Curriculum Vitae - 2016

JoAnn Slama Lighty

Division Director, CBET, National Science Foundation
Professor, Department of Chemical Engineering, University of Utah
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Education:

Ph.D. Chemical Engineering, University of Utah, 1988
Dissertation: Fundamentals of Thermal Treatment for the Cleanup of Contaminated Solid Wastes
B.S. Chemical Engineering, University of Utah, 1982 (Magna cum Laude)

Leadership and Professional Appointments

Oct 2013-present — Division Director, NSF, Chemical, Bioengineering, and Transport Systems (CBET). Lead 16 program directors with a budget of approximately $183 million and staff (approx. 35 total).

July 1999-Present — Professor, Department of Chemical Engineering, Univ. of Utah
Research interests: air pollution from combustion systems, including carbon capture; fate of metals during incineration; particulate matter characterization; soot formation and oxidation.

Jan 2007- May 2013 Chair, Department of Chemical Engineering, Univ. of Utah

June 2004-February 2007 — Director, Institute for Combustion and Energy Studies, Univ. of Utah (now Institute for Clean and Secure Energy). Founding Director of an Institute looking at a collaboration of work done in the experimental, modeling, and analytical assessment of combustion, gasification, and fires and other energy systems.

July 1997-June 2004 — Associate Dean for Academic Affairs, College of Engineering, Univ. of Utah
Responsibilities included: oversight of the academic programs of the College of Engineering; responding to student petitions for various changes and grievances (~2400 undergraduates, 600 graduate students); responsible for Office of Student Affairs for the College of Engineering which includes academic advising, outreach activities, and Program for Diversity in Engineering; implementing and coordinating efforts for State-wide articulation and ABET.

August 1999-2001 Special Assistant to the Sr. Vice President for Academic Affairs, Univ. of Utah

Aug.- Dec. 1998 Interim Dean, College of Engineering, Univ. of Utah

July 1995-1997 — Associate Dean for Outreach, College of Engineering, Univ. of Utah
Responsibilities included: oversight of the Program for Diversity in Engineering; directing various programs within the College designed to recruit undergraduates from high school and two-year.

July 1994-1999 Associate Professor, Department of Chemical and Fuels Engineering, Univ. of Utah
Sept 1988-1994 Assistant Professor, Department of Chemical and Fuels Engineering, Univ. of Utah

Honors and Awards

By-Fellow, Churchill College, Univ. of Cambridge, Michaelmas Term 2010
Elected to the grade of Fellow, American Institute of Chemical Engineers, 2009
YWCA Outstanding Achievement Award, Science and Technology (2006)
Phi Kappa Phi, Honored as a Distinguished Faculty Member, Univ. of Utah (2006)
University of Utah Diversity Award (2005)
Distinguished Engineering Educator Award, Society of Women Engineers (2004)
Linda Amos Award for Distinguished Service to Women, University of Utah (2002)
Utah Engineering Educator of the Year, Utah Engineering Council (2001)
NSF, Presidential Young Investigator Award (1990)
Tau Beta Pi

Society Memberships

Society of Women Engineers (SWE)
- Former Faculty Advisor

American Society for Engineering Education
American Institute of Chemical Engineers
- Executive Board, Programming Committee (2015-present)
- Meeting Program co-Chair, Annual Meeting (Nov 2015)
- Admissions Committee, Fellows (2011-present)
- Elected to the grade of Fellow (2009)
- Secretary of Environmental Division (1990-1991)
- Director, Environmental Division (1995-1997)
- Organized several sessions

Tau Beta Phi
- Former Faculty Advisor

The Combustion Institute
- Western States Section - Executive Committee (1999-2011)
  - Vice Chair (2007-2009), Chair (2009-2011)
- US Sections Committee (2011-2015; chair 2013-2015)
- Co-Chair for Formation and Control of Pollutants and Greenhouse Gases Colloquium, International Symposium, Aug. 2016
- Co-Chair for Stationary Systems Colloquium, International Symposium, Aug. 2014

Professional Services and Administrative Leadership

A. Selected Boards and Panels

Air Quality Program, Steering Committee, University of Utah (April 2013-present)
Engineering Advisory Council, Brown University (Feb 2004-Sept 2013)
Superfund Basic Research Program, External Advisory Committee (July 2006-January 2011)
Chemical Engineering Advisory Council, University of North Dakota (Dec 2004-2011)
National Research Council Committee on Review of the Conduct of Operations for Remediation of Recovered Chemical Warfare Materiel from Burial Sites (Sept. 2011- 2012)
National Research Council Committee on Mustard Processing at Tooele Chemical Agent Disposal Facility (2004)
National Research Council Subcommittee on Mixed Wastes, Committee on Environmental Management Technologies, Board on Radioactive Waste Management, Commission on Geosciences, Environment, and Resources (1996-1999)
U.S. EPA: Science Advisory Board (SAB), Subcommittee on Integrated Nitrogen (2007-2011)

National Advisory Council for Environmental Policy and Technology, Environmental Technologies Subcommittee (2004-2006)
Clean Air Scientific Advisory Committee (CASAC), Technical Subcommittee for Particle Monitoring (1998-2003)
Science Advisory Board (SAB), Environmental Engineering Committee (1992-1999)
Board of Trustees, Academy of Math, Engineering, and Science, appointed by Former Governor Leavitt (Oct 2002-July 2005)
Utah Engineers Council, SWE representative (1997-1999)
MESA/STEP Advisory Board of Directors (1995-2004), Secretary (1997-1999)
Presidential Commission on the Status of Women (1996-2000), Chair (1998-2000)

B. Academic and Administrative Leadership

Highlights of Accomplishments as Division Director, Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET), National Science Foundation (2.5 years)

- Co-Chair, Innovations at the Nexus of Food, Energy, Water (INFEWS) Working Group and ENG representative; INFEWS is a FY2016 priority. I have been a key architect in this foundation-wide initiative since 2014 and was recently appointed as the NSF member for the Office of Science and Technology Policy, The White House Task Force on the Nexus.
- Helped align CBET's participation in other key national and Foundation priorities such as: BRAIN Initiative; Engineering Biology and Synthetic Biology; and, Advanced Manufacturing, including Biomanufacturing for Cellular Therapies, Cyber Manufacturing and Process Intensification.
- Allocated $183 Million in funding to 16 programs and various initiatives.
- Reorganized division programs within clusters to ensure effective management of the programs and funding priorities. In addition, led the effort to re-write program descriptions to allow for more clarity and simplicity.
- Improved results from Federal Employees survey such that ENG was one of the top 10 places to work. When I started, results for CBET were the lowest in the Directorate. We are now near the top of employee satisfaction.
- Completed successful Committee of Visitors. Worked with the Directorate office to develop a template for the visit information. This will assist future Division Directors through this every-three-year process.

