

## Dr. Carl R. F. Lund

last revised 5/10/24

### Education:

Ph.D., **University of Wisconsin**, Madison, Wisconsin, June 1981.

Major: Chemical Engineering.

Thesis: Solid State Chemical Probes of the Active Site for the Water-Gas Shift Reaction on Supported Magnetite Catalysts (J. A. Dumesic, Advisor).

B.S., **Purdue University**, West Lafayette, Indiana, May 1976.

Major: Chemical Engineering

### Employment:

SUNY Distinguished Teaching Professor, May 2007 – present.

Professor, September 1997 – May 2007.

Department Chair, June 1997 – January 2006.

Associate Professor, September 1989 – August 1997.

Assistant Professor, September 1986 – August 1989.

Department of Chemical and Biological Engineering, **University at Buffalo** (SUNY), Buffalo, New York, 14260.

Chair, July 2018 – December 2022

Department of Engineering Education, **University at Buffalo** (SUNY), Buffalo, New York, 14260.

Associate Dean for Research, January 2006 – September 2006.

School of Engineering and Applied Science, **University at Buffalo** (SUNY), Buffalo, New York, 14260.

Senior Engineer, December 1984 - July 1986.

Research Engineer, June 1981 - November 1984.

**Exxon Research and Engineering Company**, Corporate Research Science Laboratory, Annandale, New Jersey, 08801.

### Awards and Honors:

2018 Section Outstanding Teacher Award, awarded April 20, 2018 by the St. Lawrence Section of the American Society for Engineering Education.

Muncy High School Academic Hall of Fame, inducted May 2016, Muncy, Pa.

“Chemical Engineering Professor of the Year,” awarded May 2015 by the AIChE Student Chapter, SUNY-Buffalo.

Elected Fellow of the American Institute of Chemical Engineers, June 2014.

“Chemical Engineering Professor of the Year,” awarded May 2014 by the AIChE Student Chapter, SUNY-Buffalo.

“Professor of the Year,” awarded April 2014 by the New York Nu Chapter of Tau Beta Pi at SUNY-Buffalo.

- “Chemical Engineering Professor of the Year,” awarded April 2009 by the AIChE Student Chapter, SUNY-Buffalo.
- “SUNY Distinguished Teaching Professorship,” awarded May 2007 by the SUNY Board of Trustees.
- “Chemical Engineering Professor of the Year,” awarded May 2006 by the AIChE Student Chapter, SUNY-Buffalo.
- “University at Buffalo Notable Contributions to Teaching and Learning Award,” awarded by the Provost of the University at Buffalo, 2005.
- “Chemical Engineering Professor of the Year,” awarded April 2003 by the AIChE Student Chapter, SUNY-Buffalo.
- “Chancellor’s Award for Excellence in Teaching,” awarded May 1991 by the SUNY Board of Trustees.
- “Presidential Young Investigator”, awarded in 1988 by National Science Foundation.
- “Lilly Teaching Fellow”, awarded May 1988 by UB Office of Teaching Effectiveness.
- “Teacher of the Year”, 1986-1987 awarded May 1987 by the New York Nu Chapter of Tau Beta Pi at SUNY-Buffalo.
- Procter & Gamble Fellow, Schulte Fellow - University of Wisconsin.
- B. S. with Highest Distinction and with Honors Program in Chemical Engineering, Bruce Wilson Award as the Outstanding Senior in Chemical Engineering, President’s Honor Award, Tau Beta Pi, Omega Chi Epsilon, Phi Eta Sigma - Purdue University.

Research Interests:

Active learning, problem-solving pedagogy, reaction engineering, catalysis and reaction pathways

Online Textbook:

1. “Reaction Engineering Basics,” C. R. F. Lund, [https://buffalobadger.github.io/RE\\_Basics/](https://buffalobadger.github.io/RE_Basics/) (partial).

Book Chapter:

1. “Humin Formation Pathways,” J. Heltzel, S. R. K. Patil and C. R. F. Lund, in “Reaction Pathways and Mechanisms in Thermocatalytic Biomass Conversion II,” Marcel Schlaf and Conrad Zhang, eds. Springer, New York, 2016.

Archival Publications:

67. “Adding Necessary Rigor to Engineering Pedagogical Change, Instructional Innovation Versus Research-Informed Counter-Resistance,” Y.-H. Lee, C. R. F. Lund and R. K. Yerrick, *Journal of College Science Teaching*, **50** (6), 31-39 (2021).
66. “Single-step Flame Aerosol Synthesis of Active and Stable Nanocatalysts for the Dry Reforming of Methane,” M. M. Mohammadi, C. Shah, S. K. Dhandapani, J. Chen, S. R. Abraham, W. Sullivan, R. D. Buchner, E. A. Kyriakidou, H. Lin, C. R. F. Lund and M. T. Swihart, *ACS Appl Mater. Interfaces*, **13** (15), 17618-17628 (2021). (<https://doi.org/10.1021/acsami.1c02180>)

65. "A Career in Catalysis: James A. Dumesic," C. R. F. Lund, B. J. Tatarchuck, N. Cardona-Martinez, J. M. Hill, M. Sanchez-Castillo, G. W. Huber, Y. Roman-Leshkov, D. Simonetti, Y. PaganTorres, T. J. Schwartz and A. H. Motagamwala, *ACS Catalysis*, **11** (4), 2310-2339 (2021). (<https://dx.doi.org/10.1021/acscatal.0c05325>)
64. "Low-Temperature Ammonia Decomposition Catalysts for Hydrogen Generation," S. Mukherjee, S. V. Devaguptapu, Y. He, C. R. F. Lund and G. Wu, *Applied Catalysis B*, **226**, 162-181 (2018). (<https://doi.org/10.1016/j.apcatb.2017.12.039>)
63. "Glucose Formate Conversion in Gamma-Valerolactone," J. Heltzel and C. R. F. Lund, *Catalysis Today*, **269**, 88-92 (2016).
62. "Reactivity of Levulinic Acid during Aqueous, Acid-Catalyzed HMF Hydration," S. Karwa, V. M. Gajiwala, J. Heltzel, S. K. R. Patil and C. R. F. Lund, *Catalysis Today*, **263**, 16-21 (2016).
61. "Online Simulator Use in the Preparing of Chemical Engineers," R. K. Yerrick, C. R. F. Lund and Y. Lee, *Int. J. Online Pedagogy Course Design*, **3** (2), 1-24 (2013).
60. "Exploring Simulator Use in the Preparation of Chemical Engineers," R. K. Yerrick, C. R. F. Lund and Y. Lee, *J. Sci. Ed. Technol.*, **22** (3), 362-378 (2013).
59. "Comparison of Structural Features of Humins Formed Catalytically from Glucose, Fructose and HMF," S. K. R. Patil, J. Heltzel and C. R. F. Lund, *Energy Fuels*, **26** (8), 5281-5293 (2012).
58. "Formation and Growth of Humins via Aldol Addition and Condensation during Acid-Catalyzed Conversion of HMF," S. Patil and C. R. F. Lund, *Energy Fuels*, **25** (10), 4745-4755 (2011).
57. "A Rate Expression for Water-Gas Shift over a Gold/Ferrochrome Catalyst," G. N. Vajani, Shea Lerk Ng and C. R. F. Lund, *Ind. Eng. Chem. Res.*, **50** (18), 10493-10499 (2011).
56. "Copper Promotion of High Temperature Shift," J. S. Coleman, M. Zhang, R. M. VanNatter and C. R. F. Lund, *Catalysis Today*, **160**, 191-197 (2011).
55. "A DFT Study of the Effect of Copper Promotion upon Iron Oxide Surface Species," R. M. VanNatter, J. S. Coleman and C. R. F. Lund, *J. Molecular Cat. A*, **311**, 17-22 (2009).
54. "DFT Models for Active Sites on High Temperature Water-Gas Shift Catalysts," R. M. Van Natter, J. S. Coleman and C. R. F. Lund, *J. Molecular Cat. A*, **292**, 76-82 (2008).
53. "Effects of Zeolite Channel Walls and Cation Migration on N<sub>2</sub>O Decomposition Energies in Fe/ZSM-5," C. R. F. Lund, *J. Catal.*, **243**, 438-441 (2006).
52. "The Effect of NO upon N<sub>2</sub>O Decomposition over Fe/ZSM-5 with Low Iron Loading," C. Sang, B. H. Kim and C. R. F. Lund, *J. Phys. Chem. B*, **109** (6), 2295-2301 (2005).
51. "A Computational Study of Aluminum Chloride Activation for Toluene Chlorination," S. R. Spencer, M. Zhang and C. R. F. Lund, *J. Phys. Chem. A*, **107** (48), 10335-10345 (2003).
50. "Assessing High-Temperature Water-Gas Shift Membrane Reactors." D. Ma and C. R. F. Lund, *Ind. Eng. Chem. Res.*, **42** (4), 711-717 (2003).

