

# CHRISTOPHER T. WILLIAMS

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## EDUCATION

Ph.D. in Chemical Engineering, Purdue University, 1997.  
Bachelor of Chemical Engineering, University of Delaware, 1993.

## PROFESSIONAL EXPERIENCE

“SEASKY” VISITING PROFESSOR, School of Chemical Engineering., Dalian Univ. of Tech., China (01/09-Present)  
PROFESSOR, Department of Chemical Engineering, University of South Carolina (08/10 – Present)  
ASSOCIATE PROFESSOR, Department of Chemical Engineering, University of South Carolina (08/05 – 07/10)  
VISITING PROFESSOR, Department of Chemistry and CNRS, University of Poitiers, France (04/07 – 06/07)  
VISITING PROFESSOR, Department of Chemical Engineering, University of Osaka, Japan (08/06 – 12/06)  
THRUST LEADER, NANOCATALYSIS, Nanocenter, University of South Carolina (11/05 – Present)  
ASSISTANT PROFESSOR, Department of Chemical Engineering, University of South Carolina (08/99 – 07/05)  
NSF-NATO POST-DOCTORAL FELLOW, Physical Chemistry, University of Oxford, U.K. (12/97 – 07/99)

## PROFESSIONAL SOCIETIES

American Institute of Chemical Engineers  
American Chemical Society  
American Vacuum Society  
American Association for the Advancement of Science  
North American Catalysis Society  
Southeastern Catalysis Society  
Tau Beta Pi

## HONORS AND AWARDS

Research Achievement Award, College of Engineering and Computing, USC (2013)  
Joseph H. Gibbons Teaching Award, Department of Chemical Engineering, USC (2012)  
Samuel Litman Distinguished Professor Award, College of Engineering and Computing, USC (2008)  
USC Mortar Board Award for Excellence in Teaching, USC (2005)  
USC Golden Key Award for Creative Integration of Research and Undergraduate Teaching, USC (2004)  
NSF-CAREER Award (2001)  
NSF-NATO Postdoctoral Fellowship (1997-98), Purdue University Magoon Award for Excellence in Teaching (1997)  
Purdue University School of Chemical Engineering Research Excellence Award (1997)  
University of Delaware Engineering Scholar (1991-93)

## RESEARCH INTERESTS

Heterogeneous Catalysis. Enantioselective Catalysis. Catalytic Hydrogenation. Adsorption at Liquid- and Gas-Solid Interfaces. Nanostructured Catalyst Design. Surface-Enhanced Raman and Infrared Spectroscopies. Sum-Frequency Spectroscopy. Chemical Reaction Engineering.

## TEACHING EXPERIENCE

INSTRUCTOR, ECHE 101 *Introduction to Chemical Engineering*, USC, F'2011-2012  
INSTRUCTOR, ECHE 300 *Chemical Process Principles*, USC, F'2000-2001, 2007; S'2000-2004, 2008-2010, 2012-2013  
INSTRUCTOR, ECHE 430 *Chemical Engineering Kinetics*, USC, F'2002-2005, F' 2008, 2009  
INSTRUCTOR, ECHE 730 *Chemical Reactor Design*, USC, S'2005  
INSTRUCTOR, ECHE 789C *Fundamentals of Industrial Catalysis*, USC, S'2006; *Catalysis*, USC, S'2010  
INSTRUCTOR, ECHE 789W *Optical Techniques for the Study of Interfacial Phenomena*, USC, F'1999  
TEACHING ASSISTANT, *Material and Energy Balances*, Purdue University, S'1997  
TEACHING ASSISTANT, *Materials Science and Engineering*, Purdue University, Spring 1995

## REFEREED JOURNAL ARTICLES

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1. "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of Catalytic Mechanisms at High Gas Pressures: The CO-NO Reaction on Rhodium," A. A. Tolia, C. T. Williams, C. G. Takoudis and M. J. Weaver, *J. Phys. Chem.* **99(13)**, 4599-4508 (1995).
2. "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of Catalytic Mechanisms at High Gas Pressures: The NO-H<sub>2</sub> Reaction on Rhodium," A. A. Tolia, C. T. Williams, M. J. Weaver and C. G. Takoudis, *Langmuir* **11(9)**, 3438-3445 (1995).
3. "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of NO Reduction Over Rhodium at High Gas Pressures," C. T. Williams, A. A. Tolia, M. J. Weaver and C. G. Takoudis, *Chem. Eng. Sci.* **51(10)**, 1673-1682 (1996).
4. "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of Catalytic Mechanisms at High Gas Pressures: The CO-NO Reaction on Platinum and Palladium," C. T. Williams, A. A. Tolia, H. Y. H. Chan, C. G. Takoudis and M. J. Weaver, *J. Catal.* **163(1)**, 63-76 (1996).
5. "Adsorption and Hydrogenation of Carbon Monoxide on Polycrystalline Rhodium at High Gas Pressures," C. T. Williams, C. A. Black, M. J. Weaver and C. G. Takoudis, *J. Phys. Chem. B* **101(15)**, 2874-2883 (1997).
6. "Raman Spectral Evidence of Reactive Oxide Formation During Methanol Oxidation on Polycrystalline Rhodium at High Gas Pressures," C. T. Williams, C. G. Takoudis and M. J. Weaver, *J. Catal.* **170(1)**, 207-210 (1997).
7. "Methanol Oxidation on Rhodium as Probed by Surface-Enhanced Raman and Mass Spectroscopies: Adsorbate Stability, Reactivity, and Catalytic Relevance," C. T. Williams, C. G. Takoudis and M. J. Weaver, *J. Phys. Chem. B* **102(2)**, 406-416 (1998).
8. "Methanol Oxidation on Palladium Compared to Rhodium at Ambient Pressures as Probed by Surface-Enhanced Raman and Mass Spectroscopies," H. Y. H. Chan, C. T. Williams, M. J. Weaver and C. G. Takoudis, *J. Catal.* **174(2)**, 191-200 (1998).
9. "Surface Potentials of Metal-Gas Compared with Analogous Electrochemical Interfaces as Probed by Adsorbate Vibrational Frequencies," M. J. Weaver, C. T. Williams, S. Zou, H. Y. H. Chan and C. G. Takoudis, *Catal. Lett.* **52(3-4)**, 181-190 (1998).
10. "Probing Molecular Vibrations at Catalytically Significant Interfaces: A New Generality of Surface-Enhanced Raman Scattering," S. Zou, C. T. Williams, E. K.-Y. Chen and M. J. Weaver, *J. Am. Chem. Soc.* **120(15)**, 3811-3812 (1998).
11. "*In-Situ* Real-Time Studies of Heterogeneous Catalytic Mechanisms at Ambient Pressures as Probed by Surface-Enhanced Raman and Mass Spectroscopies," C. T. Williams, H. Y. H. Chan, M. J. Weaver and C. G. Takoudis, *Ind. Eng. Chem. Res.* **37(6)**, 2307-2315 (1998).
12. "Reduction Kinetics of Surface Rhodium Oxide by Hydrogen and Carbon Monoxide at Ambient Gas Pressures as Probed by Transient Surface-Enhanced Raman Spectroscopy," C. T. Williams, E. K.-Y. Chen, C. G. Takoudis and M. J. Weaver, *J. Phys. Chem. B* **102(24)**, 4785-4794 (1998).
13. "Surface-Enhanced Raman Scattering as a Ubiquitous Vibrational Probe of Transition-Metal Interfaces: Benzene and Related Chemisorbates on Palladium and Rhodium in Aqueous Solution," S. Zou, C. T. Williams, E. K.-Y. Chen and M. J. Weaver, *J. Phys. Chem. B.* **102(45)**, 9039-9049 (1998).
14. "Prospects for Detecting Metal-Adsorbate Vibrations by Sum-Frequency Spectroscopy," C. T. Williams, Y. Yang, C. D. Bain, *Catal. Lett.* **61(1-2)**, 7-13 (1999).
15. "Formation and Stability of Oxide Films on Platinum-Group Metals in Electrochemical and Related Environments as Probed by Surface-Enhanced Raman Spectroscopy: Dependence on the Chemical Oxidant," S. Zou, H. Y. H. Chan, C. T. Williams, and M. J. Weaver, *Langmuir* **16(2)**, 754-763 (2000).
16. "Unusually Fast Electron and Anion Transport Processes Observed in the Oxidation of 'Electrochemically Open' Microcrystalline [ $\{M(\text{bipy})_2\} \{M'(\text{bipy})_2\} (\text{m-L})(\text{PF}_6)$ ] Complexes (M, M' = Ru, Os; bipy = 2,2'-bipyridyl; L = 1,4-Dihydroxy-2,5-Bis(Pyrazol-1-yl)-Benzene) at a Solid Electrode-Aqueous Electrolyte Interface," A. M. Bond, F. Marken, C. T. Williams, D. A. Beattie, T. E. Keys, R. J. Forster and J. G. Vos, *J. Phys. Chem. B* **104(9)**, 1977-1983 (2000).