Highlights of Accomplishments as Department Chair, Chemical Engineering, University of Utah (6 years)

- Increased undergraduate enrollment through effective recruitment and retention plans, resulting in graduating the largest class in 2013. This growth helped the department secure additional resources after I stepped down as Chair.
- Increased quality of graduate students through participation in college-wide recruitment efforts and by developing a first semester funding mechanism. Secured common graduate student space to allow for better collaboration and interactions.
- Worked with USTAR initiative to gain new positions for the Department.
- Developed and helped establish the MS degree in Petroleum Engineering (actual authorization came shortly after I stepped down as chair)
- Funding raising and alumni efforts:
    - Developed strategy and led campaign for the successful renovation of the Sr. Projects Laboratory which included the Meldrum Biotechnology Laboratory and the Starley Computer space.
    - Developed industrial and alumni connections, which included several events in Houston. As a result, the Houston Alumni Chapter was initiated and has had chemical engineering alumni involvement from its inception.

- Initiated Distinguished Alumni Award and celebration dinner.
- Established a successful Industrial Advisory Board which met consistently during my tenure as chair.
- Increased scholarship donations and endowments.

Highlights of Accomplishments as Institute Director, Institute for Combustion and Energy Studies, University of Utah (2.5 years)

- Developed and presented the proposal for the Institute to the Univ. of Utah.
- Assisted lobbyists to secure initial funding for Center for Clean Coal and Center for Oil Shale and Sands utilization.

Highlights of Accomplishments as Associate Dean for Academics, College of Engineering, University of Utah (7 years)

- Implemented a College of Engineering advising program for undecided engineering majors and created a monthly team meeting for all advisors to exchange best practices.
- Led the College through a successful ABET cycle utilizing EC 2000 for the first time. To prepare for this visit planned several mock visits and Self Studies.
- Chair of the New Engineering Building Committee (Fall 2001-2004) and led the project through the Master Plan, Programming, and initial design.

Highlights of Accomplishments as Associate Dean for Outreach, College of Engineering, University of Utah (2 years)

- Initiated several outreach events (most are still active),
  - College of Engineering Fair (High School Students)
  - Elementary Engineering Week (grades 1-6, 2500 participants)
  - High GEAR (High School Girls Engineering Achievements Realized)
  - Established University of Utah as only state site for Junior Engineering Technical Society's TEAMS competition
  - Led the conversion from quarters to semesters for the College of Engineering

C. Selected Lectures, Seminars, and Invited Speeches

University of Utah

1. "The effects of fuel components and nanostructure on soot oxidation," NREL, August 2016.
2. "Work-Life Balance," Keynote Faculty Panel, 2015 Postdoc Appreciation Day, Sept. 2015.
3. "Environmental Sustainability: The Role of Fuel Type on Soot Oxidation and Potential health Implications," University of Colorado, Boulder, February 27, 2015.
4. "Chemical Looping with Oxygen Uncoupling (CLOU): Process Modeling for Solid Fuels," University of Arizona, December 10, 2013.
5. "Process Modeling for Chemical Looping with Oxygen Uncoupling (CLOU) of Solid Fuels," University of Connecticut, October 17, 2013.
6. "The Role of Utah in Our Energy Future," Curie Club, Univ. of Utah, May 2013.
7. "Sources, Transport, and Monitoring," presentation at the Air Quality, Health and Society Retreat, University of Utah, March 4, 2013.
8. "Soot oxidation kinetics," 23rd Rocky Mountain Regional Meeting, ACS, Symposium on Fuels of the Future, Westminster, CO, Oct. 18, 2012.
9. "Fine Particles from Coal Combustion," North China Electric Power University, Baoding, China, September 2012.
10. "The Utah Years," Adel F. Sarofim Memorial Symposium, MIT, May 11, 2012
11. "Chemical looping with oxygen uncoupling: exploring opportunities by interpretation of experimental data and process modeling," CCS - Development of Improved Technologies for Chemical and Carbonate Looping European Workshop, Nov. 7-8, 2011, Zabrze, Poland.

12. "Soot Oxidation," Department of Mechanical Engineering, University of California, Riverside, February 2011.
13. "Carbon capture research at the University of Utah," Department of Engineering, University of Cambridge, Cambridge, UK, November 24, 2010.
14. "Revisiting Soot Oxidation," Department of Chemical Engineering and Biotechnology, University of Cambridge, Cambridge, UK, November 17, 2010.
15. "Coal combustion and carbon capture," invited speaker at the Chinese-American Chemical Society dinner, AIChE Annual Meeting (November 2010).
16. "Soot: Formation, Destruction, and Environmental Implications," invited talk at the ACS Conference, Philadelphia PA (August 2008).
17. "Effects of Flame Conditions and Structure on Soot Oxidation," presented at the 5th Mediterranean Combustion Symposium, Monastir, Tunisia, Sept. 9-13, 2007.
18. "Particles, Combustion, Health and the Border,"9th International Congress on Toxic Combustion By-Products: Origin, Fate and Health Impacts, Tucson, AZ, June 2005, plenary talk.
19. "Fine Particles: Issues, Solutions, and Future Work," Thermal Engineering Department, Tsinghua University, Beijing, China, June 2, 2004.
20. "Achieving Ultra-Low NOx Emissions in Coal-Fired Utility Boilers," Third Joint China/USA Chemical Engineering Conference, Beijing, China, September 25-28, 2000.
21. J. Lighty and A. F. Sarofim, "Combustion aerosols: factors governing their size and composition and implications to human health."Critical Review for the Air and Waste Management Meeting, June 2000, Salt Lake City, UT. Paper published in *Journal of Air and Waste Management Association.*
22. "The role of research in practical incineration systems - a look at the past and the future," 27th International Symposium on Combustion, Boulder, CO, August 1998, (paper published).
23. "Waste Incineration for Resource Recovery in Regenerative Life Support Systems in Space," First International Symposium on Incineration and Flue Gas Treatment Technologies, Sheffield University, UK, July 1997.
24. Department of Environmental Engineering Science, California Institute of Technology, Pasadena, CA, February 1995.
25. Interactions of Toxic Metals with Matrix Constituents, Multipollutant Sorbent Reactivity Workshop, USEPA, Research Triangle Park, NC, July 1994.
26. Innovations in Thermal Desorption Technologies, presented at the Symposium on Innovative Waste Remediation Technology "The State-of-the-Art," San Diego, CA, October 1992.