49. "An Experimental and Computational Study of Solvent Effects in Toluene Chlorination," M. Zhang and C. R. F. Lund, *J. Phys. Chem. A*, **106** (43), 10294-10301 (2002).
48. "Issues Involved in Using MCSCF to Investigate Catalytic Sites Involving Transition Metals," B. H. Kim and C. R. F. Lund, *J. Molecular Cat. A*, **188** (1-2), 173-187 (2002).
47. "Hydrogen storage in aligned carbon nanotubes," Y. Chen, D. T. Shaw, X. D. Bai, E. G. Wang, C. Lund, W. M. Lu, and D. D. L. Chung, *Appl. Phys. Lett.*, **78** (15), 2128-2130 (2001).
46. "Zeolite-Catalyzed Chlorination of Toluene by Sulfuryl Chloride: Activity, Selectivity and Deactivation of NaKL Zeolite," M. C. Hausladen, R. C. Cyganovich, H. Y. Huang, and C. R. F. Lund, *Appl. Catal. A: General*, **219** (1-2), 1-12 (2001).
45. "Zeolite-Catalyzed Chlorination of Toluene by Sulfuryl Chloride: Activity, Selectivity and Deactivation of ZSM-5," Chen-Chang Chang, M. J. Burger, G. M. Faitar, and C. R. F. Lund, *J. Catal.*, **202**, 59-67 (2001).
44. "Possible Role of Nitrite/Nitrate Redox Cycles in N<sub>2</sub>O Decomposition and Light-Off over Fe-ZSM-5," C. Sang and C. R. F. Lund, *Catal. Lett.*, **73** (1), 73-77 (2001).
43. "Isothermal "Light-Off" during Catalytic N<sub>2</sub>O Decomposition over Fe/ZSM-5," C. Sang and C. R. F. Lund, *Catal. Lett.*, **70**, 165-173 (2000).
42. "Zeolite-Catalyzed Chlorination of Toluene by Sulfuryl Chloride: Activity, Selectivity and Deactivation of NaX and NaY Zeolites," M. C. Hausladen and C. R. F. Lund, *Appl. Catal. A: General*, **190** (1-2), 269-281 (2000).
41. "Preliminary Assessment of Membrane Reactors as a Means to Improve the Selectivity of Methylamine Synthesis," Chimin Sang, Chen-Chang Chang and C. R. F. Lund, *Ind. Eng. Chem. Research*, **38** (12), 4552-4562 (1999).
40. "The Effect of a Membrane Reactor upon Catalyst Deactivation during Hydrodechlorination of Dichloroethane," Chen-Chang Chang, Christopher M. Reo, and C. R. F. Lund, *Appl. Catal. B: Environ.*, **20**, 309-317 (1999).
39. "Zeolite-Catalyzed Chlorination of Toluene by Sulfuryl Chloride: The Effect of Zeolite Drying," M. C. Hausladen, B. W. Satterley, M. J. Burger, and C. R. F. Lund, *Appl. Catal. A*, **166** (1), 55-64 (1998).
38. "Zeolite-Catalyzed Chlorination of Toluene by Sulfuryl Chloride: The Role of Sulfuryl Chloride Decomposition in Chlorination," B. W. Satterley, M. C. Hausladen, and C. R. F. Lund, *Zeolites*, **19**, 434-440 (1997).
37. "Defining Conditions Where the Use of Porous Membrane Reactors Can be Justified Solely on the Basis of Improved Yield," C. M. Reo, L. A. Bernstein, and C. R. F. Lund, *Chem. Eng. Sci.*, **52** (18), 3075-3083 (1997).
36. "Cocurrent Membrane Reactors Versus PFRs for Shifting Dehydrogenation Equilibrium," C. M. Reo, L. A. Bernstein, and C. R. F. Lund, *AIChE J.*, **43** (2), 495-504 (1997).
35. "The Effect of Adding Co to MoS<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> upon the Kinetics of Water-Gas Shift," C. R. F. Lund, *Ind. Eng. Chem. Res.*, **35** (9), 3067-3073, (1996).
34. "A Batch Membrane Reactor for Laboratory Studies," L. A. Bernstein, C. M. Reo, and C. R. F. Lund, *J. Membrane Sci.*, **118**, 93-100, (1996).
33. "The Microkinetics of Water-Gas Shift over Sulfided Mo/Al<sub>2</sub>O<sub>3</sub> Catalysts," C. R. F. Lund, *Ind. Eng. Chem. Res.*, **35** (8), 2531-2538, (1996).

32. "CESL: The Chemical Engineering Simulation Laboratory," D. A. Kofke, M. Grosso, S. Gollapudi, and C. R. F. Lund, *Chem. Eng. Ed.*, **30** (2), 114-119 (1996).
31. "Permeation Through Kapton® Polyimide at Elevated Temperatures," M. Hausladen, K. A. Oship, and C. R. F. Lund, *Chem. Eng. Comm.* **143**, 91-97 (1996).
30. "The Role of Chlorine in Induction Periods During the Oxidation of Methane over Pd/SiO<sub>2</sub>," S. S. Peri and C. R. F. Lund, *J. Catal.*, **152**, 410-414 (1995).
29. "Membrane Reactors for Catalytic Series and Series-Parallel Reactions," L. A. Bernstein and C. R. F. Lund, *J. Membrane Sci.*, **77**, 155-164 (1993).
28. "Hydrodenitrogenation-Selective Catalysts I. Fe Promoted Mo/W Sulfides," T. C. Ho, A. J. Jacobson, R. R. Chianelli, and C. R. F. Lund, *J. Catal.*, **138** (1), 351-363 (1992).
- 27a. "Improving Selectivity During Methane Partial Oxidation by Use of a Membrane Reactor," Lund, C. R. F., *Catal. Lett.*, **12**, 395-404 (1992).
- 27b. "Letter to the Editor," Lund, C. R. F., *Catal. Lett.*, **13**, 423-424 (1992).
26. "Use of a Membrane Reactor to Improve Selectivity to Intermediate Products in Consecutive Catalytic Reactions," S. Agarwalla and C. R. F. Lund, *J. Membrane Sci.*, **70**, 129-141 (1992).
25. "A Model for the Catalytic Growth of Carbon Filaments," Chitrapu, P., Lund, C. R. F., and Tsamopoulos, J. A., *Carbon*, **30**, 285-293 (1992).
24. "The Synthesis and Cracking Behavior of Zeolite-Amorphous Silica-Alumina Composites Prepared Using Gels with High Alumina and Low Organic Template Content," P. Yarlagadda, C. R. F. Lund, and E. Ruckenstein, *J. Catal.*, **133**, 28-41 (1992).
23. "The Dependence of Catalytic Carbon Filament Growth Kinetics Upon Gas Phase Carbon Activity," S. A. Safvi, E. C. Bianchini, and C. R. F. Lund, *Carbon*, **29**, 1245-1250 (1991).
22. "Carbon Gasification by Group VIII Metal Catalysts," Mark E. Vincett, J. A. Tsamopoulos, and C. R. F. Lund, *J. Catal.*, **126**, 279-290 (1990).
21. "Different Activities and Selectivities of Silica-Alumina Catalysts Synthesized in Aqueous and Alcohol Solvents," P. Yarlagadda, C. R. F. Lund, and E. Ruckenstein, *J. Catal.*, **125**, 421-426 (1990).
20. "Oligomerization of Ethene and Propene over Composite Zeolite Catalysts," P. Yarlagadda, C. R. F. Lund, and E. Ruckenstein, *Appl. Catal.*, **62**, 125-139 (1990).
19. "Solubility and Diffusivity of Carbon in Metals," R. T. Yang, P. G. Goethal, J. M. Schwartz, and C. R. F. Lund, *J. Catal.*, **122**, 206-210 (1990).
18. "Solid State Diffusion During Carbon Gasification and Filament Growth," C. R. F. Lund and R. T. Yang, *Carbon*, **27**, 956-958 (1989).
17. "Conversion of Methanol to Hydrocarbons over Silica-Alumina: Selective Formation of Lower Olefins," P. Yarlagadda, C. R. F. Lund and E. Ruckenstein, *Appl. Catal.*, **54**, 139-157 (1989).
16. "Kinetic Implications of Mechanisms Proposed for Catalytic Carbon Filament Growth," E. C. Bianchini, and C. R. F. Lund, *J. Catal.*, **117**, 455-466 (1989).
15. "Further Studies of the Formation of Filamentous Carbon from the Interaction of Supported Iron Particles with Acetylene," R. T. K. Baker, J. J. Chludzinski, Jr. and C. R. F. Lund, *Carbon*, **25**, 295-303 (1987).