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17. "Low Density Self-Assembled Monolayers on Gold Derived from Chelating 2-Monoalkylpropane-1,3-dithiols," Y.-S. Shon, R. Colorado, Jr., C. T. Williams, C. D. Bain and T. R. Lee, *Langmuir* **16(2)**, 541-548 (2000).
18. "Total-Internal Reflection Sum-Frequency Spectroscopy: A Strategy for Studying Molecular Adsorption on Metal Surfaces," C. T. Williams, Y. Yang, C. D. Bain, *Langmuir* **16(5)**, 2343-2350 (2000).
19. "Probing Buried Interfaces with Non-Linear Optical Spectroscopy," C. T. Williams and D. A. Beattie, *Surf. Sci.*, **500(1-3)**, 545-576 (2002).
20. "In-situ Raman Investigation of Cinchonidine Adsorption on Polycrystalline Platinum in Ethanol," W. Chu, R. J. LeBlanc, and C. T. Williams, *Catal. Comm.*, **3(12)**, 547-552 (2002).
21. "In-Situ Investigation of Solid-Liquid Catalytic Interfaces by Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez and C. T. Williams, *Langmuir*, **19(7)**, 2956-2962 (2003).
22. "Aliphatic Nitrile Adsorption on Al<sub>2</sub>O<sub>3</sub> and ZrO<sub>2</sub> as Studied by Total Internal Reflection Sum-Frequency Spectroscopy," M. R. Strunk and C. T. Williams, *Langmuir*, **19(22)**, 9210-9215 (2003).
23. "Vibrational Band Assignments for the Chiral Modifier Cinchonidine: Implications for Surface Studies," W. Chu, R. J. LeBlanc, C. T. Williams, J. Kubota, and F. Zaera, *J. Phys. Chem. B*, **107(51)**, 14365-14373 (2003).
24. "Surface Raman Characterization of Cinchonidine-Modified Platinum in Ethanol: Effects of Liquid-Phase Concentration and Co-Adsorbed Hydrogen," R. J. LeBlanc, W. Chu and C. T. Williams, *J. Mol. Catal. A*, **212(1-2)**, 277-289 (2004).
25. "Synthesis and Microscopic Characterization of Dendrimer-Derived Ru/Al<sub>2</sub>O<sub>3</sub> Catalysts," G. Lafaye, C. T. Williams and M. D. Amiridis, *Catal. Lett.* **96(1-2)**, 43-47 (2004).
26. "Surface Raman Characterization of Cinchonidine-Modified Polycrystalline Platinum in Ethanol: Effects of Temperature and Comparison With 10,11-Dihydrocinchonidine," R. J. LeBlanc and C. T. Williams, *J. Mol. Catal. A* **220(2)**, 207-214 (2004).
27. "Molecular Dynamics Simulations of Cinchonidine-Modified Platinum in Ethanol: Comparisons with Surface Studies," S. R. Calvo, R. J. LeBlanc, C. T. Williams and P. B. Balbuena, *Surf. Sci.* **563(1-3)**, 57-73 (2004).
28. "Decomposition and Activation of Pt-Dendrimer Nanocomposites on a Silica Support," D. S. Deutsch, G. Lafaye, D. Liu, B. D. Chandler, C. T. Williams, and M. D. Amiridis, *Catal. Lett.* **97(3-4)**, 139-143 (2004).
29. "In-Situ Attenuated Total Reflection Infrared Spectroscopy of Dendrimer-Stabilized Platinum Nanoparticles Adsorbed on Alumina," D. Liu, J. Gao, C. J. Murphy, and C. T. Williams, *J. Phys. Chem. B* **108(34)**, 12911-12916 (2004).
30. "Thermal Decomposition of Generation-4 Polyamidoamine Dendrimer Films: Decomposition Catalyzed by Dendrimer-Encapsulated Pt Particles," O. Ozturk, T. J. Black, K. Perrine, K. Pizzolato, C. T. Williams, F. W. Parsons, J. S. Ratliff, J. Gao, C. J. Murphy, H. Xie, H. J. Ploehn, and D. A. Chen, *Langmuir*, **21(9)**, 3998-4006 (2005).
31. "AFM Characterization of Dendrimer-Stabilized Platinum Nanoparticles," Y. Gu, H. Xie, J. Gao, D. Liu, C. T. Williams, C. J. Murphy, and H. J. Ploehn, *Langmuir*, **21(7)**, 3122-3131 (2005).
32. "FTIR Studies of CO Adsorption on Al<sub>2</sub>O<sub>3</sub>- and SiO<sub>2</sub>-Supported Ru Catalysts," S.-Y. Chin, C. T. Williams, and M. D. Amiridis, *J. Phys. Chem. B* **110(2)**, 871-882 (2006).
33. "Multivariate Analysis of ATR-IR Spectroscopic Data: Applications to the Solid-Liquid Catalytic Interface," I. Ortiz-Hernandez, D. J. Owens, M. R. Strunk, and C. T. Williams, *Langmuir*, **22(6)**, 2629-2639 (2006).
34. "Particle Size Control in Dendrimer-Derived Supported Ruthenium Catalysts," G. Lafaye, A. Siani, P. Marecot, M. D. Amiridis, and C. T. Williams, *J. Phys. Chem. B*, **110(15)**, 7725-7731 (2006).
35. "In-situ Investigation of Acetonitrile Adsorption on Al<sub>2</sub>O<sub>3</sub>-coated CaF<sub>2</sub> Using Sum-Frequency Spectroscopy," S. B. Waldrup and C. T. Williams, *J. Phys. Chem. B*, **110(33)**, 16633-16639 (2006).
36. "EXAFS Characterization of Dendrimer-Pt Nanocomposites Used for the Preparation of Pt/g-Al<sub>2</sub>O<sub>3</sub> Catalysts," O. S. Alexeev, A. Siani, G. Lafaye, C. T. Williams, H. J. Ploehn and M. D Amiridis, *J. Phys. Chem. B*, **110(49)**, 24903-24914 (2006).

