

Martin A. Abraham, Ph.D.

I am a transformational leader with continuously advancing roles who successfully increased the reputation, resources, and reach of each unit I have led, through a focus on interdisciplinary collaboration, corporate and community engagement, and inclusivity. I have emphasized the importance of a high-quality student experience as part of a broader strategy to increase enrollment and retention, promote high impact experiential opportunities such as undergraduate research, internships, and study abroad, and have developed new academic programs that led to growth in the organization. I have created meaningful partnerships between the university and community-based entities, including businesses, community colleges, K-12 schools, government and non-governmental organizations, and other non-profit organizations. I have successfully interacted with alumni, potential donors, and business leaders to generate support and goodwill for my organization. I have invested in diversity, increased enrollment of underrepresented students, and hired diverse faculty, staff, and administration, while maintaining focus on opportunity, access, and student success. I continue to be recognized as a leading scholar in green chemistry and sustainability, with over 100 publications and over 200 presentations, including editing the seminal “Encyclopedia of Sustainable Technologies,” and am a Fellow of the American Chemical Society and the American Institute of Chemical Engineers.

Education

1987 Ph. D. Chemical Engineering, University of Delaware

1982 B. S. Chemical Engineering, Rensselaer Polytechnic Institute

Employment and Administrative Experience

Western Illinois University

Professor, Engineering & Technology, with tenure	2019 – present
Provost and Academic Vice-President	2019 – 2021
Acting/Interim President	2019 – 2020

WIU is a comprehensive regional public institution with approximately 7500 students and 400 faculty. Serving as interim following the resignation of the former President, I demonstrated visionary leadership that reversed a decade long slide in enrollment by building a responsive admissions system, achieved record retention levels through implementation of mentoring and intrusive advising programs, restored town-gown relations through strategic interaction with community leaders, improved social justice by developing open and trusting relationships with underrepresented populations, and eliminated a multiyear budget deficit. After returning to my Provost role, I oversaw our successful decennial Higher Learning Commission review, promoted international student recruitment, invested in distance education, emphasized collegiality among faculty, and focused on assessment as a critical tool for curricular reform.

Highlighted Accomplishments:

- University Leadership:
 - Established enrollment management division and invested in new enrollment initiatives, leading to
 - The largest freshman class in three years (20.2% increase relative to prior year) and the first increase in the freshman class in nine years.
 - The first increase in incoming transfer students in ten years, up 9.5% relative to the prior year.
 - The first year-over-year increase in total new student enrollment in 14 years.
 - First-time, full-time freshmen retention of 76.8%, the highest level since 2004. Transfer student one-year retention of 83.1%, an all-time record.
 - Reestablished and funded university diversity initiatives, creating workshops for faculty and staff on dealing with diverse populations, reconstituting the University Diversity Council, and establishing a community engagement council. Recipient of the Cathy O'Neill Couza Award for Outstanding Leadership in Diversity, Spring 2021.
 - Reorganized to create a Division of Budget and Finance, for a net overall savings of more than \$500,000 per year. Reduced operational spending and decreased personnel costs to achieve the first positive balance sheet in over five years. Refinanced bond issuance that produced approximately \$4,000,000 in budget savings.
 - Maintained University operations through the Covid-19 pandemic, provided residence hall space for students without other options, coordinated the switch to predominantly online learning, developed virtual commencement, maintained frequent communications with faculty, staff, students, community, and parents, installed new safety equipment, and negotiated two Memoranda of Understanding with University Professionals of Illinois (UPI) to support faculty health and safety.
 - Secured the release of the first phase of capital funding for a new \$89,000,000 Center for Performing Arts, in support of our outstanding Music and Theatre programs and community cultural events.
 - Supported Alumni Council by meeting potential donors at events in Moline, Chicago, Florida, Alabama, Arizona, Anaheim, and Colorado.
 - Established the Center for Rural Education in conjunction with a \$2,500,000 donor contribution.
 - Expanded the role of the Illinois Institute for Rural Affairs as a contributor to the Illinois Innovation Network, a \$16,000,000 investment in both Quad Cities and Macomb to enhance economic development across the region.
 - Developed and mentored a team that authored a strategic position statement to define growth opportunities for our Quad Cities campus, emphasizing connectivity of the campus to the regional business community.
- Academic Division Leadership:
 - Oversaw the successful decennial Higher Learning Commission accreditation review.
 - Created an Office of Assessment, Accreditation, & Strategic Planning to promote the use of data in decision-making.

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- Streamlined graduate student admissions processing, invested in the online MBA and the Master of Education alternative teacher licensure, leading to a 55% increase in new graduate enrollment and an 8.6% increase in overall graduate enrollment.
- Hired a Director for International Programs who increased international student enrollment by 8.2% and more than doubled international enrollment for Fall 2021.
- Established an Office of Distance Education and Support and hired its first Director to enhance the delivery of online programs and promote enrollment growth.
- Established a collaborative partnership with Highland Community College to create a 2+2 program leading to a Bachelor of Education to partially address the teacher shortage across the State of Illinois.
- Contracted support for grant writing, to assist faculty and staff in securing external funds to meet university needs and increase external funding.
- Consolidated career services activities to expand emphasis on internships and career opportunities.
- Promoted external funding opportunities through direct interaction with federal legislators leading to a \$1.5 million appropriation for completion of an emergency management operations demonstration facility.
- Revised new faculty orientation to focus on building lasting relationships and incorporated a mentoring program to support faculty success. Promoted professional development for mid-career faculty.

Youngstown State University

Professor of Civil/Environmental and Chemical Engineering, with tenure	2007 – 2019
Provost and Vice-President for Academic Affairs	2015 - 2018
Interim Provost and Vice-President for Academic Affairs	2014 - 2015
Founding Dean,	

College of Science, Technology, Engineering, and Mathematics	2007 – 2014
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Served as the Chief Academic Officer at YSU, with oversight for six academic colleges, 35 academic departments, 365 faculty, and nearly 13,000 students. Supported enrollment growth through investment in new academic programs, international partnerships, and graduate studies. Created opportunities for faculty success by investment in faculty professional development and promoting university programs throughout the community. As Founding Dean of the STEM College, I led the faculty in developing strategies for organizational effectiveness, emphasizing community engagement and applied research, increasing student success and faculty satisfaction.

Highlighted Accomplishments:

- University and College Leadership:
 - Directed a successful Higher Learning Commission accreditation review; Developed new procedures for program review, faculty credential review, and part-time faculty evaluation.
 - Led three successful ABET accreditation reviews.
 - Successfully concluded 2014 and 2017 negotiations with faculty union.

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- Established a program review process and increased emphasis on assessment, which provided faculty the data to phase out under-enrolled and duplicative programs.
- Led the university in the collection and use of benchmarked data for decision-making.
- Expanded the role of faculty in shared governance. Established the presence of a faculty representative to the Academic Affairs committee of the Board of Trustees.
- Implemented technology solutions to streamline administrative processes, including curricular changes, graduate admission and assistantship, and faculty credential review.
- Initiated new faculty hiring procedures to increase diversity and inclusivity, which led to greater than 20 percent increase in minority faculty over two years.
- Guided the STEM College to recognition by US News and World Reports as among the top 100 engineering programs among primarily undergraduate universities in 2012; ranked 45th in the nation in 2013.
- Invested in the Society of Women Engineers to expand support for the growing enrollment of women engineering students. Tripled participation in the National Society of Black Engineers student chapter.
- Program development:
 - Developed an interdisciplinary Ph.D. program in Materials Science and Engineering, the first PhD offered at YSU. Oversaw the enrollment of first group of students in 2012. Recognized the first graduate, who found employment in the field, in May 2016.
 - Oversaw the development of new academic programs, including a BS in Biochemistry, BE in Manufacturing Engineering, Master's in Athletic Training, and Master's in Accountancy.
 - Established Centers of Excellence in STEM and across YSU. Supported an intercollegiate Center in Biomechanics, connecting Kinesiology with Mechanical Engineering. Created the Center for Innovation in Additive Manufacturing, a combined effort between Engineering and Art.
 - Created Launch Lab, an interdisciplinary STEAM initiative integrating art, engineering, and business to engage students in entrepreneurship in 3D printing. Several Launch Lab graduates have formed businesses that are now housed at the Youngstown Business Incubator.
 - Created a first-year experience program for the university, modeled on the first-year engineering program previously developed. Focus on transition for new college students, leading to increased retention and student success.
- Community impact:
 - Established the STEM Advisory Council to increase relations with industry and alumni and created the STEM College Awards dinner to recognize outstanding alumni and industrial and educational partners.
 - Partnered in the formation of the Mahoning Valley Manufacturers Coalition. Utilized this partnership to support YSU and community efforts to bring the \$70,000,000 National Additive Manufacturing Innovation Institute to Youngstown.
 - Created a mutually beneficial collaboration with the Youngstown Business Incubator, identified as the leading University-affiliated incubator in the world for 2015.

- Created an Office of STEM Research and Technology-Based Economic Development and hired the first director. Used this as a springboard to promote economic development-based research leading to over \$8 million in external funding, a record for the STEM College.
- Created a STEM College Office of Professional Practice to provide structure for co-op/internship programs. Placed over 200 students per year in internships, working with over 60 local, regional, and national companies.

University of Toledo

Professor of Chemical and Environmental Engineering, with tenure	1996 – 2007
Dean, College of Graduate Studies, (The unit was renamed after merging with the Medical University of Ohio in 2006)	2006 – 2007
Dean, Graduate School	2004 - 2006
Associate Dean, Research and Graduate Studies, College of Engineering	2000 - 2004
Chemical Engineering undergraduate program coordinator	1996 - 2000

The Dean of the College of Graduate Studies is the chief academic officer for graduate programs at the University of Toledo and represents the University at the Ohio Board of Regents and the Council of Graduate Schools. In July 2006, the University of Toledo and the Medical University of Ohio merged, resulting in the formation of the College of Graduate Studies with over 3000 graduate students in over 100 degree programs (including Master’s, Specialist, and Doctoral programs) throughout 10 academic colleges. As Associate Dean in Engineering, I was responsible for all graduate and research activities within the College of Engineering, including six Master’s programs and two doctoral programs.

Highlighted Accomplishments:

- Oversaw the integration of graduate schools during the merger between University of Toledo and the Medical University of Ohio. Developed the organizational structure for the merged Graduate College.
- Developed new degree options, including an MS/JD program with the College of Law, an integrated Engineering/Business Master’s, and a pathway for early entry of BS students into the Master’s program.
- Created the position of Graduate Recruitment Coordinator to support program directors in targeted initiatives. Increased graduate enrollment by approximately five percent over three years.
- Converted graduate admissions from a paper-based process to a fully electronic admissions system. Worked with individual departments to ensure their access throughout the admission process, enabling increased communication between programs and prospective students.
- Established guidelines for awarding graduate and teaching assistantships.
- Developed strategic plan for graduate education with key performance indicators in cooperation with Graduate Council.
- Implemented a minority recruitment effort that increased diversity in our graduate programs.
- Doubled external funding in the College of Engineering.

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- Negotiated Toledo's participation as a founding member of the Wright Fuel Cell group, a \$20,000,000 State investment.
- Represented the College as a member of the Toledo Regional Technology Alliance, a community economic development organization seeking to expand technology-based industry in the community.
- Achieved recognition by Princeton Review as the 18th best engineering graduate program in the nation.
- Expanded my research program into the use of clean solvents and other sustainable technologies. Developed new technologies for the generation of hydrogen for use in fuel cells. Collaborated with small business for the commercialization of the technology and developed a trade secret agreement.

The University of Tulsa

Associate Professor of Chemical Engineering, with tenure	1992 - 1996
Assistant Professor of Chemical Engineering	1987 – 1992
AIChE student chapter advisor	1987 – 1992

The University of Tulsa is a private, independent, doctoral-degree-granting institution focused on excellence in scholarship, dedication to free inquiry, integrity of character, and commitment to humanity. As an Assistant/Associate Professor, I developed an internationally recognized research program built on collaboration with others, worked directly with undergraduate students to support their success, and engaged with national professional organizations.

Highlighted Accomplishments:

- Developed an internationally recognized research program in catalytic supercritical water oxidation, obtaining funding from federal (\$750,000), State (\$300,000), and private (\$250,000) sources to support research efforts.
- Supervised eight undergraduate research projects and graduated 13 Master's and five Doctoral students.
- Collaborated with colleagues across engineering to design a summer research experience for women and underrepresented high school students, funded by a variety of sources (\$250,000)
- Named national Outstanding AIChE Student Chapter Advisor. Recognized as a Tau Beta Pi Professor of the Month.
- Promoted faculty interests to university leadership as Chair of the Faculty Affairs Committee of the Academic Senate.

Honors and Awards

Cathy O'Neill Couza Award for Outstanding Leadership in Diversity	2021
Nominated for YSU Distinguished Professor in Service	2019
Selected as "Most intriguing people of 2013", Youngstown Business Journal	2014
Business Advocate of the Year, Youngstown/Warren Regional Chamber of Commerce	2012

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Dion D. Raftapoulous/Sigma Xi Outstanding Research Award	2006
University of Toledo Doermann Distinguished Lecturer	2000
University of Toledo Outstanding Faculty Research Award	1999
University of Toledo College of Engineering Outstanding Researcher	1999
Lucent Technologies Fellowship in Industrial Ecology	1998
AIChE Outstanding Student Chapter Advisor	1992
Ralph R. Teetor Educational Award of the SAE	1989
Fellow, American Institute of Chemical Engineers	2012 - present
Fellow, American Chemical Society	2009 - present
Member, Phi Kappa Phi Honor Society	2000 - present
Member, Sigma Xi	1985 - present
Member, Tau Beta Pi	1980 - present
Member, Phi Beta Delta, Honor Society for International Scholars	2020 - present

Boards and Appointments

Quad Cities Manufacturing Laboratory

Board of Directors 2021 - present

QCML advances American manufacturing by helping manufacturers to develop cutting-edge technologies and processes to remain competitive and at the forefront of innovation in their industries. Through their connection with Western Illinois University School of Engineering, QCML's internship opportunities ensures a pipeline of skilled talent able to fulfill the demands of leading-edge manufacturing technologies, further empowering America's manufacturers.

Fireline, Inc.

