

## Daniel H. Chen, Ph.D., PE

Professor, Dan F. Smith Department of Chemical & Biomolecular Engineering  
University Professor & Scholar; Leland Best Distinguished Faculty Fellow  
Director, Abnormal Situation Management Lab; Director, Computational Fluid Dynamics Lab

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## BIOSKETCH

DANIEL H. CHEN, University Professor and Scholar, Leland Best Distinguished Faculty Fellow, Dan F. Smith Dept. of Chemical Engineering, Lamar University, Beaumont, TX. Dr. Chen is currently Director of Abnormal Situation Management Lab and Director of Computational Fluid Dynamics Lab. 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 had 4 years experiences in polyester and natural gas industries prior to joining Lamar faculty. He served as consultants for DOE Morgantown Energy Technology Center (1990), and US Army Aberdeen Proving Ground (1995-1999) on energy and chemical agent treatment issues.

Dr. Chen has worked on Rio Grande Basin field sampling, TCEQ 2010 flare study, DOE/UT Carbon SAFE//GoMCarb, as well as Oxy-combustion and Carbon-neutral Allam power cycle projects with >\$3.5 million in grants from Federal, State, and Industrial sources. He has published 5 book chapters, over 50 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, 2016). He is the holder of United States Patent “Oxy-fuel Cracking Furnaces and Boilers Using CO<sub>2</sub> as a Working Fluid,” No. 11,370,725 B2 (June 28, 2022.)



## Education & Training

Ph.D. (Ch.E.), Oklahoma State University, 1981

M.S. (Ch.E.), National Taiwan University, 1976

B.S. (Ch.E.), National Cheng Kung University, 1970

Aspentech Certificates (Aspen Plus, Aspen Dynamics, Aspen IQ, Aspen DMC3), 2000-2020

Simsci Certificate (SimSci PROII)

## Research and Professional Experience

- Professor, Chemical Engineering Department, Lamar University, Beaumont, Texas. August 1994 - Date. Associate Professor, 8/87-8/94; Assistant Professor 8/82 -8/87
- Battelle Faculty Associate, US Army PMCD, Aberdeen Proving Ground, Maryland, 1995-1998
- Research Fellow, Morgantown Energy Technology Center in Morgantown, West Virginia, 1990
- Project Engineer, Chemical Engineering Consultants, Inc., Stillwater, Oklahoma. 1981 - 1982
- Production Supervisor, Hualon-Teijin Corp., Tofen Polyester Plant, Tofen, Taiwan. 1971 - 1973

## Research Interests

- Oxy-fuel, Combustion Mechanisms, Allam Cycle, Carbon Capture, Flare, Greenhouse Gases, Ammonia as Alternative fuel, NO<sub>x</sub>/VOC abatement, Sulfur Recovery
- Neural Networks, Computational Fluid Dynamics, Chemkin, Model Predictive Control, Dynamic Simulation, Condition Monitoring, Fault Detection
- Solar Hydrogen, Photocatalysis, Photochemical treatment

### Selected Publications.

- Daniel Chen, Russel Buss, Dan Fernandes, “Oxy-fuel Cracking Furnaces and Boilers Using CO<sub>2</sub> as a Working Fluid,” United States Patent No. 11,370,725 B2 on June 28, 2022. US Patent Pub. No. US 2022/0033324 A1, Feb. 3, 2022.
- Song Wang, Dan Fernandes, Qiang Xu\*, and Daniel Chen, “New Conceptual Design of an Integrated Allam-Cycle Power Complex Coupling Air Separation Unit and Ammonia Plant,” *Ind. Eng. Chem. Res.* 2021, December 3, 2021, <https://doi.org/10.1021/acs.iecr.1c02478>
- Dan Fernandes, Md Emdadul Haque, Srinivas Palanki, Samuel Guizar Rios, Daniel Chen, “DMC Controller Design for an Integrated Allam Cycle and Air Separation Plant,” *Computers and Chemical Engineering* 141 (2020) 107019, <https://doi.org/10.1016/j.compchemeng.2020.107019>
- Arokiaraj Alphones, Vijaya Damodara, Anan Wang, Helen Lou, Xianchang Li, Christopher Martin, Daniel Chen, and Matthew Johnson., "Response Surface Modeling and Setpoint Determination of Steam- and Air-Assisted Flares," *Environmental Engineering Science*. Vol 37, No. 4, Apr 2020. 246-262.
- Dan Fernandes, Song Wang, Qiang Xu, and Daniel Chen, “Dynamic Simulations of the Allam Cycle Power Plant Integrated with an Air Separation Unit,” *International Journal of Chemical Engineering*, 7 December 2019, <https://doi.org/10.1155/2019/6035856>
- Dan Fernandes, Song Wang, Qiang Xu, Russel Buss and Daniel Chen, "Process and Carbon Footprint Analyses of the Allam Cycle Power Plant Integrated with an Air Separation Unit," *Clean Technol.* 2019, 1, 325–340; doi:10.3390/; <http://dx.doi.org/10.3390/cleantechnol1010022>.
- Vijaya Damodara, Arokiaraj Alphones, Daniel Chen, Helen Lou, Christopher Martin, Xianchang Li, “Flare performance modeling and set point determination using artificial neural networks,” *Int. J. Energy & Environ. Engineering*, <https://doi.org/10.1007/s40095-019-00314-3>, 5 August 2019.
- Daniel H. Chen & Arokiaraj Alphones (2019) Characterization of the incipient smoke point for steam-/air-assisted and nonassisted flares, *Journal of the Air & Waste Management Association*, 69:1, 119-130, DOI: 10.1080/10962247.2018.1525443
- Damodara, V., Chen, D., Lou, H., Rasel, K., Richmond, P., Wang, A., Li, X., "Reduced Combustion Mechanism for C1-C4 Hydrocarbons and its Application in CFD Flare Modeling," *Journal of the Air & Waste Management Association*, 67 (5), 599-612, 2017.
- Sustainable Water Management and Technologies, Sustainable Water Management (Vol. I) and Sustainable Water Technologies (Vol. II), Editor, Daniel H. Chen, Taylor & Francis/CRC Press, Boca Raton, FL, 2016. Print ISBN: 978-1-4822-1518-2 eBook ISBN: 978-1-4822-1519-9.
- Kanwar Singh, Preeti Gangadharan, Daniel Chen, Helen Lou, Xianchang Li & Peyton Richmond (2014), “Computational fluid dynamics modeling of laboratory flames and an industrial flare”, *J. of the Air & Waste Management Association*, 64:11, 1328-1340.
- Peyton C. Richmond and Daniel H. Chen, “A Model Predictive Control Package for Undergraduate Education,” *Education for Chemical Engineers*, 7 (2012), e43-e50.
- 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.
- S. Devahasdin, C. Fan, K. Li, and D. Chen, “TiO<sub>2</sub> Photocatalytic Oxidation of Nitric Oxide: Transient Behavior And Reaction Kinetics” *Journal of Photochemistry and Photobiology A: Chemistry*, 156/1-3 pp 161 – 170 (2003).