14. "Staged Carbon Gasification with Nickel Catalysts," Carl R. F. Lund, *Carbon*, **25**, 337-341 (1987).
13. "The Effect of Crystal Structure upon the Activity of Iron in Steam Gasification," Carl R. F. Lund, R. D. Sherwood and R. T. K. Baker, *J. Catal.*, **104**, 233-236 (1987).
12. "Nickel Catalyst Deactivation in the Steam-Carbon Reaction," C. R. F. Lund, *J. Catal.*, **95**, 71-83 (1985).
11. "A Comparison of the Catalytic Influence of Nickel and Copper-Nickel Alloys on the Graphite-Steam Reaction," R. T. K. Baker, N. S. Dudash, C. R. F. Lund and J. J. Chludzinski, Jr., *Fuel*, **64**, 1151-1156 (1985).
10. "Platinum, Barium, and Platinum-Barium Catalyzed Gasification of Graphite in Steam and Carbon Dioxide," C. R. F. Lund, J. J. Chludzinski, Jr. and R. T. K. Baker, *Fuel*, **64**, 789-794 (1985).
9. "Catalytic Gasification of Graphite by Barium in Steam, Carbon Dioxide, Oxygen, and Hydrogen," R. T. K. Baker, Carl R. F. Lund and J. J. Chludzinski, Jr., *J. Catal.*, **87**, 255-264 (1984).
8. "A Study of the Nickel-Titanium Oxide Interaction," A. J. Simoens, R. T. K. Baker, D. J. Dwyer, Carl R. F. Lund and R. J. Madon, *J. Catal.*, **86**, 359-372 (1984).
7. "Poisoning of the Platinum-Catalyzed Oxidation and Hydrogenation of Graphite by the Addition of CCl<sub>4</sub>," R. T. K. Baker, Carl R. F. Lund and J. A. Dumesic, *Carbon*, **21**, 469-471 (1983).
6. "Strong Oxide-Oxide Interactions in Silica-Supported Magnetite Catalysts: IV. Catalytic Consequences of the Interaction in Water-Gas Shift," Carl R. F. Lund and James A. Dumesic, *J. Catal.*, **76**, 93-100 (1982).
5. "Strong Oxide-Oxide Interactions in Silica-Supported Magnetite Catalysts: II. The Core/Shell Nature of the Interaction," Carl R. F. Lund and James A. Dumesic, *J. Phys. Chem.*, **86**, 130-135 (1982).
4. "Strong Oxide-Oxide Interactions in Silica-Supported Magnetite Catalysts: III. Water-Induced Migration of Silica on Geometrically Designed Catalysts," Carl R. F. Lund and James A. Dumesic, *J. Catal.*, **72**, 21-30 (1981).
3. "Strong Oxide-Oxide Interactions in Silica-Supported Magnetite Catalysts: I. X-ray Diffraction and Mössbauer Spectroscopy Evidence for Interaction," Carl R. F. Lund and James A. Dumesic, *J. Phys. Chem.*, **85**, 3175-3180 (1981).
2. "Magnetite Surface Area Titration Using Nitric Oxide, II. Pretreatment Effects and Silica-Supported Samples," Joseph E. Kubsh, Carl R. F. Lund and James A. Dumesic, *React. Kinet. Catal. Lett.*, **17**, 115-119 (1981).
1. "Magnetite Surface Area Titration Using Nitric Oxide," Carl R. F. Lund, James J. Schorfheide and James A. Dumesic, *J. Catal.*, **57**, 105-112 (1979).

Conference Proceedings:

14. "Using Backwards Design to Redesign a First-Year Engineering Seminar to Serve a Diverse Student Population," M. Sanchez-Pena, J. Zirnheld, K. Burke, J. Latorre, C. R. F. Lund, A. Olewnik, 2023 ASEE Annual Conference & Exposition, Baltimore, MD, 2023. DOI: 10.18260/1-2--44568
13. "Work-In-Progress: Changing the Goal Structure in a Problem-Solving Course," ASEE 2022 Annual Conference, Minneapolis, MN, 2022.

12. "Student Responses to Homework Wrappers," Paper ID 34458, 2021 Frontiers in Education Conference, Lincoln, NE, 2021.
11. "Work in Progress: Wrappers vs. Experts," Carl R. F. Lund, 2021 Virtual Annual ASEE Conference, 2021.
10. "Can Students Self-Generate Appropriately Targeted Feedback on Their Own Solutions in a Problem-Solving Context," Carl R. F. Lund, Paper ID No. 29052, 2020 Annual ASEE Conference and Exposition, Virtual Conference originally scheduled for Montreal, Quebec, Canada, 2020.
9. "A TExT for Engineering Education in the 21st Century, 2. A Sample Study Unit," C. R. F. Lund, Paper AC 2009-612, Proceedings of the 2009 Annual ASEE Conference, Austin, TX, 2009.
8. "A TExT for Engineering Education in the 21st Century, 1. Objectives and Overview," C. R. F. Lund. Paper AC-2008-192, Proceedings of the 2008 Annual ASEE Conference, Pittsburgh, PA, 2008.
7. "Kinetic Changes During the Activation of Pd Methane Oxidation Catalysts," C. R. F. Lund, S. S. Peri and S. Harou-Kouka, *Preprints of Papers, Division of Petroleum Chemistry, ACS*, **42**, 173 (1997).
6. "Partial Oxidation Using Membrane Reactors," L. A. Bernstein, S. Agarwalla, and C. R. F. Lund, ACS Symposium Series 523, "Catalytic Selective Oxidation," pp 427-437. American Chemical Society, Washington, D.C., 1993.
5. "Partial Oxidation Using Membrane Reactors," L. A. Bernstein, S. Agarwalla, and C. R. F. Lund, *Preprints of Papers, Division of Petroleum Chemistry, ACS*, **37**, 1268 (1992).
4. "A Denitrogenation-Selective Hydrotreating Catalyst," T. C. Ho, A. J. Jacobson, R. R. Chianelli, and C. R. F. Lund, *Preprints of Papers, Division of Petroleum Chemistry, ACS*, **37**, 729 (1992).
3. "A Model of Nickel-Catalyzed Gasification," M. Vincett, C. R. F. Lund and J. Tsamopoulos, *Preprints of Papers, Division of Fuel Chemistry, ACS*, **34**, 44 (1989).
2. "Nickel Deactivation During Gasification Reactions," C. R. F. Lund, Stud. Surf. Sci. Catal. 38, "Catalysis 1987, Proc. 10th North Amer. Meet. Catal. Soc." p. 733. J. W. Ward, ed., Elsevier, New York, 1988.
1. "Water-Gas Shift Over Magnetite-Based Catalysts: Nature of Active Sites for Adsorption and Catalysis," C. R. F. Lund, J. E. Kubsh and J. A. Dumesic, ACS Symposium Series, "The Role of Solid State Chemistry in Catalysis" 279, 313 (1985).

Presentations as Speaker or Principal Author (\* invited, † poster):

126. "Student Goal Orientation and Structure in a Problem-Solving Course," 2023 AIChE Annual Meeting, Orlando, FL, November 6, 2023.
125. "Replacing Mimicry with Mastery: Homework Wrappers and Effort-Based Grading," 2022 AIChE Annual Meeting, Phoenix, AZ, November 14, 2022.
124. "Effort-Based Grading of Homework," 2021 AIChE Annual Meeting, Boston, MA, November 10, 2021.
123. "Initial Analysis of the Effects of Homework Wrappers in a Problem-Solving Course," 2020 AIChE Annual Meeting, Virtual Conference, November 18, 2020.