Board of Directors 2013 - present

Fireline is a manufacturer of ceramic products for the aerospace industry. Fireline has roughly \$30M in sales and 100 employees. The Board sets policy for the company, including investment and strategic decisions. As the only technical member on the Boars, I provide guidance on new product development and process improvement. YSU had a significant role in the development of their TCON product, which provides the company significant growth potential in the automotive sector.

Advanced Methods in Innovation

Founding member 2010 - present

Director of Educational Strategies 2018 – 2019

Advanced Methods in Innovation (AMI) was formed to create engaging, meaningful learning experiences that inculcates a passion for innovation, creativity and design thinking. With a focus on 3D printing as a tool to enhance the learning potential, AMI developed a series of learning modules that use hands-on learning to teach engineering design concepts, empowering students

and teachers for creative innovation in the digital age. I also served as an independent consultant creating content for K-12 applications and organizing teacher professional development.

Macomb Area Economic Development Corporation

Board of Directors

2019 - 2020

Maedco is the regional economic development organization for McDonough County, running a business incubator, working to grow transportation needs (including the local Amtrak connection), and seeking to bring new business opportunities to the community. As a charter member and the largest employer in the region, the WIU President has a permanent position as a Director, allowing for direct involvement in the community economic development initiatives.

Youngstown Business Incubator

Board of Directors

2007 - 2019

The Youngstown Business Incubator is an internationally recognized program focused on the development of software and additive manufacturing companies in the Mahoning Valley and was ranked as the number one high impact incubation program in North America by UBI Global in 2015. YBI's mission is to facilitate the creation of high-value businesses through collaborative partnerships that promote innovative technologies and long-term, sustainable employment opportunities. YBI hosts 370 employees at portfolio companies that have generated over \$7,000,000 in revenue and raised nearly \$60,000,000 in investment capital.

Mercy Health Systems

Youngstown Region Executive Board

2017 - 2019

Strategic Development Committee

2016 - 2019

Mercy Health is the largest provider of health services in the State of Ohio. The Board of Directors is comprised of committed local community volunteers who are responsible for oversight of the organization's mission, focused on effectiveness, human resources, strategy development, financial plans, health-care quality and patient safety, and compliance with audit and corporate responsibility regulations and policies. As a member of the strategic development committee, we review performance metrics and programmatic development plans, in advance of presentation to the full Mercy Health Board.

OH Wow! The Roger and Gloria Jones Children's Center for Science and Technology

Board of Directors

2008 - 2014

OH Wow was dedicated as a children's hands-on STEM museum at its new location in downtown Youngstown in 2011. The Board identified its new mission, raised over \$2,000,000 in donor funding, rented space in a downtown facility, renovated the facility, and invested in new exhibits. The relocation of the center was recognized as a key element in the revitalization of downtown Youngstown. The center is a leader for K-6 informal science education throughout the Mahoning Valley, with over 10,000 student visits per year. My commitment to the STEM mission, and my

ability to involve STEM faculty and students in the development of exhibits, student and technical support for its operation, and general support in the community, was a critical underlying factor that allowed the new facility to thrive.

Other prior appointments

VEC Inc., Board of Advisors	2013 - 2017
Great Lakes Biomimicry	2015 - 2017
Ohio Federal Military Jobs Commission	2014 – 2015
National Additive Manufacturing Innovation Institute, Governing Board	2012 - 2014
Chair, Ohio Engineering Deans Council	2013 – 2014
TechBelt Initiative Executive Committee	2009 - 2014
TechBelt Energy Innovation Center Governing Board	2010 - 2013
Green Chemistry Institute Governing Board	2009 - 2013
National Academies of Sciences, Committee to Assess SCWO System Testing for the Blue Grass Chemical Agent Destruction Pilot Plant	2012 – 2013
Ohio Fuel Cell Coalition, Board of Directors	2006 - 2011
Environmental Protection Agency Board of Scientific Counselors Technology for Sustainability Subcommittee	2007 – 2009
EMTEC Board of Governors	2006 – 2008

Journal and editorial appointments

Editor *Environmental Progress and Sustainable Energy* 2007 - present

Environmental Progress & Sustainable Energy is a bimonthly publication of the American Institute of Chemical Engineers reporting on critical issues of the environment, including remediation and treatment of solid or aqueous wastes, air pollution, sustainability, and sustainable energy. I have grown the journal from a small paper-based publication to become a leading source of technology content with nearly 1000 submissions per year and roughly 250 published articles. I manage a staff of two Associate Editors and an office assistant and coordinate with the sponsoring society and the multinational publisher. *EP&SE* has a 2020 five-year impact factor of 2.431.

Editor in Chief, Encyclopedia of Sustainable Technologies

Second Edition	2020 – 2024
First Edition	2015 – 2017

This major reference work, published by Elsevier, Inc, is the first multivolume reference to employ both Life Cycle Analysis and Triple Bottom Line approaches in assessing the wide range of sustainable technologies and their worldwide impact. I worked with eight associate editors and over 200 authors located throughout the world to produce this four-volume encyclopedia that provides for the first time an authoritative assessment of the sustainable technologies that are currently available or in development. I have contracted with Elsevier to produce a second edition of this Encyclopedia to be published in 2024, that will expand existing content and promote new areas in sustainability.

Other appointments

Manufacturing Column Author, Youngstown Business Journal	2013 - 2017
Editorial Advisory Board, Industrial and Engineering Chemistry Research	2006 – 2008
Editor, Sustainability Science and Engineering Book Series, Elsevier	2004 - 2008
Sustainability Columnist, Environmental Progress	2005 – 2007
Editorial Board, Journal of Hazardous Materials	1998 – 2006

Leadership Service in State and National Committees**American Institute of Chemical Engineers Public Affairs & Information Committee**

Chair	2022-2023
1 st Vice-Chair, Chair Policy subcommittee	2021
2 nd Vice-Chair, Chair Policy subcommittee	2020
Member	2019 - present

The PAIC is charged with broadening AIChE's activities and providing consistent information flow to and from federal government representatives on technical issues where chemical engineering expertise is needed. This committee has significant government relations functions and leads AIChE initiatives on public policy at both the State and federal level, interacting with members of congressional delegation, house and senate committees, to provide scientific input into public policy decision-making. Under my leadership, we developed position statements on Process Safety and Advanced Manufacturing.

American Chemical Society, Committee on Environmental Improvement

Chair	2009 – 2011
Member	2006 – 2014
Associate	2003 – 2005

The Committee enhances awareness in response to challenges to sustainability for the chemical community and is also responsible for creating ACS policy on all issues of the environment. I promoted issues of sustainability throughout the Society, served as the lead author for the first sustainability statement, and led the development of a collaborative white paper addressing issues that created a barrier to the implementation of sustainable practice in industry.

American Chemical Society, Industrial and Engineering Chemistry Division

Councilor	2004 – 2018
I&EC Division Chair's sequence	2002 – 2004
Green Chemistry and Engineering Subdivision, Programming Chair	1999 – 2002

The I&EC Division of the ACS includes nearly 3500 members spread throughout the Country. As Chair, I brought together a strategic planning team that set the direction for the Division for the next five years. I represented the Division in several Society committees and was responsible for coordinating an Executive Committee of approximately 20 members. I led the Division to

recognition as one of the leading Divisions within the Society. After my service as Chair, I was elected a member of ACS Council, the main governing body for the professional society.

American Chemical Society, Multidisciplinary Program Planning Group

Chair, Meeting theme subcommittee	2014 - 2019
Immediate Past Chair	2018
Chair	2017
Executive committee, Member at large	2013 – 2014
Meeting Program Planning Group	2012 - 2019

To meet the informational and professional development needs of ACS members and meeting attendees more completely, ACS established the Multidisciplinary Program Planning Group (MPPG) to coordinate national meeting programming that emphasizes current critical scientific areas, particularly those with a multidisciplinary nature. As chair, I was responsible to select national meeting themes and their organizers. ACS meetings attract approximately 15,000 scientists from throughout the world to each national meeting.

Ohio Engineering Deans Council

Chair	2013 – 2014
Member	2007 - 2014

OEDC is a coordinating body for the 14 public and private engineering deans throughout the State of Ohio. OEDC works with the Ohio Board of Regents to develop policy that promotes quality engineering education throughout the State. As chair, I initiated discussion with the Ohio Business Roundtable to identify opportunities to work together on workforce issues that span technical training through post-graduate engineering. We worked with the Board of Regents to promote continued support for the Ohio Means Internships and Co-ops program and for increased support for infrastructure in support of STEM programs.

American Institute of Chemical Engineers Sustainable Engineering Forum

Chair	2006 – 2008
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The Sustainable Engineering Forum serves approximately 1000 members, developing programming and educational events that promote sustainability within the AIChE and the chemical engineering profession. We created a series of programs in support of the mission, including awards and education activities. As Chair, I also served on the Managing Board of the Institute for Sustainability.

American Institute of Chemical Engineers Student Activities Committee

Chair - Student Chapter Charters Subcommittee	1992 - 1993
First Vice-Chair, SCC	1993 - 1994
Chairman, SCC	1994 - 1995
Chairman - Annual Reports Subcommittee	1996 - 2000
ChemE Car Competition Rules Committee	1999 - 2003

This committee coordinated the activity of all student chapters throughout the country. As Chair, I initiated the ChemE Car competition, a new effort by the AIChE to bring notoriety to the society through student competitions. Having now passed its 20th year, this competition has evolved to become the premier event of the national student conference, pitting the winners from regional competitions against each other.

Consulting Activities

McAlister & Quinn, Washington, DC (Grant writing services)	2021 - present
InventorCloud, Youngstown, OH	2018 – 2020
Corning, S.A., Corning, N.Y.	2000 - 2001
Guild Associates, Baltimore, MD	1996 – 1998
Syntroleum GTG, Inc., Tulsa, OK	1993 – 1996
Airepair International, Inc., Tulsa, OK	1990 – 1992

Student Mentorship

Over my research career at three institutions, I was fortunate to be able to work with 29 undergraduate students, 26 master's students, 12 doctoral students, two post-doctoral students, and two visiting scientists on scholarly initiatives. Each contributed a unique and vital presence to our research and scholarship.

Undergraduate Research Projects

University of Tulsa:

1. Joe S. Horbath, "Detoxification of Pesticide-containing Wastewater through Acid Catalyzed Homogeneous Oxidation", B.S. 1990.
2. Christopher L. Phillips, "Kinetics of Formaldehyde Oxidation over Silver and Silver-Palladium Catalysts", B.S. 1990.
3. Frederick P. Ames, "Destruction of Plastic Wastes through Homogeneously Catalyzed Oxidation", B.S. 1992.
4. Catherine N. Dixon, "Direct Conversion of Methane to Methanol through Catalytic Oxidation in Supercritical Water, B.S. 1992.
5. Brenda J. Rush, "Operation of a Bubble Column Near the Critical Point of the Dispersed Phase", B.S. 1993.
6. Darin L. Rains, "Gas Holdup and Mass Transfer in a High Pressure Bubble Column", B.S. 1993.
7. Teresa Klindera, "Residence Time Distribution Studies in a Three-phase Monolith Reactor", B.S. 1994.
8. Judd Hollas, "Prediction of Catalytic Oxidation Kinetics for Mixtures", B.S., 1996.

University of Toledo:

9. Marty Goethman, "Carbonylation of Methanol to Methyl Acetate in Supercritical Carbon Dioxide", B.S., 1996.

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10. Amy Nelson, "Characterization of Nickel on Activated Carbon Catalysts", B.S. May 1999.
11. Alex Rosenbom, "Catalytic Wet Oxidation of Glucose as a Model of Solid Waste Resource Recovery for use in Long Term Human Space Missions", B.S. May 1999.
12. Timothy J. LaPlante, "Effect of Pressure on Heterogeneous Catalysis in Supercritical CO₂", B.S., May 2000.
13. Ellie Phelps, "Methanol Carbonylation using Palladium on Activated Carbon", B.S., May, 2001.
14. Bevan Lewis, "Hydrocarboxylation in supercritical CO₂ for production of adipic acid", B.S. December 2001.
15. Orin Hemminger, "Comparison of Hydroformylation in Organic and Supercritical Solvents", B.S. Dec. 2003.
16. Joe Bender, "Catalytic steam reforming of cyclohexane", Honor's Thesis research, B.S. Dec. 2003.
17. Brian Seger, "Kinetics of catalytic steam reforming of ethanol", Honor's Thesis research, B.S. Dec. 2003.
18. Kristen Hejduk, "The effect of CAFÉ standards on vehicle-generated pollution", OSGC scholarship, B.S. December 2004.
19. Marie Jardin, "Life cycle analysis of a utility pole", Urban Affairs Center research support program, B.S. December 2004.
20. Mike Vilt, "Catalytic steam reforming of ethanol to hydrogen", B.S. Dec. 2004.
21. Neil Schweitzer, "Green Engineering Modules for Reactor Design", Honor's Thesis research, B.S. Dec. 2004.
22. Amy Metz, "Kinetics of Glycerol Steam Reforming", Honor's Thesis research, B.S. Dec. 2007.
23. Lisa Gray, "Water Gas Shift Catalyst Evaluation", B.S., Dec. 2007
24. Kristen Bury, "Design of a Demonstration Program for a Backup Fuel Cell", B.S., Dec. 2009.

Youngstown State University:

25. Emily Renczewicz, "Process Modeling of the Compact Steam Reformer", B.E., May 2009.
26. Greg McCumber, "CO₂ Capture using sorbents supported on metal foil", B.E., May 2012.
27. Sean Gabriel, "Coating sorbents on metal foil for CO₂ capture", B.E., May 2014.
28. Jacob Miller, "Reforming Methanol as a source of hydrogen for fuel cells", B.E., May 2015.
29. Jeremy Hammond, "Environmental Implications of Additive Manufacturing", B.E. May 2016.

Other students:

30. Sara Murphy, "Modernizing the US Electric Grid: A Proposal to Update Transmission Infrastructure for the Future of Electricity", Washington Internships for Students in Engineering, University of Idaho, B.S. Chemical Engineering, May 2022.