National Science Foundation

1. "Priorities and Opportunities at NSF" presented at the 2016 Engineering Research Dean's Annual Conference, March 2016.
2. "Overview of CBET" presented at the Annual AIChE Meeting: 2015, 2014, 2013.
3. South by Southwest Eco, participated on Food, Energy and Water Panel, October 2015.
4. Panel on "Tips on Grant Proposal Writing for NSF CAREER Grants and Other Programs," SWE Annual Conference, October 2015.
5. "NSF Interdisciplinary Research: An ENG & CBET Perspective," presented at Western Michigan University, September 2015.
6. "Meet the Federal Funders Symposium and Speed Coaching," presented at the 2015 ACS Fall National Meeting & Exposition, August 2015.
7. "Future of Chemical Engineering Research: CBET perspective," presented at the Southeast Region ChE Department Heads and Chairs Meeting, June 2015.
8. Meeting of the US-Brazil Joint Commission on Science and Technology Cooperation, plenary talk on Food, Water, Energy Nexus, May 2015.
9. 2015 ASEE Engineering Research Council, NSF/CBET Breakout Session, March 2015.

10. "Chemical Engineering: Researching the Grand Challenges," Schoenborn Graduate Research Symposium, Department of Chemical Engineering, North Carolina State University, January 2015.
11. "CBET Research Overview," presented at University of Maryland, College of Engineering, August 2014.
12. National Science Foundation – SEES Update, 2014 University-Federal Dialogue on Energy & Environmental Research and Education, National Council of Science and the Environment, Washington DC, April 2014.

Research and Scholarly Achievements

A. Selected Research Grants and Foundation Support

(My contributions amount to over $13M in awarded grants)

DOE – Integrated oxygen production and CO_2 separation through chemical looping combustion - $2,350,000 (including matching) - September 2015-17 (PI – Kevin Whitty, Co-PI with Fry)

NSF – Investigation of fragmentation during soot oxidation - $ 276,500 – September 2011-15 (when I joined NSF I had to appoint a new PI on this grant)

Univ. of Wyoming Clean Coal Program –Validation, Modeling and Scale-up of Chemical Looping with Oxygen Uncoupling - $368,000 – December 2012- May 2015

DOE, BES – Development of Kinetics for Soot Oxidation at High Pressures Under Fuel-Lean Conditions - $539,300 – July 2010-14

Utah Clean Coal Center – ASPEN Modeling of Chemical Looping - $450,000 total – October 2008-October 2013

EPA P3 – Optimizing the Use of Biofuels in Cook Stoves for Improved Indoor Air Quality and Forest Sustainability in Rural Nepal - $15,000 Phase I – September 2012-13

Utah Clean Coal Center – Fate of Ash in Oxycoal combustion - $300,000 – October 2008-12

Effects of Soot Structure on Soot Oxidation Kinetics - $456,000 – SERDP – March 2007-June 2011

C-SAFE, Soot Formation and Oxidation in Jet Fuel Pool Fires – (with Eric Eddings, Adel Sarofim) – 2002-2009

NIRT Investigating Nano-carbon Particles in the Atmosphere: Formation and Transformation – NSF (PI with Pugmire, Voth, Violi, and Sarofim) – $1,800,000 - September 2003-July 2009

Utah Clean Coal Center – Mercury Project – DOE - $100,000 – June 2006-December 2008

Fundamentals of Mercury Oxidation – DOE, Univ. Coal Research Program - $539,400 (including match) – August 2003-July 2008

Millennium Synfuels Coal and Oil Shale Retort Research - $252,000 – Millennium Synfuels, LLC – April 2007-February 2008 (with Eddings, Silcox, and Whitty)

ADVANCE – Women Engineering Faculty Leadership Network – NSF, $115,335 – June 2003- 2007

Enhancement of Digital Methods for Determination of Opacity - $100,000 – SERDP – March 2006-2007

A Planning Study to Investigate the Impacts of Dust and Vehicles on Acute Cardio respiratory Responses in the Arid Southwest – Health Effects Institute - $108,000 – April 2006-February 2007

Hewlett Foundation Grant: A "CLEAR" Approach to an Improved Engineering Education - $1,100,000 – 2003-2008 (with R. Roemer, A. Darling, M. Mathison)

NSF/CONACyT: Integrated Air Modeling Approach to PM Source Apportionment at the USA/Mexico - Border with Henk Meuzelaar - $101,000 – September 2002 – March 2005

Feasibility demonstration of an integrated air quality modeling approach to PM source apportionment in the Paso del Norte region - SCERP, EPA - $73,350 - September 2002-2004

Phillips Petroleum, Dr. Marv Johnson – support for Elementary School Outreach Programs, 1996-2004, $110,000.

"Characterization of Particulate Emissions: Size Fractionation and Chemical Speciation" – SERDP (with Adel Sarofim) - $3.6 million – May 1998-December 2003

Investigation of vehicles in the border region: evaluation of high particulate matter sources - SCERP, EPA - $75,000 - June 2001- September 2003

Phase II Proposal for the DoE Toxic Substances from Coal Combustion Program (with Adel Sarofim) - $260,000, June 1998-2001.

