

Martin A. Abraham, Ph.D., P.E.

Provost and Vice-President for Academic Affairs

Youngstown State University

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Administrative Leadership

2014 - present

Provost, Youngstown State University

The Chief Academic Officer at YSU, with oversight for six academic colleges, 36 academic departments, 378 faculty, and approximately 12,800 students. YSU representative to the Interuniversity Provost Council.

Significant Accomplishments:

- Organizational change:
 - Created an independent College of Graduate Studies, and hired its first Dean. Worked with the Dean to create an online application system. Increased graduate student enrollment at a pace of roughly 4% per year.
 - Created an independent Office of Research, and hired the first Associate Vice-President for Research. Enhanced functioning of the office and increased submissions and awards. Integrated regional economic development initiatives to create greater community involvement.
 - Transformed the Honors Program into an Honors College with expanded programmatic offerings, expanded the function of the Honors Director, and roughly doubled the number of honors participants in two years.
 - Created the Division of Student Success within the Academic Division and hired the first Assistant Vice-President for Student Success. Reorganization of the division includes greater alignment of student support services with academic units to improve advising and career guidance, with a goal of increasing student retention.
 - Expanded the role of the Center for International Students and Programs, including the hiring of an Associate Provost for International and Global Initiatives, leading to enhanced international student recruitment and enrollment, and growth in faculty-led study abroad programs for YSU students.
 - Hired new Deans for the Colleges of Creative Arts and Communication, Science, Technology, Engineering, and Mathematics, and Liberal Arts and Social Sciences.
- Program development:
 - Supported 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.
 - Transitioned the Journalism program from English to Communications, to emphasize new opportunities with electronic media.
 - Developed new general education requirements to include a first-year

experience program that addresses issues of transition for new college students. Hired a first-year experience director to work cooperatively with student success division in coordination of orientation and first year programs.

- Supporting the expansion of Launch Lab into the Business College, including hiring of appropriate faculty and staff support.
- Supervised the implementation of the online electronic bulletin. Overseeing implementation of new degree completion software.
- Community impact:
 - Working to align partnerships with other regional organizations, including Mercy Health Systems and Eastern Gateway Community College.
 - Continued promotion and involvement with the Youngstown Business Incubator, ranked as the best university-affiliated incubator in the world for 2015.
 - Leading the development of the Mahoning Valley Innovation and Commercialization Center, a multi-organizational hub for integration of advanced manufacturing efforts throughout the region, including the development efforts to raise funds for its construction.
- University Leadership:
 - Brought to successful conclusion 2014 negotiations with faculty union. Member of leadership team for 2017 negotiations cycle.
 - Worked with YSU academic senate in the realignment of commencement activities to provide enhanced ceremony for graduating students.
 - Oversee the university's efforts at reaccreditation through the Higher Learning Commission. Increased emphasis on program assessment. Initiated program review process.
 - Support for major capital projects including renovation of academic and non-academic facilities.
 - Promotion of academic computing needs, including enhancement of technology resources for distance learning. Support for ADA compliance initiatives required to meet Department of Education access guidelines.

2007 -
2014

**Founding Dean, College of Science, Technology, Engineering, and Mathematics,
Youngstown State University**

The STEM College at YSU was created in July 2007 through a merger of the College of Engineering and several departments from the College of Arts and Sciences. The STEM College was home to 2653 undergraduate and 194 graduate students, and roughly 130 full-time tenure and tenure-track faculty and 30 full-time staff, at the time I transitioned from this role. With ten departments and 39 academic programs distributed over four academic buildings, the STEM College is the largest and most complex at YSU. As the Founding Dean, I developed the policies needed for the successful operation of the College, by merging successful activities from our predecessor colleges and creating new mechanisms where prior methods were no longer viable.

Significant Accomplishments:

- Increased research funding in the college roughly 5-fold, with the STEM College

accounting for roughly 60% of all research activity at YSU.