*Masters Students*University of Tulsa

1. Deepak Sodhi, "Kinetics of Formaldehyde Oxidation over Platinum and Palladium Catalysts", M.S. 1989.
2. Sang-Yong Kim, "Development of a Novel Three-Phase Catalytic Reactor", M.S. Aug. 1991.
3. Jin-Chu Chen, "The Influence of Supercritical Water on Catalytic Reactor Design Parameters", M.S. Aug. 1991.
4. John E. Sawyer, "Kinetics and Mechanism of Ethyl Acetate Oxidation", M. Eng. May 1992.
5. Todd F. Brewer, "Methanol Oxidation Mechanism over Monolith-supported Palladium Catalyst", M.S. May 1992.
6. Narendra Borgharkar, "Catalytic Oxidation of Fixed Nitrogen Compounds", M.S. May 1993.
7. Sudhir Aki, "Corrosion during Supercritical Water Oxidation, M.Eng., December 1994.
8. Suresh Pisharody, "Supercritical Water Oxidation of Solid Particles" M.S. August 1995.
9. Teresa Jean Lechner-Fish, "Electrolytic Measurement of Moisture in Natural Gas", M.S. May 1996.
10. Shailesh Dangi, "Modelling Catalytic Oxidation Kinetics for a Mixture of Benzene and Ethanol", M.S. August 1996.
11. Merah Zoubida, "Catalytic Supercritical Water Oxidation: Kinetics of Ammonia Destruction", M.S. August 1996.
12. Vijay Dhakshinamoorthy, "Selective Catalytic Partial Oxidation in Supercritical Water", M.S. August 1996.
13. Alec A. Klinghoffer, "Catalytic Wet Oxidation of Particulate-containing Aqueous Wastestreams in a Novel Three Phase Reactor", M.S., May 1997 (Phillips Petroleum – Bartlesville, OK).

University of Toledo

14. Sonia Martinez, "Development of a Reaction and Transport Model for the Movement of MTBE in the Environment", M.S. May 1999.
15. Srinivas Dharmadhikari, "Hydroformylation of Propylene in Supercritical Carbon Dioxide", M.S. research completed May 1999 (no degree awarded).
16. Natarajan Sreekumar, "Kinetic Analysis of the Stability of Forging Lubricants", M.S., August 1999.
17. Trent Patrick, "Catalytic Wet Oxidation of Glucose Solutions", M.S., December 1999. (Owens Illinois, Los Angeles, CA)
18. Greg Snyder, "Heterogeneously catalyzed hydroformylation in supercritical carbon dioxide", M.S. Dec. 2000.
19. Andrew R. Tadd, "Catalyst Development for hydroformylation in supercritical carbon dioxide", M.S. August 2001. (University of Michigan, Chemical Engineering)

20. Ben Schutt, "Selective conversion of cellulosic wastes through catalytic oxidation in sub-critical water", M.S. August 2002. (Quality Environmental Professionals, Inc., Indianapolis, IN)
21. Timothy Tack, "Catalysis in confined spaces enhanced through supercritical fluid solvents", M.S. August 2003.
22. Angela Kleman, "Stereospecific hydroformylation using supported catalysts in supercritical CO₂", M.S. May 2005. (Dow Chemical, Freeport, TX)
23. Amanda McCoy, "Steam Reforming of Jet Fuel Simulants Using a Sulfur-Tolerant Catalyst", M.S. August 2006. (NexTech Materials, Columbus, OH)
24. Pradeep Kumar Sharma, "Methane steam reforming in a spiral stackable reactor", M.S. Dec. 2006 (Research Triangle Institute, RTP, NC).
25. Preshit Gawade, "Reaction Kinetics for Reforming of Fuel Simulants", M.S. Dec. 2007 (The Ohio State University).

Youngstown State University

26. Robert Sovesky, "Design and Construction of a reactor system for durability testing of steam reforming catalysis", M.S.E Dec. 2010. (Associate, K&L Gates)
27. Geetha Challa, Editorial Assistant for *Environmental Progress & Sustainable Energy*, M.S.E. May 2017 (Astellas Pharmaceuticals)
28. Derrick Houston, Editorial Assistant for *Environmental Progress & Sustainable Energy*, M.S.E. May 2019

Doctoral Students

University of Tulsa

1. Lei Jin, "The Influence of Supercritical Water on the Kinetics and Mechanism of 1,4-Dichlorobenzene Oxidation", Ph.D. Aug. 1991.
2. Lawrence Crynes, "Evaluation of a Novel Three Phase Monolithic Reactor, Ph. D. December 1993, with R.L. Cerro.
3. Zhong-Yi Ding, "Catalytic Supercritical Water Oxidation of Aromatic Compounds on Transition Metal Oxides", Ph. D. May, 1995. (Solutia Inc., Houston, TX)
4. John E. Sawyer, "The Oxidation of Volatile Organic Compounds on a Platinum-Alumina Catalyst", Ph.D. May 1995. (Rogers State University, Claremore, OK)
5. Thulasidas Chellppannair, "Fluid Dynamics in a Novel Three Phase Monolithic Reactor", Ph. D. May 1996, with R.L. Cerro. (BOC Gases, Allentown, PA)

University of Toledo

6. Sudhir N.V.K. Aki, "Catalytic Supercritical Water Oxidation: Mass Transfer and Solvation Effects in the Conversion of Nitrogen Containing Compounds" Ph.D. August 1998. (Invista – Sabine River, Orange, TX)
7. Andrei Merenov, "Development of a New Route for the Production of Acetic Acid from Synthesis Gas", Ph.D. December 1999. (Dow Chemical, Houston, TX).
8. Selma Bektesevic, "Analysis of heterogeneous catalysts for use hydroformylation of 1-hexene in supercritical carbon dioxide", Ph.D. August 2005 (Honeywell, Buffalo, NY).

9. Sandeep Goud, "Catalyst deactivation during steam reforming of higher hydrocarbons to hydrogen", Ph.D. May 2007 (SOFCO-EFS/Rolls Royce).
10. Sadashiv Swami, "Conversion of biomass-derived compounds to hydrogen for fuel cell applications", Ph.D. Dec. 2008 (Praxair, Buffalo, NY).
11. Atish Kataria, "Conversion of refined hydrocarbon fuels to hydrogen for fuel cell applications", Ph.D. Dec. 2009 (Research Triangle Institute, RTP, NC).
12. Satish Lakhapatri, "Fundamental evaluation of catalyst deactivation during steam reforming of diesel and jet fuel", Ph.D. Aug. 2010 (New Jersey Institute of Technology).

Post-Doctoral Associates

1. Dr. Ponnaiyan Ayyappan, "Development of sulfur-tolerant catalysts for hydrogen production by reforming of heavy fuels", 2006 – 2007 (Caterpillar, Inc.)
2. Dr. Rajender Kondakindi, "CO₂ capture by sorbents supported on metal foil", 2010 – 2012 (Watt Fuel Cell Corporation, New York).

Visiting Scientists

1. Dr. Benito Serrano, University of Zacatecas, Mexico, "Cellulose conversion to chemicals by catalytic oxidation in subcritical water", Summer 2000.
2. Dr. Peter Smith, Westminster University, Department of Chemistry, "Design of catalyst supports for diesel fuel steam reforming", 2009 – 2010.

External Examiner:

Ph.D. Thesis of Mr. Benito Serrano Rosales, Department of Chemical Engineering, University of Western Ontario, London, Ontario, Canada

Refereed Publications

Includes over 75 refereed publications and nearly 200 total publications, per Google Scholar. Many undergraduate and graduate students have been co-authors on these papers, which have generated nearly 4,000 citations and an h-index of 36, including 37 publications with more than 10 citations within the last five years.

1. Abraham, M.A., Klein, M.T.; "Pyrolysis of Benzylphenylamine Neat and with Tetralin, Methanol, and Water Solvents;" *I&EC Prod. Res. Dev.*; **24**(2), 300, 1985.
2. Abraham, M.A., Klein, M.T.; "Solvent Effects during the Reaction of Coal Model Compounds" in **Supercritical Fluids: Chemical Engineering Principles and Applications**, Squires, T.G. and Paulaitis, M.E., eds.; ACS Symposium Series 329, 1987.
3. Townsend, S.H., Abraham, M.A., Huppert, G.L.; Klein, M.T., Paspek, S.C.; "Solvent Effects during Reactions in Supercritical Water", *I&EC Research*, **27**(1), 1988, pp. 143-9.
4. Abraham, M.A., Wu, B.C., Paspek, S.C., Klein, M.T.; "Reactions of Dibenzylamine Neat and in Supercritical Fluid Solvents", *Fuel Sci. & Technol.*, **6**(5), 557, 1988.
5. Abraham, M.A., Klein, M.T.; "Reactions of Benzylphenylsulfide in Dense Polar Solvents", *Fuel Sci. & Technol.*, **6**(6), 633, 1988.

6. Leavitt, D.D., Abraham, M.A.; "Homogeneous Oxidation of 2,4-Dichlorophenoxyacetic Acid by Ammonium Nitrate", *Environ. Sci. Technol.*, **24**(4), 566, 1990.
7. Sodhi, D., Abraham, M.A., Summers, J.C.; "Control of Formaldehyde Emissions from Methanol Fueled Vehicles", *J. Air Waste Manage. Assoc.*, **40**(3), 352, 1990.
8. Leavitt, D.D., Horbath, J.S., Abraham, M.A.; "Homogeneously Catalyzed Oxidation for the Destruction of Aqueous Organic Wastes", *Environ. Progress*, **9**(4), 222, 1990.
9. Jin, L., Shah, Y.T., Abraham, M.A.; "The Effect of Supercritical Water on the Catalytic Oxidation of 1,4-Dichlorobenzene", *J. Supercritical Fluids*, **3**(4), 233, 1990.
10. Jin, L., Abraham, M.A.; "Low Temperature Catalytic Oxidation of 1,4-Dichlorobenzene", *Ind. Eng. Chem. Research*, **30**(1), 89, 1991.
11. Jin, L.; Ding, Z., Abraham, M.A.; "Catalytic Supercritical Water Oxidation of 1,4-Dichlorobenzene", *Chem. Eng. Sci.*, **47**(9-11), 2659, 1992.
12. Rush, B.J.; Shah, Y.T.; Abraham, M.A.; "The Effect of Gas Density on Holdup in a Supercritical Fluid Bubble Column", in **Supercritical Fluid Engineering Science**, E. Kiran and J.F. Brennecke, eds., ACS Symposium Series 514, 338-346, 1992.
13. Dixon, C.N., Abraham, M.A.; "Conversion of Methane to Methanol by Catalytic Supercritical Water Oxidation", *J. Supercritical Fluids*, **5**(4), 269, 1992.
14. Chen, J.C., Shah, Y.T., Abraham, M.A. "Liquid Phase Axial Dispersion in a High Pressure Packed Column", *Chem. Eng. Comm.*, **125**, 1-12, 1993.
15. Brewer, T.F., Abraham, M.A., Silver, R.G. "Mixture Effects and Methanol Oxidation Kinetics over a Palladium Monolith Catalyst", *Ind Eng Chem Res*, **33**(3), 526, 1994.
16. Fisher, J.W., Abraham, M.A. "Particle Size Effect on Supercritical Water Oxidation - Polystyrene Beads", *SAE Technical Paper* 941399, 1994.
17. Sawyer, J.E., Abraham, M.A. "Reaction Pathways during the Oxidation of Ethyl Acetate on a Platinum/Alumina Catalyst", *Ind Eng Chem Res*, **33**(9), 2084, 1994.
18. Aki, S.N.V.K., Abraham, M.A. "Catalytic Partial Oxidation of Methane in Supercritical Water", *J. Supercritical Fluids*, **7**(4), 259, 1994.
19. Borgharkar, N.S., Abraham, M.A. "Monomethylamine Oxidation over Palladium Catalysts", *Chem. Eng. Sci.*, **49**(24A), 4501-4513, 1994.
20. Crynes, L.E., Cerro, R.L., Abraham, M.A. "The Monolith Slug Flow Reactor: Development of a Novel Three-Phase Catalytic Reactor", *AIChE J.*, **41**(2), 337, 1995.
21. Thulasidas, T.C., Abraham, M.A., Cerro, R.L. "Bubble-Train Flow in Capillaries of Circular and Square Cross Section", *Chem. Eng. Sci.*, **50**, 183, 1995.
22. Patrick, R.H., Jr., Klindera, T., Crynes, L.L., Cerro, R.L., Abraham, M.A. "Residence Time Distribution in a Three Phase Monolith Reactor", *AIChE J.*, **41**(3), 649, 1995.
23. Thulasidas, T.C., Cerro, R.L., Abraham, M.A. "The Monolith Froth Reactor: Residence Time Modeling and Analysis" *Trans IChemE*, **73**(A), 314, 1995.
24. Ding, Z.Y., Aki, S., Abraham, M.A. "Catalytic Supercritical Water Oxidation: An Approach for Complete Destruction of Aromatic Compounds", in **Innovations in Supercritical Fluids: Science and Technology**, Hutchenson, K.; Foster, N.R., eds., ACS Symposium Series No. 608, pp. 234-247, 1995.