Outreach and Diversity Program Support – INTEL (with Jolie Coleman) - $60,000 – December 2001-August 2003

"Applied Environmental Research Program for the United States-Mexico Border Region in Support of Border XXI (Paso Del Norte Airshed Study)" – SCERP, EPA - $195,000 - August 1998-December 2001

"Minimizing NOx Emissions from By-Product Fuels in Steel Making" – US DOE, Office of Energy Research (with D. W. Pershing) - $384,130 – October 1996-October 1999

"Particle Characteristics Responsible for Effects on Human Lung Epithelial Cells" - Health Effects Institute (subcontract to Utah State University) - subcontract $75,060 - 18 months, August 1, 1997-September 1999

"Integration of a Metal Fluorite-Type Catalyst and a Low temperature Fluidized bed incinerator into a biomass/waste management system for Resource Recovery" – SBIR Phase II with Reaction Engineering International, NASA/Ames Research Center - $243,000 - February 1997- May 99

"Waste Incineration for Resource Recovery in Regenerative Life Support Systems," NASA/Ames Research Center and the State of Utah - $740,000 - May 1994-September 1998

"Reduction of Emissions from Domestic Heating Units Using Low-Cost Alternatives," $82,213 - September 1996-98

"Advanced Combustor Design Concepts to Control NOx and Air Toxics," US DOE, PETC (with D. W. Pershing and P. J. Smith) - $400,000 - October 1994-98

National Science Foundation, Presidential Young Investigator Award, $255,000 - June 1990-February 1998

"The Development and Evaluation of Natural Gas-Fired Solid Waste Incineration Devices," Gas Research Institute (with D. W. Pershing and G. D. Silcox) - $440,000 - November 1990-May 1995

"The Fate of Heavy Metals and Radionuclides during Thermal Treatment of INEL Waste," EG&G Idaho - $37,000 - May 1993-September 1994

"Hazardous Waste Incineration," NSF Advanced Combustion Engineering Research Center (with D. W. Pershing and G. D. Silcox) - $620,000* - May 1989-May 1995

"Incineration of Sludges", Eastman Kodak - $75,000 (industrial matching for PYI grant) - November 1990-December 1992

"Bench and Pilot-Scale Investigations in Support of the Dow Rotary Kiln Incineration Project," LSU/HWRC - $62,000 - 1988-1992

"Incineration of Unconventional Fuels," NSF Advanced Combustion Engineering Research Center (with G. D. Silcox) - $30,000 - May 1989-April 1990

"Fluidized Bed Incineration," NSF Advanced Combustion Engineering Research Center - $310,000 - May 1989-May 1996

"Incineration of Wastes," part of the Southwest Center for Environmental Research (with G. D. Silcox) - $230,000 - May 1991-May 1996

B. Research Associates and Post Doctorates Supervised

Present

Cristina Jaramillo

Past

Carlos Andres Echavarria Yepes, Brian Griffin, J. A. Kozinski, Q. Lu

C. Graduate Students Supervised

Present

Matthew Hamilton – PhD – Chemical Engineering (work highlighted on the cover of "The Mixing Cup," University of Utah, Department of Chemical Engineering, Fall 2015)

Past (15 PhD, 11 MS 1 ME and 2 MS-SST)

Hossein Ghiassi – PhD 2015 – Chemical Engineering
"Soot oxidation and the mechanisms of oxidation-induced fragmentation in a two-stage burner for ethylene and surrogate fuels"

Joseph Levinthal – MS 2013 – Chemical Engineering
"Investigation of Soot Oxidation Kinetics, Nanostructure, and Surface Elemental Analysis"

Asad Sahir – PhD 2013 – Chemical Engineering
"Process modeling aspects of chemical-looping with oxygen uncoupling and chemical looping combustion for solid fuels"

Ethan Hecht – PhD 2013, Chemical Engineering
"Single particle studies of pulverized coal oxy-combustion"

Skipper Coates – MS 2013, Secondary Science Teaching
Rebecca Olsen – MS 2012, Secondary Science Teaching

Yunlu Jia – MS 2011, Chemical Engineering
"Fly ash particle size distributions during oxy-coal combustion"

Carlos Andres Echavarria Yepes – PhD 2010, Chemical Engineering
"Evolution of soot size distribution during soot formation and soot oxidation-fragmentation in pre-mixed flames: experimental and modeling study"

Michael Morrell – MS 2010, Chemical Engineering
"Modeling of mercury adsorption"

Cristina Jaramillo Sanchez – PhD 2009, Chemical Engineering
"Source Apportionment in Mexico"

Andrew Fry – PhD 2006, Chemical Engineering
"Experimental and Kinetic Modeling Investigation of Gas-Phase Mercury Oxidation Reactions with Chlorine"

Nathan Orton – MS 2006, Chemical Engineering
"Experiments with an Inverse Diffusion Flame"

Cristina Jaramillo Sanchez – MS 2005, Chemical Engineering
"Particulate Matter Source Attribution and Apportionment using Organic Signatures: A Study of the El Paso/Juarez Airshed"

Chris Merrill – MS 2005, Chemical Engineering
"Oxidation and Fragmentation of Soot in a Two Stage Burner System"

Mai-Anh Vu-Tran – MS 2005, Chemical Engineering (with Adel Sarofim)
"Fate of inorganic matter during pulverized coal combustion"

Pengzhi Jiang – PhD 2003, Mechanical Engineering
"Modeling of aerosol dynamics in flames and exhaust plumes

Don Summit - PhD 2003, Civil Engineering
"Pollutant emissions from waste burning in residential heaters of the United States/Mexico border region"

David Cacciatore - PhD 2002, Chemical Engineering
"NOx formation from by-product fuels"

Charles Holbert - PhD 2001, Chemical Engineering
"The behavior of selected trace metals during and after thermal treatment of paper-mill sludge"

Autumn Hu - MS 2000, Chemical Engineering
"Collection and Characterization of Coal Flyash for Toxicology"

Glen Palmer - MS 1999, Environmental Engineering
"Ambient air monitoring of fine particulate matter at Hill Air Force Base, UT and the influence of mobile sources"

Avinash R. Sirdeshpande - PhD 1998, Chemical Engineering
"Incineration for resource recovery in a regenerative life-support system: flue gas treatment"

Robert Barton - PhD 1995, Chemical Engineering
"Fate of Metals during Incineration"

Karl Rink - PhD 1995, Mechanical Engineering
"Fluidized Bed Incineration"

Eric Eddings - PhD 1992, Chemical Engineering
"Behavior of Metal Contaminants during Solids Incineration"

Warren Owens - PhD 1991, Mechanical Engineering (with D. W. Pershing)
"Hazardous Waste Incineration in a Rotary Kiln"

Stacie Twitchell - ME 1996, Mechanical Engineering
"Incineration of biomass for regenerative use in space - incineration system"

Frank Bales - MS 1995, Chemical Engineering
"The Use of Wood as a Reburning Fuel"

Dave Walker - MS 1992, Chemical Engineering
"The Desorption of Toluene in the Presence of Water in a Rotary Kiln Environment"

D. Peer-Reviewed Publications and Proceedings – over 2700 citations (Google Scholar)

1. M. Sirignano, H. Ghiassi, A. D'Anna, **J. S. Lighty,** "Temperature and oxygen effects on

oxidation-induced fragmentation of soot particles," published, *Combustion and Flame* (2016).