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37. "Probing Powder Supported Catalysts with Sum Frequency Spectroscopy," S. B. Waldrup and C. T. Williams, *Catal. Comm.*, **8**, 1373-1376 (2007).
38. "In Situ Studies of Butyronitrile Adsorption and Hydrogenation on Pt/Al<sub>2</sub>O<sub>3</sub> using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez and C. T. Williams, *Langmuir*, **23(6)**, 3172-3178 (2007).
39. "FTIR Investigation of the Thermal Decomposition of Poly(amidoamine) (PAMAM) Dendrimers and Dendrimer-Metal Nanocomposites Supported on Al<sub>2</sub>O<sub>3</sub> and ZrO<sub>2</sub>," D. S. Deutsch, A. Siani, P. T. Fanson, H. Hirata, S. Matsumoto, C. T. Williams, and M. D. Amiridis, *J. Phys. Chem. C*, **111(11)**, 4246-4255 (2007).
40. "Hydrogenation of 3,4-Epoxy-1-Butene over Cu-Pd/SiO<sub>2</sub> Prepared by Electroless Deposition," M. T. Schaal, A. Y. Metcalf, J. H. Montoya, J. P. Wilkinson, C. C. Stork, C. T. Williams, and J. R. Monnier, *Catal. Today*, **123(1-4)**, 142-150 (2007).
41. "Acetonitrile Adsorption on Polycrystalline Platinum: An in Situ Investigation Using Sum Frequency Spectroscopy," S. B. Waldrup and C. T. Williams, *J. Phys. Chem. C*, **112(1)**, 219-226 (2008).
42. "Characterization and Evaluation of Ag-Pt/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition," M. T. Schaal, A. C. Pickerell, C. T. Williams, J. R. Monnier, *J. Catal.* **254(1)**, 131-143 (2008).
43. "Degradation Characteristics of Elastomeric Gasket Materials in a Simulated PEM Fuel Cell Environment," J. Tan, Y. J. Chao, M. Yang, C. T. Williams, and J. W. Van Zee, *J. Mater. Eng. Perform.*, **17(6)**, 785-792 (2008).
44. "Synthesis and Characterization of Dendrimer-Derived Supported Iridium Catalysts," Y. M. López-De Jesús, A. Vicente, G. Lafaye, P. Marécot and C. T. Williams, *J. Phys. Chem. C*, **112(36)**, 13837-13845 (2008).
45. "Hydrodechlorination of 1,2-Dichloroethane Catalyzed by Dendrimer-Derived Pt-Cu/SiO<sub>2</sub> Catalysts," H. Xie, J. Y. Howe, V. Schwartz, J. R. Monnier, C. T. Williams and H. J. Ploehn, *J. Catal.*, **259(1)**, 111-122 (2008).
46. "Theoretical and Experimental Studies of Ag-Pt Interactions for Supported Ag-Pt Bimetallic Catalysts," M. T. Schaal, M. P. Hyman, M. Rangan, S. Ma, C. T. Williams, J. R. Monnier and J. W. Medlin, *Surf. Sci.*, **603(4)**, 690-696 (2009).
47. "In situ FTIR Spectroscopic Studies of Limonene Epoxidation over PW-Amberlite", R. B. Zapata, A. Luz Villa, C. Montes de Correa and C. T. Williams, *Appl. Catal. A: Gen.* **365(1)**, 42-47 (2009).
48. "Dendrimer-Mediated Synthesis of Subnanometer-Sized Rh Particles Supported on ZrO<sub>2</sub>," A. Siani, O. S. Alexeev, D. S. Deutsch, J. Monnier, P. T. Fanson, H. Hirata, S. Matsumoto, C. T. Williams and M. D. Amiridis, *J. Catal.* **252(2)**, 331-342 (2009).
49. "PAMAM Dendrimer-Derived Ir/Al<sub>2</sub>O<sub>3</sub> Catalysts: An EXAFS Characterization," Y. M. López-De Jesús and C. T. Williams, *Catal. Lett.* **132**, 430-437 (2009).
50. "Preparation, Characterization and Kinetic Evaluation of Dendrimer-Derived Bimetallic Pt-Ru/SiO<sub>2</sub> Catalysts," D. Liu, Y. M. López de Jesús, J. R. Monnier and C. T. Williams, *J. Catal.* **269(2)**, 376-387 (2010).
51. "Synthesis and Characterization of Au-Pd/SiO<sub>2</sub> Bimetallic Catalysts Prepared by Electroless Deposition," J. Rebelli, M. Detwiler, S. Ma, C. T. Williams and J. R. Monnier, *J. Catal.* **270(2)**, 224-233 (2010).
52. "Selective Hydrogenation of Benzonitrile by Alumina-Supported Ir-Pd Catalysts," Y. M. López-De Jesús, C. E. Johnson, J. R. Monnier and C. T. Williams, *Top. Catal.* **53(15-18)**, 1132-1137 (2010).
53. "Effect of liquid phase reducing agents on the dispersion of supported Pt catalysts," M. T. Schaal, J. Rebelli, H. M. McKerrow, C. T. Williams, and J. R. Monnier, *Appl. Catal. A: Gen.* **382(1)**, 49-57 (2010).
54. "In Situ FTIR Spectroscopic Analysis of Carbonate Transformations during Adsorption and Desorption of CO<sub>2</sub> in K-Promoted HTlc," H. Du, C. T. Williams, A. D. Ebner and J. A. Ritter, *Chem. Mater.* **22(11)**, 3519-3526 (2010)
55. "Influence of the Nature of the Precursor Salts on the Properties of Rh-Ge/TiO<sub>2</sub> Catalysts for Citral Hydrogenation," A. Vicente, T. Ekou, G. Lafaye, C. Especel, P. Marecot and C. T. Williams, *J. Catal.* **275(2)**, 202-210 (2010).

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56. "Synthesis and Catalytic Properties for Phenylacetylene Hydrogenation of Silicide Modified Nickel Catalysts," X. Chen, A. Zhao, Z.-F. Shao, C. Li, C. T. Williams, and C.-H. Liang, *J. Phys. Chem. C* **114**(39), 16525-16533 (2010).
57. "Preparation and Characterization of Silica-Supported, GroupIB–Pd Bimetallic Catalysts Prepared by Electroless Deposition Methods," J. Rebelli, A. A. Rodriguez, S. Ma, C.T. Williams and J. R. Monnier, *Catal. Today*, **160**(1), 170-178 (2011).
58. "Effects of Synthetic Parameters on the Structure and Catalytic Performance of Cu–Cr Catalysts Prepared by a Non-Alkoxide Sol–Gel Route," Z. Xiao, Z. Ma, X. Wang, C. T. Williams, and C.-H. Liang, *Ind. Eng. Chem. Res.* **50**(4), 2031–2039 (2011).
59. "Catalyst Development for Ultra-Deep Hydrodesulfurization (HDS) of Dibenzothiophenes: (I) Effects of Ni Promotion in Molybdenum-Based Catalysts," Q. Gao, T. K. Ofosu, S. Ma, V. Komvokis, C. T. Williams and K. Segawa, *Catal. Today*, **164**(1), 538-543 (2011).
60. "The Formation Mechanism of Cobalt Silicide on Silica from  $\text{Co}(\text{SiCl}_3)(\text{CO})_4$  by *In Situ* Fourier Transform Infrared Spectroscopy," A. Zhao, X. Chen, J. Guan, C. T. Williams and C.-H. Liang, *Phys. Chem. Chem. Phys.* **13**(20), 9432-9438 (2011).
61. "Thermal Dehydration and Vibrational Spectra of Hydrated Sodium Metaborates," A. M. Beaird, P. Li, H. S. Marsh, W. A. Al-Saidi, J. K. Johnson, M. A. Matthews, and C. T. Williams, *Ind. Eng. Chem. Res.*, **50** (13), 7746–7752 (2011).
62. "ATR-IR study of the adsorption of 2'-hydroxyacetophenone and benzaldehyde on MgO" J. A. Cortes-Concepcion, C. T. Williams, and M. D. Amiridis, *Catal. Commun.* **16**(1), 198-204 (2011).
63. "Unsupported NiMoW Sulfide Catalysts for Hydrodesulfurization of Dibenzothiophene by Thermal Decomposition of Thiosalts," Y. Yi, B. Zhang, X. Jin, L. Wang, C. T. Williams, G. Xiong, D. Su, and C. Liang, *J. Mol. Catal. A: Chemical* **351**, 120-127 (2011).
64. "In Situ ATR-IR Study of Prochiral 2-Methyl-2-Pentenoic Acid Adsorption on  $\text{Al}_2\text{O}_3$  and  $\text{Pd}/\text{Al}_2\text{O}_3$ ," S. Tan, X. Sun and C. T. Williams, *Phys. Chem. Chem. Phys.* **13**, 19573-19579 (2011).
65. "The Relationship Between the Structural Properties of Bimetallic Pd–Sn/ $\text{SiO}_2$  Catalysts and Their Performance for Selective Citral Hydrogenation," A. Vicente, G. Lafaye, C. Especel, P. Marécot and C. T. Williams, *J. Catal.* **283**(2), 133-142 (2011).
66. "A Facile and Novel Approach to Magnetic  $\text{Fe}@\text{SiO}_2$  and  $\text{FeSi}_2@\text{SiO}_2$  Nanoparticles," M. Li, X. Chen, J. Quan, X. Wang, J. Wang, C. T. Williams and C. Liang, *J. Mater. Chem.* **22**, 609-616 (2012)
67. "In-situ ATR-IR Investigation of Methylcinnamic Acid Adsorption and Hydrogenation on  $\text{Pd}/\text{Al}_2\text{O}_3$ ," X. Sun and C. T. Williams, *Catal. Commun.* **17**(1), 13-17 (2012).
68. "Chemical Vapor Deposition of  $\text{Pd}(\text{C}_3\text{H}_5)(\text{C}_5\text{H}_5)$  to Synthesize  $\text{Pd}@\text{MOF-5}$  Catalysts for Suzuki Coupling Reaction," M. Zhang, J. Guan, B. Zhang, D. Su, C. T. Williams and C. Liang, *Catal. Lett.* **142**(3), 313-318 (2012).
69. "Evidence of Electrochemical Graphene Functionalization by Raman Spectroscopy," K. M. Daniels, B. K. Daas, N. Srivastava, C. T. Williams, R. M. Feenstra, T.S. Sudarshan, MVS Chandrashekar, *Materials Science Forum* **717-720**, 661-664 (2012).
70. "Evidences of electrochemical graphene functionalization and substrate dependence by Raman and scanning tunneling spectroscopies," K. M. Daniels, B. K. Daas, N. Srivastava, C. T. Williams, R. M. Feenstra, T.S. Sudarshan, MVS Chandrashekar, *J. Appl. Phys.* **111**(11), 114306/1-114306/7 (2012).
71. "Nickel-Silicon Intermetallics with Enhanced Selectivity in Hydrogenation Reactions of Cinnamaldehyde and Phenylacetylene," X. Chen, M. Li, J. Guan, X. Wang, C. T. Williams and C. Liang, *Ind. Eng. Chem. Res.* **51**(9), 3604-3611 (2012).
72. "CO Desorption Ability from Pt Enhanced by  $\text{Al}_2\text{O}_3$ : An in Situ Real-Time Attenuated Total Reflection Infrared Investigation," G. Hu, H. Gao and C. T. Williams, *J. Phys. Chem. C* **116** (10), 6247–6250 (2012).

