

## David A. Rockstraw, Ph. D., P. E.

2008 Calle de El Paso; Las Cruces, NM 88005

phone: (575) 635-9539

fax: (575) 523-7502

[rockstraw@zianet.com](mailto:rockstraw@zianet.com)



### **Executive Summary**

*I have worked in the chemical processing industries; academia; government labs; and private practice as consultant, R&D engineer, expert witness, and forensic analyst. I have diverse experiences that includes commodity chemicals; energy; water; petrochemicals; pharmaceuticals; agricultural chemicals; fluorochemicals; monomers, polymers and plastics; plutonium processing; membrane/electromembrane processes; safety; biofuels; and processed foods. I have provided expert testimony in numerous depositions, trials, and arbitrations.*

### **Specific areas of expertise (not exhaustive)**

- engineering education and administration
- chemical plant design, simulation, economic evaluation, construction, and operation (including direct exposure to dozens of products, processes, and chemical plants)
- 29 CFR 1910.119 process safety management of highly hazardous chemicals
- scale-up of laboratory and pilot plant operations to commercial facilities
- kinetics and catalysis, spontaneous combustion, runaway reactions, and explosions
- chemical separation and heat/mass transfer phenomena
- activated carbon synthesis and application as an adsorbent
- ethanol from fermentation of biomass and subsequent processing
- biodiesel production facilities
- ultrasonic flash pyrolysis synthesis of metallic nanoparticles
- intellectual property and trade secret law, including inter partes review
- forensic analysis of chemical plant operations and incidents

### **Education**

***The University of Oklahoma***, Norman, Oklahoma Aug 1986 – Sep 1989

Ph.D., Chemical Engineering

Dissertation: *Experimental & Theoretical Electrodialysis Investigations*

Advisor: Dr. John F. Scamehorn

***Purdue University***, West Lafayette, Indiana Aug 1980 – Jun 1986

B.S., Chemical Engineering

***New Mexico State University***, Las Cruces, New Mexico August 2010 – 2012

Masters of Accountancy (incomplete due to accepting new position in 2012)

## **Major Honors & Awards**

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- Frank Bromilow Award for Teaching Excellence, 2016
- NMSU Roush Teaching Award, 2014
- NMSU Environmental Health & Safety “Friend of Safety” Award, 2014
- Robert Davis Distinguished Professorship, 2013
- NMSU Distinguished Achievement Professor Award, 2012
- Ed and Harold Foreman Engineering Education Excellence Award, 2012
- National Society of Professional Engineers, Professional Engineers in Higher Education Engineering Education Excellence Award, 2009
- E-Council Outstanding Engineering Professor Award, 2008
- AspenTech® Educational Innovation Award, 2004
- Outstanding Faculty Member, voted by the 2001 CH E graduating class
- Research Grand Prize, American Academy Environmental Engineers, 1998
- Level II DuPont Safety Sentinel Award, 1995.
- DuPont Partnering Recognition for Suva® HFC development: 1992, 1991

## **Professional Service**

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### **American Institute of Chemical Engineers (AIChE)**

- Fellow (awarded 2015)
  - Fellow’s Council (2016 – present)
- *Faculty Advisor to the NMSU Student AIChE Chapter, 2007-present*
- *"Outstanding Chapter" recognition; 2007/08, 2008/09, 2009/10, 2011/10, 2015/16*

### **National Society of Professional Engineers**

- *Board of Directors (Interest Groups representative), 2013 - 2015*
- *House of Delegates (PEHE representative), 2012 - 2014*
- *Education Foundation Trustee, 2013 – 2015*
- *Licensure and Qualifications to Practice Committee, 2013 – 2015*
- *Legislative & Government Affairs Committee, 2014 - 2015*
- *Chair, Professional Engineers in Higher Education (PEHE) Interest Group, 2010-11*
- *Immediate Past Chair, PEHE Interest Group, 2011-12*
- *Chair-elect, PEHE Interest Group, 2009-10*
- *SW Region Vice Chair, Professional Engineers in Higher Education (PEHE), 2008-09*

### **New Mexico Society of Professional Engineers**

- *Faculty Advisor to the NSPE@NMSU Student Chapter, 2010-2015*
- *Governor of Educational Practice (2000-2010)*

### **Biomedical Engineering Society**

- *Faculty advisor, 2014-2015*

### **American Society of Engineering Education**

## Employment Experience

### ***New Mexico State University***, Las Cruces, New Mexico

ROBERT DAVIS DISTINGUISHED PROFESSOR	SEP 2013 - PRESENT
ACADEMIC DEPARTMENT HEAD, CHEMICAL & MATERIALS ENGINEERING	July 2012 – PRESENT
DISTINGUISHED ACHIEVEMENT PROFESSOR, CHEMICAL & MATERIALS ENGINEERING	AUG 2012 – PRESENT
PROFESSOR, CHEMICAL & MATERIALS ENGINEERING	AUG 2004 – AUG 2012
ASSOCIATE PROFESSOR, CHEMICAL ENGINEERING	MAY 1998 – AUG 2004
ASSISTANT PROFESSOR, CHEMICAL ENGINEERING	AUG 1995 – MAY 1998