2. M. A. Hamilton, K. J. Whitty, **J.S.** Lighty, "Numerical simulation comparison of two reactor configurations for chemical looping combustion and chemical looping with oxygen uncoupling," in print, *J. Energy Resources & Technology*, 2016. DOI:10.1115/1.4033108
3. M. A. Hamilton, K. J. Whitty, **J.S.** Lighty, "Incorporating oxygen uncoupling kinetics into computational fluid dynamic simulations of a chemical looping system," in press, *Energy Technology*, 2016. DOI: 10.1002/ente.201600031
4. H. Ghiassi, Jaramillo, I. C., & Lighty, J. S., "Kinetics of soot oxidation by molecular oxygen in a premixed flame," published, *Energy and Fuels* (2016). DOI: 10.1021/acs.energyfuels.5b02942
5. H. Ghiassi, I. C. Jaramillo, P. Toth, **J. S. Lighty**, "Soot oxidation-induced fragmentation: Part 2: Experimental investigation of the mechanism of fragmentation," *Combustion and Flame,* 163, 170-178 (2016). doi:10.1016/j.combustflame.2015.09.023
6. H. Ghiassi, I. C. Jaramillo, P. Toth, **J. S. Lighty**, "Soot oxidation-induced fragmentation: Part 1: The relationship between soot nanostructure and oxidation-induce fragmentation," *Combustion and Flame*, 163, 179–187 (2016). doi:10.1016/j.combustflame.2015.09.023
7. P. Toth, A. B. Palotas, T. A. Ring, E. G. Eddings, R. VanderWal, **J. S. Lighty**, "The effect of pressure on the equilibrium nanostructure of soot particles," *Combustion and Flame,* 162 (6), 2422-2430 (2015).
8. M. A. Hamilton, K. J. Whitty, **J. S. Lighty**, "Parametric comparison of dual fluidized bed performance using a cold-flow unit and simulations," *Proceedings of the 22nd International Fluidized Bed Conference*, Turku, Finland, June 2015.
9. I. Jaramillo, C. K. Gaddam, R. Vander Wal, and **J. S. Lighty**, "Effect of nanostructure, oxidative pressure, and extent of oxidation on model carbon reactivity," *Combustion and Flame,* 162, 1848–1856 (2015). http://dx.doi.org/10.1016/j.combustflame.2014.12.006
10. J. K. Dansie, A. H. Sahir, M. A. Hamilton, **J. S. Lighty**, "An investigation of steam production in chemical-looping combustion (CLC) and chemical-looping with oxygen uncoupling (CLOU) for solid fuels," *Chemical Engineering Research and Design,* 94, 12-17 (2015).
11. I. Jaramillo, C. K. Gaddam, R. L. VanderWal, C-H Huang, J. D. Levinthal, and **J. S. Lighty**, "Soot oxidation kinetics under pressurized conditions," *Combustion and Flame*, 161, 2951-2965 (2014). http://dx.doi.org/10.1016/j.combustflame.2014.04.016
12. H. Ghiassi, **J. S. Lighty**, "Sooting Behaviors of n-Butanol and n-Dodecane Blends," *Combustion and Flame*, 161, 671-679 (2014). http://dx.doi.org/10.1016/j.combustflame.2013.10.011
13. A. Sahir, J. Dansie, A. L. Cadore, **J. S. Lighty**, "A comparative process study of chemical-looping combustion (CLC) and chemical-looping with oxygen uncoupling (CLOU) for solid fuels," *International Journal of Greenhouse Gas Control,* 22, 237-243 (2014). http://dx.doi.org/10.1016/j.ijggc.2014.01.008
14. E. Hecht, C. R. Shaddix, **J. S. Lighty**, "Analysis of the errors associated with typical pulverized coal char combustion modeling: assumptions for oxy-fuel combustion," *Combustion and* Flame, 160, 1499-1509 (2013). http://dx.doi.org/10.1016/j.combustflame.2013.02.015
15. P. Toth, J. K. Farrer, A. B. Palotas, **J. S. Lighty**, E. G. Eddings, "Automated analysis of heterogeneous carbon nanostructures by high-resolution electron microscopy and on-line image processing," *Ultramicroscopy*, 129, 53-62 (2013). Featured on cover.
16. P. Toth, A. B. Palotas, E. G. Eddings, R. T. Whitaker, **J. S. Lighty**, "A novel framework for the quantitative analysis of high resolution transmission electron micrographs of soot II. - robust multiscale nanostructure quantification," *Combustion and Flame*, 160, 920-932 (2013).
17. P. Toth, A. B. Palotas, E. G. Eddings, R. T. Whitaker, **J. S. Lighty**, "A novel framework for the quantitative analysis of high resolution transmission electron micrographs of soot I. - improved measurement of interlayer spacing," *Combustion and Flame,* 160, 909-919 (2013).
    A. Sahir, H. Y. Sohn, and H. Leion, **J. S. Lighty**, "Rate analysis of chemical-looping with oxygen

uncoupling (CLOU) for solid fuels," *Energy and Fuels,* 26, 4395-4404 (2012). http://dx.doi.org/10.1021/ef300452p