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74. "Carbon Nanotubes Supported Mono- and Bimetallic Pt and Ru Catalysts for Selective Hydrogenation of Phenylacetylene," C. Li, Z. Shao, M. Pang, C. T. Williams, X. Zhang and C. Liang, *Ind. Eng. Chem. Res.* **51(13)**, 4934-4941 (2012).
75. "Microwave-Assisted Green Synthesis of Uniform Ru Nanoparticles Supported on Non-Functional Carbon Nanotubes for Cinnamaldehyde Hydrogenation," X. Ni, B. Zhang, C. Li, M. Pang, D. Su, C. T. Williams, C. Liang, *Catal. Comm.* **24**, 65-69 (2012).
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79. "Kinetic Study of Asymmetric Hydrogenation of  $\alpha$ ,  $\beta$ -Unsaturated Carboxylic Acid over Cinchona-Modified Pd/Al<sub>2</sub>O<sub>3</sub> catalyst," S. Tan, J. R. Monnier, and C. T. Williams, *Top. Catal.* **55(7-10)**, 512-517 (2012).
80. "Insights into the Reaction Pathways of Glycerol Hydrogenolysis over Cu-Cr Catalysts," Z. Xiao, C. Li, J. Xiu, X. Wang, C. T. Williams, C. Liang, *J. Mol. Catal. A: Chem.* **365**, 24-31 (2012).
81. "Synthesis and Characterization of Ferromagnetic Nickel-Cobalt Silicide Catalysts with Good Sulfur Tolerance in Hydrodesulfurization of Dibenzothiophene," X. Chen, X. Wang, J. Xiu, C. T. Williams, and C. Liang, *J. Phys. Chem. C* **116(47)**, 24968-24976 (2012).
82. "Facile In Situ Preparation of Noble Metal Nanoparticles Supported on Silica," X. Wang, X. Tan, X. Zhang, C. Bao, C. T. Williams, and C. Liang, *Micro & Nano Lett.* **7(9)**, 901-903 (2012).
83. "High Sulfur Tolerance of Ni-Si Intermetallics as Hydrodesulfurization Catalysts," X. Chen, X. Liu, L. Wang, M. Li, C. T. Williams, and C. Liang, *RSC Advances* **3(6)**, 1728-1731 (2013).
84. "Controlled Preparation and Characterization of Supported CuCr<sub>2</sub>O<sub>4</sub> Catalysts for Hydrogenolysis of Highly Concentrated Glycerol," Z. Xiao, J. Xiu, X. Wang, B. Zhang, C. T. Williams, D. Su, and C. Liang, *Catal. Sci. Tech.* **3(4)**, 1108-1115 (2013).
85. "Preparation and Characterization of Dendrimer-Derived Bimetallic Ir-Au/Al<sub>2</sub>O<sub>3</sub> Catalysts for CO Oxidation," Y.-J. Song, Y. M. López de Jesús, P. T. Fanson, and C. T. Williams, *J. Phys. Chem. C* **117(21)**, 10999–11007 (2013).
86. "Enantioselective Hydrogenation of  $\alpha$ -Methylcinnamic Acid over Pd/Al<sub>2</sub>O<sub>3</sub>: A Kinetic Study of Solvent, Temperature and Pressure Effects," X. Sun, J. R. Monnier, C. T. Williams, *Catal. Lett.* **143(9)**, 881-886 (2013).
87. "An In Situ Spectroscopic Study of Prochiral Reactant–Chiral Modifier Interactions on Palladium Catalyst: Case of Alkenoic Acid and Cinchonidine in Various Solvents," S. Tan and C. T. Williams, *J. Phys. Chem. C* **117(35)**, 18043–18052 (2013).
88. "Electrochemical Hydrogenation of Dimensional Carbon," K. M. Daniels, S. Shetu, J. Staser, J. W. Weidner, C. T. Williams, T.S. Sudarshan, MVS Chandrashekar, *ECS Trans.* **58(4)**, 439-445 (2013).
89. "The Selective Oxidation of Ethylene Glycol and 1,2-Propanediol on Au, Pd, and Au–Pd Bimetallic Catalysts," M. B. Griffin, A. A. Rodriguez, M. M. Montemore, J. R. Monnier, C. T. Williams, J. W. Medlin, *J. Catal.* **307**, 111-120 (2013).

**REFEREED JOURNAL ARTICLES (CONT.)***PUBLISHED OR IN PRESS (CONT.)*

90. "Gas-Phase, Catalytic Hydrodeoxygenation of Propanoic Acid, Over Supported Group VIII Noble Metals: Metal and Support Effects," Y. K. Lugo-José, J. R. Monnier and C. T. Williams, *Appl. Catal. A: Gen.* **469**, 410-418 (2014).
91. "Selective Hydrogenation of Acetylene in Excess Ethylene Using Ag- and Au-Pd/SiO<sub>2</sub> Bimetallic Catalysts Prepared by Electroless Deposition," Y. Zhang, W. Diao, C. T. Williams and J. R. Monnier, *Appl. Catal. A: Gen.*, **469**, 419-426 (2014).

**REFEREED CONFERENCE PROCEEDINGS***PUBLISHED OR IN PRESS*

1. "EXAFS Characterization of Dendrimer-Derived Pt/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub>," A. Siani, O.S. Alexeev, C.T. Williams, H.J. Ploehn and M.D. Amiridis, *AIP Conference Proceedings*, **882**, 737-739 (2007).

**PATENTS***PUBLISHED OR IN PRESS*

1. "Supported Catalysts with Controlled Metal Cluster Size," P. T. Fanson, H. Hirata, M. D. Amiridis, C. T. Williams, D. S. Deutsch, A. Siani, S. Matsumoto, US Patent 20080051282 A1 20080228. (2008)

**NON-REFEREED CONFERENCE PROCEEDINGS***PUBLISHED OR IN PRESS*

1. "In-Situ Raman investigation of Enantioselective Heterogeneous Catalysis: Cinchonidine Adsorption on Polycrystalline Platinum," W. Chu, R. J. Le Blanc, and C. T. Williams, *Proc. of Topical Conf. on Pharma. and Biotech.: Discovery, Development, and Delivery of Medicine*, AIChE, pp. 334-339 (2001).
2. "Degradation of Gasket Materials in a Simulated Fuel Cell Environment," J. Tan, Y. J. Chao, W.-K. Lee, C. S. Smith, J. W. Van Zee and C. T. Williams, *Proceedings of FUELCELL2006: The 4<sup>th</sup> Annual International Conference on Fuel Cell Science, Engineering and Technology*, pp. ASME (2006).

**NON-REFEREED BOOK CHAPTERS***PUBLISHED OR IN PRESS*

1. "Synthesis of Supported Metal Catalysts by Dendrimer-Metal Precursors," D. S. Deutsch, C. T. Williams and M. D. Amiridis, *Catalyst Preparation: Science and Engineering*, ed. J. Regalbuto, CRC Press, p. 209-235 (2006).

**EDITED JOURNAL ISSUES**

1. "Spectroscopic Techniques to Elucidate Reaction Mechanism and Structure-Activity Relationships – a Symposium at the 241st ACS National Meeting in 2011," H. Idriss, J. J. Spivey, C. T. Williams (Editors), *Catal. Today*, **182(1)**, 2012.

**PRESENTATIONS - TECHNICAL MEETINGS****Invited – presented by CTW**

1. Talk - "In-Situ Vibrational Spectroscopic Investigation of Solid-Liquid Catalytic Interfaces," R. J. LeBlanc, I. Ortiz-Hernandez, M. R. Strunk, and C. T. Williams (presenter), ACS National Meeting, New Orleans, LA, March, 2003.
2. Talk - "Surface-Enhanced Raman Spectroscopy as an In-Situ Probe of Catalytic Interfaces: Progress and Prospects," C. T. Williams, ACS National Meeting, New York, NY, September, 2003.
3. Talk - "In-situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, ACS National Meeting, Anaheim, CA, April, 2004.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT.)****Invited – presented by CTW (cont.)**

4. Talk - "Bridging the Liquid Gap: In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, AIChE Annual Meeting, Cincinnati, OH, November 2005.
5. Talk - "Dendrimer Metal Nanocomposites for Synthesis of Controlled-Structure Supported Metal Catalysts," C. T. Williams, Gratama Workshop, Awaji, Hyogo, Japan, October 2006.
6. Talk - "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Regional Meeting, Catalysis Society of Japan, University of Osaka, Osaka, Japan, November 2006.
7. Talk - "In-situ and Operando Spectroscopy of Solid-Catalyzed Liquid-Phase Reactions: Progress and Prospects," C. T. Williams (presenter), VI Colombian Symposium on Catalysis (VI SICCAT), Medellin, Colombia, October 2009.
8. Talk - "Vibrational Spectroscopy at Solid-Liquid Catalytic Interfaces: Progress and Prospects" C. T. Williams (presenter), Gordon Research Conference on Catalysis, Colby-Sawyer College, New London, NH, June 2010.
9. Talk - "Viewing the Solid Catalyst - Liquid Interface with Attenuated Total Reflection Infrared Spectroscopy," C. T. Williams (presenter), Gordon Research Conference on Vibrational Spectroscopy, University of New England, Biddeford, ME, August, 2012.
10. Talk - "Viewing Solid-Liquid Catalytic Interfaces with Attenuated Total Reflection Infrared Spectroscopy", C. T. Williams (presenter), 2012 Southeastern Regional Meeting (SERMACS 2012), Raleigh, NC, November 2012.