122. "Can Students Self-Generate Appropriately Targeted Feedback on Their Own Solutions in a Problem-Solving Context," 2020 Annual ASEE Conference and Exposition, Virtual Conference originally scheduled for Montreal, Quebec, Canada, June 21-24, 2020.
121. "Improved Homework Effectiveness in a Problem-Solving Course," Annual AIChE Meeting, Orlando, FL, November 11, 2019.
120. "Helping Students Learn from their Mistakes," ASEE Zone 1 Conference, Niagara Falls, NY, April 12, 2019.
- 119.\* "Self-Sustaining Reaction of an Oxygen Candle," XXIX Interamerican Congress of Chemical Engineering/68<sup>th</sup> Canadian Chemical Engineering Conference, Toronto, CA, October 29, 2018.
118. "The Most Important Thing You've Learned," Muncy High School Commencement Address, Muncy, PA, May 27, 2016.
117. \*# "A Toolkit for Exceptional Teaching (TE<sub>x</sub>T): Teaching/Learning Resources for Flipping the Classroom," NAE Future of Engineering Education Conference, Irvine, CA, October 27-30, 2013.
116. "The Stability of Levulinic Acid During Acid-Catalyzed Glucose Dehydration," Annual AIChE Meeting, San Francisco, November 3-8, 2013. Co-author: J. Hetzel
115. "Processing of Glucose-Derived Humins," Annual AIChE Meeting, San Francisco, November 3-8, 2013. Co-author: J. Hetzel
114. "Chemical Processing of Fructose-Derived Humins," Annual AIChE Meeting, Pittsburgh, PA, Oct 28 - Nov 2, 2012. Co-authors: J. Heltzel and S. Patil
113. \* "Modification of the morphology and chemical functionality of humins formed from hexoses," 244<sup>th</sup> ACS National Meeting, Philadelphia, PA, August 19-23, 2012. Co-authors: S. Patil and J. Heltzel
112. \* "Mechanism of humin formation during catalytic conversion of cellulose-derived carbohydrates," Michigan Technological University, Materials Science and Engineering Department Seminar, April 20, 2012, Houghton MI.
111. \* "Mechanism of humin formation and growth during acid-catalyzed conversion of glucose, fructose and HMF," 243<sup>rd</sup> ACS National Meeting, San Diego, CA, March 25-29, 2012. Co-author S. Patil.
110. \* "Reducing Waste Byproducts of Cellulose Hydrolysis," 2011 ESW National Conference, Buffalo, NY, October 21, 2011. Co-author S. Patil.
109. # "Growth of Humins during Acid-Catalyzed Carbohydrate Conversion," AIChE Annual Meeting, Minneapolis, MN, October 16-21, 2011. Co-author: S. Patil.
108. # "Characterization of humins formed during acid-catalyzed hydrolysis of glucose, fructose and HMF," 22<sup>nd</sup> North American Catalysis Society Meeting, Detroit, MI, June 5-10, 2011. Co-author: S. Patil.
107. "Characterization of Humins Formed during Hydrolysis of C-6 Sugars," Pittsburgh-Cleveland Catalysis Society Meeting Pittsburgh, PA, May 16-17, 2011. Co-author: S. Patil.
106. "Deactivation of Gold-Ferrocene Very Low Temperature Water-Gas Shift Catalysts," AIChE Annual Meeting, Salt Lake City, UT, November 7-12, 2010. Co-author: G. N. Vajani.



105. \* "Moving Lectures Out of the Classroom," Target Your Teaching Conference for Teaching Assistants, University at Buffalo, Buffalo, NY August 2010.
104. \* "A Comparative Overview of Biofuels and their Potential to Meet our Energy Requirements," Business of Energy June 16th Event in Biofuels, Buffalo, NY, June 16, 2010.
103. "Role of Copper as a High Temperature Shift Promoter," AIChE Annual Meeting, Nashville TN, November 8-13, 2009. Co-authors: R. M. Van Natter, J. S. Coleman.
102. "Textbooks are so Twentieth Century," AIChE Annual Meeting, Nashville TN, November 8-13, 2009.
101. \* "Fe<sub>3</sub>O<sub>4</sub>-Based High and Low Temperature Shift Catalysts." Pittsburgh-Cleveland Catalysis Society, Pittsburgh, PA, October 9, 2009.
100. \* "Making Room for Active Learning in the Classroom," Target Your Teaching Conference for Teaching Assistants, University at Buffalo, Buffalo, NY August 2009.
99. \* "Alternative Fuel Alternatives," U. B. This Summer Lecture Series, University at Buffalo, SUNY, July 22, 2009.
98. † "A TEXT for Engineering Education in the 21st Century, 2. A Sample Study Unit." 2009 Annual ASEE Conference, Austin, TX, June 2009.
97. \* "There isn't a Remedy for the U. S. Energy Situation; There are Several." Western New York Science and Technology Forum, University at Buffalo, Buffalo, NY December 3, 2008.
96. "Kinetic Study of Water-Gas Shift over Au-Ferrochrome Catalysts." AIChE Annual Meeting, Philadelphia, PA, November 16-21, 2008. Co-authors: J. S. Coleman and G. N. Vajani.
95. "TEXTs for the 21<sup>st</sup> Century." AIChE Annual Meeting, Philadelphia, PA, November 16-21, 2008.
94. \* "Making Room for Active Learning in the Classroom," Target Your Teaching Conference for Teaching Assistants, University at Buffalo, Buffalo, NY August 2008.
93. † "A TEXT for Engineering Education in the 21<sup>st</sup> Century, 1. Objectives and Overview." 2008 Annual ASEE Conference, Pittsburgh, PA, June 2008.
92. \* "Moving Lectures Out of the Classroom to Make Room for Learning," University at Buffalo Teaching and Learning Center, Teaching Effectiveness Workshop Series, April 7, 2008, Buffalo, NY.
91. \* "There Isn't an Answer to the U. S. Energy Dilemma, So What Should We Do?" U. B. Scholars Forum Seminar, March 29, 2008, Buffalo, NY.
90. "Comparison of Unpromoted Ferrochrome WGS Catalysts to Those Promoted with Au or Cu." AIChE Annual Meeting, Salt Lake City, November 2007. Co-author: J. S. Coleman.
89. "A Computational Study of Fe<sub>3</sub>O<sub>4</sub> (100) Surface Species Related to Water-Gas Shift." AIChE Annual Meeting, San Francisco, November 2006. Co-author: R. M. VanNatter.
88. \* "Role of copper and other high temperature water-gas shift promoters," 231st ACS National Meeting, Atlanta, GA, March 2006.

87. \* "Promotion of ferrochrome water-gas shift catalysts with copper," Pittsburgh-Cleveland Catalysis Society Meeting, Pittsburgh, PA, December, 2005.
86. "Effects of Cation Migration upon Energetics of Fe/ZSM-5 Catalyzed Reactions," AIChE Annual Meeting, Cincinnati, OH, November 2005. Co-author: B. Chen.
85. ‡ "Computational Investigation of Cation Migration and its Effect Upon the Thermochemistry of N<sub>2</sub>O Decomposition over Fe/ZSM-5," 19th North American Meeting of the Catalysis Society, Philadelphia, PA, May 2005. Co-author: B. Chen.
84. \* "Tenure and Promotion: Perspective from a Departmental Chairperson," AIChE Annual Meeting, Austin, TX, November 2004.
83. "A Method for Approximating Activation Barriers using Geometric Interpolation," AIChE Annual Meeting, Austin, TX, November 2004.
82. "A Unifying Mechanistic Model for Redox Reactions over Fe/ZSM-5," AIChE Annual Meeting, Austin, TX, November 2004. Co-author: B. Chen.
81. \* "Microkinetic Modeling of High-Temperature Shift for Development of Catalysts for Membrane Reactors," Engelhard Corporation, Iselin, NJ, July 29, 2004.
80. "The Effect of Sodium Cations upon Redox Cycles involving Fe/ZSM-5," AIChE Annual Meeting, San Francisco, CA, November 2003. Co-author: B. Chen.
79. "The Role of Water in the Activation of Aluminum Chloride Halogenation Catalysts," AIChE Annual Meeting, San Francisco, CA, November 2003. Co-authors: S. Spencer, M. Zhang.
78. \* "Environmental Applications of Heterogeneous Catalysis: Remediation and Source Reduction," Civil, Structural and Environmental Engineering Department, University at Buffalo, SUNY, Buffalo, NY, September 26, 2003.
77. ‡ "Water-Gas Shift Kinetics over Iron Oxide Catalysts at Membrane Reactor Conditions," 18th North American Catalysis Society Meeting, Cancun, June 2003. Co-author: M. Zhang.
76. "Redox Cycles over Fe/ZSM-5," 18th North American Catalysis Society Meeting, Cancun, June 2003. Co-author: B. Chen.
75. ‡ "Development of Catalysts and Processes for Environmentally Benign Aromatic Chlorination," ESI Spring Symposium, Buffalo, NY, April 2003.
74. "Redox Cycles over Fe/ZSM-5," AIChE Annual Meeting, Indianapolis, IN, November 2002. Co-author: B. Kim.
73. "High Temperature Water-Gas Shift at Membrane Reactor Conditions," AIChE Annual Meeting, Indianapolis, IN, November 2002. Co-author: M. Zhang.
72. ‡\* "Water Gas Shift Kinetics at Membrane Reactor Conditions," University Coal Contractors Review Meeting, Pittsburgh, PA, June 4, 2002.
71. "Water-Gas Shift Kinetics over Modified Iron Oxide Catalysts at Membrane Reactor Conditions," Pittsburgh-Cleveland Catalysis Society Meeting, Monroeville, PA, May 10, 2002. Co-author: M. Zhang (speaker).
70. \* "Surface Intermediates in Redox Cycles on Fe/ZSM-5," Pittsburgh-Cleveland Catalysis Society Meeting, Cranberry PA, December 7, 2001.
69. "Pathways in Homogeneous Catalytic Chlorination," AIChE Annual Meeting, Reno, NV, November 2001. Co-author: S. Spencer.
68. "Water-Gas Shift over Promoted Iron Oxide," AIChE Annual Meeting, Reno, NV, November 2001. Co-author: M. Zhang.