18. P. Toth, A. B. Palotas, **J. S. Lighty**, C. A. Echavarria, "Quantitative differentiation of poorly ordered soot nanostructures: a semi-empirical approach," *Fuel,* 99, 1-8 (2012). http://dx.doi.org/10.1016/j.fuel.2012.04.013
19. Y. Jia and **J. S. Lighty**, "Ash particulate formation from pulverized coal under oxy-fuel combustion conditions," *Environ. Science and Technol.*, 46 (9), 5214–5221 (2012). http://dx.doi.org/10.10211/es204196s
20. **J. Lighty**, A. Violi, M. J. Wornat, "Adel Fares Sarofim (1934-2011)," invited in: *Combustion and Flame* 159 (4), 1369-1370 (2012).
21. A. Echavarria, I. C. Jaramillo, A F. Sarofim, **J. S. Lighty** ,"Burnout of Soot Particles Derived from JP-8 Surrogate Flames in a Two-Stage Burner," *Comb. and Flame*, 159 (7), 2441-2448 (2012). http://dx.doi.org/10.1016/j.combustflame.2012.03.011
22. A. Sahir, J. Lighty, H. Y. Sohn, "Kinetics of copper oxidation in the air reactor of a chemical looping combustion system using the law of additive reaction times," *Industrial & Eng Chem Research*, *50* (23), 13330–13339 (2011). http://pubs.acs.org/doi/abs/10.1021/ie201577g
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E. Book Chapters and Document Contributions

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F. Research Conference Presentations, Papers and Proceedings – 168, last 10 years listed

1. Whitty, K. J., Hamilton, M.A., Merrett, K. M., O'Malley, K., Ali, S., Rahislic, E., Fry, A.R., **Lighty, J. S.**, "Copper-Based Chemical Looping with Oxygen Uncoupling: Process Development, Reactor Scale-Up, Pilot-Scale Studies and System Modeling," Presented at the 33rd Annual International Pittsburgh Coal Conference, 8-12 August 2016, Cape Town, South Africa (2016).
2. H. Ghiassi, I. C. Jaramillo, **J. S. Lighty**, "Combustion and emissions from biodiesel/diesel and alcohol/diesel surrogate flames," presented at 2015 AIChE Annual Meeting, Salt Lake City, UT, November 2015.
3. M. A. Hamilton, K. J. Whitty, **J. S. Lighty**, "Validation of particle fluid dynamic code using chemical looping experiments," presented at 2015 AIChE Annual Meeting, Salt Lake City, UT, November 2015.
4. M. A. Hamilton, K. Thompson, K. J. Whitty, **J. S. Lighty**, S. Stafsholt, "Determination of autothermal state for chemical looping combustion and chemical looping with oxygen uncoupling with Powder River Basin coal as fuel," presented at 2015 AIChE Annual Meeting, Salt Lake City, UT, November 2015.
5. A. Sahir, **J. S. Lighty**, "Chemical Looping with Oxygen Uncoupling: A process development perspective," presented at 2015 AIChE Annual Meeting, Salt Lake City, UT, November 2015.
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7. H. Ghiassi, I. C. Jaramillo, P. Toth, **J. S. Lighty**, "Experimental investigation of the mechanism of soot oxidation-induced fragmentation," 9th U. S. National Combustion Meeting, Cincinnati, OH, May 2015.
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9. M. Hamilton, K. J. Whitty, **J. S. Lighty**, "Using Barracuda-VR to determine operational parameters and the fluidization regime of a dual circulating fluidized bed system,," 3rd International Conference on Chemical Looping, Chalmers, Sweden, September 2014.
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14. H. Ghiassi and **J. S. Lighty**, "The role of surface functional groups and nanostructure on the oxidation rate of soot derived from an oxygenated fuel," presented at the Western State Section of the Combustion Institute Spring Technical Meeting, Pasadena CA, March 2014.
15. M. Hamilton, K. Whitty, and **J. S. Lighty**, Modeling a scaled 300kWth circulating fluidized bed reactor with Barracuda Chemical Looping with Oxygen Uncoupling," presented at the 2013 Annual AIChE Meeting, San Francisco, CA (2013).
16. J. D. Levinthal, C. Jaramillo, C. K. Gaddam and R. Vander Wal, and **J. S. Lighty**, "Oxidation Behavior of Biodiesel Surrogate Soot: Examination using X-Ray Photoelectron Spectroscopy (XPS), HR-TEM and Thermogravimetric Analysis (TGA)," presented at the 2013 Annual AIChE Meeting, San Francisco, CA (2013).
17. K. Whitty, **J. Lighty**, "Development, scale-up and process modeling of copper-based chemical looping with oxygen uncoupling," 2013 International Pittsburg Coal Conference, September 16-19, Beijing, China (2013).
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27. A. Sahir, **J. S. Lighty**, L. Bigelow, "The role of open innovation in development of futuristic technologies for carbon capture in coal-fired power plants: an academic perspective," 2012 AIChE Annual Meeting, Pittsburgh, PA, November 2012.
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29. **J. S. Lighty**, A. H. Sahir, K. Whitty, C. Clayton, "Chemical looping with oxygen uncoupling studies at the University of Utah," presented at the American Flame Research Committee Annual Meeting, September 2012.
30. A. H. Sahir, N. Tingey, **J. S. Lighty**, "Process analysis of chemical looping with oxygen uncoupling (CLOU) and chemical looping combustion (CLC) for solid fuels," presented at the 2nd International Conference on Chemical Looping, Darmstadt, Germany, September 2012.
31. P. Toth, A. B. Palotas, **J. S. Lighty,** E. G. Eddings, "A novel framework for the quantitative analysis of high resolution transmission electron micrographs of soot," poster presented at the International Sooting Flames Workshop, Warsaw, Poland, August 2012.
32. **J. S. Lighty**, R. Vander Wal, I. C. Jaramillo, J. Levinthal, C. Gaddam, C-H Huang, "Nanostructure and soot oxidation kinetics: pressure and fuel comparisons," poster presented at the International Sooting Flames Workshop, Warsaw, Poland, August 2012.
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37. I.C. Jaramillo, J. Levinthal, **J. S. Lighty**, "Soot oxidation kinetics: pressure and fuel comparisons," Western States Section of the Combustion Institute, Arizona State Univ., Tempe, AZ, March 19-20, 2012.
38. E. S. Hecht, **J. S. Lighty,** "Experimental investigation of pulverized coal char reactions with oxygen, carbon, dioxide, and steam," Western States Section of the Combustion Institute, Univ. of CA, Riverside, October 18, 2011.
39. J. Levinthal, I. C. Jaramillo, C.A. Echavarria, and **J. S. Lighty**, "Soot oxidation experimental kinetics: comparison of experimental techniques," Western States Section of the Combustion Institute, Univ. of CA, Riverside, October 18, 2011.
40. A. Sahir, **J. S. Lighty,** Sohn, "Application of the law of additive reaction times to the analysis of oxidation kinetics in the air reactor of a chemical looping combustion systems," 2011 AIChE Annual Meeting, Minneapolis, MN, October 2011.
41. A. Sahir, T. Ring, **J. S. Lighty**, An academic perspective on developing a course framework on inspiring students to be innovative," 2011 AIChE Annual Meeting, Minneapolis, MN, October 2011.
42. Y. Jia and **J. S. Lighty**, "Particulate Formation from Pulverized Coal Under Oxy-Fuel Combustion Conditions," 28th Annual International Pittsburgh Coal Conference, Sept. 12-15, 2011, Pittsburgh, PA.
43. **J. S. Lighty**, A. H. Sahir, and A. F. Sarofim, "Chemical looping with oxygen uncoupling: exploring opportunities by process modeling and interpretation of experimental data," 28th Annual International Pittsburgh Coal Conference, Sept. 12-15, 2011, Pittsburgh, PA.