**Contributed – presented by CTW**

1. Talk - "Reaction Path Analysis in Heterogeneous Catalytic Reactors with Real-Time Probing of Adsorbed Reaction Intermediates," A. A. Tolia, C. T. Williams (presenter), M. J. Weaver and C. G. Takoudis, AIChE Annual Meeting, San Francisco, CA, November, 1994.
2. Talk - "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of Catalytic Mechanisms at High Gas Pressures: The NO-H<sub>2</sub> Reaction on Rhodium," A. A. Tolia, C. T. Williams (presenter), M. J. Weaver and C. G. Takoudis, AIChE Annual Meeting, Miami Beach, FL, Nov., 1995.
3. Talk - "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of NO Reduction Over Rhodium at High Gas Pressures," C. T. Williams (presenter), A. A. Tolia, M. J. Weaver and C. G. Takoudis, 14<sup>th</sup> International Symposium on Chemical Reaction Engineering, Brugge, Belgium, May, 1996.
4. Talk - "An *In-Situ* Surface-Enhanced Raman and Mass Spectroscopic Study of Methanol Oxidation on Rhodium," C. T. Williams (presenter), M. J. Weaver and C. G. Takoudis, Chemical Engineering Graduate Research Symposium, School of Chemical Engineering, Purdue University, W. Lafayette, IN, Aug., 1996.
5. Talk - "An *In-Situ* Surface-Enhanced Raman and Mass Spectroscopic Study of Methanol Oxidation Over Polycrystalline Rhodium at High Gas Pressures," C. T. Williams (presenter), M. J. Weaver and C. G. Takoudis, AIChE Annual Meeting, Chicago, IL, November, 1996.
6. Poster - "An *In-Situ* Surface-Enhanced Raman and Mass Spectroscopic Study of Methanol Oxidation Over Polycrystalline Rhodium at High Gas Pressures," C. T. Williams (presenter), C. G. Takoudis and M. J. Weaver, 1997 Gordon Research Conf. on Chemical Reactions at Surfaces, Ventura, CA, Feb., 1997.
7. Talk - "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of Heterogeneous Catalytic Reactions at High Gas Pressures," C. T. Williams (presenter), C. G. Takoudis and M. J. Weaver, 1997 Spring Symposium of the Catalysis Club of Chicago, Northwestern University, Evanston, IL, April, 1997.
8. Poster - "Surface-Enhanced Raman Spectral Evidence of Reactive Oxide Formation During Methanol Oxidation over Polycrystalline Rhodium," C. T. Williams (presenter), M. J. Weaver and C. G. Takoudis, AVS Prairie Chapter 1997 Spring Meeting, Purdue University, West Lafayette, IN, May, 1997.
9. Talk - "An *In-Situ* Surface-Enhanced Raman and Mass Spectroscopic Study of Methanol Oxidation at High Gas Pressures Over Rhodium and Palladium," C. T. Williams (presenter), Ho Yeung H. Chan, M. J. Weaver and C. G. Takoudis, 15<sup>th</sup> North American Catalysis Society Meeting, Chicago, IL, May, 1997.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by CTW (cont.)**

10. Talk - "*In-Situ* Probing of Metal-Liquid-Gas Catalytic Interfaces Using Surface-Enhanced Raman Spectroscopy," C. T. Williams (presenter), S. Zou, C. G. Takoudis, M. J. Weaver, 44<sup>th</sup> National Symposium of the American Vacuum Society, San Jose, CA, October, 1997.
11. Talk - "*In-Situ* Probing of Metal-Liquid-Gas Catalytic Interfaces Using Surface-Enhanced Raman Spectroscopy," C. T. Williams (presenter), S. Zou, M. J. Weaver and C. G. Takoudis, AIChE Annual Meeting, Los Angeles, CA, November, 1997.
12. Talk - "Sum-Frequency Spectroscopy as an *In-Situ* Probe of Interfacial Processes," C. T. Williams (presenter), D. A. Beattie, M. M. Knock and C. D. Bain, AIChE Annual Meeting, Dallas, TX, Nov., 1999.
13. Talk - "Model Supported-Metal Catalysts for *In-Situ* Vibrational Spectroscopic Investigation of Enantioselective Heterogeneous Catalysis," R. J. Le Blanc, W. Chu and C. T. Williams (presenter), AIChE Annual Meeting, Los Angeles, CA, November, 2000.
14. Talk - "In-Situ Raman investigation of Enantioselective Heterogeneous Catalysis: Cinchonidine Adsorption on Polycrystalline Platinum," W. Chu, R. J. Le Blanc, and C. T. Williams (presenter), AIChE Annual Meeting, Reno, NV, November, 2001.
15. Poster - "In-Situ Investigation of the Pt/Al<sub>2</sub>O<sub>3</sub>/Solution Interface Using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez and C. T. Williams (presenter), Southeastern Catalysis Society Meeting, Clemson, SC, May, 2002.
16. Talk - "Characterization of Nitrile/Metal Oxide Interfaces using IR-Visible Sum-Frequency Generation," M. R. Strunk and C. T. Williams (presenter), North American Catalysis Society Meeting, Cancun, Mexico, June, 2003.
17. Talk - "In-Situ Raman Studies of Cinchonidine Adsorption on Platinum as a Function of Liquid-Phase Concentration, Temperature, and Co-adsorbed Hydrogen," R. J. LeBlanc and C. T. Williams (presenter), 77<sup>th</sup> ACS Colloid and Surface Science Symposium, Atlanta, June, 2003.
18. Talk – "Aliphatic Nitrile Adsorption on Al<sub>2</sub>O<sub>3</sub> and ZrO<sub>2</sub> as Studied by Total Internal reflection Sum-Frequency Spectroscopy," M. R. Strunk and C. T. Williams (presenter), AIChE Annual Meeting, San Francisco, CA, November, 2003.
19. Poster – "*In-Situ* Investigation of Supported Catalyst-Liquid Interfaces by Attenuated Total Reflection Infrared Spectroscopy: Applications of Multivariate Analysis for Spectral Interpretation," I. Ortiz-Hernandez, D. J. Owens and C. T. Williams (presenter), AIChE Annual Meeting, San Francisco, CA, November, 2003.
20. Talk – "Synthesis and Characterization of Dendrimer-Derived Bimetallic Pt-Ru and Pt-Sn Catalysts," G. Lafaye, O. S. Alexeev, D. S. Deutsch, S.-Y. Chin, K. A. Hristova, C. T. Williams (presenter) and M. D. Amiridis, AIChE Annual Meeting, Austin, TX, November, 2004.
21. Talk – "Dendrimer-Stabilized Nanoparticles for Advanced Catalyst Synthesis," C.T. Williams (presenter), H. J. Ploehn, and M. D. Amiridis, North American Catalysis Soc. Meeting, Philadelphia, PA, May 2005.
22. Talk - "Characterization and Kinetic Evaluation of Dendrimer-Derived Bimetallic Catalysts for the Selective Hydrogenation of 3,4-Epoxy-1-Butene," D. Liu, H. Xie, Y. M. Lopez, M. D. Casper, H. J. Ploehn, J. R. Monnier, and C. T. Williams (presenter), AIChE Annual Mtg., Cincinnati, OH, Nov. 2005.
23. Talk – "In-Situ Studies of Supported Catalysts in the Liquid Phase Using ATR-IRS and TIR-SFS," S. B. Waldrup, I. Ortiz-Hernandez, and C. T. Williams (presenter), ACS National Meeting, San Francisco, CA, September 2006.
24. Talk – "Dendrimer-Metal Nanocomposites for Synthesis of Controlled-Structure," C. T. Williams (presenter), O. S. Alexeev, and M. D. Amiridis, International Conference on Nanocatalysis: Fundamental & Applications, Dalian, China, July 2008.
25. Poster – "Characterization and Evaluation of Ag-Pt/SiO<sub>2</sub> Catalysts Prepared via Electroless Deposition," M. T. Schaal, C. T Williams (presenter), and J. R. Monnier, 14<sup>th</sup> International Congress on Catalysis, Seoul, North Korea, July 2008.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by CTW (cont.)**

26. Poster – “Synthesis and Characterization of PAMAM-OH Dendrimer-Derived Supported Iridium Catalysts,” Y. M. López-De Jesús, A. Vicente, G. Lafaye, P. Marécot, O. S. Alexeev, J. R. Monnier, and C. T. Williams (presenter), 14<sup>th</sup> International Congress on Catalysis, Seoul, North Korea, July 2008.