### *Department Head Administrative Highlights:*

- Highlighted need for upgrades to program infrastructure leading to NMSU administration to put Chemical Engineering in the top capital outlay priority position. Began ~\$20 million renovation to the building in May 2015 with completion and return to the building in 2Q 2017.
- Led 2012 Accreditation Board for Engineering & Technology (ABET) accreditation review of program. Final ABET statement identified no deficiencies, weaknesses nor concerns. Named strengths: alumni, students, and faculty.
- Established safety program and modified safety culture that includes: requirement of rigorous documentation and analysis of all experimental procedures carried out in the department; continuous training on issues of chemical safety; an internal audit program; regular safety meetings for faculty, staff, grad students, and researchers; an awards program to reward outstanding leadership in laboratory safety. Promoted and drove effort to hire College of Engineering Safety Specialist position. Personally recognized as a “friend of safety” by NMSU Environmental, Health, and Safety.
- Developed protocol and online form that permits a single advisor to advise 200 undergraduate chemical engineering students in a couple of days.
- Leading effort to build a dual parallel 45-gallon pilot plant brewery coming online summer 2017, to be used in the unit operations laboratory for fitting mathematical models of fermentation reaction kinetics. Developed minor-of-study in Brewery Engineering based on Master Brewer’s Association guidelines for education program.
- Integrated simulation science with Aspen Plus® across the BSCHE curriculum, including four formal lab courses, one in each of the upper division semesters, and informal use within courses at the lower division level.
- Procured software from Simulation Solutions, Inc. that simulates complete operation of a pentane/hexane distillation column, to be integrated and employed across the curriculum in the junior-level separations course, the senior-level dynamics & control course, and the capstone design course.
- Built and maintain department web site with form-driven data collection integrated into a continuous self-study for program assessment and accreditation.

*Recent Research Areas:*

- nanoparticle synthesis;
- activated carbon synthesis and application;
- process simulation;
- plastic pyrolysis to liquid fuels;
- ethanol from transgenic alfalfa

*Primary Teaching Subject Areas:* chemical kinetics & reaction engineering; equilibrium-staged separations; chemical process design & simulation (with Aspen Plus® and Dynamics®), and economic evaluation; transport phenomena; fundamentals of material and energy balances, numerical techniques in Matlab and Mathcad.

*Comprehensive list of Subjects Taught at NMSU:*

- Basics of Chemical Engineering
- Computer applications (Matlab, Excel, Mathcad, C++, Fortran)
- Material and Energy Balances
- Engineering Data Analysis
- Transport Operations II: Heat and Mass Transfer
- Transport Operations III: Staged Operations
- Process Instrumentation Systems Laboratory
- Simulation of Unit Operations (with Aspen Plus®)
- Transport Processes Laboratory
- Unit Operations Laboratory
- Novel Industrial Separation Processes (adsorption, crystallization, membranes)
- Environmental Process Design I & II
- Chemical Kinetics and Reactor Engineering
- Engineering Economics
- Chemical Process Design and Economic Evaluation
- Chemical Process Simulation (with Aspen Plus®)
- Chemical Plant Design
- Chemical Plant Simulation (with Aspen Plus®)
- Advanced Process Simulation (with Aspen Plus®)
- Senior Seminar (Fundamentals of Engineering Exam preparation)
- Graduate Chemical Engineering Calculations (analytical methods)
- Graduate Chemical Engineering Calculations (numerical methods)
- Graduate Chemical Reactor Analysis & Design
- Chemical Complexation Analysis
- Graduate Student Seminar
- Fundamentals of Inline Hockey
- Racquetball

**Rockstraw Consulting**, Mesilla, New Mexico

CHEMICAL PROCESS DESIGN/REVIEW/CONSULTATION AND EXPERT WITNESS 1997 – present

*Expert Witness and Testimony Experience*

1. Akin Gump; San Francisco, CA. Expert witness for defense in litigation associated with design of a 1,000 gpd biodiesel production facility (R Power Biofuels, LLC vs. Chemex, LLC). Case closed 32 days after start of my involvement based on my findings (2017).
2. Alston & Bird; Atlanta, GA. Expert witness for plaintiff in lawsuit involving theft of trade secret and intellectual property (Norit Americas vs. ADA). Client was awarded a \$38 million dollar judgment and significant royalties for a period of eight years (2009).
3. Christesen & Jensen, Salt Lake City, UT - Expert opinion on litigation of residential fire attributed to spontaneous combustion.
4. Cronin & Howe, Phoenix, AZ - Provided expert testimony for defense on residential fire attributed to spontaneous combustion (Classic Coatings Corp.).
5. Cronin & Howe, Phoenix, AZ –Retained to provide expert testimony for defense on litigation of residential fire purportedly attributed to spontaneous combustion (Arizona Paint Works).
6. Clausen Miller, New York, NY - Provided expert opinion for plaintiff in litigation involving explosion of a chemical reactor producing sodium dihydrobis (2-methoxyethoxy) aluminate (Travelers Property Casualty)
7. Davis & Associates P.C., Albuquerque, NM – Provided expert opinion on valuation of oil production operations in a Chapter 11 matter (2015).
8. Dongell Lawrence Finney LLP, Las Vegas, NV – Provided expert opinion for defense in litigation involving the failure of an tank designed to store HCl at a rural water treatment facility (Tetra Tech MM, Inc., 2013)
9. Haynes & Boone, LLC; Dallas, TX. Expert witness for plaintiff in lawsuit involving theft of trade secret and intellectual property (Norit Americas, 2008-2009).
10. Holland & Knight LLC, Tampa, FL – Provided technical analysis and opinion on several patented chemical reaction technologies.
11. Paul M. Hood Law Offices, Dallas, TX - Provided expert opinion for defense on litigation involving injury incident liability from operation of a commercial molding machine (Falcon Plastics, Inc.)
12. Klecan & Childress, Albuquerque, NM - Expert opinion for defense on litigation involving corrosion of residential construction materials.
13. Levin & Associates, Cleveland, OH – Expert opinion for plaintiff in litigation involving failures in engineering, procurement, construction, and management of a biodiesel production facility from a beef tallow feedstock (Western Biodiesel, Inc., 2013).
14. McClaugherty & Silver PC, Santa Fe, NM – provide expert statement on the risk potential of using polybutylene pipe in radiant heating systems.