67. \* "Selective Chlorination of Toluene using Zeolites: Activity, Selectivity and Deactivation," GE Corporate Research & Development, Schenectady, NY, October 12, 2001.
66. \* "An Experimental and Computational Investigation of Redox Cycles during N<sub>2</sub>O Decomposition," Chemical Engineering Department Seminar, Worcester Polytechnic Institute, October 11, 2001.
65. \*(keynote) "A Nitrite/Nitrate Redox Cycle for N<sub>2</sub>O Decomposition over Fe/ZSM-5," 17<sup>th</sup> North American Catalysis Society Meeting, Toronto, June 2001. Co-author: C. Sang.
64. \* "Water-Gas Shift at Membrane Reactor Conditions," University Coal Contractors Review Meeting, Pittsburgh, PA, June 5, 2001. Co-author: M. Zhang.
63. \* "Microkinetic Models for Water-Gas Shift at Membrane Reactor Conditions," Chemical Engineering Department Seminar, Tufts University, March 26, 2001.
62. \* "An Experimental and Computational Study of N<sub>2</sub>O Decomposition on Fe/ZSM-5," Center for Computational Research Colloquium Series, University at Buffalo, February 23, 2001.
61. "Uncatalyzed and AlCl<sub>3</sub>-catalyzed chlorination of toluene," AIChE Annual Meeting, Los Angeles, CA, November 2000. Co-authors: M. Zhang, S. Spencer.
60. "N<sub>2</sub>O Decomposition over Fe-ZSM-5," AIChE Annual Meeting, Los Angeles, CA, November 2000. Co-author: C. Sang.
59. "Water Gas Shift Kinetics under Membrane Reactor Conditions," AIChE Annual Meeting, Los Angeles, CA, November 2000. Co-author: D. Ma.
58. "Ab-initio modeling of iron dimers in ZSM-5 and other iron clusters," AIChE Annual Meeting, Los Angeles, CA, November 2000. Co-author: B. Kim.
57. ‡ "N<sub>2</sub>O Decomposition over Fe-ZSM-5: Two Levels of Catalytic Activity," Catalysis Gordon Conference, Colby-Sawyer College, New London, NH, June 26-30, 2000. Co-author: Chimin Sang.
56. ‡\* "Water Gas Shift at Membrane Reactor Conditions," University Coal Research Contractors Review Meeting, Pittsburgh, PA, June 6-7, 2000. Co-author: D. Ma.
55. "Chlorination of Toluene Using ZSM-5," AIChE Annual Meeting, Dallas, TX, November 1999. Co-author: C.-C. Chang.
54. ‡ "Activation of Oxygen on Fe/ZSM-5," AIChE Annual Meeting, Dallas, TX, November 1999. Co-authors: B.H. Kim, C. S. Sang.
53. "On the Role of the Lewis Acid in Electrophilic Substitution," AIChE Annual Meeting, Dallas, TX, November 1999.
52. "Assessment of Methylamine Synthesis using Membrane Reactor," AIChE Annual Meeting, Dallas, TX, November 1999. Co-authors: C. S. Sang, C.-C. Chang.
- 51.\* "DFT Studies of the Chlorination of Toluene using AlCl<sub>3</sub>," Jaguar/MacroModel Users Group Meeting, Forrestal Marriott Hotel, Princeton, NJ, August 1999.
- 50.‡ "Selective Toluene Chlorination Using ZSM-5 Catalysts," 16th North American Catalysis Society Meeting, Boston, June 1999. co-authors: M. J. Burger and G. M. Fatar.
- 49.\* "Catalytic Chlorination of Toluene Using Zeolite Catalysts," Pittsburgh-Cleveland Catalysis Society Meeting, Mercer, PA, December 1998.
48. "Catalysts for Selective Electrophilic Substitution," Annual AIChE Meeting, Miami, November 1998.

- 47.\* "Using Membrane Reactors to Enhance Conversion of Large Molecules in Reversible Reactions," The Procter & Gamble Company, Cincinnati, OH, March 23, 1998.
46. "Changes in Reaction Kinetics during Activation of Supported Pd," Annual AIChE Meeting, Los Angeles, November 1997. co-authors: S. Harou-Kouka and S. Peri.
45. "Zeolite-Catalyzed Chlorination of Toluene Using Sulfuryl Chloride," 15<sup>th</sup> North American Catalysis Society Meeting, Chicago, May 1997. co-authors: M. C. Hausladen, B. W. Satterley, and M. J. Burger.
44. "Kinetic Changes during the Activation of Pd Methane Oxidation Catalysts," Spring ACS Meeting, San Francisco, April 1997. co-authors: S. Harou-Kouka, S. S. Peri.
43. "An Assessment of Membrane Reactors for Dehydrogenation Reactions," Annual AIChE Meeting, Chicago, November 1996. co-authors: C. Reo and L. Bernstein.
- 42.\* "Using Membrane Reactors for Catalytic Reactions to Improve Selectivity," Workshop on Advances in Homogeneous and Heterogeneous Catalysis and Surface Science, June 1996, Nanjing, China.
- 41.\* "Zeolite Catalysts for Enhanced para-Selectivity during Toluene Chlorination," Workshop on Advances in Homogeneous and Heterogeneous Catalysis and Surface Science, June 1996, Nanjing, China.
- 40.\* "The Activation of Pd Catalysts during Oxidation of Methane," Workshop on Advances in Homogeneous and Heterogeneous Catalysis and Surface Science, June 1996, Nanjing, China.
- 39.\* "The Mechanism of Water-Gas Shift over Sulfided Molybdenum Catalysts," Workshop on Advances in Homogeneous and Heterogeneous Catalysis and Surface Science, June 1996, Nanjing, China.
38. † "When Can a Catalytic Membrane Reactor Enhance Dehydrogenation Yields?," Gordon Conference on Catalysis, June 1996.
37. "Experimental Studies of the Effect of Membrane Reactors on Selectivity," Annual AIChE Meeting, Miami, November 1995. co-authors: L. Bernstein and C. Reo.
36. "Selectivity and Activity in Zeolite-Catalyzed Chlorination," Annual AIChE Meeting, Miami, November 1995. co-authors: M. Hausladen (speaker) and B. Satterley.
35. † "The Microkinetics of Water-Gas Shift," 1995 Gordon Conference on Catalysis, Colby-Sawyer College, NH, June 26-27, 1995.
34. "A Microkinetic Model for Sulfur-Tolerant Water-Gas Shift," 14th North American Meeting of the Catalysis Society, Snowbird, UT, June 1995.
- 33.\* "Reducing Chemical Hazardous Waste Generation at the Source," NYS Center for Hazardous Waste Management Industrial Research Roundtable, February, 1995.
32. "Effect of Preparation and Pretreatment Methods on the Activity of Pd/SiO<sub>2</sub> in the Oxidation of Methane," Annual AIChE Meeting, San Francisco, November 1994. co-author: S. Peri.
31. † "Carburization of Pd During Catalytic Oxidation of Methane," 1994 Gordon Conference on Catalysis, Colby-Sawyer College, NH, June 27 & 28 1994. co-author: S. S. Peri.
- 30.\* "Effect of Preparation and Pretreatment on the Activity of Pd/SiO<sub>2</sub> in the Oxidative Conversion of Methane," SUNY-Buffalo, Chemical Engineering Department Seminar, April, 1994.