**Contributed – presented by post-doctoral researchers supervised by CTW**

1. Poster - "Characterization of Nitrile/Metal Oxide Interfaces using IR-Visible Sum-Frequency Generation," M. R. Strunk (presenter) and C. T. Williams, ACS National Meeting, Boston, MA, August, 2002.
2. Poster - "Characterization of Nitrile/Metal Oxide Interfaces using IR-Visible Sum-Frequency Generation," M. R. Strunk (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2002.
3. Talk - "Characterization of Nitrile/Metal Oxide Interfaces using IR-Visible Sum-Frequency Generation," M. R. Strunk (presenter) and C. T. Williams, AIChE Annual Meeting, Indianapolis, IN, November, 2002.
4. Talk - "Characterization of Nitrile/Metal Oxide Interfaces Using IR-visible Sum-Frequency Generation," M. R. Strunk (presenter) and C. T. Williams, 77<sup>th</sup> ACS Colloid and Surface Science Symposium, Atlanta, June, 2003.
5. Poster - "Adsorption of aliphatic nitriles on oxide surfaces: A sum-frequency investigation," M. R. Strunk (presenter) and C. T. Williams, ACS National Meeting, New York, NY, September, 2003.
6. Talk – “Synthesis and Characterization of Dendrimer-Derived Bimetallic Pt-Ru Catalysts,” G. Lafaye (presenter), M. D. Amiridis and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2003.
7. Talk – “Synthesis and Characterization of Dendrimer-Derived Bimetallic Pt-Ru Catalysts,” G. Lafaye (presenter), S.-Y. Chin, M. D. Amiridis and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.

**Contributed – presented by graduate students supervised by CTW**

1. Poster - "In-Situ Raman Studies of Cinchonidine Adsorption on Platinum as a Function of Liquid-Phase Concentration and Temperature," R. J. Le Blanc (presenter), W. Chu and C. T. Williams, AIChE Annual Meeting, Reno, NV, November, 2001.
2. Poster - "In-Situ Investigation of the Pt/Al<sub>2</sub>O<sub>3</sub>/Solution Interface Using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez (presenter) and C. T. Williams, AIChE Annual Meeting, Reno, NV, November, 2001.
3. Poster - "In-Situ Raman Studies of Cinchonidine Adsorption on Platinum as a Function of Liquid-Phase Concentration and Temperature," R. J. Le Blanc (presenter) and C. T. Williams, ACS National Meeting, Orlando, FL, April, 2002.
4. Poster - "In-Situ Investigation of the Pt/Al<sub>2</sub>O<sub>3</sub>/Solution Interface Using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez (presenter) and C. T. Williams, ACS National Meeting, Orlando, FL, April, 2002.
5. Poster - "Surface Raman Characterization of Cinchonidine-Modified Platinum: Effects of Liquid-Phase Concentration and Temperature," R. J. Le Blanc (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Clemson, SC, May, 2002.
6. Talk - "In-Situ Investigation of the Pt/Al<sub>2</sub>O<sub>3</sub>/Solution Interface using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2002.
7. Talk - "In-Situ Investigation of the Pt/Al<sub>2</sub>O<sub>3</sub>/Solution Interface using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez (presenter) and C. T. Williams, AIChE Annual Meeting, Indianapolis, IN, November, 2002.
8. Poster - "Dendrimer Stabilized Nanoparticles for Next-Generation Catalysts," D. Liu (presenter), D. S. Deutsch, M. D. Amiridis, and C. T. Williams, AIChE Annual Meeting, Indianapolis, IN, November, 2002.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by graduate students supervised by CTW (cont.)**

9. Talk - "Surface Raman Characterization of Cinchonidine-modified Platinum: Effects of Liquid-phase Concentration and Temperature," R. J. LeBlanc (presenter) and C. T. Williams, AIChE Annual Meeting, Indianapolis, IN, November, 2002.
10. Poster (1<sup>st</sup> Place Prize) – “Adsorption of Dendrimer-Stabilized Metal Nanoparticles Onto Various Supports” D. Liu (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, April, 2003.
11. Talk - "Surface Raman Characterization of Cinchonidine-modified Platinum: Effects of Liquid-phase Concentration and Temperature," R. J. LeBlanc (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, April, 2003.
12. Talk - " *In-Situ* Raman Investigation of an Enantioselective Catalyst: Cinchonidine Interactions with Polycrystalline Platinum," R. J. LeBlanc (presenter) and C. T. Williams, North American Catalysis Society Meeting, Cancun, Mexico, June, 2003.
13. Poster - "*In Situ* Investigation of Solid-Liquid Catalytic Interfaces by Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez (presenter) and C. T. Williams, North American Catalysis Society Meeting, Cancun, Mexico, June, 2003.
14. Talk - "*In-Situ* Investigation of the Pt/Al<sub>2</sub>O<sub>3</sub>/Solution Interface using Attenuated Total Reflection Infrared Spectroscopy," I. Ortiz-Hernandez (presenter) and C. T. Williams, 77<sup>th</sup> ACS Colloid and Surface Science Symposium, Atlanta, June, 2003.
15. Talk - "Adsorption of Dendrimer-Stabilized Nanoparticles onto Various Supports," D. Liu (presenter) and C. T. Williams, 77<sup>th</sup> ACS Colloid and Surface Science Symposium, Atlanta, June, 2003.
16. Talk – “In-Situ Raman Investigation for the Platinum-Catalyzed Orito Reaction: Relevance of Surface Species to Proposed Reaction Pathways,” R. J. LeBlanc (presenter) and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.
17. Talk - "Adsorption of Dendrimer-Stabilized Metal Nanoparticles onto Alumina on Route to Nanostructured Supported Catalysts," D. Liu (presenter) and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.
18. Talk – “In-Situ ATR-IR and SFS Investigation of Nitrile Adsorption and Hydrogenation on Pt/Al<sub>2</sub>O<sub>3</sub> in the Liquid Phase”, I. Ortiz-Hernandez (presenter) and C. T. Williams, AIChE Annual Meeting, Austin, TX, November, 2004.
19. Talk - “Synthesis and Adsorption of Dendrimer Stabilized Nanoparticles on Oxide Supports,” D. Liu (presenter), H. Xie, Y. Gu, C. T. Williams, and H. J. Ploehn, North American Catalysis Society Meeting, Philadelphia, PA, May 2005.
20. Talk – “In-Situ Studies of Liquid-Phase Nitrile Adsorption and Hydrogenation using Attenuated Total Reflection Infrared Spectroscopy,” I. Ortiz-Hernandez (presenter) and C. T. Williams, North American Catalysis Society Meeting, Philadelphia, PA, May 2005.
21. Talk - “Characterization and Kinetic Evaluation of Dendrimer-Derived Bimetallic Catalysts for the Selective Hydrogenation of 3,4-Epoxy-1-Butene,” D. Liu (presenter), H. Xie, Y. M. Lopez, M. D. Casper, H. J. Ploehn, J. R. Monnier, and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2005.
22. Poster - “Investigation of Solid/Liquid Interfaces by Sum-Frequency Spectroscopy: Nitrile Adsorption on Model Supports,” S. B. Waldrup (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2005.
23. Poster - “Synthesis and Characterization of Dendrimer-Templated Bimetallic Pt-Cu Nanoparticles,” H. Xie (presenter), C. T. Williams, H. J. Ploehn, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2005.
24. Poster (2<sup>nd</sup> place prize) - “Characterization and Kinetic Evaluation of Silver-Platinum Bimetallic Catalysts Prepared via Electroless Deposition,” M. T. Schaal (presenter), T. C. Hoang, A. C. Pickerell, J. R. Monnier, and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2005.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by graduate students supervised by CTW (cont.)**