- Helped bring the \$70,000,000 National Additive Manufacturing Innovation Institute to Youngstown. Established Centers of Excellence in Applied Chemical Biology and Materials Science and Engineering, the Institute for Applied Topology, the Natural Gas and Water Resources Institute, and the Center for Innovation in Additive Manufacturing.
- Developed an interdisciplinary PhD program in Materials Science and Engineering. Oversaw the enrollment of first group of students in 2012. The first graduate completed in May 2016 and is quickly found employment in the field.
- Established strong community partnerships for economic development. Created the STEM Research and Technology-Based Economic Development office. Established a partnership with the Youngstown Business Incubator, which was recently recognized as the best University-associated incubator in the world.
- Increased scholarship support through philanthropy. Obtained State funding for the Choose Ohio First Scholarship Program that provides scholarship opportunities to high potential students.
- Guided the college to recognition by US News and World Reports as among the top 100 engineering programs among primarily undergraduate universities in 2012, and ranked 45th in the nation in 2013.
- Created a STEM College Office of Professional Practice to provide structure for co-op/internship programs. Increased services to placing roughly 150 students per year in summer internships, working with over 60 local, regional, and national companies. Obtained roughly \$2,000,000 in State and Federal funding for program expansion. Initiated a high school internship program in cooperation with Youngstown City Schools.
- Coordinated the development of a STEM facilities master plan. The proposal transitioned into the plan now in place for the Innovation Center described elsewhere.
- Increased enrollment by over 20% in our first four years. Stabilized enrollment during a period of significant enrollment decline.
- Improved the quality of the entering student, as measured by incoming ACT scores and HS GPA.
- Achieved one year retention rate of 86.4%, up from 82.4% in 2008 and higher than the overall YSU average.
- Oversaw three successful ABET accreditation reviews. Participated in a successful University-level HLC accreditation review.
- Created the STEM Leadership Society in support of high quality students.
- Expanded participation in College in High School program, developed programs to recruit from that population, and reorganized staff to provide a liaison for Outreach and Scholarships.
- Established the STEM College Awards dinner to recognize outstanding alumni and industrial and educational partners. Established the STEM Advisory Council to increase relations with industry and alumni.

2004 -
2007

Dean, College of Graduate Studies, University of Toledo

As graduate dean, I served as the chief academic officer for graduate programs at the University of Toledo, representing 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.

Significant Accomplishments:

- Increased graduate enrollment by approximately 5% over three years. Created the position of graduate recruitment coordinator to work with departmental graduate directors in order to allow larger initiatives to be implemented.
- 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.
- 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.
- Established guidelines for awarding graduate and teaching assistantships.
- Worked with Graduate Council to develop best practices for graduate education, which served as a strategic plan for graduate education on our campus.
- Implemented a minority recruitment effort to promote increased diversity in our graduate programs.
- Represented University of Toledo to the Statewide Regents Advisory Committee on Graduate Study.

2000 -
2004

**Associate Dean, Research and Graduate Studies, College of Engineering,
University of Toledo**

As Associate Dean, I was responsible for all graduate activities within the College of Engineering, including six Master's programs and two doctoral programs, and was the chief administrative officer for all research activities within the college. I supervised a graduate population of approximately 400 students with a budget of nearly \$7,000,000, and oversaw a doubling of our research funding from approximately \$4 to \$8,000,000 in four years.

Significant Accomplishments:

- Doubled external funding in the College.
- 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.

- Developed several joint degree programs, including an MS/JD program with the College of Law.

Leadership Service in State and National Committees

2013 - **Chair, Ohio Engineering Deans Council**
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 have initiated a discussion with the Ohio Business Roundtable to identify opportunities to work together on workforce issues that span technical training through post-graduate engineering. We have 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. We engage with the Ohio Society of Professional Engineers on licensing requirements for engineers, including recent discussion on requiring Master's programs prior to licensure.