44. C. A. Echavarria, C. Jaramillo, A. F. Sarofim, and **J. S. Lighty,** "Oxidation and Fragmentation of Soot Particles Derived from JP-8 Surrogate Flames in a Two-Stage Burner", presentation at the 7th US National Meeting, March 20-23, 2011, Atlanta GA.
45. Sahir, A. H., A. F. Sarofim, and **J. S. Lighty,** "Determination of burnout profiles for coal chars in a Chemical Looping with Oxygen Uncoupling process", presentation at the 7th US National Meeting, March 20-23, 2011, Atlanta GA.
46. Sahir, A. H., A. F. Sarofim, and **J. S. Lighty**, "Design Aspects and Insights From Experimental Data in Chemical Looping with Oxygen Uncoupling for Solid Fuel Combustion," presented at 2010 AIChE Annual
47. C. A. Echavarria, C. Jaramillo, A. F. Sarofim, and **J. S. Lighty**, "Burnout of Soot Particles Derived From a JP-8 Surrogate in a Two- Stage Premixed Burner," presented at 2010 AIChE Annual Meeting, Salt Lake City, UT, November (2010).
48. Y. Jia and **J. S. Lighty**, "Particulate Formation From Pulverized Coal Under Oxy-Fuel Combustion Conditions," presented at 2010 AIChE Annual Meeting, Salt Lake City, UT, November (2010).
49. **J. S. Lighty,** A. F. Sarofim, A. H. Sahir, E. Eyring, G. Konya, "Chemical Looping with Oxygen Uncoupling: Design Calculations and Process Engineering Simulations Using Kinetic Data," presented at the 27th International Pittsburgh Coal Conference, Istanbul, Turkey, October (2010).
50. **J.S. Lighty**, A.H. Sahir, A.F. Sarofim, et al., "Coal Combustion using Chemical Looping with Copper Oxide as Carrier," Poster at the 31st Symposium (International) on Combustion, Beijing, China, August (2010).
51. C. A. Echavarria, I. C. Jaramillo, A F. Sarofim, **J. S. Lighty**, "Studies of Soot Oxidation and Fragmentation in a Two-Stage Burner under Fuel-Lean and Fuel-Rich Conditions," Presented at the 31st Symposium (International) on Combustion and accepted in the *Proceedings of the Combustion Institute*, Beijing, China (2010).
52. Edward Eyring, Gabor Konya, **JoAnn Lighty,** Asad Sahir, Adel Sarofim, Kevin Whitty, "Chemical Looping with Copper Oxide as Carrier and Coal as Fuel." Presented at 1st International Conference on Chemical Looping, Lyon, France, March 17-19 (2010).
53. Sahir, A. H., A. F. Sarofim, **J. S. Lighty**, "Insights from Process Engineering Simulations for Envisioning the Design of Chemical Looping Combustion Processes for Solid Fuels," presented at 2009 AIChE Annual Meeting, Nashville, TN, November (2009).
54. Buitrago, P. A., G. Silcox, C. Senior, and **J. S. Light**y, "On Mercury Speciation under Homogeneous and Heterogeneous Conditions," presented at 2009 AIChE Annual Meeting, Nashville, TN, November (2009).
55. C. A. Echavarria, B. Brewster, **J. S. Lighty**, A. Sarofim, "Effects of temperature and fuel composition on the evolution of PSD," presented at 2009 AIChE Annual Meeting, Nashville, TN, November (2009).
56. Sahir, A. H., A. F. Sarofim, **J. S. Lighty**, "Preliminary Analysis of a Chemical Looping Combustion of Coal Scheme by ASPEN PLUS Simulations," presented at the Western States Section of the Combustion Institute Meeting, Irvine CA, October 2009.
57. C. A. Echavarria , **J. S. Lighty**, A. Sarofim, "Studies of soot oxidation in a two stage burner under fuel lean conditions," presented at the Western States Section of the Combustion Institute Meeting, Irvine CA, October 2009.
58. Whitty, K., E. M. Eyring, **J. S. Lighty,** A. F. Sarofim, "Copper oxide as a carrier for chemical looping: a status report," presented at the 26th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, Sept. 20-23, 2009.
59. C. A. Echavarria, A. Sarofim, and **J. Lighty**, "Role of the Soot Main Precursors in the PSDs for Premixed Ethylene and Benzene flames," 2008 AIChE Annual Meeting, Philadelphia, PA, November (2008)