25. Ding, Z.Y., Aki, S.N.V.K., Abraham, M.A. "Catalytic Supercritical Water Oxidation: Phenol Conversion and Product Selectivity", *Environ. Sci. & Technol.*, 29(11), 2748, 1995.
26. Shah, Y.T., Abraham, M.A., Cerro, R.L., "Oxidation of Phenol in a Three-Phase Monolithic Froth Reactor", Ch. 7 in **Three Phase Sparged Reactors**, Nigam, K.D.P. and Schumpe, A., eds., Gordon and Breach Science Publishers, Reading, UK, 1996.
27. Aki, S.N.V.K., Ding, Z.Y., Abraham, M.A. "Catalytic Supercritical Water Oxidation: Stability of Cr₂O₃ Catalyst", *AIChE J.*, 42(7), 1995, 1996.
28. Pisharody, S., Fisher, J.W., Abraham, M.A. "Conversion of Solid Wastes by Supercritical Water Oxidation", *Ind Eng Chem Res*, 35(12), 4471, 1996.
29. Dangi, S., Abraham, M.A. "Study of Mixture Effects during Complete Catalytic Oxidation of Benzene and MTBE", *Ind Eng Chem Res*, 36(6), 1979, 1997.
30. de Tezanos Pinto, M., Abraham, M.A. and Cerro, R.L. "How do bubbles enter a capillary?", *Chem. Eng. Sci.*, 52(11), 1685, 1997.
31. Aki, S.N.V.K., Abraham, M.A. "Catalytic Supercritical Water Oxidation of Pyridine: Kinetics and Mass Transfer Effects", in **Supercritical Fluids: Extraction and Pollution Prevention**, Abraham, M.A.; Sunol, A.K., eds., ACS Symposium Series 670, 232, 1997.
32. Thulasidas, T.C., Abraham, M.A., Cerro, R.L. "Flow Patterns in Liquid Slugs during Bubble-Train Flow inside Square Capillaries", *Chem. Eng. Sci.*, 52(17), 2947, 1997.
33. Klinghoffer, A.A., Cerro, R.L., Abraham, M.A. "Catalytic Wet Oxidation of Acetic Acid using Platinum on Alumina Monolith Catalyst", *Catalysis Today*, 40(1), 59-72 (1998).
34. Klinghoffer, A.A., Cerro, R.L., Abraham, M.A. "Influence of Flow Properties on the Performance of the Monolith Froth Reactor for Catalytic Wet Oxidation of Acetic Acid", *Ind & Eng Chem Res*, 37(4), 1203, (1998).
35. Merenov, A.S., Abraham, M.A. "Catalyzing the Carbonylation of Methanol using a Heterogeneous Vapor Phase Catalyst", *Catalysis Today*, 40 (4), (1998), 397.
36. Aki, S.N.V.K., Abraham, M.A. "An Economic Evaluation of catalytic supercritical water oxidation: Comparison with alternative waste treatment technologies", *Environ Progress*, 17(4) (1998), 246.
37. Thulasidas, T.C., Abraham, M.A., Cerro, R.L. "Dispersion during Bubble-Train Flow in Capillaries", *Chem. Eng. Sci.*, 54(1) 61 (1999).
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40. Merenov, A.S., Nelson, A., Abraham, M.A. "The Effect of Support on the Activity and Stability of Ni/Activated Carbon as a Catalyst for Vapor Phase Methanol Carbonylation" *Catalysis Today*, 55, 91, (2000).
41. Hesketh, R.P., Abraham, M.A. "Pollution Prevention Education in Chemical Reaction Engineering", in **Reaction Engineering in Pollution Prevention**, Martin A. Abraham and Robert P. Hesketh, eds, Elsevier Science, New York, 305, (2000).
42. Natarajan, S., Olson, W.W., Abraham, M.A. "Reaction Pathways and Kinetics in the Degradation of Forging Lubricants", *Ind. Eng. Chem. Res.*, 39(8), 2837, (2000).

43. Abraham, M.A. "A Pollution Prevention Course that helps meet EC 2000 objectives", *Chem. Eng. Educ.*, **34**(3) 272 (2000).
44. Dharmidhikari, S., Abraham, M.A. "Rhodium supported on activated carbon as a heterogeneous catalyst for hydroformylation of propylene in supercritical carbon dioxide", *J. Supercritical Fluids*, **18**(1), 1 (2000).
45. Patrick, T.A., Abraham, M.A. "Evaluation of a monolith-supported Pt/Al₂O₃ catalyst for wet oxidation of carbohydrate-containing waste streams", *Environ. Sci. Technol.*, **34** (16), 3480 - 3488, (2000).
46. Snyder, G., Tadd, A., Abraham, M.A. "Evaluation of Catalyst Support Effects during Rhodium-catalyzed Hydroformylation in Supercritical CO₂" *Ind. Eng. Chem. Res.*, **40**(23), 5317-5325 (2001).
47. Schutt, B.D., Serrano, B., Cerro, R.L., Abraham, M.A. "Production of chemicals from cellulose and biomass-derived compounds through catalytic sub-critical water oxidation in a monolith reactor", *Biomass & Bioenergy*, **22**(5), 365-375 (2002).
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49. Hemminger, O., Marteel, A., Mason, M. R., Davies, J. A., Tadd, A. R., Abraham, M.A. "Hydroformylation of 1-hexene in supercritical carbon dioxide using a heterogeneous rhodium catalyst. 3. Evaluation of solvent effects" *Green Chemistry*, 2002, **4**, 507-512.
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51. Tadd, A. R., Marteel, A., Mason, M. R., Davies, J. A., Abraham, M.A. "Hydroformylation of 1-Hexene in Supercritical Carbon Dioxide Using a Heterogeneous Rhodium Catalyst. 1. Effect of Process Parameters", *J. Supercritical Fluids*, 2003, **25**(2): 183-196.
52. Marteel, A., Davies, J. A., Mason, M. R., Abraham, M.A. Tack, T., Bektesevic, S., "Supported platinum/tin complexes as catalysts for hydroformylation of 1-hexene in supercritical carbon dioxide" *Catalysis Communications*, 2003, **4** (7), 309-314.
53. Marteel, A., Davies, J.A., Olson, W.W., Abraham, M.A. "Green Chemistry and Engineering: Drivers, Metrics, and Reduction to Practice" **Annu. Rev. Environ. Resour.** 2003, 28:401-28.
54. Tack, T., Marteel, A., Bektesevic, S., Davies, J. A., Mason, M. R., Abraham, M.A. "Hydroformylation of 1-Hexene in Supercritical Carbon Dioxide: Characterization, Activity and Regioselectivity Studies", *Environ. Sci. Technol.*, 2003, **37** (23): 5424-5431.
55. Abraham, M.A., Nguyen, N. "Results from the Sandestin Conference: Green Engineering: Defining the Principles" *Environ. Prog.*, 2003, **22**(4): 233 - 236.
56. Schutt, B.D., Abraham, M.A. "Evaluation of a monolith reactor for the catalytic wet oxidation of cellulose" *Chem. Eng. J.*, 2004, **103**(1-3): 77-88.
57. Abraham, M.A. "Sustainable Engineering: An initiative for chemical engineers", *Env. Prog.* 2004, **23**(4): 261-263.

58. Bektesevic, S., Tack, T., Mason, M.R., Abraham, M.A. "Analysis of the Hydroformylation Reaction over an Immobilized Catalyst in Supercritical Carbon Dioxide" *Ind. Eng. Chem. Res.*, 2005, **44**, 4973-4981.
59. Kleman, A.M., Abraham, M.A., "Asymmetric Hydroformylation of Styrene in Supercritical Carbon Dioxide", *Ind. Eng. Chem. Res.*, 2006, **45**, 1324-1330.
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61. Swami, S., Abraham, M.A., An Integrated Catalytic Process for Conversion of Biomass to Hydrogen", *Energy & Fuels*, 2006, **20** (6), 2616 -2622.
62. Slater, C. Stewart, Hesketh, Robert P., Fichana, Daniel, Henry, Jim, Flynn, Ann Marie, Abraham, Martin, "Expanding the Frontiers for Chemical Engineers in Green Engineering Education " *Int. J. Engng Ed.* 2007 **23**(2), 309-324.
63. Goud, S., Whittenberger, W.A., Abraham, M.A., "An evaluation of catalyst deactivation for steam reforming of diesel fuel", *International Journal of Hydrogen Energy*, 2007, **32**(14), 2868-2874.
64. McCoy, A. M., Duran, M. J., Azad, A-M., Chattopadhyay, S., Abraham, M.A., "Performance of sulfur tolerant reforming catalysts for production of hydrogen from jet fuel simulants", *Energy & Fuels*, **21** (6), 3513–3519, 2007.
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66. Azad, A.M., Duran, M.J., McCoy, A.K., Abraham, M.A., "Development of ceria-supported sulfur tolerant nanocatalysts: Pd-based formulations", *Appl Catal A. – Gen'l*, **332** (2): 225-236, 2007.
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68. Swami, S.M., Chaudari, V., Kim, D.S., Sim, S.J., Abraham, M.A., ""Production of hydrogen from glucose as a biomass simulant: Integrated biological and thermochemical approach", *I&EC Research*, **47**(10): 3645-3651, 2008.
69. Satterfield, M.; Kolb, Charles; Peoples, Robert; Adams, Georjean; Schuster, Darlene; Ramsey, Henry; Stechel, Ellen B.; Wood-Black, Frankie; Garant, Raymond, Abraham, Martin; "Overcoming Nontechnical Barriers to the Implementation of Sustainable Solutions in Industry", *Environ Sci & Technol.*, **43**(12), 4421 – 4426, 2009.
70. Lakhapatri, S., Abraham, M.A., "Deactivation due to sulfur poisoning and carbon deposition on Rh-Ni/Al₂O₃ catalyst during steam reforming of sulfur-doped n-hexadecane" *Appl Catal A: General*, **364**(1-2), 113-121, 2009.
71. Gawade, Preshit, Lipscomb, G. Glenn, Abraham, Martin A. "Kinetics and Modeling of the Flexible Fuel Reformer: n-Hexadecane Steam Reforming and Combustion" *Ind. & Eng. Chem. Research*, **49**(15), 6931-40, 2010.

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75. Lakhapatri, S., Abraham, M.A., “Sulfur Poisoning in Rh-Ni Catalysts during Steam Reforming of Sulfur-containing Liquid Fuels”, *Catal. Sci. Technol.*, **3** (10), 2755 – 2760, 2013.
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Books and Editorships

1. **Supercritical Fluids: Extraction and Pollution Prevention**, Martin A. Abraham and Aydin K. Sunol, eds., ACS Symposium Series 670, Washington, DC, 1997.
2. *Catalysis Today*, **40**(1), (1998) Special issue on Environmental Catalysis and Reaction Engineering (based on papers at the 1996 AIChE Annual meeting), with P. Smirniotis.
3. *Environmental Progress*, special issue on Environmental Applications of Supercritical Fluids (based on papers at the 1997 AIChE Annual meeting), Winter 1998.
4. **Reaction Engineering in Pollution Prevention**, Martin A. Abraham and Robert P. Hesketh, eds., Elsevier Science, New York, ISBN: 0-444-50215-7 (2000).
5. **Clean Solvents: Alternative Media for Chemical Reactions and Processing**, Martin A. Abraham and Luc Moens, eds., ACS Symposium Series 819, Oxford University Press, Washington, DC, 2002.
6. *Environmental Progress*, special issue on Sustainability in Chemical Engineering (based on papers at the 2003 AIChE Annual meeting), **23**(4), December 2004.
7. **Sustainability Science and Engineering: Defining Principles**, Elsevier Science, Amsterdam, The Netherlands, ISBN: 0-444-51712-X (2005).
8. **Innovations in Industrial and Engineering Chemistry: A Century of Achievements and Prospects for the New Millennium**, W. Flank, M.A. Abraham, and M. Matthews, eds., ACS Symposium Series 1000, Washington, DC 2008.

9. **Green Chemistry and Engineering: A Pathway to Sustainability**, Anne E. Marteel-Parrish, Martin A. Abraham, AIChE/Wiley Books, ISBN: 978-0-470-41326-5, (2014).
10. **Encyclopedia of Sustainable Technologies**, 1st edition, Martin A. Abraham, editor, Elsevier Major Reference works, ISBN: 9780128046777, July 28, 2017.

Additional Publications

1. Lawson, J.R., Obst, J.R., Abraham, M.A., Townsend, S.H., Klein, M.T.; "Solvent Effects During the Reaction of Coal and Biomass Model Compounds in Dense Water", ACS Div. of Fuel Chemistry preprints; **30**(1), 398, 1985.
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7. Abraham, M.A. "Fluid-Solid Interactions during Reactions in Supercritical Water", *Emerging Technologies in Hazardous Waste Management V*, American Chemical Society, 304, 1993.
8. Borgharkar, N.S., Al-Mehairi, A.S., Abraham, M.A. "Catalytic Oxidation of Monomethylamine: Kinetics and Effect of Water Vapor", Proceedings of the International Petroleum Environmental Conference, PennWell Books, p. 8, 1994.
9. "Catalytic Supercritical Water Oxidation: Pathways, Kinetics, and Modeling", First International Workshop on Supercritical Water Oxidation, *Supercritical Water Oxidation: A Revolutionary Environmental Technology*, Jacksonville, FL, February 6-9, 1995, with S.N.V.K. Aki and Z.Y. Ding.
10. "Catalytic Supercritical Water Oxidation: Destruction of Nitrogen Containing Compounds", Proceedings of the Second International Symposium on Environmental Applications of Advanced Oxidation Technologies, San Francisco, CA., 1996, with S.N.V.K. Aki and Z. Merah.
11. "Heterogeneously Catalyzed Hydroformylation of Propylene in Supercritical Carbon Dioxide", 3rd Annual Green Chemistry and Engineering Conference, Washington, DC, June 29 – July 1, 1999, with G. Snyder and S. Dharmidhikari, p. 91.
12. "When is Green Really Green? A Pilot Investigation of Time Effects using LCA Data", SAE 2000-01-1494, SAE Total Life Cycle Conference, April 26-28, 2000, with W. W. Olson.

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15. Book Review: "Pollution Prevention: Fundamentals and Practice", *J. Haz. Mater.* **77**(1-3), 262 – 265.
16. "Development of Heterogeneous Catalysts for Hydroformylation of 1-Hexene in Supercritical Carbon Dioxide", 5th Annual Green Chemistry and Engineering Conference, Washington, DC, June 26 – 28, 2001, with A. R. Tadd, A. Marteel, J.A. Davies, and M.R. Mason.
17. "Green Engineering Education: Multiple Audiences – Multiple Presentations", Proceedings of Green Engineering: Sustainable and Environmentally Conscious Engineering, VPI&SU, Roanoke, VA, July 29 – 31, 2001.
18. "Surface Analysis of a Heterogeneous Catalyst Designed for Hydroformylation in Supercritical CO₂", A. Marteel, J. Davies, M. Mason, S. Bektesevic, and M. Abraham, Proceedings of the 4th International Symposium on High Pressure Technology and Chemical Engineering, Sept. 22 – 25, 2002, Venice, Italy, Vol. 2, p. 549 – 555.
19. R. Parab, A. Heydinger, A. Kumar, and M. A. Abraham, "A Pilot Study to Estimate Application of Atrazine on Areas near Auglaize River using AERMOD/BASINS", Paper # OS-02-26, Proceedings of Ohio Air Pollution Research Symposium, 2002.
20. Abraham, M.A. "Sustainable engineering for engineers", *Environmental Progress*, 2005, **24**(1), 10 – 11.
21. Abraham, M.A., "Energy, sustainability, and engineering", *Environmental Progress*, 2005, **24**(2), 119 – 120.
22. Abraham, M.A., "The importance of China for sustainable development", *Environmental Progress*, 2005, **24**(3), 231 - 233.
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29. Abraham, M.A., Clark, J., and Winterton, N., Chapter 1: *Introduction*, in **Green Chemistry Metrics: Measuring and Monitoring Sustainable Processes**, Lapkin, A., and Constable, D., eds., Wiley-Blackwell Publishing, ISBN 978-1-4051-5968-5, 2009.
30. Abraham, M.A., "YSU's STEM College – Is this what an urban research university looks like?", *The Vindicator*, March 7, 2010
31. Abraham, M.A. "Energy: Our No. 1 challenge", *The Vindicator*, January 8, 2012.
32. "Assessment of Supercritical Water Oxidation System Testing for the Blue Grass Chemical Agent Destruction Pilot Plant", National Research Council of the National Academies, Division on Engineering and Physical Sciences, The National Academies Press, 2013.
33. Abraham, M.A. "Beware attack on fossil fuel", *The Vindicator*, February 9, 2015.
34. Abraham, M.A., "Introduction to the special section on thermochemical conversion of biomass resources", *Env. Prog. Sust. Energy* 2017, 36(3), 654.
35. Abraham, M.A., "Introduction to the special section on the food, energy, water nexus", *Env. Prog. Sust. Energy* 2018, 37(1), 20.
36. Abraham, M.A., "Introduction to the special section on carbon dioxide", *Env. Prog. Sust. Energy* 2019, 38(1), 12.
37. Gayle J. Gibson and Martin Abraham, "Building Blocks for Contributing to Public Affairs Within AIChE", *Chemical Engineering Progress*, Jan 2022.