15. McDonald (Bruce S.) Law Offices, Albuquerque, NM - Provided expert opinion for defense on litigation involving a residential fire purportedly attributed to spontaneous combustion.
16. Miller, Maki, LLP, Sudbury, ON, Canada – Provided expert opinion on the potential for spontaneous combustion to occur in carbon chars (Ontario Superior Court of Justice; Helene Carter, Edmond Blais And Donald Givogue vs. Placements C. Jolicoeur Limitee, Ontario Inc., Christine Jolicoeur, Isabel Lamarche, Marc Clement, Alain Lamarche, The Clorox Company Of Canada, Ltd., and Charbon De Bois Feuille D’erable Inc., 2015-2016).
17. Miller Stratvert PA, Albuquerque, NM – Provided expert opinion for plaintiff on litigation involving a potentially contaminated feedstock of a food processing company.
18. Mitchell, Lang & Smith, Portland, OR – Provided expert opinion for defense in litigation involving bioethanol contamination and remediation for company in U.S. Bankruptcy Court on matters of causation, negligence, and mitigation of damage (Cascade Grain Products, LLC, 2013).
19. Mound, Cotton, & Wollan, New York, NY - Provided expert testimony for plaintiff in arbitration involving a thermal explosion at a commercial chemical facility in Grants, NM involving a scrubbing tower that removes traces of hydrofluoric acid from propane (Travelers Property Casualty, 1999)
20. Moyer Law Offices LPA, Columbus, OH - Expert opinion for plaintiff in litigation involving failures in engineering, procurement, construction, and management of a mixed feedstock biodiesel production facility (Washakie Renewable Energy, LLC. Vs. Jatrodiesel, Inc., 2016)
21. Nossaman Guthner Knox & Elliott, San Francisco, CA – Provided expert opinion on trade secret theft involving a process to manufacture ant insecticide baits (Copper Harbor vs. Central Garden and Pet Company, 2015-2016).
22. Quarles & Brady LLP, Chicago, IL. Provided expert opinion on novelty of patents associated with oil separation in the corn ethanol process (Hydrite Chemical Co./Solenis LLC Patent Issue - U.S. Patent No. 8,841,469, 2015-2016).
23. Quinn Emanuel Urquhart & Sullivan, LLP, New York, NY – Provided expert opinion for plaintiff on chemical process design for manufacture of adiponitrile (International Court of Arbitration of the International Chamber of Commerce, Paris, France, 2013).
24. Ratiner, Lagos & Mirabal, P.A., Miami, FL – Providing expert opinion for plaintiff on batch process development methods in fungicide manufacture (Case No. 92-18377 CA 23, Circuit Court of the Eleventh Judicial Circuit in and for Miami-Dade County, Florida; Claire J. Sidran, et al. v. E. I. DuPont de Nemours & Co., Inc., 2012)
25. Seaton & Husk, L.P., Vienna, VA – Provided expert opinion for defense on the operability of a gas processing unit.
26. Sills, Cummis & Gross P.C., Newark, NJ – Provided expert opinion for plaintiff on the physical mechanism and operation of suppression systems for a fire involving chlorinated swimming pool chemicals (Aiden Leeds, 2014-2015).

27. Stoel Rives, Salt Lake City, UT – provided expert opinion for defense on viability and economic evaluation of a process to manufacture an antibacterial additive intended for oral care use (N8 Medical, Inc.; Brigham Young University; N8 Pharmaceutical, Inc. vs. Colgate-Palmolive Company, 2015-2016)
28. Stoel Rives, Minneapolis, MN – provided expert opinion for defense on patent infringement matter involving corn stover ethanol production, with emphasis on material handling and process design around the separation of residual corn oil from the stillage of the beer column bottoms (Master Case No.: 1:10-ml-2181-LJM-DML in the United States District Court for the Southern District Of Indiana. GS CleanTech Corp. v. Bushmills Ethanol, Inc., Chippewa Valley Ethanol Co., LLLP, Heartland Corn Products and Al-Corn Clean Fuel, 2013-2014).
29. Travelers’ Insurance Boiler & Machinery Claim Service, Naperville, IL – provided consultation and expert opinion for plaintiff on the mechanisms that led to the explosion of a graphite refining furnace.
30. Winston & Strawn LLP; Washington, DC– provided technical and economic analysis of potassium permanganate processes in federal antitrust matter (Carus Chemical Co., Peru, IL, 2004).

#### *Consultant/Design/Research Experience*

1. Analytical Systems International Keco R&D Inc., Tomball, TX – Assisted with application of Henry’s Law to sensor applications.
2. Automation Correct, LLC; Syracuse, NY – Performed analysis of computer code written to simulate operation and control of coal stove.
3. Clean Can Technology, Bloomfield, NM – Advised company in the development of an adhesive foam for applications in trash can cleaning.
4. Entegris, Inc., Round Rock, TX – Provided consultation on redesign of company’s MegaVap metallic vapor feed system (2015).
5. Environmental Remediation Services, LLC., Seattle WA - Performed material & energy balances in support of design & construction of a mineral processing pilot plant.
6. Fluxtron Holdings, Inc., Houston, TX – Served as chair of the Technical Advisory Board; performed numerous calculations and experimental work in support of design and commercial installation of electrocoagulation cell.
7. Halkey-Roberts Corporation; St. Petersburg, FL – Performed product research in support of inflation device development.
8. King Abdulaziz City for Science and Technology, Daharan, Saudia Arabia – Technical consultant on a project entitled “Development of Selective Catalyst for conversion of Carbon Dioxide to Formic acid.” (2015)
9. LaSys, Inc., Las Cruces, NM - Consulted on self-assembly phenomena; designed, constructed, operated flash pyrolysis reactor to synthesize nanoparticles for optical applications.