25. Talk - “Investigation of Solid/Liquid Interfaces by Sum-Frequency Spectroscopy: Nitrile Adsorption and Hydrogenation on Model Supports and Catalysts,” S. B. Waldrup (presenter) and C. T. Williams, AIChE Annual Meeting, Cincinnati, OH, November 2005.
26. Talk - “Synthesis and Characterization of Dendrimer-Stabilized Bimetallic Pt-Cu Nanoparticles,” H. Xie (presenter), D. Liu, C. T. Williams, and H. J. Ploehn, AIChE Annual Meeting, Cincinnati, OH, November 2005.
27. Talk - “Characterization and Kinetic Evaluation of Silver-Containing Bimetallic Catalysts Prepared via Electroless Deposition,” M. T. Schaal (presenter), A. C. Pickerell, C. T. Hoang, J. R. Monnier, and C. T. Williams, AIChE Annual Meeting, Cincinnati, OH, November 2005.
28. Talk - “Dendrimer-stabilized Bimetallic Pt-Cu Nanoparticles: Synthesis, Characterization, and Catalytic Evaluation,” H. Xie (presenter), J. R. Monnier, C. T. Williams, and H. J. Ploehn, 231st ACS National Meeting, Atlanta, GA, March 2006.
29. Talk - “Investigation of Solid/Liquid Interfaces by Sum Frequency Spectroscopy: Acetonitrile Adsorption on Model Supports,” S. B. Waldrup (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2006.
30. Poster (1<sup>st</sup> place prize) - “Synthesis and Characterization of Dendrimer-Derived Ir/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Catalysts,” Y. M. López-De Jesús (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2006.
31. Talk - “Hydrodechlorination of 1,2-Dichloroethane over Supported Pt-Cu Catalysts,” H. Xie (presenter), J. R. Monnier, C.T. Williams, and H. J. Ploehn, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2006.
32. Talk – “Characterization and Kinetic Evaluation of Ag-Pt Bimetallic Catalysts Prepared by Electroless Deposition,” M. T. Schaal (presenter), A. C. Pickerell, J. R. Monnier, and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November 2006.
33. Talk – “Investigation of Solid/Liquid Interfaces by Sum-Frequency Spectroscopy: Acetonitrile Adsorption on Model Supports and Pt Covered Supports,” S. B. Waldrup (presenter) and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November 2006.
34. Talk - “Synthesis and Characterization of Dendrimer-Derived Ir/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Catalysts,” Y. M. López-De Jesús (presenter), O. S. Alexeev and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November 2006.
35. Poster - “Investigation of Solid/Liquid Interfaces by Sum Frequency Spectroscopy: Acetonitrile Adsorption and Hydrogenation on Pt/Al<sub>2</sub>O<sub>3</sub>,” S. B. Waldrup (presenter) and C. T. Williams, North American Catalysis Society Meeting, Houston, TX, June 2007.
36. Poster - “Synthesis and Characterization of PAMAM-OH Dendrimer-Derived Iridium Supported Catalysts,” Y. M. López-De Jesús (presenter), O. S. Alexeev and C.T. Williams, North American Catalysis Society Meeting, Houston, TX, June 2007.
37. Talk – “Characterization and Kinetic Evaluation of Ag-Pt Bimetallic Catalysts Prepared by Electroless Deposition,” M. T. Schaal (presenter), C. T. Williams and J. R. Monnier, North American Catalysis Society Meeting, Houston, TX, June 2007.
38. Poster – “Characterization and Catalytic Evaluation of Dendrimer-Derived Pt-Cu/SiO<sub>2</sub> Catalysts,” H. Xie (presenter), J. R. Monnier, C. T. Williams and H. J. Ploehn, North American Catalysis Society Meeting, Houston, TX, June 2007.
39. Poster – “Synthesis and Characterization of Au-Pt/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition Methods,” J. Rebelli (presenter), J. H. Montoya, M. T. Schaal, C. T. Williams and J. R. Monnier, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2007.
40. Talk – “Synthesis and Characterization of Dendrimer-Derived Iridium Supported Catalysts,” Y. M. López-De Jesús (presenter), A. Vicente, G. Lafaye, P. Marécot, O. S. Alexeev, J. R. Monnier and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2007.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by graduate students supervised by CTW (cont.)**

41. Talk – “Preparation, Characterization, and Evaluation of Bimetallic Catalysts Prepared by Electroless Deposition Methods,” J. R. Monnier, M. T. Schaal (presenter), C. T. Williams, AIChE Annual Meeting, Salt Lake City, UT, November 2007.
42. Talk – “Synthesis and Characterization of Dendrimer-Derived Iridium Supported Catalysts,” Y. M. López-De Jesús (presenter), A. Vicente, G. Lafaye, P. Marécot, O. S. Alexeev, J. R. Monnier and C. T. Williams, ACS National Meeting, New Orleans, LA, April 2008.
43. Talk – “Synthesis and Characterization of Au-Pt/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition Methods,” J. Rebelli (presenter), J. H. Montoya, M. T. Schaal, C. T. Williams and J. R. Monnier, AIChE Spring National Meeting, New Orleans, LA, April 2008.
44. Talk – “Characterization and Evaluation of Ag-Pt/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition,” M. T. Schaal (presenter), J. R. Monnier, and C. T. Williams, 82<sup>nd</sup> ACS Colloid and Surface Science Symposium, Raleigh, NC, June 2008.
45. Poster – “Synthesis and Characterization of Au-Pt/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition Method,” J. Rebelli (presenter), J. H. Montoya, M. T. Schaal, C. T. Williams and J. R. Monnier, 82<sup>nd</sup> ACS Colloid and Surface Science Symposium, Raleigh, NC, June 2008.
46. Talk – “Synthesis and Characterization of Dendrimer-Derived Supported Ir and Ir-Pd Catalysts,” Y. M. López-De Jesús (presenter), A. Vicente, G. Lafaye, P. Marécot, O. S. Alexeev, J. R. Monnier and C. T. Williams, 82<sup>nd</sup> ACS Colloid and Surface Science Symposium, Raleigh, NC, June 2008.
47. Talk - “Synthesis and Characterization of Au-Pt/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition Method,” J. Rebelli (presenter), M. Detwiler, J. H. Montoya, M. T. Schaal, C. T. Williams and J. R. Monnier, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2008.
48. Talk - “Dendrimer-Derived Bimetallic Ir-Based/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Catalysts for Liquid-Phase Hydrogenation Reactions” Y. M. López-De Jesús (presenter), A. Vicente, J. R. Monnier, G. Lafaye, P. Marécot and C. T. Williams, AIChE Annual Meeting, Philadelphia, PA, November 2008
49. Talk - “Silica and Alumina Pd-Sn Catalysts : Correlations Between Structure and Surface Properties of the Catalysts and Their Catalytic Performances in Citral Hydrogenation,” A. Vicente (presenter), G. Lafaye, C. Especel, C. T. Williams and P. Marécot, AIChE Annual Meeting, Philadelphia, PA, November 2008
50. Talk - “High Unsaturated Alcohol Selectivity Over Silica and Alumina Pd-Sn Catalysts,” A. Vicente (presenter), G. Lafaye I, C. Especel, C. T. Williams and P. Marécot, AIChE Annual Meeting, Philadelphia, PA, Nov. 2008
51. Talk - “Synthesis and Characterization of Au-Pd/SiO<sub>2</sub> Catalysts Prepared by Electroless Deposition Methods,” J. Rebelli (presenter), M. Detwiler, J. H. Montoya, , C. T. Williams and J. R. Monnier, AIChE Annual Meeting, Philadelphia, PA, November 2008
52. Poster – “Characterization and Kinetic Evaluation of Dendrimer-derived Pt-Ru/SiO<sub>2</sub> Catalysts for Selective Hydrogenation of 3,4-Epoxy-1-Butene,” D. Liu (presenter), Y. M. López-De Jesús, J. M. Monnier and C. T. Williams, North American Catalysis Society Meeting, San Francisco, CA, June 2009.
53. Poster - “Dendrimer-Derived Ir-Pd/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Catalysts,” Y. M. López-De Jesús (presenter), A. Vicente, J. Monnier, G. Lafaye, P. Marécot, and C. T. Williams, North American Catalysis Society Meeting, San Francisco, CA, June 2009.
54. Poster – “Synthesis, Characterization, and Evaluation of Au Bimetallic Catalysts Prepared by Electroless Deposition Methods,” J. Rebelli (presenter), M. Dettwiller , J. H. Montoya , C. T. Williams and J. R. Monnier, North American Catalysis Society Meeting, San Francisco, CA, June 2009.
55. Poster – “The Role of Mo and Ni for Hydrodesulfurization of Dibenzothiophene, 4-Methyl Dibenzothiophene, and 4,6-Dimethyl Dibenzylthiophene,” Q. Gao (presenter), C. T. Williams and K. Segawa, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2009.
56. Talk - “Synthesis and Characterization of Au-Bimetallic Catalysts Prepared by Electroless Deposition Methods,” J. Rebelli (presenter), J. H. Montoya, M. Detwiler, C. T. Williams and J. R. Monnier, AIChE Annual Meeting, Nashville, TN, November 2009.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by graduate students supervised by CTW (cont.)**