29. "Membrane Reactors for Consecutive Heterogeneous Catalytic Reactions," Annual AIChE Meeting, St. Louis, November 1993. co-author: L. Bernstein.
28. ‡ "Engineering Membrane Reactors to Control Selectivity in Consecutive Catalytic Reactions," 13<sup>th</sup> North American Meeting of the Catalysis Society, Pittsburgh, PA, May 1993. co-authors: S. Agarwalla and L. Bernstein.
27. "Methane Oxidation over Palladium and Palladium-Copper Supported on Silica," Annual AIChE Meeting, Miami Beach, November 1992. co-author: S. Peri (speaker).
26. "Partial Oxidation Using Membrane Reactors," 204<sup>th</sup> National ACS Meeting, Washington, D.C., August 1992. co-author: L. Bernstein (speaker).
25. "Composite Catalysts of ZSM-5 and Amorphous Silica-Alumina," Annual AIChE Meeting, Los Angeles, November 1991. co-authors: P. Yarlagadda and E. Ruckenstein.
24. "An Assessment of Catalytic Membrane Reactors for Use in the Partial Oxidation of Methane," Annual AIChE Meeting, Los Angeles, November 1991.
- 23.\* "Partial Oxidations in Catalytic Membrane Reactors," SUNY – Buffalo, Chemistry Department Colloquium, April 3, 1991.
- 22.\* "Deactivation of Nickel Catalysts During Steam Gasification of Carbon," Worcester Polytechnic Institute, Chemical Engineering Department Seminar, April 2, 1990.
- 21.\* "Water Gas Shift Reaction over Magnetite Catalyst," AIChE 1990 Spring National Meeting, Orlando, March 19, 1990. co-author: J. A. Dumesic.
20. "Activity and Coking Studies of High Silica Zeolites in Oxygenate and Hydrocarbon Conversion Reactions," Annual AIChE Meeting, San Francisco, November, 1989. co-authors: P. Yarlagadda, and E. Ruckenstein.
19. "Kinetic Implications of Mechanisms Proposed for Carbon Filament Growth," Carbon Conference, Penn State University, June 27, 1989. Co-author: E. C. Bianchini.
18. ‡ "Mechanistic Interpretation of the Kinetics of Catalytic Carbon Filament Growth," North American Meeting of the Catalysis Society, Detroit, May 8, 1989. Co-author: E. C. Bianchini.
17. "A Model of Nickel-Catalyzed Gasification," 197<sup>th</sup> National ACS Meeting, Dallas, April 10, 1989, co-authors: M. A. Vincett, and J. Tsamopoulos.
- 16.\* "Redox Behavior of Iron in Faujasite," W. R. Grace, Research Division, Columbia, Maryland, July 15, 1988.
- 15.\* "Kinetic Studies of Iron-Catalyzed Carbon Deposition," Union Carbide Parma Technical Center, Parma, Ohio, June 20, 1988.
- 14.\* "Growth of Carbon Filaments Using Iron Catalysts," Hyperion Catalysis International, Lexington, Mass, Nov. 4, 1987.
- 13.\* "Carbon Filament Growth," Carbon Science and Technology Short Course, SUNY-Buffalo, April, 1987.
12. "Carbon Deposition on Nickel during Steam Gasification," 17th Biennial Conference on Carbon, Worcester, MA, 1987.
11. "Nickel Deactivation During Gasification Reactions," 10<sup>th</sup> North American Meeting of the Catalysis Society, San Diego, 1987.
- 10.\* "Nickel Catalyst Deactivation During Steam Gasification," Chemical Engineering Department Seminar, University of Wisconsin, 1986.

9. "Catalytic Gasification of Carbon Using Iron," Annual AIChE Meeting, Miami Beach, 1986. Co-author: R. T. K. Baker.
8. "Deactivation During Nickel Catalyzed Gasification Reactions," Joint Spring Symposium of the New York and New England Catalysis Societies, New Haven, 1986.
7. "Steam Gasification of Graphite Using Platinum, Barium, and Platinum-Barium Catalysts," Annual AIChE Meeting, Chicago, 1985. Co-author: R. T. K. Baker.
6. "Active Sites on Magnetite Water-Gas Shift Catalysts," ACS Meeting, Miami Beach, 1985. Co-author: J. A. Dumesic.
- 5.\* "Steam Gasification of Graphite Using Platinum, Barium, and Platinum-Barium Catalysts," Auburn University Chemical Engineering Department Seminar, 1985.
4. "Inhibition of the Platinum Catalyzed Gasification of Graphite," Biennial Conference on Carbon, San Diego, 1983. Co-authors: J. A. Dumesic, R. T. K. Baker.
3. "Strong Oxide-Oxide Interactions in  $\text{Fe}_3\text{O}_4/\text{SiO}_2$  Water-Gas Shift Catalysts," North American Catalysis Society Meeting, Boston, 1981. Co-author: J. A. Dumesic.
2. "Structure Sensitivity in Reactions on Oxides: The Water-Gas Shift over  $\text{Fe}_3\text{O}_4$ ," Annual AIChE Meeting, Chicago, 1980. Co-author: J. A. Dumesic.
1. "Supported Magnetite Catalysts for the Water-Gas Shift: Surface Titration using Nitric Oxide," Annual AIChE Meeting, Miami, 1978. Co-authors: J. J. Schorfhiede, J. A. Dumesic.

Current Research Funding:

1. "Catalytic Membrane Reactors Based on Carbon Molecular Sieve Hollow Fiber Membranes for Sustainable and Modular  $\text{H}_2$  Production," DOE, 10/1/22 – 9/30/24, \$1,550,039, Co-PI with H. Lin, R. Singh, M. Swihart and K. Dombrowski.
2. "High Tech Matching Grant: Catalytic Membrane Reactors Based on Carbon Molecular Sieve Hollow Fiber Membranes," New York State Department of Economic Development, 10/1/22 – 9/30/24, 500,000, Co-PI with H. Lin and M. Swihart.

Past Research Funding:

35. "Manufacturing USA: GOALI: Designing Catalytic Membrane Reactors (CMRs) for Low Temperature  $\text{CO}_2$  Utilization and Methane Dry Reforming," NSF, 8/1/18 - 7/31/21, \$389,757.00, Co-PI with Mark Swihart and Haiqing Lin.
34. "TEXTs for the 21<sup>st</sup> Century," NSF CCLI, 4/1/08 – 3/31/11, \$125,000, principal investigator.
33. "Catalyst Modification to Reduce Product Inhibition During High Temperature Water-Gas Shift," ACS-PRF, 6/1/07 – 8/31/10, \$90,000.00, principal investigator.
32. "Mechanism for Carbon Deposition on Coated and Uncoated Metals," Praxair, Inc., 3/1/07 – 2/28/08, \$70,692.61, principal investigator.
31. Stone Energy Research Funds, U. B. School of Engineering, 9/1/05 – 8/31/07 \$30,000.00, principal investigator.
30. "Setting up facilities for the creation of course-related video presentations," U. U. P. Individual Development Award, NYS, 4/07 – 6/07, \$302.00, principal investigator.
29. "Environmentally Benign Aromatic Chlorination," U.B. IRCAF, \$45,000, 6/04-5/05, co-principal investigator (with one other).

28. "High Activity Catalytic Redox Sites within Zeolites," NSF (CTS-0099359), \$243,186.00, 6/01-11/04, principal investigator.
27. "Feasibility Data for a New Class of Environmentally-Friendly Chlorination Catalysts," U. B. Environment and Society Institute ESIRP Program, 2/02-12/03, \$5,000.00, principal investigator.
26. "Water Gas Shift Kinetics at Membrane Reactor Conditions," DOE-FETC, 6/99-6/02, \$194,762, principal investigator.
25. "Why do I need to know this stuff?" Educational Technology Grant, \$7,200, 6/01-5/02, principal investigator.
24. "Environmentally Benign Chemical Processes and Products," U. S. Dept. of Education, 8/98-8/01, \$302,664, co-PI in a group of 8.
23. "A Case Study that Spans the Chemical Engineering Curriculum," Educational Technology Grants Program, SUNY-Buffalo, \$10,000.00, principal investigator.
22. "Enhanced Selectivity in Aromatic Chlorinations Through the Use of Improved ZSM-5 Zeolite Catalysts," NSF (CTS-9727315), 3/98-7/00, \$160,000, principal investigator.
21. "Taking CE 428 Online," Educational Technology Faculty Development Grant, \$4,800, 1998, principal investigator.
20. "Membrane Reactors for Control of Selectivity in Multiple Reactions," NSF (CTS-9406620), \$178,332, 9/15/94-3/14/98, principal investigator.
19. "Using Membrane Reactors to Reduce the Generation of Waste Products," EPA (R82343-01-0), \$212,076, 10/1/95-9/30/97, principal investigator.
18. "Selective Electrophilic Substitution of Halogens into Alkyl-Aromatics using ZSM-5," NSF, \$215,999, 4/1/94 – 3/31/97, principal investigator.
17. "Catalytic Polymerization Reactor Studies," \$24,845, 8/1/95-1/31/97, Occidental Chemical.
16. "The Microkinetics of Water-Gas Shift over Pd, Pt, and Rh," PRF, \$50,000, 6/1/94 – 8/31/96, principal investigator.
15. "Reduction of Waste from Series-Parallel Reactions by Use of a Membrane Reactor," \$43,015, 1 year, New York State Center for Hazardous Waste Management, principal investigator. (awarded July 1995 but not funded due to state budgetary reductions)
14. "A Membrane Reactor for Source Reduction of Waste," New York State Center for Hazardous Waste Management, \$62,849, 7/15/94-8/14/95, principal investigator.
13. "Development of a Simulation Laboratory for Chemical Engineering Instruction," NSF, 1.5 years, \$100,000 (co-principal investigator with six others, D. Kofke lead investigator).
12. Presidential Young Investigator Award, National Science Foundation, \$308,500.00, 6/1/88 – 5/31/94, principal investigator.
11. "Direct Conversion of Methane to Methanol," Johnson-Matthey Ltd., \$30,000.00, 11/1/90 – 2/31/93, principal investigator.
10. "Parallel Computing Applications in Multidisciplinary Synthesis," \$45,000.00, 5/28/92, Sun Microsystems, principal investigator.
9. "A Means of Separating Dimethyl Ether," Occidental Chemical Company, \$28,000.00, 1/15/90 – 6/1/91, principal investigator.