Patents and Filings

1. Azad, A-M., Abraham, M.A., "Sulfur-Tolerant Catalysts and Sulfur Sorbents" Provisional Patent Application, filed February 21, 2007.
2. Abraham, M.A. "Formula for six novel sulfur-tolerant catalysts", trade secret licensed to Catacel Corp, Nov. 2008.
3. Abraham, M.A., Kondakindi, Rajender, Aleksic, S., Whittenberger, W.A. "CO₂ Capture Using Sorbents Supported on Structures", Provisional Patent application filed March 2012.

Presentations

Nearly 150 technical presentations completed at national and international meetings, many of which were presented by undergraduate and graduate student researchers. As the faculty mentor, I coached these students in the development of the presentation, preparing them for a successful career.

1. "Reactions in and with Supercritical Fluid Solvents" AIChE Annual Meeting, Miami Beach, FL, Nov. 6, 1986, with M.T. Klein, S.H. Townsend, and S.C. Paspek.
2. "Supercritical Fluid Solvation of Polar Transition States;" AIChE Annual Meeting, Miami Beach, FL, Nov. 6, 1986, with M.T. Klein, S.H. Townsend, and S.C. Paspek.
3. "Modelling the Thermal Reactions of Benzylphenylsulfide", 1987 ACS Fall National Meeting, New Orleans, LA; September 1, 1987, with M.T. Klein.
4. "Destruction of Hazardous Wastes by Catalyzed Chemical Oxidation", AIChE 1988 Spring National Meeting, New Orleans, LA, March, 1988, with D.D. Leavitt.

5. "Destruction of Toxic Wastes through Catalytic Oxidation in Superphosphoric Acid", Hazardous Waste Research Conference, Manhattan, KS, May 25, 1988, with D.D. Leavitt.
6. "Automobile Emission - Changes in Fuels and Catalysts", AIChE Annual meeting, Washington, DC, December 1, 1988, with D. Sodhi and J.C. Summers.
7. "Oxidant and Solvent Effects in the Homogeneous Oxidation of Pesticide-containing Wastewaters", AIChE National Meeting, April 2-6, 1989, Houston, TX; with J.S. Horbath and D.D. Leavitt.
8. "Catalytic Oxidation of Dichlorobenzene in Supercritical Fluid Solvents", Industrial & Engineering Chemistry Division Symposium of the American Chemical Society, Atlanta, GA, May 1-4, 1989; Conference on Hazardous Waste Research, May 23, 1989, Manhattan, KS; with L. Jin.
9. "New Methods in Automobile Emissions Control", Conference on Hazardous Waste Research, May 23, 1989, Manhattan, KS, with D. Sodhi.
10. "Destruction of 1,4-Dichlorobenzene through Heterogeneous Catalytic Reaction at Low Temperature", AIChE Annual Meeting, November 10, 1989, San Francisco, CA.
11. "Catalytic Oxidation of Chlorinated Organics in Supercritical Fluid Solvents", AIChE Spring National Meeting, March 20, 1990, Orlando, FL.
12. "A Comparison of Several Novel Catalysts for Emissions Control in Methanol-Fueled Vehicles", IECEC 25, August 17, 1990, Reno, NV.
13. "Heterogeneous Catalysis in Supercritical Water: Oxidation of 1,4-Dichlorobenzene", AIChE Annual Meeting, November 14, 1990, Chicago, IL.
14. "Operation of a Bubble Column Near the Critical Point of the Dispersed Phase", AIChE Annual Meeting, November 14-15, 1990, Chicago, IL, with B.J. Rush and Y.T. Shah.
15. "Three-Phase Catalytic Oxidation of Phenol in a Monolithic Slug-Flow Reactor", AIChE Annual Meeting, November 13, 1990, Chicago, IL, with S. Kim, J. Papa, Y.T. Shah, and R.L. Cerro.
16. "Measurement of Rate Parameters above the Critical Pressure of Water", 2nd International Symposium of Supercritical Fluids, May 21, 1991, Boston, MA, with J. C. Chen and Y. T. Shah.
17. "Methanol, Carbon Monoxide, and Propylene Oxidation over Alumina-supported Palladium Catalysts", Hazardous Waste Research Conference, May 30, 1991, Manhattan KS, with T. F. Brewer.
18. "A Determination of Rate Parameters during Heterogeneous Catalysis in Supercritical Fluids", 4th World Congress of Chemical Engineering, June 17, 1991, Karlsruhe, Germany, with J. C. Chen and Y. T. Shah.
19. "Aqueous Phase Oxidation of Phenol in a Monolithic Reactor", AIChE National Meeting, Pittsburgh, PA, August 21, 1991, with S. Kim, R.L. Cerro, and Y.T. Shah.
20. "Selective Partial Oxidation of Methane by Catalytic Supercritical Water Oxidation", 4th Chemical Congress of North America and 202nd ACS National Meeting, New York, NY, August 29, 1991, with C.N. Dixon.

21. "Combustion Byproducts of Ethyl Acetate over Pt-Alumina Catalyst", 4th Chemical Congress of North America and 202nd ACS National Meeting, New York, NY, August 30, 1991, With J.E. Sawyer.
22. "Kinetics of Methanol Combustion on Palladium Monolith Catalyst", 4th Chemical Congress of North America and 202nd ACS National Meeting, New York, NY, August 30, 1991, with T.F. Brewer and R.L. Silver.
23. "Evaluation of Support Formulations for Automotive Emissions Control", AIChE Annual Meeting, Los Angeles, CA, November 16-22, 1991, with T.F. Brewer, A. Chirkis, and R.G. Silver.
24. "Recruitment and Retention Programs of the AIChE at the University of Tulsa", AIChE Annual Meeting, Los Angeles, CA, November 16-22, 1991, with B.J. Rush and R.P. Hesketh.
25. "Mass Transfer and Chemical Reaction in a Monolith Foam Reactor", AIChE Annual Meeting, Los Angeles, CA, November 16-22, 1991, with J. Papa and R.L. Cerro.
26. "Mass Transfer and Reaction during Catalytic Supercritical Water Oxidation", AIChE Annual Meeting, Los Angeles, CA, November 16-22, 1991, with J.C. Chen and Z. Ding.
27. "Holdup and Mass Transfer in a Supercritical Fluid Bubble Column", AIChE Annual Meeting, Los Angeles, CA, November 16-22, 1991, with B.J. Rush and Y.T. Shah.
28. "Analysis of Palladium Catalysts for Methanol Fuel Applications", ACS National Meeting, San Francisco, CA, April 5-9, 1992, with T.F. Brewer and R.G. Silver.
29. "Development of a Novel Three-Phase Reactor", AIChE Annual Meeting, Miami Beach, FL., Nov. 6, 1992, with L. Crynes and R.L. Cerro.
30. "Catalytic Supercritical Water Oxidation of Aromatic Compounds", International Symposium of Chemical Reaction Engineering 12, Torino, Italy, June 30, 1992, with Z. Ding and S. Aki.
31. "Catalytic Supercritical Water Oxidation: Kinetics of 1,4-Dichlorobenzene Oxidation over V_2O_5 ", AIChE Annual Meeting, Miami Beach, FL., Nov. 4, 1992, with Z. Ding.
32. "Palladium Catalyzed Oxidation of Monomethylamine", 205th ACS National Meeting, Denver, CO., April 2, 1993, with N. Borgharkar.
33. "Fluid Solid Interactions during Reactions in Supercritical Water", I&EC Special Symposium, Emerging Technologies in Hazardous Waste Remediation V, Atlanta, GA., September 27, 1993.
34. "Reaction Pathways During the Oxidation of Ethyl Acetate on a Palladium-Alumina Catalyst", AIChE 1993 Annual Meeting, St. Lous, MO, November 11, 1993, with J. Sawyer.
35. "Analysis of a Novel Three Phase Catalytic Monolith Reactor for Wastewater Treatment", AIChE 1993 Annual Meeting, St. Lous, MO, November 11, 1993, with L. L. Crynes and R. L. Cerro.
36. "Particle Size Effect on Supercritical Water Oxidation - Polysterene Beads", 24th International Conference on Environmental Systems, Friedrichshafen, Germany, June 21, 1994, with J. Fisher.

37. "Catalytic Supercritical Water Oxidation: Phenol Conversion and Product Selectivity", The First International Conference on Advanced Oxidation Technologies for Water and Air Remediation, London, Ontario, Canada, June 29, 1994, with S. Aki and Z. Ding.
38. "Monomethylamine Oxidation over Palladium Catalysts", ISCRE 13, Baltimore, MD, September 26, 1994, with N.S. Borgharkar and A.S. Al-Mehairi.
39. "Supercritical Water Oxidation of Aromatic Compunds on MnO₂/CeO Catalyst", Third International Symposium on Supercritical Fluids, Strasbourg, France, October 18, 1994, with S. Aki and Z. Ding.
40. "Catalytic Oxidation of Nitrogen Containing Compounds", AIChE Annual Meeting, San Francisco, CA, November 16, 1994, with A. S. Al-Mehairi.
41. "Catalytic Supercritical Water Oxidation: Phenol Conversion and Product Selectivity", AIChE Annual Meeting, San Francisco, CA, November 16, 1994, with Z. Ding and S. Aki.
42. "Gas and Liquid Residence Time Distribution in Monolith Froth Reactors", AIChE Annual Meeting, San Francisco, CA, November 17, 1994, with T.C. Thulasidas, and R.L. Cerro.
43. "Catalytic Supercritical Water Oxidation: Pathways, Kinetics, and Modeling", First International Workshop on Supercritical Water Oxidation, *Supercritical Water Oxidation: A Revolutionary Environmental Technology*, Jacksonville, FL, February 6-9, 1995, with S.N.V.K. Aki and Z.Y. Ding.
44. "The Monolith Froth Reactor: Residence Time Modeling and Analysis", 2nd International Conference on Gas-Liquid-Solid Reactor Engineering, Cambridge, England, March 27-29, 1995, with T.C. Thulasidas and R.L. Cerro.
45. "Towards the Prediction of Conversion during Catalytic Oxidation over Platinum", 14th North American Meeting of the Catalysis Society, Snowbird, UT, June 12, 1995, with J.E. Sawyer.
46. "Catalytic Liquid Phase Oxidation of Acetic Acid in a Monolith Froth Reactor", World Environmental Congress, London, Ontario, Canada, September 20, 1995, with A. A. Klinghoffer and T.C. Thulasidas.
47. "Evaluating Mixture Effects During Gas Phase Complete Oxidation of Benzene and MTBE", AIChE Annual Meeting, Miami Beach, FL, November 14, 1995, with D. Shailesh.
48. "Catalytic Supercritical Water Oxidation for the Partial Oxidation of Heavy Hydrocarbons", AIChE Annual Meeting, Miami Beach, FL, November 15, 1995, with V. Dhakshinamoorthy.
49. "Catalytic Supercritical Water Oxidation: Destruction of Nitrogen Containing Compounds", Second International Symposium on Environmental Applications of Advanced Oxidation Technologies, San Francisco, CA., February 28, 1996, with S.N.V.K. Aki and Z. Merah.
50. Catalytic Supercritical Water Oxidation: Destruction of Nitrogen Containing Compounds", 211th American Chemical Society National Meeting, New Orleans, LA, March 28, 1996, with S.N.V.K. Aki.