10. Los Alamos National Laboratory, Los Alamos, NM – Provided expert opinion on transport phenomena calculations in support of the design of Plutonium-238 aqueous scrap processing units (2000).
11. Modular Process Technology Corporation, San Jose, CA –Design and economic evaluation of a 10<sup>4</sup> mtpy silicon production facility. Presentation of the design in Wuhai City and Hohhot in the Chinese province of Inner Mongolia, Chengdu in the Sichuan province, and in Taipei, Taiwan (2006).
12. Northern Biodiesel, Ontario, NY – Performed distillation column design and rating calculations for biodiesel process.
13. OZONELite™, Boca Raton, FL – Performed literature review and testimonial in support of a light bulb that employs a photocatalytic surface to disinfect the air. Served as technical expert in infomercial aimed at marketing of the product. Designed, constructed and operated a photocatalysis reactor to quantify the reaction kinetics of the Ozonelite™ bulb with acetaldehyde and used the results to perform performance calculations and design of new units.
14. Peduzzi & Company; Houston, TX – Provided technical advice on the synthesis of tetraethyl lead and bismuth derivatives.
15. Potter Industries Inc., Potsdam, NY – Assisted to analyze feasibility of using a non-ideal feedstock to a glass recycling facility
16. ProTech Systems, Albany, NY – Developed heat transfer models of a wall mounted vent kit for boilers and water heaters.
17. Rio Grande Environmental Products, Albuquerque, NM - Provided technical expertise to the conceptual design of a commercial activated carbon processing facility based on lignocellulosic raw materials.
18. Rio Valley Biofuels, Anthony, NM – Third party engineering review for RFS2 certification of a waste vegetable oil feedstock biodiesel production facility.
19. Sets Systems, Inc.; Miami, FL – Provided review of heat transfer calculations for hot water furnace system.
20. SolAqua, LLC, Las Cruces, NM - Operated solar distillation prototype with spiked feed of organic contaminants.
21. Sound Earth, LLC, Fishkill, NY – Assisted with processing of a homemade cleaning product to eliminate phase separation of the product.
22. Southwest Bio Fuels, Albuquerque, NM – Third party engineering review for RFS2 certification of a waste vegetable oil feedstock biodiesel production facility.
23. T-P Domestic Bio-Fuels, Rincon, NM – Performed sizing calculations for elements of a biodiesel and bioethanol production facility.
24. Tri-State Biodiesel, New York, NY – Provided expertise in the design of an ultrasonic transesterification reactor system for biodiesel conversion.
25. Winslow Life Rafts, Lake Suzy, FL - Designed prototype chemical-based, commercial life raft inflation system.

**Los Alamos National Laboratory, Los Alamos, New Mexico** (summers)  
VISITING SCIENTIST- NUCLEAR MATERIALS TECHNOLOGY DIVISION 1997 - 2000

- Measurement and prediction of stability constants in complex systems.
- Fundamental studies of crystal habit and specific cake resistance for hydroxide neutralization precipitates from actinide process.

**E.I. DuPont de Nemours Co., Inc. / Conoco, Inc., Ponca City, Oklahoma**

RESEARCH ENGINEER - CORPORATE PROCESS DEVELOPMENT Aug 1990 Jul 1995

- Managed research program for pilot plant production of Suva® HFC-134a.
- Commercialized methyl 3-hydroxy-2-thiophenecarboxylate process.
- Designed and piloted process for the continuous depolymerization of Terethane®. Supervised construction & start-up of the commercial facility.
- Designed, constructed, operated pilot systems simulating modifications to the commercial Tyvek® operation and a Lycra® depolymerization facility.
- Safety & Occupational Health Excellence Team Leader
- Sulfonyl Urea Process Engineering Creativity Team
- Hydrodechlorination Technology Committee

**Ethyl Corporation, Orangeburg, South Carolina**

SENIOR R&D ENGINEER, RESEARCH & DEVELOPMENT Sep 1989 – Jul 1990

- Developed, patented, commercialized novel Na/K catalyst and catalytic process for production of an Ibuprofen® pharmaceutical intermediate.

**Kraft, Inc., Glenview, Illinois**

ENGINEER I / CO-OP STUDENT- R & D DIVISION Aug 1981 – Aug 1986

- Performed material and energy balances on fuel-grade ethanol process. Unit operations included ultrafiltration, reverse osmosis, fermentation, and azeotropic distillation.
- As co-op student, provided tech support of operations at research center; extrusion, ultrafiltration, evaporation, emulsification, and spray drying. Provided pioneering support in the development of the processing method for the purple horseshoe cereal marshmallow, now found in Lucky Charms.