8. "Research on Catalysts and Reaction Kinetics," Occidental Chemical Company, \$20,000.00, 2/1/89 – 3/31/91, principal investigator.
7. "Copper Oxide Catalyst for Gas Purification," Chemical Design, Inc., \$9,000.00, 9/1/89 – 8/31/90, principal investigator.
6. Sun Microsystems Equipment Grant, \$37,706.00, 5/90.
5. Experienced Faculty Travel Award, NYS/UUP Professional Development and Quality of Working Life Committee, \$500.00, 7/1/89 to 12/31/90, principal investigator.
4. Exxon Education Foundation Unrestricted Grant for Research on Catalytic Carbon Filament Growth, \$15,000.00, September 1988 – August 1989, principal investigator.
3. Lilly Teaching Fellowship, "A Proposal to Develop a Computer Game which will Demonstrate Reactor Design Problem Solving Methods," \$8000.00, 1 year, Lilly Endowment Teaching Fellows Program, June 1988 – December 1989, principal investigator.
2. New Faculty Development Award, NYS/UUP Professional Development and Quality of Working Life Committee, \$725.00, 1/1/88 to 1/1/89, principal investigator.
1. "Production of Carbon Fibers Using Iron Catalysts," NSF Grant No. MSM-8707606, Engineering Initiation Grant, \$30,000.00, 9/1/87 to 2/28/89, principal investigator.

Ph. D. Graduates, Dissertation (last known affiliation):

15. Jacob Heltzel, "A Study of HMF Formation During Acid-catalyzed Dehydration of Cellulosic Sugars," 2015. (Post-doctoral fellow at George Washington University)
14. Sushil Patil, "A Mechanistic Study of Formation and Growth of Humins during Acid Catalyzed Hydrolysis of Cellulosic Sugars," Ph. D. Dissertation (2012). (Global Foundries)
13. Gaurav N. Vajani, "Low Temperature Water-Gas Shift Reaction over Gold-Ferrochrome Catalysts," Ph. D. Dissertation (2011). (Intel)
12. Rainee Van Natter, "Active Site Models for High Temperature Water Gas Shift Reaction Over Iron Oxide Catalysts," Ph. D. Dissertation (2011). (Surmet Ceramics)
11. John S. Coleman, "Mechanistic Modeling of the High Temperature Water Gas Shift Reaction on Ferrochrome," Ph. D. Dissertation (2008). (Exxon-Mobil)
10. Bin Chen, "A Mechanistic Study of Redox Pathways in Fe/ZSM-5," Ph. D. Dissertation (2006). (Johnson-Matthey)
9. Mang Zhang, "An Experimental Investigation of Promoted Iron Based Oxide for High Temperature Water Gas Shift Reaction Catalysts at Membrane Reactor Conditions and an Experimental and Computational Study of Solvent Effects in Toluene Chlorination," Ph. D. Dissertation (2003). (California Air Resources Board).
8. Bryan Kim, "Methodology for ab initio Calculations of Spin-Coupled Transition Metal Clusters," PhD Dissertation (2001). (Pressure Products)
7. Chimin Sang, "Investigations on Membrane Application to Catalytic Methylamines Synthesis and Kinetics of Nitrous Oxide Decomposition on FeZSM-5," PhD Dissertation (2001). (Nobel Limited)
6. Chen-Chang Chang, "Selective Chlorination of Aromatic Hydrocarbons," PhD Dissertation (2001). (Feng Chia University)



5. Saley Harou-Kouka, "Microkinetic Modeling of Methane Oxidation on Silica Supported Palladium at Medium Temperature," PhD Dissertation (1999). (Bristol-Myers Squibb)
4. Mike Hausladen, Ph. D. 1996 "Zeolite-Catalyzed Chlorination of Toluene By Sulfuryl Chloride: Zeolite Activity, Selectivity and Stability," (1996). (Bristol-Myers Squibb)
3. Mark Schiek, "Activity, Coking, and Acidity of Amorphous Silica-Alumina, ZSM-5 Zeolite, and Their Composite," PhD Dissertation (1996). (Westvaco)
2. Lewis Bernstein, "Membrane Reactors for Consecutive Heterogeneous Catalytic Reactions," PhD Dissertation (1996). (Bristol-Myers Squibb)
1. Sarves Peri, "Kinetics of Methane Oxidation on Supported Palladium Catalyst Systems," PhD Dissertation (1995). (National Starch & Chemicals)

M. S. Graduates, Thesis (last known affiliation):

22. Matt Stone, "Modeling and Comparative Optimization of Palladium Membrane Reactors for the Water-Gas Shift Reaction," MS Thesis (2018).
21. Matt Mitchnik, "Analysis of Humins Made in a Non-Aqueous Environment," MS Thesis (2015).
20. Shruti Karwa, "Aldol Condensation of the Ketone Group in Levulinic Acid During Acid Catalyzed Hydrolysis of 5-Hydroxymethylfurfural," MS Thesis (2013). (Hebler Corp.)
19. Varun Gajiwala, "Reactivity of Levulinic Acid during Acid Catalyzed Hydrolysis of Glucose, Fructose or HMF," MS Thesis (2012).
18. Donghao Ma, "Kinetic Study of Water-Gas Shift Reaction over Iron-based Catalysts," MS Thesis (2001). (University at Buffalo, Computer Science Graduate Student)
17. Scott Spencer, "Ab-Initio Study of the Aluminum Chloride Catalysis of the Chlorination of Toluene," MS Thesis (2001). (General Mills)
16. Gheorghita M. Faitar, "K/ZSM-5 Catalyzed Chlorination of Toluene Using Sulfuryl Chloride," MS Thesis (1999). (SUNY-Buffalo, education)
15. Richard Cyganovich, "A Kinetic Study of the Catalytic Chlorination of Toluene By Sulfuryl Chloride Using Zeolite L and Aluminum Chloride," MS Thesis (1998). (ATSI)
14. Arun Subramanian, "Microkinetic Modeling of Water Gas Shift Reaction Over Rhodium on Silica Catalyst," MS Thesis (1998)
13. Yaping Huang, "Chlorination of Toluene – Zeolite L Catalyst Deactivation and Regeneration Study," MS Thesis (1997). (Ph. D. Candidate, University of Michigan)
12. Matthew Burger, "Toluene Chlorination Catalysis Using Zeolite ZSM5, MS Thesis (1997). (CSK Technical)
11. Christopher Reo, "A Study of the Dehydrogenation of Small Hydrocarbons in Membrane Reactors," MS Thesis (1997). (Pfaudler, Inc.)
10. Brian Satterley, "The Effect of the Decomposition of Sulfuryl Chloride on the Zeolite-Catalyzed Chlorination of Toluene," MS Thesis (1996). (Advanced Rubber Compounding)

9. Jane Lamanna, "Activation Behavior of a Silica-Supported Palladium Catalyst During Methane Oxidation," MS Thesis (1996).
8. Mike Hausladen, "Characterization of Polyimides as High Temperature Membrane Material for the Selective Separation of Partial Oxidation Products and Reactants," MS Thesis (1992). (Bristol-Myers Squibb)
7. Sunil Agarwalla, "Partial Oxidation of Methane: Preliminary Kinetic and Reactor Modeling," MS Thesis (1991).
6. Kimberly Oship (Lasala), "High Temperature Permeation of CO<sub>2</sub>, O<sub>2</sub>, CH<sub>4</sub>, and CH<sub>3</sub>OH in Polyimide Films," MS Thesis (1991). (Proctor & Gamble).
5. Syed Safvi, "A Catalytic Study of Carbon Filament Growth," MS Thesis (1990). (post-doc, Univeristy of Wisconsin)
4. Amaresh Ramaswamy, "Investigations on the Water Gas Shift Reaction, Effect of Hydrogen and of Catalyst Acidity," MS Thesis (1990).
3. Padmavati Chitrapu, "A Model for the Catalytic Growth of Carbon Filaments," MS Thesis (1989). (co-advised with Prof. Tsamopoulos)
2. Eber Bianchini, "A Study of the Catalytic Production of Carbon Filaments", MS Thesis (1988). (Mobil Chemical)
1. Anthony Knoerzer, "Pulse Adsorption on Zeolite Partial Oxidation Catalysts," MS Thesis (1988). (Mobil Chemical)

Courses Taught:

- CE 631, Chemical Engineering Research Methods II, second year graduate level.
- CE 630, Chemical Engineering Research Methods I, second year graduate level.
- CE 563, Introduction to Catalysis, first year graduate level.
- CE 561, Applied Chemical Kinetics I, first year graduate level.
- CE 514/414 Energy and the Environment, first year graduate/senior level.
- CE 429, Chemical Engineering Kinetics and Reactor Design, senior level.
- CE 428, Chemical Engineering Lab 4, senior level.
- CE 427, Chemical Engineering Lab 3, senior level.
- CE 419, Alternative Fuels, junior/senior level.
- CE 329, Chemical Engineering Kinetics and Reactor Design, junior level (replaced CE 429).
- CE 328, Chemical Engineering Lab 2, junior level.
- CE 311, Unit Operations I, junior level.
- CE 307, Section on Process Control, junior level.
- CE 212, Introduction to Chemical Engineering, sophomore level.
- CE 100H, Alternative Fuels (Honors Seminar), undergraduate honors level.
- EAS 140, Engineering Solutions, freshman level.