51. "Catalytic Supercritical Water Oxidation for Remediation of Wastewater", Emerging Technologies in Hazardous Waste Management VIII, Division of Industrial and Engineering Chemistry, American Chemical Society, Birmingham, AL, Sept. 9, 1996, with S.N.V.K. Aki.
52. "Aqueous Phase Oxidation of Acetic Acid Using a Platinum Monolith Catalyst", Emerging Technologies in Hazardous Waste Management VIII, Division of Industrial and Engineering Chemistry, American Chemical Society, Birmingham, AL, Sept. 11, 1996, with R.L. Cerro, and A.A. Klinghoffer.
53. "Catalytic Supercritical Water Oxidation: Pyridine Kinetics and Mass Transfer", AIChE Annual Meeting, Chicago, IL, Nov. 13, 1996, with S.N.V.K. Aki.
54. "A Comparison of Heterogeneous Catalysts for use in Supercritical Water Oxidation", International Symposium on Supercritical Fluids, Sendai, Japan, May 15, 1997, with S.N.V.K. Aki.
55. "Development of Novel Catalysts for Vapor Phase Carbonylation of Methanol", Engineering Foundation Conference: Chemical Reactor Engineering for Sustainable Processes, Banff, Alberta, Canada, June 11, 1997, with A.S. Merenov.
56. "Catalytic Supercritical Water Oxidation of Pyridine", AOTs-4, Orlando, FL, September 24, 1997, with S.N.V.K. Aki.
57. "Development of Novel Catalysts for Vapor Phase Carbonylation of Methanol", AIChE Annual Meeting, Los Angeles, CA, Nov. 17, 1997, with A. S. Merenov.
58. "Catalyst Development for Supercritical Water Oxidation" AIChE Annual Meeting, Los Angeles, CA, Nov. 21, 1997, with S. N. V. K. Aki.
59. "Heterogeneous Catalyst Development for CO Insertion Reactions" Green Chemistry Gordon Conference, Kimball Union Academy, Meriden, NH, August 19, 1998.
60. "Kinetics of Heterogeneous Catalysis during Supercritical Water Oxidation", International Symposium on Chemical Reaction Engineering 15, Newport Beach, CA, September 14, 1998, with S. N. V. K. Aki.
61. "Catalytic Supercritical Water Oxidation of Pyridine", AIChE Annual Meeting, Miami Beach, FL, November 16, 1998, with S. N. V. K. Aki.
62. "Influence of the Support on the Activity and Stability of Ni/Activated Carbon as a Catalyst for Vapor Phase Methanol Carbonylation" AIChE Annual Meeting, Miami Beach, FL, November 20, 1998, with Andrei S Merenov and Amy Nelson.
63. "Heterogeneous Catalysis in Supercritical CO₂: Hydroformylation of Propylene" AIChE Annual Meeting, Miami Beach, FL, November 18, 1998, with S. Dharmidikari.
64. "A Stable Catalytic Method for Enhancing the Supercritical Water Oxidation of Chlorophenol", XVIII Interamerican Congress of Chemical Engineering, San Juan, PR, December 6, 1998.
65. "Methanol Carbonylation Using Nickel Supported on Activated Carbon", ACS 31st Central Regional Meeting, Columbus, OH, June 22, 1999, with A. Merenov.
66. "Heterogeneously Catalyzed Hydroformylation of Propylene in Supercritical Carbon Dioxide", 3rd Annual Green Chemistry and Engineering Conference, Washington, DC, June 29 – July 1, 1999, with G. Snyder and S. Dharmidhikari.

67. "Conversion of propylene to 1-butanal through heterogeneous hydroformylation in supercritical carbon dioxide", American Chemical Society Annual Meeting, New Orleans, LA, August 24, 1999, with G. Snyder.
68. "Catalytic wet oxidation of cellulosic wastes", American Chemical Society Annual Meeting, New Orleans, LA, August 25, 1999, with T. A. Patrick.
69. "Mechanism of Methanol Carbonylation over Nickel supported on Activated Carbon", American Chemical Society Annual Meeting, New Orleans, LA, August 25, 1999, with A. Merenov.
70. "Decomposition Pathways for Forging Lubricants", AIChE Annual meeting, Dallas, TX, November 1, 1999, with S. Natarajan and W. W. Olson.
71. "Requiring Pollution Prevention for Chemical Engineers", AIChE Annual meeting, Dallas, TX, November 1, 1999, with S. LeBlanc.
72. "Surface Study of Nickel on Activated Carbon as a Catalyst for Vapor Phase Methanol Carbonylation", AIChE Annual meeting, Dallas, TX, November 4, 1999, with A. Merenov.
73. "Heterogeneous Hydroformylation of Propylene in Supercritical CO₂", AIChE Annual meeting, Dallas, TX, November 5, 1999, with G. Snyder and T. LaPlante.
74. "Development of heterogeneous hydroformylation catalyst for use with supercritical CO₂." American Chemical Society annual meeting, March 27, 2000, with G. Snyder.
75. "Development of supported rhodium catalyst for hydroformylation of propylene in supercritical carbon dioxide." International Symposium on Supercritical Fluids, April 10, 2000, with G. Snyder and M.R. Mason.
76. "When is Green Really Green? A Process Modeling Approach to LCA", Total Life Cycle Conference and Exposition, SAE International, Detroit, MI, April 27, 2000, with W. W. Olson (presenter).
77. "Development of a heterogeneous hydroformylation catalyst for use with supercritical CO₂." Central Meeting of the American Chemical Society, May 18, 2000, with G. Snyder, A. R. Tadd, and M.R. Mason.
78. "Development of a Selective Heterogeneous Catalyst for use in Supercritical Carbon Dioxide", 4th Annual Green Chemistry and Engineering Conference, Washington, DC, June 27, 2000, with G. Snyder and M.R. Mason.
79. "Development of a Heterogeneous Hydroformylation Catalyst for use with Supercritical Carbon Dioxide", 220th American Chemical Society Meeting, San Francisco, CA, August 22, 2000, with G. Snyder, A. R. Tadd, and M.R. Mason.
80. "Investigation of Catalytic Surface Mechanism during Hydroformylation in scCO₂", AIChE Annual Meeting, Los Angeles, CA, Nov. 16, 2000, with G. Snyder, A. R. Tadd, and M.R. Mason.
81. "Experiments in Pollution Prevention" AIChE Annual Meeting, Los Angeles, CA, Nov. 17, 2000.
82. "Engineering Green Processes through Solvent Substitution: Research and Education", AIChE Spring National Meeting, Houston, TX, April 25, 2001.

83. “Development of Heterogeneous Catalysts for Hydroformylation of 1-Hexene in Supercritical Carbon Dioxide”, 5th Annual Green Chemistry and Engineering Conference, Washington, DC, June 26 – 28, 2001, with A. R. Tadd, A. Marteel, J.A. Davies, and M.R. Mason (presenter).
84. “Developing a Heterogeneous Hydroformylation Catalyst for use with Supercritical CO₂”, United Engineering Foundation, Chemical Reaction Engineering VIII, Barga, Italy, June 24-29, 2001, with A. R. Tadd, A. Marteel, J.A. Davies, and M.R. Mason.
85. “Green Engineering Education: Multiple Audiences –Multiple Presentations”, Green Engineering: Sustainable and Environmentally Conscious Engineering, VPI&SU, Roanoke, VA, July 29 – 31, 2001.
86. “Using a Monolith Reactor for the Conversion of Biomass in Aqueous Systems”, ACS Annual Meeting, Chicago, IL, Aug. 28, 2001, with B. D. Schutt and B. Serrano.
87. “Development and Analysis of a Heterogeneous Hydroformylation Catalyst for Reaction in Supercritical CO₂, AIChE Annual meeting, Reno, NV, Nov. 6, 2001, with A. R. Tadd, A. Marteel, J.A. Davies, and M.R. Mason.
88. “Designing a heterogeneous catalyst for hydroformylation in supercritical CO₂” ACS National Meeting, Orlando, FL, April 7, 2002, with S. Bektesevic, A. R. Tadd, A. Marteel, J.A. Davies, and M.R. Mason.
89. “Surface Analysis of a heterogeneous catalyst designed for hydroformylation in supercritical CO₂” International Society for the Advancement of Supercritical Fluids, 8th Meeting on Supercritical Fluids, Universite Bordeaux, France April 15, 2002, with S. Bektesevic, A. Marteel, J.A. Davies, and M.R. Mason.
90. “Development of Heterogeneous Catalysts for Hydroformylation of 1-Hexene in Supercritical Carbon Dioxide”, 6th Annual Green Chemistry and Engineering Conference, Washington, DC, June 24 – 27, 2002, presented by Anne E. Marteel, with J. Davies and M. Mason.
91. “Surface Analysis of a Heterogeneous Catalyst Designed for Hydroformylation in Supercritical CO₂”, 4th International Symposium on High Pressure Technology and Chemical Engineering, Sept. 22 – 25, 2002, with A. Marteel, J. Davies, M. Mason, and S. Bektesevic.
92. “DRIFTS Study of 1-Hexene Hydroformylation on Silica-Supported Rhodium-Phosphine Complex”, AIChE Annual Meeting, Indianapolis, IN, Nov. 5, 2002, with S. Bektesevic, J.A. Davies, M.R. Mason, and A. Marteel.
93. “Analysis of Heterogeneous Catalysts for Hydroformylation of 1-Hexene in Supercritical Carbon Dioxide”, 7th Annual Green Chemistry and Engineering Conference, Washington, DC, June 23 – 26, 2003, presented by S. Bektesevic, with A. Marteel, T. Tack, J. Davies and M. Mason.
94. “Development of Heterogeneous Catalysts for Hydroformylation of 1-hexene in Supercritical Carbon Dioxide,” AIChE Annual Meeting #546c, San Francisco, CA, Nov. 21, 2003, presented by S. Bektesevic, with A. Marteel, J. Davies and M. Mason.

95. "Behavior of Silica-Supported Rhodium Catalyst Under Hydroformylation Conditions in SC-CO₂", 11th International Symposium & Exhibit on Supercritical Fluid Chromatography, Extraction, and Processing, Pittsburgh, PA, August 2, 2004, with S. Bektesevic.
96. "Supported Catalyst Development for Hydroformylation in Supercritical Carbon Dioxide", AIChE Annual meeting #516e, Austin, TX, Nov. 9, 2004 (Selma Bektesevic and Martin Abraham).
97. "Deactivation kinetics during steam reforming of diesel-fuel components by coking and sulfur poisoning", AIChE Annual meeting #518c, Austin, TX, Nov. 9, 2004 (Sandeep Goud and Martin Abraham).
98. "An Integrated Catalytic Process for Conversion of Biomass to Hydrogen", 19th North American Catalysis Society Meeting, Philadelphia, PA, May 24, 2005 (Sadashiv Swami and Martin A. Abraham).
99. "Catalyst deactivation in a novel diesel fuel reformer", 19th North American Catalysis Society Meeting, Philadelphia, PA, May 24, 2005 (William A. Whittenberger, Sandeep Goud, and Martin A. Abraham).
100. "Deactivation kinetics during the steam reforming of Diesel- fuel components", 230th ACS National meeting, Washington, DC, Aug. 28, 2005, presented by Sandeep Goud.
101. "Novel catalyst development for Steam Reforming of Natural Gas", AIChE Annual Meeting, Cincinnati, OH, November 2005, with Pradeep Kumar Sharma and William A. Whittenberger.
102. "Development of Sulfur-Tolerant Catalysts for Jet Fuel Reforming", AIChE Annual Meeting, Cincinnati, OH, November 2005, Amanda C. McCoy, Abdul-Majeed Azad and Martin Abraham.
103. "Hydrogen production from biomass wastes through ethanol fermentation and catalytic reforming", AIChE Annual Meeting, Cincinnati, OH, November 2005, Vaibhav Chaudhari, Sadashiv Swami, Martin Abraham, and Dong-Shik Kim.
104. "Kinetics of Catalyst Deactivation in a Novel Diesel Steam Reforming System", AIChE Annual Meeting, Cincinnati, OH, November 2005, Sandeep Goud, Martin Abraham, and William Whittenberger.
105. "Understanding the change in reaction pathways during catalyst deactivation in diesel fuel steam reforming", AIChE Annual Meeting, Cincinnati, OH, November 2005, Atish Kataria and Martin Abraham.
106. "An Integrated Catalytic Process for Conversion of Biomass to Hydrogen", AIChE Annual Meeting, Cincinnati, OH, November 2005, Sadashiv Swami and Martin Abraham.
107. "A Sulfur-Tolerant Catalyst for Steam Reforming of Logistic Fuels", Amanda C. McCoy, Martin Duran, Sandeep K. Goud, Atish Kataria, A. M. Azad, Martin A. Abraham, Sudipta Chattopadhyay, William A. Whittenberger, 6th Annual Logistic Fuel Processing Conference, Panama City, FL, May 16-17, 2006
108. "Compact, Lightweight Flexible Fuel Reforming for Solid Oxide Fuel Cells", Sandeep Goud, Martin A Abraham, Sudipta Chattopadhyay and William A Whittenberger, Ohio Fuel Cell Coalition Annual Meeting, Canton, OH, May 24, 2006.

109. “Novel Sulfur-Tolerant Reforming Catalysts for Jet Fuel”, Martin Duran, Amanda McCoy, Abdul-Majeed Azad and Martin Abraham, Ohio Fuel Cell Coalition Annual Meeting, Canton, OH, May 24, 2006.
110. “Novel Catalyst Development for Steam Reforming of Natural Gas”, Pradeep Sharma, Martin A Abraham, Sudipta Chattopadhyay, and William A Whittenberger, Ohio Fuel Cell Coalition Annual Meeting, Canton, OH, May 24, 2006.
111. “Development of Sulfur Tolerant Reforming Catalyst for Diesel Fuel”, Sandeep Goud and Martin A Abraham, 28TH Annual Spring Symposium, The Michigan Catalysis Society, May 25, 2006.
112. C. Stewart Slater, Robert Hesketh, Mariano Savelski, Ann Marie Flynn, Jim Henry, Martin Abraham, "Web-based course modules to incorporate green engineering concepts into the chemical engineering curriculum," paper #106, ACS 10th Green Chemistry and Engineering Conference, Washington, DC, June 26-30, 2006.
113. Sandeep Goud, Martin Abraham, Sudipta Chattopadhyay, “Development of sulfur tolerant catalyst for diesel fuel reforming”, The 232nd ACS National Meeting, San Francisco, CA, Sept. 11, 2006
114. Sadashiv M. Swami and Martin Abraham, Aqueous Phase Reforming of Bio-Derived Organic Compounds, AIChE 2006 Annual Meeting, San Francisco, CA, Nov. 15, 2006.
115. Atish Kataria, Sandeep Goud, Amanda C. McCoy, Satish Lakhapatri, and Martin Abraham, “Development of Sulfur Tolerant Reforming Catalyst for Diesel and Jet Fuel: Understanding the Reaction Pathways and Catalyst Characterization”, AIChE 2006 Annual Meeting, San Francisco, CA, Nov. 16, 2006.
116. Sudipta Chattopadhyay, Sandeep Goud, William A. Whittenberger, and Martin Abraham, “Development of a Novel Flexible Fuel Reformer with Sulfur Tolerant Catalyst”, AIChE 2006 Annual Meeting, San Francisco, CA, Nov. 16, 2006.
117. William Whittenberger, Sandeep Goud, Martin Abraham and Sudipta Chattopadhyay; “Development of a Sulfur Tolerant Fuel Reformer For Hydrogen Production From Heavy Fuels”, 30th Fuel Cell Seminar, Hawaii, 13th-17th November 2006.
118. Robin D. Rogers, Martin A. Abraham “A ‘Green’ industrial revolution is in our future”, ACS 233rd National Meeting & Exposition, Chicago, IL, March 26, 2007.
119. Atish Kataria, Ponnaiyan Ayyappan, Sudipta Chattopadhyay, and Martin Abraham. "Development of Sulfur Tolerant Catalyst for Jet Fuel Steam Reforming", North American Catalysis Society, 20th North American Meeting, Houston, Texas, June, 17-22, 2007..
120. Sadashiv M. Swami, and Martin A. Abraham, “Production of hydrogen from biomass: Integrated biological and thermo-chemical approach”, North American Catalysis Society, 20th North American Meeting, Houston, Texas, June, 17-22, 2007.
121. S.Goud, William Whittenberger, Martin A. Abraham, Sudipta Chattopadhyay; “Development of Novel Sulfur Tolerant Catalysts for Heavy Fuel Reforming”, 20th North American Catalysis Society, Houston, TX, June 17-22, 2007.
122. Sadashiv M. Swami, Ponnaiyan Ayyappan, and Martin A. Abraham, “An integrated approach for production of hydrogen from biomass”, 3rd International Conference on Green and Sustainable Chemistry, Deft, The Netherlands, July, 1-5, 2007.