2009 - **Chair, ACS Committee on Environmental Improvement**
2011
CEI is a joint Board-Council committee of the American Chemical Society, responsible for advising ACS governing bodies on pertinent environmental issues in science and public policy. The committee consists of 15 members and roughly a dozen associates. As chair, I reorganized the subcommittee structure to allow a greater focus on communications and outreach, and have spearheaded initiatives that promote sustainability within the ACS. The committee has led the development of a sustainability website on behalf of the ACS and created significant new awards for development of sustainability activities of members and educators. We developed policy statements on hydraulic fracturing, energy, and climate change, negotiating the delicate political balance by using sound fundamental science to promote policy recommendations. The committee's activities were used in the development of initiatives incorporated into President Obama's recovery act programs.

2006 - **Chair, Sustainable Engineering Forum, American Institute of Chemical Engineers**
2008
The Sustainable Engineering Forum is the newest Division within the AIChE. This new Division, with approximately 1000 members, seeks to develop programming and educational events that promote sustainability within the AIChE and the chemical engineering profession. As Chair, my primary goal was to increase the membership of the Division and to install a leadership team that would continue the Division's success beyond my tenure. We created a series of programs in support of the mission, including awards and education activities that continue to grow and expand the influence of the Forum throughout the Institute. As Chair, I also served on the Managing Board of the Institute for Sustainability, AIChE's governance body that coordinates its efforts to reach out to academia, government, and industry

in the promotion of sustainability and sustainable development.

2001 - **Chair, Industrial and Engineering Chemistry Division of the American Chemical Society**
2004

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 to complete Division tasks. Shortly prior to my becoming Chair, the Division was reviewed for poor performance; when I left office, the Division was recognized by ACS with a Chemluminary Award as one of the leading Divisions within the Society. After my service as Chair of the Division, I was elected as a member of ACS Council, the main governing body for the professional society, and I continue to serve as a Councilor for the Division.

1992 - **Chair, Student Activities Committee, American Institute of Chemical Engineers**
1994

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. Typically, well over 1000 chemical engineering students participate each year from across the country.

Service on Boards

2007 - **Board of Directors, Youngstown Business Incubator**

YBI is now ranked best in the world for University-associated incubators according to the University Business Incubator Index. Previous efforts have been on business-to-business software product companies. The incubator's biggest success is Turning Technologies, a 300 employee company still located on the YBI campus in downtown Youngstown. Recent collaboration with the YSU STEM College, and their activity as landlord for America Makes, has allowed for expansion into advanced and additive manufacturing. This collaboration has brought national and international attention to the area through the development of new additive manufacturing technologies, and the development of the first two spin-out companies from the YSU STEM College.

2008 - **OH Wow! The Roger and Gloria Jones Children's Center for Science and Technology**
2014

OH Wow's relocation to space downtown and dedication as a children's STEM museum was a bold decision undertaken by the Board in 2009. Faced with declining attendance and community support, the museum faced closure. With a renewed focus, the center raised over \$2,000,000 in donor funding, rented space in a

downtown facility, renovated the facility, and invested in new exhibits. Nearly three years and over 100,000 visitors later, OH Wow recently undertook its first major expansion to create new STEM learning space for the support of area children. 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, has been a critical underlying factor that allowed the new facility to thrive.

2013 - **Fireline Corp., Board of Directors**
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. My technical background helps to provide guidance on new products being considered for development and process improvements in existing product lines. YSU has had a major role in the development of their TCON product, which provides the company significant growth potential into the automotive sector.

2013 - **VEC, Inc., Advisory Board**
VEC is a contractor for the oil and gas manufacturing sector. The company has expanded rapidly to over \$100M in sales with over 300 employees nationally. As an advisor, I work with the executive leadership team to identify new opportunities for investment and expansion, review current activities, and discuss personnel and HR issues. I am the only representative from an academic institution, providing advice on educational opportunities and a broad perspective on the future of this sector based on my involvement through the YSU Natural Gas and Water Resources Institute.

