011- Date); University Tenure Committee (2009-2011); University Tenure Appeal Committee (2009-Date); University Admission Committee (2009-Date); University Grade Review Committee (2011); College of Engineering Promotion Committee (2009); College of Engineering University Professor/Merit Award Committee (1990-2005); College of Engineering Tenure Committee (2008)
- Department **Safety** Training **Coordinator** (2003-2006); Department **Graduate Advisor** (1990-1995)

B. Professional service to the community:

- **Referee** of 25 international/national journals and 2 book publishers.
- **Proposal Reviewer** (NSF, Discovery Grant, Canada; Petroleum Research Fund; University of Houston GEAR, Nano and Advanced Materials Institute, Hong Kong)
- Instructor & Developer, "An introduction to PRO-II Simulation software," a three-day short course for Exxon Mobil Engineers (August 2006).

C. Other service to the community:

- Volunteer Worker, Texas Rice Festival, Winnie, TX, October, 2009-2014.
- **Invited Speaker**, Leisure Learning Club, Golden Nest Investment Club, CKUAAH annual

banquet & meeting, AIChE Financial Night, and Chinese Association of Southeast Texas.

- **Secretary**, the Chinese Association of Southeast Texas (2001-2002).
- Transportation **Chair**, International Choreographed Ballroom Dance Association, 2014
- Joint Chinese College Alumni Association (Houston) Scholarship **Judge**, 2015-2016.

PERSONAL INTEREST

Travel, Dance, Swimming, and Investment Analysis