### Synergistic Activities

- >3.5 million of total completed and on-going grants from DOD, DOE, EPA, USDA, NSF, TCEQ, AQRP, HARC, ATP, & private sectors.

- Daniel Chen (PI) & Gevorg Sargsyan, "Evaluating Various LNG Plant Electrification Options," Center for Midstream Management & Science, \$34,000, 09/01/22 -08/31/23.
- Sujing Wang (PI), Daniel Chen, "Modeling and Optimization for a Generic Gas Processing Plant and Natural Gas Liquids Fractionation Train," Center for Midstream Management & Science, Project 366, \$25,000, 09/01/21 -02/28/22.
- Daniel Chen (PI), Qiang Xu, & Gevorg Sargsyan, "Integrated Allam Cycle-LNG Complex for Greenhouse Gas Reduction and Efficient Energy Supply," Center for Midstream Management & Science, Project 364, \$50,000, 09/01/21 -08/31/22.
- Chen, D.H. & X. LI, "Development of Reduced Combustion Reaction Mechanisms of the Ammonia/Natural Gas/Air System for Predicting NOx, Soot & unburnt NH3 Emissions," 110LUB0179A, 04/01/2020-06/30/2021, TARC Grant, \$19,350.
- "Flare, Abnormal Situation Management, & Big Data," D. Chen (PI), \$185,000, Distinguished Research Fellow Award and Visionary Initiatives, Lamar University, 09/01/16-8/31/2019.
- Tracy Benson (PI) and Daniel Chen, "Offshore Gulf of Mexico Partnership for Carbon Storage-- Resources and Technology Development GoMCarb," \$153,123, 4/1/2018-3/31/2022, # DE-FE0031558, LU Subaward UTA18-000644, UT-Department of Energy Offshore Gulf of Mexico.
- Daniel Chen (PI), Tracy Benson, and David Cocke, "CO2 Source Sink matching, Outreach, and Risks," \$99,999, 2/1/2017-7/31/2018, Subaward from the Gulf Coast Carbon Center, University of Texas-Austin, as part of CarbonSAFE Phase I project, DE-FE0029487, US Department of Energy.
- "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, 09/01/2013-08/31/2018.
- "Computational Fluid Dynamics and Neural Network Modeling of Industrial Flares," 10 grants 05/01/07-07/15/17, \$886,765, TCEQ, AQRP, HARC, and TARC, PI/Co-PI, with K. Li, H. Lou, X. Li, C. Martin, and P. Richmond. "Flare Performance Optimization: DRE/CE vs. Soot," Daniel Chen (PI), Helen Lou, Xianchang Li, Peyton Richmond, Matthew Johnson (Carleton U., Canada), TCEQ, 01/01/14-8/31/2014,
- "ALEP Fuel Cell Catalyst & Hydrogen," David Cocke (PI), Jack R. Hopper, Daniel H. Chen, Sidney Lin, US Army Missile Defense Command, \$7,250,000, 2005-2012.
- "Improving Engineering Curricula by Integrating PBL Pedagogy with Modern Manufacturing Case Studies," National Science Foundation, Co-PI, CCLI 0737089 \$149,897, 03/15/08-02/28/10.
- "Controller Performance Diagnostics, Process/Controller Parameter Identification, and Predictive Maintenance," Nexus Engineering, PI, \$76,160, 2001-2005; Ten (10) consecutive Exxon-Mobil grants to support process modeling, simulation, and control education to undergraduate/ graduate students and area engineers, PI (1998-2007).