**Peer-Reviewed Publications (appearing in print and in review)**

1. Corrected rate law for sulfite oxidation mechanism with ethanol-inhibition, D. A. Rockstraw, *Industrial & Engineering Chemistry Research*, **51**(35), p. 11587 (2012).
2. Old Dead Guy Trading Cards, **D. A. Rockstraw**, *Chemical Engineering Education*, **46**(1), Winter 2012.
3. Synthesis of Nanowires by Spray Pyrolysis, K. C. Pingali, S. Deng, and D. A. Rockstraw, *Journal of Sensors*, Article ID 683280, 2009, doi: 10.1155/2009/683280.
4. Synthesis of Ru-Ni Core-Shell Nanoparticles for Potential Sensor Applications, S. Deng, K. C. Pingali, D. A. Rockstraw, *Institute of Electrical and Electronics Engineers Sensors Journal: Nanosensors for Defense and Security*, **8**(5-6), pp. 730-734 (2008).
5. Synthesis and Thermal Stability of Carbon Supported and Carbon Coated Ru-Ni Core-and-Shell Nanoparticles, K. C. Pingali, S. Deng, D. A. Rockstraw; *Powder Technology*, **187** (2008) 19–26.
6. Effect of Ammonium Nitrate on Nanoparticle Size Reduction, K. C. Pingali, S. Deng, D. A. Rockstraw; *Research Letters in Nanotechnology*, Volume 2008, Article ID 756843, doi:10.1155/2008/756843.
7. Direct Synthesis of Ru-Ni Core-Shell Nanoparticles by Spray-Pyrolysis: Effects of Temperature and Precursor Constituent Ratio, K. C. Pingali, S. Deng, D. A. Rockstraw; *Powder Technology*, **183**(2), p.282-289 (2008).
8. Deposition of Ru-Ni-S Nanoparticles on Carbon by Spray-Pyrolysis: Effects of Solvent, K. C. Pingali, S. Deng, D. A. Rockstraw; *Current Nanoscience*, 2007, **3**, 215-221.
9. Physicochemical properties of carbons prepared from pecan shell by phosphoric acid activation, Y. Guo and D. A. Rockstraw, *Bioresource Technology*; **98**(8), 1513-1521. (May 2007).
10. Direct synthesis of Ru-Ni nanoparticles with core-and-shell structure, K. C. Pingali, S. Deng, D. A. Rockstraw; *Chemical Engineering Communications*, **194**(6), 780-786 (2007).
11. Activated carbons prepared from rice hull by one-step phosphoric acid activation, Y. Guo and D. A. Rockstraw, *Microporous & Mesoporous Materials*, **100**(1-3); 12-19, March 23, 2007.
12. Synthesis of carbon nanoparticle thin film with spray pyrolysis, K. C. Pingali, S. Deng, D. A. Rockstraw; *New Mexico Journal of Science*, **44**, 149-163, August 2006.
13. Physical and chemical properties of carbons synthesized from xylan, cellulose, and Kraft lignin by H<sub>3</sub>PO<sub>4</sub> activation, Y. Guo, D. A. Rockstraw, *Carbon*, **44**(8); 1464-1475 (July 2006).
14. Silver nanoparticles from ultrasonic spray pyrolysis of aqueous silver nitrate, K. C. Pingali, D. A. Rockstraw, S. Deng; *Aerosol Science & Technology*, **39**:1010–1014, 2005.
15. ASPEN Plus® in the Chemical Engineering Curriculum: Suitable Course Content and Teaching Methodology, D. Rockstraw, *Chemical Engineering Education*, **39**(1), Winter 2004.
16. A Generating Equation for Mixing Rules and Two New Mixing Rules for Interatomic Potential Energy Parameters, A. K. Al-Matar, D. A. Rockstraw, *Journal of Computational Chemistry*; **25**(5), p.660-668 (April 2004).

17. Rapid oxidation of sulfide mine tailings by reaction with potassium ferrate, M. Murshed, D.A. Rockstraw, A.T. Hanson, M.D. Johnson, *Environmental Pollution*, **125**(2), 245-253 (Sep 2003).
18. A model for the adsorption of multiple metal ion solutes in aqueous solution onto activated carbon produced from pecan shells, S. A. Dastgheib, D.A. Rockstraw, *Carbon*, **40**(11), 1853-1861 (2002).
19. A model for the adsorption of single metal ion solutes in aqueous solution onto activated carbon produced from pecan shells, S. A. Dastgheib, D.A. Rockstraw, *Carbon*, **40**(11), 1843-1851 (2002).
20. Copper and strontium adsorption by a novel carbon material manufactured from pecan shells; RA Shawabkeh, DA Rockstraw, RK Bhada, *Carbon*, **40**(5), 781-786 (2002).
21. Rare Earths and Actinides: Science, Technology and Applications IV, (ISBN: 0-87339-470-4), Bautista and Mishra, editors, "Vitrified Magnesia Dissolution and Its Impact on Plutonium Residue Processing," K.W. Fife, J.L. Alwin and D.A. Rockstraw, pp. 123-135.
22. Pecan shell activated carbon: synthesis, characterization, and application for the removal of copper from aqueous solution, S. A. Dastgheib, D.A. Rockstraw, *Carbon*, **39**(12), 1849-1855 (2001).
23. Modeling Substrate Particle Degradation by *Bacillus Coagulans* Biofilm, S. Rajagopalan, D. Rockstraw, S. M. McGee, *Bioresource Tech.*, **61**, (1997).
24. An Integrated Course/Project in Chemical Process Design, D.A. Rockstraw, S. Bellner, J.A. Eakman, N. Nabours, *Chemical Engineering Education*, **31**(1), Spring 1997.
25. Use of Electrodialysis to Remove Acid, Salt, & Heavy Metal Mixtures from Aqueous Solutions, D.A. Rockstraw, J.F. Scamehorn, *Separation Science. & Technology*, **32**(11), (1997).
26. An Integrated Electrodialysis/Evaporation Process for the Treatment of Aqueous Process Streams Containing Electrolytes, D.A. Rockstraw, J.F. Scamehorn, E.A. O'Rear III, *J. of Membrane Science*, **52** (1990) 43-56.