Other Teaching/Mentoring Activities:

- Advisor, Student Chapter Tau Beta Pi, April 1997 – April 2000.
- Faculty Mentor, Ronald E. McNair Program, September 1991 - August 1992.
- Host/advisor for student participants in the University at Buffalo Collegiate Science & Technology Entry Program (CSTEP) since Fall 2006.

Host for minority high school students interested in engineering through the SEAS BEAM (Buffalo Engineering Awareness for Minorities) program, various summers since 1989.

Advisor, Student Chapter AIChE, August 1987 - May 1990.

Faculty Mentor, University Honors Program, as requested since 1986.

Co-ordinator, Chemical Engineering Student Internship Program, September 1986 - December 1989.

Professional Memberships and Activities:

American Institute of Chemical Engineers, American Chemical Society, North American Catalysis Society, Pittsburgh-Cleveland Catalysis Society, American Society of Engineering Educators.

Director, Catalysis and Reaction Engineering Division of AIChE, 2007-2009.

Reviewer for *J. Molec. Catal., A:Chemical, J. Catal., Appl. Catal., Catal. Lett., Chem. Eng. Comm., Carbon, J. Phys. Chem., Ind. Eng. Chem. Research, Chem. Eng. Journal, AIChE J., J. Membrane Sci. Can. J. Chem. Eng., J. Amer. Ceram. Soc., Chem. Eng. Sci., Langmuir, Environmental Science & Technology, Energy and Fuels*, Butterworth Publishers, John Wiley Publishers, ACS Books, DOE Basic Energy Sciences Proposals and Programs, NSF Proposals, PRF Proposals, US Dept. of Agriculture Proposals, State of South Carolina.

Symposia Chaired and/or Organized:

Session Co-chair, "Environmental Catalysis." 17<sup>th</sup> North American Catalysis Society Meeting, Toronto, CA, June 2001.

Co-chair, "Zeolite Catalysis, Kinetics and Characterization." Annual AIChE Meeting, Dallas, November 1999.

Co-chair, "Clean Manufacturing." 16<sup>th</sup> North American Catalysis Society Meeting, Boston, May 1999.

Co-chair, "Zeolite Catalysis, Kinetics and Characterization." Annual AIChE Meeting, Los Angeles, November 1997.

Session Chair, "Zeolites," 15<sup>th</sup> North American Catalysis Society Meeting, Chicago, May 1997.

Co-chair, "Zeolite Catalysis, Kinetics and Characterization." Annual AIChE Meeting, Miami, November 1995.

Co-chair, "Zeolite Catalysts, Kinetics and Characterization." Annual AIChE Meeting, St. Louis, November 1993.

Organizer and Chair, "Catalytic and Related Chemistry of Methane." American Chemical Society Meeting, Los Angeles, CA, 1988.

Chair, "Carbon Deposition on Catalysts." 17<sup>th</sup> Biennial Conference on Carbon, Worcester, MA, 1987.

Other Professional Service:

Member, Technical Advisory Committee, New York State Pollution Prevention Institute, 2009.

Presented talk entitled "What do Chemical Engineers Do? What do Chemical Engineers Study?" to ChemShare, a local association of High School Chemistry Teachers, March 20, 2006.

University at Buffalo representative to the Council for Chemical Research, June 1997 – January 2006.

Invited participant in NSF PYI Workshop on U.S. Engineering, Mathematics and Science Education for the year 2000 and Beyond, November 4-6, 1990, Washington, DC.

University Service:

Member, Gateway Math Committee, Fall 2020-Spring 2021.

Co-chair, Academics Subcommittee of the Student Retention Task Force, Fall 2020-Spring 2021.

Member, Center for Educational Innovation Advisory Council, Fall 2014 - present.

Member, Gen. Ed. Quantitative Reasoning Committee, Spring 2014.

Member, Education Innovation Committee, Fall 2013.

Member, GSE Dean Search Committee, Spring 2013.

Member, Distinguished Series/Chancellor's Awards Selection Committee, 2009 - 2015.

Member, Faculty Senate Teaching and Learning Committee, February 2009 – 2013.

Presented talk to prospective freshmen and their parents entitled "There Isn't an Answer to the U. S. Energy Dilemma, So What Should We Do?," at the U. B. Scholars Forum Seminar, March 29, 2008.

Member, SEAS Program and Building Committee, January 2006 – September 2006.

Member, Center of Excellence in Bioinformatics Building Committee, 2005 – 2006.

Member, Task Force on Graduate Education in the Chemical Sciences, September 1996 – June 1997.

Member, Vice Presidential Committee to Solicit and Review Faculty Nominations for Special Sponsored Programs, January 1995 – January 1996.

Member, Council on Research and Sponsored Programs, March 1995 – 1998.

Member, Vice Presidential committee to select SUNY-Buffalo's nominees for NSF Presidential Faculty Fellowship Awards, October 1993.

Member, Research Foundation Sponsored Programs Advisory Council, January 1992 – January 1995.

SEAS Representative, Graduate School Executive Committee, January 1991 – February 1992.

Member, Advisory Committee for the Office of Teaching Effectiveness, 1990 – August 1992.

Alternate, Faculty Senate, September 1987 – August 1991.

School of Engineering Service:

Member, Engineering Education Department Chair Search Committee, December 2017 – April 2019.

Chair, Ad Hoc Tenure Committee, December 2017 - January 2018.

SEAS Awards Committee, August 2014 - present.

SEAS Promotions Committee, August 2007 – May 2010, August 2012 - August 2016  
chair September 2015 - August 2016.

SEAS Furnas Hall Emergency Response Coordinator, December 2007 – September 2009.

Associate Dean for Research, January 2006 – September 2006.

Chair, MAE Department Chair Search Committee, Fall 2001 – Spring 2002.

Chair, MAE Department Chair Search Committee, Fall 2000 – Spring 2001.

Member, search committee for Engineering Computing Services staff, multiple occasions 1993 - 2000.

Member Graduate Academic Programs Committee, January 1990 – August 1995. Chairperson, September 1991 – February 1992.

Member Faculty Personnel Committee, July 1990 – June 1994.

Secretary, Chemical Engineering Chairperson Search Committee, September 1989 – June 1990.

SEAS Masters of Engineering Committee, September 1989 – August 1995.

Ad Hoc Academic Grievance Committees: December 1989 – January 1990.  
December 1988 – February 1989.

Member SEAS Computer Committee, October 1988 – January 1996, September 1997 – January 2006.

*Chemical and Biological Engineering Department Service:*

Member, CBE Awards Committee, May 2013 - present.

Member, CBE Faculty Search Committee (materials), August 2013 - May 2014.

Member, CBE Space and Instrumentation Committee, January 2012 - May 2014.

Safety Committee Chairperson, September 2006 – September 2009.

Member, September 2009 – present.

Department Chairperson, June 1997 – January 2006.

Faculty Search Committee Chairperson (separations), October 1996 – June 1997.

Supervisor of Department Secretary, March 1993 – August 1995.

Member, Faculty Search Committee, October 1991 – June 1992.

Member, Chemical Engineering Computer Committee, October 1988 – September 1996. Chairperson, October 1988 – January 1996.

Member, Chemical Engineering Department Graduate Committee, September 1987 – June 1997.

Director of Graduate Studies, January 1997 – June 1997.

Acting Director of Graduate Studies, September 1996 – December 1996.

Director of Graduate Studies, January 1993 – August 1995.

Chairperson, January 1990 – January 1993.

*Personal Information:*

Born in Philadelphia, Pa.; U. S. Citizen; Married; 2 Adult Children