60. B. Cauch, G. Silcox, **J. S. Lighty**, J. O. L. Wendt, A. Fry, C. L. Senior, "Gas phase oxidation of elemental mercury and the effects of aqueous phase impinger chemistry on apparent levels of oxidation, 2007 AIChE Annual Meeting, Salt Lake City UT, November (2007) .
61. C. A. Echavarria, A. Sarofim, **J. S. Lighty**, Z. Yang, A. D'Anna, "Soot formation in premixed ethylene and benzene flames," 2007 AIChE Annual Meeting, Salt Lake City UT, November (2007).
62. C. A. Echavarria, A. F. Sarofim, **J. S. Lighty**, "Soot formation in laminar pre-mixed flames," poster at the nanoUtah 2007 Conference, October 26 (2007).
63. M. Morrill, **J. S. Lighty**, "Modeling of entrained flow mercury adsorption on sorbents," presented at the 2007 Fall Technical Meeting, Western States Section/Combustion Institute, Livermore, CA October 16-17 (2007).
64. V. Romano, A. F. Sarofim, **J. S. Lighty**, "Soot fragmentation in laminar pre-mixed ethylene-air flames," presented at the 2007 Fall Technical Meeting, Western States Section/Combustion Institute, Livermore, CA October 16-17 (2007).
65. B. Cauch, G. Silcox, **J. Lighty**, J. Wendt, "Gas phase oxidation of elemental mercury and the effects of aqueous-phase impinger chemistry on apparent levels of oxidation," poster at Air Quality VI, Washington DC, September 2007.
66. **J. S. Lighty**, B. Cauch, G. Silcox, A. Fry, C. Senior, "Effects of aqueous-phase impinger chemistry on levels of gas-phase mercury oxidation, 10th International Congress on Combustion By-Products and their Health Effects, Ischia, Italy, June 17-20 (2007).
67. C. A. Echavarria, A. Sarofim, **J. S. Lighty**, A. D'Anna, "Soot formation from premixed ethylene and benzene flames," 10th International Congress on Combustion By-Products and their Health Effects, Ischia, Italy, June 17-20 (2007).
68. **J. S. Lighty**, A. F. Sarofim, "Soot oxidation in a two-stage burner," invited poster and participation at the International Workshop on Combustion-Generated Fine Carbon Particles, Anacapri, Italy, May 13-16, 2007.
69. **J. S. Lighty,** E. G. Eddings, N. Orton, A. F. Sarofim, N. Yang, "Characterization of young soot from an inverse diffusion flame," 5th US Combustion Meeting, San Diego CA, March 2007.
70. C. A. Echavarria, A. Sarofim, Z. Yang, **J. S. Lighty,** "Characterization of the properties of soot for aromatic and aliphatic flames," 5th US Combustion Meeting, San Diego CA, March 2007.
71. Fry, A., **J. Lighty**, G. Silcox, B. Cauch, C. Senior, "Reaction to mercury with chlorine and bromine in the presence of NO and SO_2 in a 1000 Btu/hr quartz furnace," 23rd Annual International Pittsburgh Coal Conference, Pittsburgh, PA, September 25-28, 2006.
72. N. B. Orton, **J. Lighty**, and A. F. Sarofim, "Characterization of young soot from an ethylene inverse diffusion flame," Work in Progress Poster at the 31th International Symposium on Combustion, Heidelberg, Germany, August 6-11, 2006.
73. Suhui Li, **J. S.** Lighty, and A. F. Sarofim, "Soot oxidation in a two-stage burner," Work in Progress Poster at the 31th International Symposium on Combustion, Heidelberg, Germany, August 6-11, 2006.
74. Carlos Andres Echavarria Yepes, **J. S. Lighty,** and A. F. Sarofim, "Flat flame experiments to explore the properties of soot for various fuels," Work in Progress Poster at the 31th International Symposium on Combustion, Heidelberg, Germany, August 6-11, 2006.
75. Anderson-Rowland, M., Homsher, B. **Lighty, J**., Raper J., and Vance J., "A characterization of potential women engineering administrators in academia," WEPAN National Conference, Pittsburgh, PA, June 2006

G. Seminars, Short Courses

Taught short course on Chemical Looping Technologies, Clearwater Coal Conference, Clearwater FL, June 2013

University of Utah RATS seminar, NSF Grant Writing, developed and presented information on writing NSF grants for university community, May/Nov. 2006; May/Nov. 2007; May 2008, 2009, 2010, 2011, 2012; Nov. 2012; April 2013.

Mentor at the Grant Writing Crash Course, sponsored by University of Utah, October 2011, 2012; May 2011; April 2013.

Organized COACh Training (for young female faculty) at the Combustion Institute, International Symposium, Beijing, China, August 2010 and Montreal, Canada, August 2008.

NSF Women in Engineering Leadership Institute Conference, held in conjunction with SWE National Conference, November 3-6, 2005; October 11-14, 2006; conference organizer
NSF Women in Engineering Leadership Institute Summit, University of Connecticut, May 2004; conference panelist
NSF Women in Engineering Leadership Institute Conference, Snowbird, Utah, November 5-8, 2002; conference organizer
NSF Women's Engineering Leadership Conference, Winter Park, Colorado, October 11-15, 2000; attended.

H. Contributions to Innovative Teaching

Environmental Engineering and Law class – reorganized and helped with this course (see ChFEn 775) as a new model of interdisciplinary teaching; received University of Utah funds for this.
Departmental liaison for industrial interactions; organized Interview Workshop for students; working with Career Services for student internship/job placement; meet with industry for internships/job placement, scholarship or other donations; case studies or research projects
Organized campus-wide, Annual ASEE Mini Course in Teaching Excellence, "Fresh Perspectives on Teaching," August 15-16, 2002; August 11-12, 2003
Philosophy 3540: developed Engineering Ethics and Society, Humanities Designation, with Philosophy Department
ChFEn 250: introduced a new textbook and the use of spreadsheets in the course
ChFEn 364: incorporated the use of industrial computer programs for the design of shell and tube heat exchangers.
ChFEn 361: introduced the use of ChemShare, NASA equilibrium code, and ChemCad to the course
ChFEn 591-Waste Incineration: assisted with the development of the course (with a graduate student) and offered the course over EDNET with BYU.
ChFEn 775-Law, Engineering, and the Environment: developed the course with Susan Poulter in the Law School to incorporate engineering and law principles in one course and have students from both disciplines interact with each other as they would in industry.

University Service

Past chair of the Departmental RPT committee, Undergraduate Recruitment Committee, Department Graduate Curriculum Committee
Member of the search committee for:
Chair, Department of Civil Engineering (2012)
Director of the International Center (2010)
Associate Dean for University College (chair of committee)
Honors Director
Union Director

Member of the Self-Study Steering Committee, prepared for the Northwest Commission on Colleges and Universities, Oct. 2006
Former member of the Honors Advisory Board
Past member of the Sr. VP Committee on Future Directions for the Honors Program