### **Other Publications and/or Presentations**

1. Electrochemical Conversion of CO<sub>2</sub> to Formic Acid Using Rotating Lead Electrode, David Rockstraw, Reyad Shawabkeh, Aban Sakheta, American Institute of Chemical Engineers National Meeting, November 16, 2016, San Francisco, CA.
2. Panel: What You Need to Know about Being an Expert Witness (invited panelist), Chemical Engineering & the Law Forum, American Institute of Chemical Engineers National Meeting, November 14, 2016, San Francisco, CA.
3. Panel: Ethics and Expert Witnessing for Scientists & Engineers (invited panelist), Daniel B. Jett Chapter of the American Society of Civil Engineers, November 4, 2016, Las Cruces, NM.
4. Generating Perchlorate and N-Nitrosodimethylamine Isotherms Using Pecan Shell Activated Carbons; J. Freeh, J. Rodriguez, D. A. Rockstraw, C. E. Brewer, American Institute of Chemical Engineers National Meeting, Salt Lake City, UT, November, 11, 2015.
5. Generating Perchlorate and N-Nitrosodimethylamine Isotherms Using Pecan Shell Activated Carbons; J. Freeh, D. Amidei, D. A. Rockstraw, C. E. Brewer, 13<sup>th</sup> Annual International Workshop on Environment and Alternative Energy, European Space Agency, Madrid, Spain, November, 11, 2015.
6. Remediating Salt Attack in Adobe and Earthen Structures; E. Liefeld, D. A. Rockstraw, G. Henry, Earth USA 2015 Conference, Santa Fe, NM Oct. 2-4, 2015.
7. Understanding, Detecting, Measuring, and Remediating Salt Attack (Salt Weathering) in Adobe and Earthen Structures; D. A. Rockstraw, S. Cooper, E. Liefeld, G. Henry, Earth USA 2013 Conference, Santa Fe, NM, Oct. 4-5, 2013.
8. Teach Your Students the Power of Aspen Plus® and Aspen HYSYS® with University Teaching Modules; D. A. Rockstraw, C. Yip, and B. Gochenour, AspenTech Webinar series, Oct 2 2013.
9. Incorporating Process Simulation Across the Chemical Engineering Curriculum to Improve Student Performance On the Capstone Design Project, American Institute of Chemical Engineers Conference, Pittsburgh, PA Oct. 28 - Nov 2, 2012.
10. Continuing Our Journey to Bridge the Process Safety Gaps Between Academia and Industry (Paper 232e), Bruce K. Vaughn, Thomas O. Spicer, D. Morrison, James A. Klein, and David A. Rockstraw, American Institute of Chemical Engineers Conference, Minneapolis, MN, Oct. 16-21, 2011.
11. Mentoring STEM Students (panel member), presented by The NMSU Teaching Academy on Thursday, September 15, 2011.
12. Recruiting & Interacting with Students; Erin Reyes (NSPE), David Rockstraw (NMSU), and Terrance Glunt (FDOT), NSPE Leadership Webinar Series, Nov. 11, 2010.
13. Photocatalytic Activity of TiO<sub>2</sub> and TiO<sub>2</sub>-xCxNy Thin Films From Polymer Assisted Deposition, S. Baber, Q. Lin, V. Daram, D. A. Rockstraw, S. Deng, H. Luo, American Institute of Chemical Engineers Conference, Salt Lake City, UT, Nov. 7-12, 2010.
14. Workshop: How to Make Meetings Worthwhile and Entertaining, Michelle Wilson, Alicia Aguirre, David Rockstraw, Jessica Houston, American Institute of Chemical Engineers Conference, Salt Lake City, UT, November 6, 2010.

15. Deposition Of Ru-Ni-S Nanoparticles On Carbon By Spray-Pyrolysis: Effects Of Solvent And Other Processing Parameters, K. C. Pingali, S. Deng, D. A. Rockstraw, American Institute of Chemical Engineers Conference, Salt Lake City, UT, Nov. 4-9, 2007.
16. Synthesis of Ru-Ni Core-Shell Nanoparticles for Sensor Applications, S. Deng, K. C. Pingali, D. A. Rockstraw, Nanoelectronic Devices for Defense and Security conference, organized by the U. S Army Edgewood Chemical Biological Center (ECBC) & U.S. Army Research Office (ARO) in Washington DC, June 18-21, 2007.
17. Water Distillation in a Solar Still, E. Sandoval, A. De La O, D.A. Rockstraw; American Institute of Chemical Engineers Conference, San Francisco, CA; Nov. 12-17, 2006.
18. Synthesis of core-shell nanoparticles and mathematical modeling of exponential relation of particle size variation with precursor concentration, K.C. Pingali, S. Deng, D.A. Rockstraw; American Institute of Chemical Engineers Conference, San Francisco, CA; November 12-17, 2006.
19. Formation of Ru-Ni core-and-shell nanoparticles by spray pyrolysis and effect of temperature and precursor constituent ratio on particle size; K. C. Pingali, S. Deng, D. A. Rockstraw; The 14<sup>th</sup> International Conference on Composites/NANO Engineering Conference, Boulder, CO; July 2-7, 2006.
20. Synthesis of binary metal nanoparticles of Ru-Ni with core and shell structure; K. C. Pingali, S.Deng, D. A. Rockstraw, Particle Technology Forum, American Institute of Chemical Engineers Conference, Cincinnati, OH; October 30-November 4, 2005.
21. Effect of Ammonium Nitrate on Average Size Reduction of Nanoparticles of Silver and Nickel; K. C. Pingali, S.Deng, D. A. Rockstraw, Nanoscale Science and Engineering Forum, American Institute of Chemical Engineers Conference, Cincinnati, OH; October 30-November 4, 2005.
22. Suitable Course Content and Pedagogy for use of the Aspen Plus<sup>®</sup> Simulator in the Chemical Engineering Curriculum, D.A. Rockstraw, 2004 American Society of Engineering Education National Meeting, Salt Lake City, UT, June 20-23, 2004.
23. Rapid oxidation of sulfide mine tailings by reaction with potassium ferrate, D.A. Rockstraw, M. Murshed, A.T. Hanson, M.J. Johnson, Int. Symposium on Chemical Reaction Engineering, Chicago, IL, June 6-9, 2004.
24. Synthesis and characterization of TiO<sub>2</sub> aerogel photocatalysts for environmental remediation technologies, D.A. Rockstraw, G.K. Newman, M. Dreyer, S. J. Kersey, II Encuentro Científico Internacional de Invierno - ECI2003i, Lima Peru Jan 2-5, 2003.
25. Adsorption of 2,4-dinitrophenol and 2,4-dinitrotoluene from aqueous system using surfactant-modified, lignocellulosic based activated carbon, A. D. Cota-Espericueta, D. Rockstraw, 224<sup>th</sup> ACS National Meeting, Boston, MA, August 18-22, 2002.
26. A Generating equation for Mixing Rules for the Interatomic Potential Parameters and a New Mixing Rule for the Noble Gases, American Institute of Chemical Engineers National Meeting, Poster Session: Applying Molecular Simulations and Computational Chemistry, Ali K Al-Matar, David A Rockstraw, Reno, NV, November 2001.