123. Sadashiv M. Swami, Ponnaiyan Ayyappan, and Martin A. Abraham, "Production of hydrogen from biomass: Integrated biological and thermo-chemical approach", ACS 234th national meeting and Exposition, Boston, MA, Aug, 19-23, 2007.
124. Atish Kataria, Ponnaiyan Ayyappan, Sudipta Chattopadhyay, and Martin Abraham, "Development of Sulfur Tolerant Catalyst for Jet Fuel Steam Reforming", ACS 2007 Annual Meeting, Boston, MA, Aug. 22, 2007
125. Atish Kataria, Ponnaiyan Ayyappan, Sudipta Chattopadhyay, and Martin Abraham, "Analysis of Deactivation of Jet Fuel Reforming Catalysts", MS&T 2007, Detroit, MI, Sept. 19, 2007.
126. Sadashiv M. Swami and Martin A. Abraham, "Investigation of catalyst deactivation mechanism for hydrogen production from fermentation broth", 2007 AIChE Annual Meeting, Salt Lake City, Utah, Nov, 4-9, 2007.
127. Satish Lakhapatri and Martin A. Abraham, "Understanding Sulfur Poisoning in Steam Reforming of N-Hexadecane: Catalyst Characterization Studies", 2008 AIChE Spring National Meeting, New Orleans, LA., April 7, 2008.
128. "Catalysis, Hydrogen, and Sustainable Energy", Sustainability: The Ultimate Quest – An interdisciplinary perspective, Exeter College, Oxford, England, August 12, 2008.
129. Satish Lakhapatri, Atish Kataria, Martin A. Abraham "Catalyst development for hydrogen production through reforming of sulfur-containing liquid fuels", ACS 236th national meeting and Exposition, Philadelphia, PA, Aug, 18, 2008.
130. Martin A. Abraham, "Energy sustainability for the twenty-first century" ACS 236th national meeting and Exposition, Philadelphia, PA, Aug, 18, 2008.
131. Satish Lakhapatri and Martin A. Abraham, Understanding Sulfur Poisoning and Carbon Deposition on Rh-Ni/Al₂O₃ Catalysts during Steam Reforming of Logistic Fuels", 274a, 2008 AIChE Annual meeting, Philadelphia, PA, Nov. 18, 2008.
132. Satish Lakhapatri and Martin A. Abraham, "Deactivation due to sulfur poisoning and carbon deposition during steam reforming of logistic fuel on Rh promoted Ni/γ-alumina catalyst", 238th ACS National Meeting, Washington, DC, August 16-20, 2009.
133. Martin A. Abraham, "The Role for Catalysis in Achieving Energy Sustainability in the Twenty-first Century" 5th Sino-USA Conference of Chemical Engineering, Beijing, China, Oct. 15, 2009.
134. Rajender Kondakindi and Martin A. Abraham, "High performance carbonate-based sorbents for the capture of CO₂" 244th ACS National Meeting, Philadelphia, PA, August 20, 2012.
135. Rajender Kondakindi and Martin A. Abraham, "Performance of Na₂CO₃-based sorbents: Post-testing analysis", 244th ACS National Meeting, Philadelphia, PA, August 23, 2012.
136. Martin A. Abraham, "Sustainability Progress", Sustainability Plenary, AIChE Annual Meeting, San Francisco, CA, November 4, 2013.
137. Martin A. Abraham "Sustainability, a systems approach: I&EC perspective", 248th ACS National Meeting. San Francisco, CA, August 10, 2014.

138. Jeremy Hammond, Guha Manogharan, Clovis Linkous, and Martin Abraham, "Additive Manufacturing Sustainability", AIChE Annual meeting, Salt Lake City, UT, November 9, 2015.
139. Jeremy Hammond, Guha Manogharan, Clovis Linkous, and Martin Abraham, "SOFC Sustainability", The International Chemical Congress of Pacific Basin Societies, Honolulu, HI, December 14, 2015.

Invited Seminars/Presentations

These presentations were by invitation, often as a departmental seminar speaker, and generally to a large audience. While some were based on my technical expertise, later presentations provided me an opportunity to speak on the broader nature of sustainability topics, and eventually I became a frequent lecturer on the integration of sustainability principles in education.

1. "Oxidant and Solvent Effects in the Homogeneous Oxidation of Pesticide-containing Wastewaters", University of Kansas, Lawrence, KS, March 28, 1989.
2. "Oxidant and Solvent Effects in the Homogeneous Oxidation of Pesticide-containing Wastewaters", ACS Pentasectional meeting, Tulsa, OK, April 1, 1989.
3. "New Automotive Emission Catalysts for Methanol Fueled Vehicles", School of Chemical Engineering, Oklahoma State University, November 16, 1989.
4. "Catalytic Oxidation of Chlorinated Organic Compounds in Supercritical Water" Department of Chemical Engineering, University of Missouri - Rolla, April 17, 1991.
5. "Catalytic Oxidation of Chlorinated Organic Compounds in Supercritical Water", Kerr-McGee Corp., Oklahoma City, OK, June 6, 1991.
6. "Catalytic Oxidation of Chlorinated Organic Compounds in Supercritical Water", Conoco, Inc., Ponca City, OK, Sept. 6, 1991.
7. "Catalytic Oxidation: Applications for Air Pollution Control", US Army Edgewood Research, Development, and Engineering Center, Aberdeen Proving Grounds, MD, January 3, 1993.
8. "Catalytic Oxidation of Low Molecular Weight Compounds for Control of Vapor Phase Emissions", University of Oklahoma, School of Chemical Engineering and Materials Science, March 31, 1994.
9. "Supercritical Water Oxidation: Technology for the Treatment of Aqueous Wastes", NASA Ames Research Center, Moffett Field, CA, August 10, 1994.
10. "AIChE After Graduation", Oklahoma State University AIChE student chapter, September 5, 1995.
11. "Catalytic Supercritical Water Oxidation", University of Cincinnati, Department of Chemical Engineering, February 13, 1997.
12. "Fundamentals of Supercritical Water Oxidation", presented at AOTs-4 workshop, September 23, 1997, Orlando, FL.
13. "Development of Heterogeneous Catalysts for use with Supercritical Water Oxidation", University of Akron, Department of Chemical Engineering, December 2, 1997.

14. "Catalytic Supercritical Water Oxidation for Waste Treatment", US EPA – Division of Pollution Prevention, Cincinnati OH, June 22, 1998.
15. "Heterogeneous Catalysis in Supercritical Fluids", Tri-State Supercritical Fluids Discussion Group, Battelle Research Laboratory, Columbus, OH, February 22, 1999.
16. "Achieving Membership Growth: Tips and Techniques for AIChE Officers", AIChE Officer's Conference, Dearborn, MI, June 6, 1999.
17. "Supercritical CO₂ as a Reaction Medium", tutorial presented at "A Workshop on Hybrid Technologies for Waste Minimization" in association with FOCAPD 1999, Breckenridge, CO, July 16, 1999.
18. "Development of Novel Catalysts for Vapor Phase Carbonylation of Methanol", Western Michigan University, October 25, 1999.
19. "It's not easy being Green ... Engineering Clean Chemical Processes", University of Pittsburgh, Department of Chemical and Petroleum Engineering, February 4, 2000.
20. "It's not easy being green ... Engineering Clean Processes", University of Toledo Doermann Lecture, March 21, 2000.
21. "Green Chemistry through Heterogeneous Catalysis with Supercritical Carbon Dioxide", The Tri-State Supercritical Fluids Discussion Group, Columbus, OH, April 20, 2001.
22. "It's not easy being Green ... Engineering Clean Chemical Processes", Michigan Technological University, Department of Chemical Engineering, March 26, 2002.
23. "What is Sustainable Engineering", Pennsylvania State University, Environmental Engineering Program, July 17, 2003.
24. "Research in Transportation and Alternative Energies at The University of Toledo", ASHRAE Toledo Chapter, Sept. 3, 2003.
25. "The Fuel Cell in your future", Toledo Lions Club, Sept. 18, 2003.
26. "Principles of Green Engineering", Wayne State University, Department of Chemical Engineering, Feb. 25, 2004.
27. "Environmental Implications of Heterogeneous Catalysis in Green Engineering" 18th Canadian Symposium on Catalysis, Montreal, Quebec, Canada, May 16 – 19, 2004.
28. "Heterogeneous Catalysis in Green Engineering" Green Chemistry Gordon Conference, Roger Williams University, Bristol, RI, July 4-9, 2004.
29. "Catalysis, Hydrogen Production, and Green Engineering", Yanshan University, Qinhuangdao, Hebei Province, PRC, May 26, 2005.
30. "Catalysis, Hydrogen Production, and Green Engineering", China-US Workshop on Green Chemistry, sponsored by NSF, Beijing, PRC, May 28, 2005.
31. "When Gas hits \$5/gal: Fuel Cells, Energy Alternatives, and the Environment", UT Society of Environmental Education, Toledo, OH, Nov. 15, 2005.
32. "Production of Hydrogen from Biomass Resources", Northwest Ohio Society of Automotive Engineers, Toledo, OH, Oct. 26, 2006.
33. "Catalyst Development for Hydrogen Production through Reforming of Sulfur-Containing Liquid Fuels" Kansas State University, April 22, 2008.
34. "STEM Education at an Urban Research University", Midwestern Intermediate Unit IV annual convention, Grove City, PA, April 28, 2010.

35. “Sustainability for the 21st Century”, Friends of the Boardman Library, Boardman, OH, May 10, 2010.
36. “Sustainable Energy in the 21st Century”, The University of Akron, April 5, 2011.
37. “Sustainability values in STEM education”, Youngstown City, East High School, April 11, 2011
38. Panel presenter, Editor’s Roundtable, International Symposium on Sustainable Systems and Technology, Cincinnati, OH, May 2013.
39. Panel presenter “The Research University and US Economic Growth: Is a New Model Emerging?” Kennedy Caucus Room, Russell Senate Office Building, Washington, DC, April 8, 2014.
40. Panel presenter “Getting your research published”, AIChE 2017 Annual meeting, Minneapolis, MN, October 30, 2017.
41. Panel presenter “Tips for Publishing in *Environmental Progress*”, AIChE 2018 Annual meeting, Pittsburgh, PA, October 29, 2018.
42. Panel presenter “Get Your Research Published”, AIChE 2019 Annual meeting, Orlando, FL, November 11, 2019.

Grants received

The list below includes a wide range of federal, state, and local awards, as well as multiple grants received from industrial sponsors. Many research projects were collaborative efforts with other faculty who are identified. As an administrator, I served as the lead for significant multi-investigator awards that supported many faculty and student projects. Total grants secured exceeds \$16,000,000.

University of Tulsa

1. “An Introduction to Engineering for Native American and Minority High School Students”, NSF Young Scholars Program, \$67,937.
2. “Development of Automobile Emission Catalysts for use with Methanol Fuels”, Allied-Signal, Inc.; 1988 - \$49,777, 1989 - \$59,130, 1990 - \$65,249, 1991 - \$62,448.
3. “Hazardous Waste Detoxification by Catalytic Oxidation in Inorganic Acids”, University of Tulsa Faculty Summer Development Fellowship, Summer 1988, \$4,000.
4. “Catalyst Surface Area Measurements for Monolithic Catalysts”, Airepair International, Inc., June 1, 1989 – Dec. 31, 1989, \$2,903.
5. “Evaluation of Rate Parameters during Heterogeneous Catalysis in Supercritical Fluids” National Science Foundation Research Initiation Grant, beginning 7/1/89 for 2 years, \$67,907.
6. “Hazardous Waste Treatment by Oxidation in Supercritical Fluids,” Oklahoma Centers for Applied Science and Technology, beginning 1/1/90 for 3 years, \$97,043.
7. “Evaluation of Bubble-Column Parameters for Catalysis in Supercritical Fluids” NSF – Research Experience for Undergraduates, Summer 1990, \$4,850.

8. "Catalytic Destruction of Polymeric Wastes", University of Tulsa Faculty Summer Development Fellowship, Summer 1990, \$4,900.
9. "Recovery of Precious Metals from Catalytic Converters", Oklahoma Centers for Applied Science and Technology, beginning 9/1/90 for 3 years, \$300,000, with K. Wisecarver and N. Takach.
10. "Analysis of a Novel Three-Phase Catalytic Reactor for Foaming Systems," National Science Foundation, beginning 7/1/91 for 2 years, \$144,683, with R.L. Cerro. REU Supplement, \$10,000 received summer 1992.
11. "An Introduction to Engineering for Early High School Students", National Science Foundation, February 1, 1992 – April 30, 1994, \$159,424, with R. Hesketh, J. Henshaw, and M. Timmerman.
12. "Catalytic Oxidation – Student Stipend", Allied-Signal, Inc., \$3,155, Jan 1993 – May 1993.
13. "NASA-Joint Venture", Jove Grant NAG8-1005, January 1, 1994 – May 31, 1996, \$141,319, with S. Pomeranz and W. Potter.
14. "Catalytic Oxidation for Air Pollution Control", The University of Tulsa Faculty Research Grant, Fall, 1994, \$600.
15. "Catalytic Supercritical Water Oxidation", National Science Foundation, July 1, 1994 – June 30, 1997, \$185,000.
16. "Catalytic Supercritical Water Oxidation for the Partial Oxidation of Heavy Hydrocarbons", Imperial Oil Resources, Ltd., September 1, 1994 – December 31, 1994, \$27,334.
17. "Development of a New Fischer-Tropsch Catalyst", Syntroleum Corp., \$8,798, Sept. 1, 1994 – May 31, 1995.
18. "An Introduction to Engineering for Early High School Students", NSF – Young Scholars Program, \$179,931, Feb. 1, 1995 – July 31, 1997, with R. Hesketh, C. Patton, and J. Henshaw.
19. "Catalytic Wet Oxidation in a Monolith Reactor for the Destruction of Solid Wastes", NASA – Ames Research Center, \$40,000, Sept. 1, 1995 – Aug. 31, 1997.