2015 - **Board of Directors, Great Lakes Biomimicry**
GL Bio has a goal of taking nature's best ideas and adapting those designs and processes to solve human problems. Great Lakes Biomimicry is a hybrid, entrepreneurial 501(c)(3) organization with a mission to create conditions for innovation through biomimicry. GL Bio runs a fellows program primarily at the University of Akron, while also supporting innovation proposed through industrial partnerships. The Board consists of education and business leaders from throughout Northeast Ohio, with a passion for creating sustainable solutions to technical challenges.

2016 - **Strategic Development Committee, Mercy Health Systems**
Mercy Health is the largest provider of health services in the Mahoning Valley, and one of the largest providers in the State of Ohio. 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.

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Professor, Civil/ Environmental and Chemical Engineering

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Honors and Awards

Most intriguing people of 2013, Youngstown Business Journal	(2014)
Business Advocate of the Year, Youngstown/Warren Regional Chamber of Commerce	(2012)
Fellow, American Institute of Chemical Engineers	(2012 -)
Fellow, American Chemical Society	(2009 -)
Dion D. Raftapoulos/Sigma Xi Outstanding Research Award	(2006)
Member, Phi Kappa Phi Honor Society	(2000 -)
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)
Member, Tau Beta Pi	(1980 -)

Boards and Appointments

Current

Mercy Health Systems, Strategic Development Committee	(2016)
GL Bio	(2015 -)
Ohio Federal Military Jobs Commission	(2014 – 2015)
Fireline, Inc. Board of Directors	(2013 -)
VEC Inc, Board of Advisors	(2013 -)
Advanced Methods in Innovation, Founding member	(2010 -)
Youngstown Business Incubator Advisory Board	(2007 -)
OH Wow! The Roger and Gloria Jones Children’s Center for Science and Technology, Youngstown (Secretary, 2013)	(2008 - 2014)

Prior

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 in Chief, <i>Encyclopedia of Sustainable Technologies</i> , to be published by Elsevier, Inc, 2017	(2015 – 2017)
Manufacturing Column Author, <i>Youngstown Business Journal</i>	(2013 -)
Editor, <i>Environmental Progress and Sustainable Energy</i>	(2007 -)
Editorial Advisory Board, <i>Industrial and Engineering Chemistry Research</i>	(2006 – 2008)
Editor, Sustainability Science and Engineering Book Series, Elsevier	(2004 - 2008)
Sustainability Columnist, <i>Environmental Progress</i>	(2005 – 2007)
Editorial Board, <i>Journal of Hazardous Materials</i>	(1998 – 2006)

Employment Experience

Youngstown State University

Provost and Vice-President for Academic Affairs, 2015 - Present
 Interim Provost and Vice-President for Academic Affairs, 2014 - 2015
 Founding Dean for the College of Science, Technology, Engineering, and Mathematics, 2007 – 2014
 Professor of Civil/Environmental and Chemical Engineering, with tenure. 2007 – present.

University of Toledo

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
 Professor of Chemical and Environmental Engineering, with tenure 1996 – 2007

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

Stauffer Chemical Co.

Completed an Industrial Internship during the first two summers of my graduate program, 1982, 1983

ARCO Chemical - Polymers Division,

Worked as an engineering Co-op student in spring 1980 and summer 1981 as part of my undergraduate degree program.

Education

1987 Ph. D. Chemical Engineering, University of Delaware

1982 B. S. Chemical Engineering, Rensselaer Polytechnic Institute

Registered Professional Engineer, Oklahoma License number 17383

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**, Martin A. Abraham, editor, Elsevier Major Reference works, under contract for 2017 publication.