27. **2001 AIChE Extra:** "The Expert Witness: An Alternative Career Path for the Chemical Engineer," D. A. Rockstraw, Ph.D., P.E.
28. Adsorption of metal ions onto oxidized, activated carbon produced from pecan shells, in single and multicomponent systems, S.A. Dastgheib, D. A. Rockstraw, 219<sup>th</sup> American Chemical Society National Meeting, San Francisco, CA, March 27, 2000
29. Adsorption of aromatics on pecan-shell-based carbon, D.A. Rockstraw and L.A. Roybal, 219<sup>th</sup> American Chemical Society National Meeting, San Francisco, CA, March 27, 2000
30. Solution to the 1999 AIChE National Student Design Contest, D.A. Rockstraw, S.P. Bellner, 1999 American Institute of Chemical Engineers National Meeting, Dallas, TX, November 1, 1999.
31. Vitrified Magnesia Dissolution and its Impact on Plutonium Residue Processing, K.W. Fife, J.L. Alwin, D.A. Rockstraw, 129<sup>th</sup> Minerals, Metals, and Materials Society, Nashville, TN, March 12-16, 2000.
32. Real-Time Densitometer for Implementation in Hanford Tanks, M. Corpening, K. Anderson, D.A. Rockstraw, Waste Management '99 Proceedings; Tucson, AZ, February 28 - March 4, 1999.
33. Enhanced Pyrite Destruction and Copper Recovery with Fe(VI), A. Al-Matar, J. Alwin, J. Kearns, D.A. Rockstraw, Waste Management '99 Proceedings, Tucson, AZ, February 28 - March 4, 1999.
34. A Novel Lignocellulosic-Based Carbon Material for Separation of Ionic Species from Aqueous Solutions, D. A. Rockstraw, R. Shawabkeh, R. K. Bhada, TechnoVentions '98, Orlando, FL, December 9-12, 1998.
35. Synthesis & Characterization of Phosphate-Based Zirconium/Titanium Mixed Oxide Catalysts, D. K. Kambhampati, D. A. Rockstraw, N. Jackson, S. Thoma, poster presentation at the 2<sup>nd</sup> World Congress on Environmental Catalysis Conference, Miami, FL, November 1998.
36. One-Step Sol-Gel Synthesis of Sulfated Zirconium/Titanium Phosphate Solid Acid Catalysts, D. K. Kambhampati, D. A. Rockstraw, N. Jackson, S. Thoma, American Institute of Chemical Engineers National Meeting Proceedings, Miami, FL, November 15-19, 1998.
37. Treatment of Copper Mine Tailings Using a Slurry Approach: A Case Study, D.K. Kambhampati, R. Mallapragada, K.G. Ragunathan, R.K. Bhada, D.A. Rockstraw, Environmental Engineering & Management Proceedings, Barcelona, Spain, September 30 - October 2, 1998,
38. Synthesis & Characterization of Carbon from Pecan Shells, D. Rockstraw, Center for Applied Energy Res., Univ of Kentucky, Lexington, KY, April 23, 1998 (invited).
39. Use of Pecan Shells in the Chemical Industry, D. A. Rockstraw, R. Shawabkeh, R. K. Bhada, D. Binkley, XXXII Annual Western Pecan Conference, Las Cruces, NM, March 9-11, 1998 (invited).
40. Groundwater Remediation with Pecan Shell-Based Activated Carbon and Montmorillonite Clay, J. Alwin, D. Rockstraw, Waste Management '98 Proceedings, Tucson, AZ, February 28 - March 4, 1998.