University of Toledo

1. "Catalytic Supercritical Water Oxidation", National Science Foundation, July 1, 1994 – June 30, 1997, \$70,000 (transferred from the University of Tulsa).
2. "Determination of Oxidation Mechanism using Diffuse Reflectance FTIR", Guild Associates (prime: NSF), June 1997 – Sept. 1998, \$35,000.
3. "Development of an Environmental Chemical Engineering Laboratory", NSF Instrumentation and Laboratory Improvement Program and University of Toledo, \$100,000, with S.E. LeBlanc.
4. "Evaluation of Catalytic Wet Oxidation for the Ultimate Conversion of Solid Wastes", NASA – Ames Research Center, \$40,000, July 1, 1997 – June 30, 1998.
5. "Development of a Seminar Series on Pollution Prevention", University of Toledo Program for Academic Excellence, \$6,000, July 1, 1997 – June 30, 1999.
6. "Using Emission Master Throughout the Chemical Engineering Curriculum", Mitchell Scientific, Inc., \$30,000 (in kind).

7. "Development of Environmental Engineering Instructional Modules for Middle School Students", Ohio Board of Regents, \$85,330, Sept. 1997 – March 1999.
8. "Stability and Friction Characterization of Forging Lubricants", College of Engineering Collaborative Research Grants, \$40,000, Sept 1998 – Aug 1999, with W. Olson (MIME) and L. Valencic (Dana Corporation).
9. "High Performance Liquid Chromatograph for Biochemical and Environmental Engineering Research", NSF Equipment Grant, \$71,400, with A. Nadarajah, S. Sharfstein, and C. A. Schall.
10. "Heterogeneous Catalysis in Supercritical Carbon Dioxide", NSF – Lucent Technologies Industrial Ecology Research Fellowship, \$100,000, Sept. 1998 – August. 2000. REU Supplement, summer 1999, \$5,038.
11. "Development of a Heterogeneous Catalyst for Hydroformylation in Supercritical CO₂", Technology for a Sustainable Environment, Environmental Protection Agency, \$315,000, June 2000 – May 2003, with J.A. Davies and M.R. Mason.
12. "Catalysis in Confined Spaces" PG Research Foundation, \$48,991, May 2001 – Dec. 2002, with M.R. Mason.
13. "Sustainable Development: Modeling the Maumee River Watershed for Economic Growth", URAFP, with K. Czajkowski, K. Schneider, J. Gottgens, A. Heydinger, D.S. Kim, and A. Kumar, \$50,000, May 2001 – Dec. 2002.
14. "Evaluation of tire pyrolysis oil", Riverside Technology, Inc., July 1, 2001 – Aug. 31, 2001, \$7,500.
15. "Validation of Toxicity Database", EPA Risk Reduction Laboratory, Cincinnati, OH, August 1, 2001 – Dec. 31, 2001, \$15,000.
16. "Northwest Ohio Partnership on Alternative Energy Systems", NSF Partnership for Innovation Award, Oct. 2002 – Sept. 2005, \$600,000, F. Calzonetti, PI.
17. "BEST: Bridging Engineering and Science Teaching", NSF – Bridges for Engineering Education, 1/1/03 – 12/31/03, \$100,000, with Mark Pickett (PI), Charlene Czerniak, Doug Nims, and Rebecca Schneider.
18. "Mini-proposal on Catalyst Deactivation", Catacel, Inc., January 1, 2004 – May 15, 2004, \$3,000.
19. "Conversion of Waste Biomass to Hydrogen", EISC, Inc., March 2, 2004 – March 2, 2005, \$75,000, with D.S. Kim.
20. "Fuel Processing for Fuel Cell Applications", Ohio Department of Development Wright Centers Initiative, Feb. 1, 2004 – Jan. 31, 2007, \$1,350,000, with G. Lipscomb and M. Coleman, through Case Western Reserve University.
21. "Compact Fuel Reformer for SOFC", Catacel, Inc (through NSF SBIR program), July 2004 – Dec. 2004, \$25,542.
22. "High Performance Reforming Catalyst with in-situ Desulfurization Capability for Jet Fuels", NASA Glenn research center, Sept. 2004 – Aug. 2005, \$137,005, with A.M. Azad.
23. "Novel Spiral Stackable Reactor (SSR) for Low-cost Hydrogen Production", Dept of Energy (through EMTEC), Jan. 2005 – Aug. 2005, \$23,137, with A.M. Azad and W.A. Whittenberger (Catacel).

24. "Clean and Renewable Hydrogen", Dept of Energy, May 1, 2005 – April 30, 2006, approx. \$992,000, with A. D. Compaan, X. Deng, and others.
25. "Wright Fuel Cell Group Operating Funds", Ohio Department of Development, Wright Centers of Innovation, May 15, 2005 – May 14, 2008, \$404,840, with A.M. Azad, John McGrath (WFCG), and others.
26. Biodiesel Study, TARTA (US Department of Transportation), June 1, 2005 – May 31, 2008, \$574,685, with Mark Vonderembse.
27. "Novel Spiral Stackable Reactor (SSR) for Low-cost Hydrogen Production", Dept of Energy (through EMTEC), Phase II, Jan. 2006 – July 2007, \$50,000, W.A. Whittenberger (Catacel), P.I.
28. "Compact Fuel Reformer for SOFC", Catacel, Inc (NSF SBIR Phase II), March 1, 2006 – Feb. 2008, \$140,138.
29. "Clean Sources of Hydrogen", U.S. Army Contract W909MY-06-C-0048, August 1, 2006 – July 31, 2007, \$850,000, with A.M. Azad and X. Deng.
30. "Utility Vehicle for the Hydrogen Economy", Ohio Department of Development, Jan. 1, 2007 – Dec. 31, 2008, \$228,022, with Tom Stuart and Ed Kron.
31. "A Novel Desulfurizer-embedded Processor for Sulfur-laden Logistic Fuels", Third Frontier Fuel Cell Program, May 1, 2007 – April 30, 2009, \$613,457, with A.M. Azad and William Whittenberger.

Youngstown State University

32. Durability and Performance Evaluation of Catalysts on Metal Foil, Ohio Department of Development (Wright Capital Fund), July 1, 2008 – June 30, 2010, \$504,114, with S. Cahttopadhyay (Catacel Corp).
33. Durability and Performance Evaluation of Catalysts on Metal Foil, Ohio Department of Development (Third Frontier Alternative Energy Program), July 1, 2008 – June 30, 2010, \$124,050, with S. Cahttopadhyay (Catacel Corp).
34. Center for Efficiency of Sustainable Energy Systems, US Department of Energy, Sept. 2009 – April 2012, with M.D. Costarell and C.A. Linkous, \$1,903,000.
35. "Structured Bed for CO₂ Capture", NSF STTR Phase I, 7/1/2010 – 6/30/2011, \$150,000 (\$49,845 YSU portion) S. Cahttopadhyay (Catacel Corp), PI.
36. Ohio Hub for Innovation and Opportunity: Advanced Materials Commercialization and Software Development, Ohio Department of Development, Sept 2010 – Sept 2013, \$250,000.
37. "Advanced Automotive Fuels Research, Development, & Commercialization Cluster (OH)", US Department of Energy (NETL), \$1,000,000, Oct 2010 – Sept. 2011, C.A. Linkous, PI.
38. TechBelt Energy Innovation Center, US Department of Energy, National Energy Technology Laboratory, \$2,700,000, April 2011 – Sept. 2012.
39. "Post-Combustion Capture of CO₂, Sorbent Design and Implementation", National Energy Technology Laboratory, \$99,544, Oct. 2010 – Sept. 2012, S.R. Lovelace-Cameron, PI.
40. Support for the Environmental Progress Office, provided by AIChE, approximately \$20,000 per year, 2008 – 2019.
41. "CFD Analysis of Thermal Deburring", Extrude Hone, \$84,400, 2019, with S. Moldavan.

42. “Aerosol spray coating for fuel cell development”, Hall Labs, \$18,000, with C. A. Linkous.

Western Illinois University

43. “Promoting Engineering Access for Rural Learners (PEARL)”, NSF Scholarships in Science, Technology, Engineering, and Mathematics, Sept 2022 – Aug 2028, with Blair McDonald, Garrett Hunter, and Debbie Kepple-Mamros, \$749,950, under development for resubmission, February 2022.

Teaching

University of Tulsa

ChE 1002 – Introduction to Chemical Engineering, F 94
ChE 2003 – Stoichiometry, F 88, Sp 90, Sp 91, Sp 92, Sp 93, Sp 96.
ChE 3063 – Equilibrium Thermodynamics, F 89, F 90, F 91, F 92.
ChE 3083 – Mass Transfer, Sp 87, Sp 88, Sp 89, Sp 90.
ChE 4063 – Chemical Reactor Design, F 87, F 88.
ChE 4971 – Senior Seminar, F 94
ChE 7023 – Thermodynamics, F 92, F 93, Sp 96.
ChE 7033 – Reaction Kinetics, Sp 95.
ChE 7043 – Heat and Mass Transfer, Sp 89.
ChE 7863 – Catalysis, Sp 88, Sp 1994.
ES 3083 – Engineering Economics, Sp 92.
Graduate Seminar Coordinator, Sp 88; F 89 – Sp 92.

University of Toledo

ChEE 2010 – Material and Energy Balances, Sp. 00, Sp. 01
ChEE 2230 – Thermodynamics I, Su 99
ChEE 2330 – Thermodynamics II, Sp 98, Sp 03
ChE 430 – Reactor Design, Sp 97
ChEE 4890; ChEE 4110 – Pollution Prevention, F 98, F 99, Su 00
ChEE 4500 – Senior Lab, Sp. 02
ChEE 4980, 5980 – Green Engineering, F 02, F 03, F 05, Sp. 07
ChE 5/797; ChEE 5930 – Graduate Seminar, W 97, Sp 97, F 99
ChE 621, 6510 – Graduate Thermodynamics, W 97, F 97, Sp. 99
ChEE 6500 – Reaction Engineering, Sp. 04

Youngstown State University

HONR 2601B – STEM Honors Seminar, Sustainable Energy, F11
MECH 2610 – Engineering Thermodynamics, F16
CHEN 3771 – Chemical Engineering Thermodynamics, F18, S19

Western Illinois University

GH 299 –Honors Seminar, The Next Great Idea, F20
 GH 299 – Honors Seminar, The President’s Leadership Class, S21, F21, S22
 ETL 515 - Research Design, Visualization, and Dissemination, F21
 ENGR 490 – Senior Design, S22
 ET 455 – ET Seminar: Sustainable Engineering, S22

Short Course Activities, Department of Engineering Professional Development, University of Wisconsin-Madison Extension

“Chemical Engineering for Non-Chemical Engineers, 1995 – 2014
 “Green Engineering: 2001
 Effective Techniques for Minimizing the Environmental Impact of Processes”

Academies Attended

Participant, AASCU New Presidents Academy 2020 – 2021
 Participant, Ohio Energy Summit 2011

Professional Memberships

Phi Beta Delta – Honor Society for International Scholars 2020 - present
 American Chemical Society 1985 - present
 American Institute of Chemical Engineers 1985 - present
 Sigma Xi, the Scientific Honor Society 1985 - present
 Tau Beta Pi 1980 - present
 American Society of Engineering Education 1999 - 2016
 Air and Waste Management Association 1988 - 1991

Professional Service Activities

I participated in my professional societies through service on boards and committees, including programming committees. I organized many technical sessions at national and international meetings, identifying, inviting, and selecting speakers. In addition, but not listed, I have chaired or co-chaired over 100 technical sessions at technical meetings.

International Organizing Committee, 23rd Annual Green Chemistry 2018 – 2019
 & Engineering and 9th International Green and Sustainable Chemistry
 Conference, Reston, VA USA
 International Organizing Committee, The 8th International Conference on 2017
 Green and Sustainable Chemistry, Melbourne, Australia
 Member, Committee to Assess Supercritical Water Oxidation System Testing 2012 – 2013
 for the Blue Grass Chemical Agent Destruction Pilot Plant
 National Research Council of the National Academies

ABRAHAM Curriculum Vita

Programming Committee, 23 rd North American Meeting of The North American Catalysis Society	2012 – 2013
Member, review committee, NorTech Innovation Awards	2010
Green Chemistry and Engineering Conference Organizing Committee, 12 th , 13 th , 14 th	2007 – 2010
1st International Congress on Sustainability Science and Engineering, Program Advisory Committee	2008 – 2009
The First International Symposium on Sustainable Chemical Product and Process Engineering, Guangzhou, China, International Program Committee	2007
3rd International Conference on Green & Sustainable Chemistry GSC-3 International Advisory Board, Delft, Netherlands	2006 – 2007
Engineering Conferences International, “ <i>Green Engineering; Defining the Principles</i> ”, Conference Chair	2002 – 2003
Sigma Xi, Toledo section, Presidential succession	2001 – 2004
International Advisory Committee for TiO ₂ /AOTs-6	1999 – 2000

Reviewer for journals and proposals:

Journal of Additive Manufacturing, Industrial & Engineering Chemistry; Langmuir, AIChE Journal; Journal of Supercritical Fluids; Environmental Science and Technology; Environmental Progress, Journal of Hazardous Materials, The Chemical Engineering Journal, Chemical Engineering Communications, Energy and Fuels, National Academy of Engineering, National Science Foundation; Environmental Protection Agency, Army Research Office; American Chemical Society Petroleum Research Fund; US Department of Agriculture; The Consortium for Plant Biotechnology Research, NSERC (Canada), The Catalyst Group, Philadelphia, PA; Louisiana Board of Regents; Australian Research Council; OSU University Center for Energy Research.