Refereed Publications

Over 1500 citations, 18 average citations per item, and an h-index of 22

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 Cr_2O_3 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).
38. Aki, S.N.V.K, Abraham, M.A. "Catalytic Supercritical Water Oxidation of Pyridine: Comparison of Catalysts", *Ind. Eng. Chem. Res.* **38**(2), 358, (1999).
39. Aki, S.N.V.K, Abraham, M.A. "Catalytic Supercritical Water Oxidation of Pyridine: Kinetics and Mass Transfer", *Chem. Eng. Sci.* **54**(15-16), 3533 (1999).
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).
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Patents and Filings

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Presentations

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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.
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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.
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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.

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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.
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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.
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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.
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36. "Particle Size Effect on Supercritical Water Oxidation - Polystyrene 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.
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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.
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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.
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63. "Heterogeneous Catalysis in Supercritical CO₂: Hydroformylation of Propylene" AIChE Annual Meeting, Miami Beach, FL, November 18, 1998, with S. Dharmidikari.
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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.
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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.

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

Invited Seminars/Presentations

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.

*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.
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 Rencewicz, "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.

Master's 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. (University of Pittsburgh)

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 Bektsevic, "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-Doc Associate

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.

Sponsored Research**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 – 2016.

Fundraising activities

1. Support for ECI Conference on Green Engineering (2003): \$5,000, Green Chemistry Institute; \$10,000 Department of Energy; \$35,000, National Science Foundation; \$30,160, Environmental Protection Agency.
2. Lake to River Science Day, \$2500 Wean Foundation (2010); \$8500 Dominion Foundation (2011); \$10,000 GM Foundation (2011).
3. Sustainable Energy Forum; Roth Brothers, Dominion Foundation, R.J. Wean Foundation, ms Consultants, Energy Industries of Ohio, NorTech, Ohio Clean Technologies Group, Regional Chamber of Commerce, \$13,500 (2010); V&M Star, NorTech, Dominion Foundation, Johnson Controls, Roth Brothers, Regional Chamber of Commerce, Youngstown Business Incubator, Applied Systems and Technology Transfer \$11,000 (2011)
4. STEM Summer Bridge program, \$10,000 Wean Foundation (2011)
5. Edward W. Powers Women in Science and Engineering Program, \$100,000, (2012)
6. YSU STEM Explore, Thomas' Family Foundation, \$5,000 (2013)
7. Jim and Patricia Hodgson Scholarship Fund, \$1,100,000 (2013)
8. The Jack Bakos Collaborative Student Lounge, \$150,000 (2013)
9. Roger Jones, STEM Scholarship support, \$100,000 (2014)
10. Mary Pat Salomone, STEM Scholarship, \$25,000 (2014)
11. Friedman chair in Engineering, \$2,500,000 (2015)

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

Short Course Activities

“Chemical Engineering for Non-Chemical Engineers, Department of Engineering Professional Development, University of Wisconsin-Madison Extension:

Date	Location	Attendees
October 18-20, 1995	Madison, WI	
May 17-19, 1996	Madison, WI	
March 25-27, 1997	Madison, WI	
March 9 – 11, 1998	Madison, WI	
August 24 – 26, 1998	Madison, WI	
March 8 – 10, 1999	Houston, TX	
August 16 – 18, 1999	Madison, WI	
March 6 – 8, 2000	Houston, TX	
August 15 – 17, 2000	Madison, WI	
October 2 – 4, 2000	Houston, TX	54
March 12 – 14, 2001	Houston, TX	18
July 25 – 27, 2001	Philadelphia, PA	29
October 1 – 2, 2001	Houston, TX	19
March 11 – 13, 2002	Houston, TX	21
October 7 – 9, 2002	Philadelphia, PA	17
March 10 – 12, 2003	Houston, TX	13
July 14 – 16, 2003	Philadelphia, PA	12
October 20 – 22, 2003	Houston, TX	5
March 8 – 10, 2004	Houston, TX	11
Sept. 27 – 29, 2004	Philadelphia, PA	21
March 7 – 9, 2005	Houston, TX	18
April 11 – 13, 2005	BP Research, Naperville, IL	27