41. Interaction of Surfactant Micelles with Ion-Exchange Membranes, M. Nelson, D.A. Rockstraw, M. Montoya, J.F. Scamehorn, American Institute of Chemical Engineers, Los Angeles, CA, November 16-21, 1997.
42. An Interdisciplinary Course in Design, D.A. Rockstraw, American Chemical Society, Emerging Technologies in Hazardous Waste Management, Special Session WERC: Bringing Environmental Excellence into the 21<sup>st</sup> Century, Pittsburgh, PA, September 15-17, 1997.
43. Reduction of BOD in Pecan Process Water using Foam Flotation, D.A. Rockstraw, National Pecan Sheller's Association Annual Meeting, Charleston, SC, September 12, 1997 (invited).
44. Removal of Reactive Dyes from Water, D.A. Rockstraw, El Paso Water Users Consortium Meeting, El Paso, TX, July 16, 1997 (invited).
45. Synthesis and Characterization of Phosphate-Based Solid Acid Catalysts, N. Jackson, D.A. Rockstraw, D.K. Kambhampati, S. Thoma, North Amer. Catalysis Society Proceedings, Chicago, IL, May 19-23, 1997.
46. An Activated Carbon Manufactured by Novel Techniques, R. Shawabkeh, D. A. Rockstraw, R. K. Bhada, NMSU Graduate Student Symposium, Las Cruces, NM, May 2, 1997 (First Place).
47. Activated Carbon Manufactured by Novel Techniques, D.A. Rockstraw, R.K. Bhada, R.A. Shawabkeh, Waste-management Education & Research Consortium/Hazardous Substances Research Consortium Joint Conference on the Environment, Albuquerque, NM, April 22-24, 1997.
48. Micellar-Enhanced Electrodialysis for Water Treatment, D.A. Rockstraw, J.F. Scamehorn, Waste-management Education and Research Consortium / Hazardous Substances Research Consortium Joint Conference on the Environment, Albuquerque, NM, April 22-24, 1997.
49. A Course in Chemical Process Design, D.A. Rockstraw, J.A. Eakman, S. Bellner, N. Nabours, American Society of Engineering Education/Gulf Southwest Section Proceedings, Houston, TX, March 23-25, 1997.
50. An Activated Carbon Manufactured by Novel Techniques, D.A. Rockstraw, R.K. Bhada, R. Shawabkeh, American Institute of Chemical Engineers Spring Meeting, Houston, TX, March 9-13, 1997.
51. Activated Carbon for Water Treatment Made From Pecan Shells, D.A. Rockstraw, R. Shawabkeh, Poster Presentation, XXXI Annual Western Pecan Conference, Las Cruces, NM, March 9-11, 1997.
52. Get Real! That Way by Design, D. Rockstraw, S. Bellner, J. Eakman, N. Nabours, American Institute of Chemical Engineers Nat'l Meeting, Free Forum on Engineering Educ., Chicago, IL, November 11-15, 1996.
53. Harvest, Steam Percolation, & Composting Radioactive Flora, M. Pagedar, D. Rockstraw, Waste Management 97, Tucson, AZ, March 2-7, 1996.
54. Effect of Biofilm Parameters on Growth in Solid State Fermentation Processes, S. Rajagopalan, J. Modak, D. Rockstraw, American Institute of Chemical Engineers, Biochemical Engineering Poster Session, Chicago, IL, November 11-15 1996.
55. Are Constant Biofilm Parameters Models Valid? S. Rajagopalan, D. Rockstraw, American Society for Microbiology, Microbial Biofilms Conference, Salt Lake City, UT, October, 1996.

56. An Industrial Challenge: Case Study in Technology Commercialization, D.A. Rockstraw, University of Oklahoma School of Chemical Engineering and Materials Science Seminar, Norman, OK, Mar. 9, 1995 (invited).
57. An Integrated Electrodialysis/Evaporation Process for the Treatment of Aqueous Process Streams Containing Electrolytes, D.A. Rockstraw, J.F. Scamehorn, E.A. O'Rear III, American Institute of Chemical Engineers Fall National Meeting; San Francisco; CA; November 1989.
58. Characterization of Electrodialysis for the Removal of Acids, Salts and Heavy Metal Mixtures from Aqueous Solutions, D.A. Rockstraw, J.F. Scamehorn, American Institute of Chemical Engineers Summer National Meeting Proceedings; Philadelphia, PA; September 1989.
59. Removal of Dissolved Metals from Water Using Electrodialysis, D.A. Rockstraw, J.F. Scamehorn, "10th American Electroplaters and Surface Finishers & EPA Conference on Environmental Control for the Metal Finishing Industry" Proceedings, Orlando, FL, January 23-25, 1989.
60. Use of Electrodialysis to Clean Abandoned Zn Mine Water in NE Oklahoma: Characterization of Multi-Component Systems Containing Species of Mixed Valences, D.A. Rockstraw, J.F. Scamehorn, Annual Generic Meeting of the Bureau of Mines; Reno, NV, May 1989.
61. The Use of Electrodialysis to Clean Water from Abandoned Zinc Mines in Northeast Oklahoma: Characterization of Single Component Systems, Annual Bureau of Mines Generic Meeting, Golden, CO, May 1988.

## Patents

- 6,225,256, May 1, 2001, Activated carbon feedstock.
- 5,157,186, Oct 20, 1992, Catalytic Coupling of an Alkene with an Aromatic.
- 5,104,843, Apr 14, 1992, Catalyst Composition for Coupling Process.

## Service Activities

Performed article reviews for the following journals:

- *Applied Surface Science*
- *Advances in Environmental Res.*
- *BioResource Technology*
- *Biotechnology Research*
- *Chemical Engineering Education*
- *Chemical Engineering Journal*
- *Chemosphere*
- *Colloids & Surfaces*
- *Environmental Technology*
- *Fuel Processing Technology*
- *Industrial Crops and Products Industrial & Engineering Chemistry Res.*
- *International J. of Scientific Res.*
- *Journal of Physical Chemistry*
- *Journal of Membrane Science*
- *J. of Taiwan Institute of Chem. Engineers*
- *Journal of Environmental Management*
- *Langmuir*
- *Separation Science and Technology*

Proposal Review for the following funding organizations:

- National Science Foundation, Div. of Chemical & Transport Systems
- American Chemical Society - Petroleum Research Fund Type AC
- US Civilian Research and Development Foundation
  - *Arab Science & Technology Foundation's Iraq R&D Initiative*
  - *Independent States of the Former Soviet Union*
  - *Moldovan - U.S. Bilateral Grants Program*
  - *International Science and Technology Center (Ukraine)*
- U.S. Department of Agriculture Phase I and Phase II SBIR
- Oklahoma Center for Advancement of Science & Technology
- Canada Foundation for Innovation

Recent Civic activities

- Mesilla Valley Preservation, Inc. (mvpres.org);
  - Board of Directors, 2010 - present
  - Treasurer; 2010 - 2013
- Mesilla Planning, Zoning, & Historical Appropriateness Commission; 2009 – 2011
- Las Cruces Inline Hockey Association; Founder and Director; 2000 - 2007