October 17 – 19, 2005	Philadelphia, PA	22
March 6 – 8, 2006	Houston, TX	21
Sept. 25 – 27, 2006	Philadelphia, PA	20
March 5 – 7, 2007	Houston, TX	20
August 27- 29, 2007	W.R. Grace, Chicago, IL	25
Sept. 17 – 19, 2007	Philadelphia, PA	15
March 10 – 12, 2008	Houston, TX	32
Sept. 15-17, 2008	Philadelphia, PA	10
March 9 – 11, 2009	Houston, TX	15
Sept. 14 – 16, 2009	Philadelphia, PA	12
Nov. 16 – 18, 2009	Amgen, Juncos, PR	20
March 8 – 10, 2010	Houston, TX	13
Sept. 13 – 15, 2010	Walt Disney World, FL	8
March 14 – 16, 2011	Houston, TX	26
March 12 – 14, 2012	Houston, TX	15
October 1 – 3, 2012	Chicago, IL	20
March 11 -13, 2013	Houston, TX	12
Sept 30 - Oct 2, 2013	Chicago, IL	15
March 3 – 5, 2014	Houston, TX	15
Sept. 29 – Oct 1, 2014	Chicago, IL	11

“Green Engineering: Effective Techniques for Minimizing the Environmental Impact of Processes”,
Department of Engineering Professional Development, University of Wisconsin-Madison/Extension,
January 10 – 12, 2001, presented in Lake Buena Vista, FL.

Professional Memberships and Service

American Society of Engineering Education	(1999 -)
American Institute of Chemical Engineers	(1985 -)
American Chemical Society	(1985 -)
Sigma Xi, the Scientific Honor Society	(1985 -)
Tau Beta Pi	(1980 -)
Air and Waste Management Association	(1988 - 1991)

Service Activities

Programming Committee, 23 rd North American Meeting of The North American Catalysis Society	(2012 – 2013)
Invited to attend the Ohio Energy Summit	(Oct. 2011)
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,
“Green Engineering; Defining the Principles”, Conference Chair (2002 – 2003)
 Sigma Xi, Toledo section, Presidential succession (2001 – 2004)
 International Advisory Committee for TiO₂/AOTs-6 (1999 – 2000)

American Chemical Society

Industrial and Engineering Chemistry Division,
 Green Chemistry and Engineering Subdivision, Programming Chair (1999 – 2002)
 I&EC Division Chair's sequence (2002 – 2004)
 Councilor (2004 –)
 Committee on Environmental Improvement (2003 – 2014)
 Chair, (2009 – 2011)
 Green Chemistry Institute, Advisor to Board of Governors (2011 – 2013)
 Meeting Program Planning Group (2012 -)
 Executive committee, Member at large
 Chair, Meeting theme subcommittee (2014 -)
 Divisional Affairs Committee (2015 – 2017)

American Institute of Chemical Engineers

Energy programming committee (2007 - 2009)
 Institute for Sustainability (2007 – 2008)
 Sustainable Engineering Forum, Chair (2006 – 2008)
 Catalysis and Reaction Engineering Division,
 Director (2000 – 2002)
 Programming Committee Chair (Reaction Engineering) (2002 – 2004)
 Nominating Committee (National) (1994, 2006)
 Student Chapters Committee
 Chairman - Student Chapter Charters Subcommittee (1992 - 93)
 First Vice-Chair, SCC (1993 - 94)
 Chairman, SCC (1994 - 95)
 Chairman - Annual Reports Subcommittee (1996 - 2000)
 ChemE Car Competition Rules Committee (1999 - 2003)
 Tulsa Section
 Internal Secretary (1989 - 90)
 Corresponding Secretary (1990 - 91)
 Vice-Chairman (1991 - 92)
 Chairman (1992 - 93)
 Chairman, Organizing Committee, 1994 Officers Conference (1993 - 94)

Professional Meetings, Session Chair or Co-chair

AIChE 1989 Annual meeting, "Young Faculty Forum", San Francisco, CA.

Invited attendee of "Workshop on Supercritical Water Oxidation for Treatment of High Risk Wastes" at Los Alamos National Laboratory, August 1-2, 1989.

AIChE 1990 Spring National meeting, "New Methods in Automobile Emission Reduction", Orlando, FL

AIChE 1991 Annual meeting, "Supercritical Fluids V-Special Topics and Applications", Los Angeles, CA.

AIChE 1993 Annual Meeting, Supercritical Fluids Poster Session, St. Louis, MO.

13th International Symposium on Chemical Reaction Engineering, "Environmentally Benign Processing", September, 1994, Baltimore, MD

World Environmental Conference, AOTs - A, "Catalytic Oxidation", September 20, 1995, London, Ontario, Canada.

AIChE 1995 Annual Meeting, Miami Beach, FL, "Environmental Reaction Engineering I", "Environmental Reaction Engineering II", and "Environmental Applications of Supercritical Fluids"

ACS 1996 Spring National Meeting, New Orleans, LA, "Symposium on Supercritical Extraction" (5 sessions)

AIChE 1996 Annual Meeting, Chicago, IL, "Environmental Applications of Supercritical Fluids" and "Environmental Reaction Engineering"

Engineering Foundation Conference: Chemical Reactor Engineering for Sustainable Processes, Banff, Alberta, Canada. June, 1997, "Alcohols and Oxygenate Manufacturing"

AIChE 1997 Annual Meeting, Los Angeles, CA. Symposium Coordinator for Area 1f, High Pressure.

ISCRE 15, San Diego, CA Sept. 1998. Program coordinator for the Environmental - Air Pollution technical area.

AIChE 1998 Annual Meeting, Miami Beach, FL.

- Topical Conference on Environmental Reaction Engineering, Technical Program Chair.
- "Reactions in Environmentally Benign Solvents", Session Chair
- "Pollution Prevention Using Supercritical Fluids", Session Co-Chair

AIChE 1999 Annual Meeting, Dallas, TX.

- "Reactions in Environmentally Benign Solvents", Session Chair
- "Environmental Reaction Engineering", Session Chair

ACS Spring National Meeting, San Francisco, CA, March 2000 – "Green Chemistry for the Reduction of Greenhouse Gas Emissions"

Green Chemistry Gordon Conference, July, 2000, Connecticut College, New London, CT.

AIChE 2000 Annual Meeting, Los Angeles, CA. - "Innovations in Reaction Engineering Education" and "Benign Synthesis in Supercritical Fluids"

ACS Fall Annual Meeting, Washington, DC, August 2000 – "Symposium on Clean Solvents"

AIChE Annual Meeting, Reno, NV, November, 2001 – "Pollution Prevention using Supercritical Fluids I" and "Environmental Reaction Engineering II"

AIChE Annual Meeting, Indianapolis, IN, November, 2002 – "Green Reaction Engineering" and "CO₂ Emissions Reduction and Sequestration Technologies"

AIChE Annual Meeting, San Francisco, CA, November 2003 – "Greenhouse Gas Sequestration Technology" (2 sessions), and "Green Chemistry and Reaction Engineering" (3 sessions).

AIChE Annual Meeting, Austin, TX, November 2004, "Green Chemistry and Reaction Engineering", "Principles of Sustainable Engineering", "Sustainable Processing"

- NAS Workshop: Critical Building Blocks and Tools for Sustainability in the Chemical Industry: Identifying an Agenda for National Research, Washington DC, February 7-8, 2005, invited participant.
- 2nd International Conference on Green and Sustainable Chemistry and the 9th Annual Green Chemistry and Engineering Conference, Washington, DC, June 20 – 24, 2005, Workshop on Green Engineering Education, co-organizer.
- AIChE Annual Meeting, Cincinnati, OH, November 2005, "TE006 Green Chemistry for Sustainability: Co-sponsored by ACS".
- AIChE Annual Meeting, San Francisco, CA, November 2006, Topical E: Sustainability, "Green Chemistry and Engineering for Sustainability"
- American Chemical Society, 233rd National Meeting & Exposition, March 25-29, 2007, Chicago, IL USA, "Sustainability and Chemical Education: Industry's Perspective", "ACS and AIChE Symposium on Applied Chemistry and Engineering"
- AIChE Spring national meeting, Tampa, FL "Sustainable Energy I", "Sustainable Energy II", April 22, 2009.
- AIChE Annual meeting, Nashville, TN, "Sustainable Energy Plenary", Nov. 17, 2009.
- AIChE Annual meeting, Salt Lake City, UT, "Sustainable Energy Plenary", "Energy Efficiency: Challenges and Solutions" Nov. 8 – 10, 2010.
- Pacificchem 2015, Honolulu, HI, "Green Chemistry: Beyond the Bench", with Michael Gonzalez, Phillip Jessop, and Milton Hearn, December 2015.

Major Service Activities

University of Tulsa Department of Chemical Engineering

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|--|---------------|
| Chairman's Search Committee | (1987 - 1988) |
| Advisor for ChE Class of 1992 | (1988 - 1992) |
| AIChE Student Chapter Advisor | (1988 - 1994) |
| Host chapter for 1991 Mid-America Regional Conference | |
| Received Outstanding AIChE Student Chapter Award, 1991, 1992, 1993, 1994 | |
| Graduate Student Advisor | (1992 - 1996) |
| Assistant Professor Search Committee | (1994 - 95) |

University of Tulsa College of Engineering and Applied Sciences

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|------------------------------|---------------|
| Chief Advisor to Tau Beta Pi | (1991 - 1996) |
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University of Tulsa

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| Committee to Improve Teaching Evaluations | (Sp87 - Sp89) |
| University Senate | (1987 - 91) |
| Chairman of Faculty Affairs Council | (1988 - 90) |
| Executive Committee | (1988 - 90) |
| Member - Ad Hoc Committee on Senate Constitution | (1991 - 92) |
| Chairman | (1992) |
| Committee to review the graduate program, History Department | (1991 - 92) |

University of Toledo, Department of Chemical and Environmental Engineering

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|--|-----------------|
| Departmental Promotions Committee, Chair | (1996 -1999) |
| Undergraduate Director | (1998 - 2000) |
| Organized Seminar Series in Pollution Prevention | (Spring , 1999) |

University of Toledo, College of Engineering

Elaboration of Review, Promotion, and Tenure Criteria (1996 - 1997)
 Dean's Search Committee (1998 - 1999)

University of Toledo

Provost's Search Committee (1998 - 1999)
 Chair, Search committee for Vice-Provost for Graduate Education
 and Dean of the Graduate School (2000)
 Academic Honor's Committee (2000 – 2002;
 2005 – 2007)
 Graduate Council (2000 - 2006)
 Research Council (2000 - 2006)
 Economic Development Council (2004 - 2006)
 University Prioritization Committee (2005 - 2006)

Youngstown State University

Advisor for Tau Beta Pi (2014 -)
 Dean of Graduate Studies and Associate Provost for Research
 Search committee (2013 – 2014)
 Vice-President for Advancement search committee (2012)
 Executive Administrative Staff Committee (2010 - 2014)
 YSU representative to Mahoning Valley Economic Development
 trip to Israel (January, 2010)
 Academic Senate, Ad Hoc Committee on Sustainability, Chair (2008 - 2011)
 OEA Negotiations Team (2007 – 2009)

Technical Consulting and Review Committees

External Examiner:

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

Consulting

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)

Reviewer for:

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.