57. Talk - “Dendrimer-Derived Bimetallic Catalysts for Liquid-Phase Hydrogenation Reactions,” Y. M. López-De Jesús (presenter), D. Liu and C. T. Williams, AIChE Annual Meeting, Nashville, TN, November 2009
58. Poster - “In-Situ ATR-IR Spectroscopic Investigation of Chirally-Modified Pd/Al<sub>2</sub>O<sub>3</sub> for Enantioselective C=C Bond Hydrogenation,” X. Sun (presenter), S. Tan (presenter), G. Hu, and C. T. Williams, AIChE Annual Meeting, Nashville, TN, November 2009.
59. Talk – “The Effect of Ni Promoter and Chelating Reagent for the Preparation of Highly Active Ni-MoS<sub>2</sub>/g-Al<sub>2</sub>O<sub>3</sub> HDS Catalysts,” Q. Gao (presenter), V. G. Komvokis, C. T. Williams, and K. Segawa, TOCAT6/APCAT5, Tokyo, Japan, July, 2010
60. Talk - “The Effect of Ni Promoter and Chelating Reagent on the Preparation, Structure and Performance of Molybdenum-Based HDS Catalysts”, Q. Gao (presenter), T. N. K. Ofosu, S. Ma, V. G. Komvokis, C. T. Williams, and K. Segawa, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2010.
61. Talk - “Synthesis and Evaluation of Group IB-Pd/SiO<sub>2</sub> Bimetallic Catalysts, Prepared by Electroless Deposition Methods”, J. Rebelli (presenter), S. Abbaspour, A. Rodriguez, C. T. Williams and J. R. Monnier, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2010.
62. Talk – “Synthesis and Evaluation of Au-Pd/SiO<sub>2</sub> Bimetallic Catalysts Prepared Using Electroless Deposition Method,” J. Rebelli (presenter), S. Abbaspour, A. Rodriguez, C. T. Williams and J. R. Monnier, AIChE Annual Meeting, Salt Lake City, UT, November 2010.
63. Talk - “Effect of Mg/Al Atom Ratio on Catalytic Performance of Pt/MgO-Al<sub>2</sub>O<sub>3</sub> Catalyst in Acetonitrile Hydrogenation,” C. Poupin (presenter), L. Pirault-Roy, R. Maache, R. Brahmi, C. Kappenstein and C. T. Williams, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
64. Poster - “A Spectroscopic and Kinetic Study of Asymmetric Hydrogenation of  $\alpha$ ,  $\beta$ -Unsaturated Carboxylic Acid and Cinchonidine on Pd/Al<sub>2</sub>O<sub>3</sub> Surface,” S. Tan (presenter) and C. T. Williams, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
65. Poster – “Effect of pH Control in Liquid Phase Glycerol Oxidation Reactions,” J. Rebelli, A. A. Rodriguez, C. T. Williams and J. R. Monnier, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
66. Poster – “Synthesis of Dendrimer-Derived Supported Ir-Au Bimetallic Catalysts,” Y.-J. Song, Y. M. López-De Jesús and C. T. Williams, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
67. Poster – “In-situ Investigation of Prochiral C=C Bond Hydrogenation in Methylcinnamic Acid,” X. Sun and C. T. Williams, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
68. Poster – “Effects of Ni Promotion and Chelating Reagent on the Preparation, Structure and Performance of Molybdenum-based HDS Catalysts,” Q. Gao (presenter), V. G. Komvokis, C. T. Williams, and K. Segawa, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
69. Talk - “Asymmetric hydrogenation of  $\alpha$ ,  $\beta$ -unsaturated carboxylic acid over cinchona-modified Pd catalyst”, S. Tan (presenter) and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2011.
70. Poster – “Unsupported NiMoW Sulfide Catalysts Prepared by Thermal Decomposition of Thiosalts for Hydrodesulfurization of Dibenzothiophene,” Y. Yi (presenter), C. T. Williams, G. Xiong and C. Liang, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2011.
71. Talk – “Enantioselective Hydrogenation of  $\alpha$ ,  $\beta$ -Unsaturated Carboxylic Acid Over Cinchona-Modified Pd/Al<sub>2</sub>O<sub>3</sub>: a Spectroscopic and Kinetic Study,” S. Tan (presenter) and C. T. Williams, AIChE Annual Meeting, Minneapolis, MN, October 2011.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by graduate students supervised by CTW (cont.)**

72. Talk – “Preparation, Characterization and Evaluation of Group IB-Pd Bimetallic Catalysts Prepared by Electroless Deposition,” Y. Zhang (presenter), J. Rebelli, C. T. Williams and J. R. Monnier, AIChE Annual Meeting, Minneapolis, MN, October 2011.
73. Talk – “Kinetic Study of Asymmetric Hydrogenation of  $\alpha$ ,  $\beta$ -Unsaturated Carboxylic Acid over Cinchona-Modified Pd/Al<sub>2</sub>O<sub>3</sub> Catalyst,” S. Tan, J. R. Monnier, and C. T. Williams, 24<sup>th</sup> Organic Reactions Catalysis Society Meeting, Annapolis, MD, April 2012.
74. Poster – “Alumina Supported Ir-Ag Bimetallic Catalysts by Electroless Deposition for CO Oxidation,” Y.-J. Song (presenter), J. R. Monnier and C. T. Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2012.
75. Talk – “Selective Liquid Phase Oxidation of Glycerol Using (Group I-B)-Pd Bimetallic Catalysts Prepared by Electroless Deposition Method,” A. A. Rodriguez (presenter), C. T. Williams, and J. R. Monnier, AIChE Annual Meeting, Pittsburgh, PA, October 2012.
76. Talk – “Catalytic Hydrodeoxygenation of Propionic Acid Over Supported Monometallic Palladium: A Study of the Support Effects,” Y. K. Lugo-Jose (presenter), J. R. Monnier and C. T. Williams, AIChE Annual Meeting, Pittsburgh, PA, October 2012.
77. Talk – “Preparation of Alumina Supported Ir-Ag Bimetallic Catalysts by Electroless Deposition,” Y.-J. Song (presenter), J. R. Monnier, P. T. Fanson and C. T. Williams, AIChE Annual Meeting, Pittsburgh, PA, October 2012.
78. Poster - “Catalytic Hydrodeoxygenation of Propionic Acid over Supported Group VIII Noble Metals” Y. K. Lugo-Jose (presenter), J. R. Monnier and C. T. Williams, 23rd North American Catalysis Society Meeting, Louisville, KY, June, 2013.
79. Talk – “Oxidation of Acohols, Diols, and Polyols Using Au-Pd/C Bimetallic Catalysts Prepared by Electroless Deposition” A. A. Rodriguez (presenter), M. B. Griffin, J. W. Medlin, J. R. Monnier and C. T. Williams, 23rd North American Catalysis Society Meeting, Louisville, KY, June, 2013.
80. Talk – “Selective Hydrogenation of Acetylene in Excess Ethylene Using Group IB-Pd Bimetallic Catalysts Prepared by Electroless Deposition” Y. Zhang (presenter), C. T. Williams and J. R. Monnier, 23rd North American Catalysis Society Meeting, Louisville, KY, June, 2013.

**Contributed – presented by undergraduate students supervised by CTW**

1. Poster - "Synthesis and Characterization of Metallic, Nanoscale Catalysts," N. Dygert (presenter) and C. T. Williams, AIChE Annual Meeting, AIChE Annual Meeting, Indianapolis, IN, November, 2002
2. Poster - "Self-Assembly and Characterization of Dendrimer-Stabilized Metal Nanoparticles on Gold," J. P. Angelos (presenter) and C. T. Williams, AIChE Southern Regional Conference, Melbourne, FL, March, 2003.
3. Poster - "*In Situ* Investigation of Aldehyde Adsorption and Dissociation on Pd/Al<sub>2</sub>O<sub>3</sub> Catalyst using Attenuated Total Reflection Infrared Spectroscopy," D. Jason Owens (presenter) and C. T. Williams, AIChE Southern Regional Conference, Melbourne, FL, March, 2003.
4. Poster - "Synthesis of Pt-Pd Bimetallic Catalysts using Dendrimer-Stabilized Nanoparticles," M. D. Casper (presenter) and C. T. Williams, AIChE Southern Regional Conference, Melbourne, FL, March, 2003.
5. Poster (1<sup>st</sup> place prize in Catalysis and Reaction Engineering Division) - "Synthesis of Pt-Pd Bimetallic Catalysts using Dendrimer-Stabilized Nanoparticles," M. D. Casper (presenter) and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.
6. Poster (2<sup>nd</sup> place prize in Materials Engineering and Sciences Division) - "Self-Assembly and Characterization of Dendrimer-Stabilized Metal Nanoparticles on Gold," J. P. Angelos (presenter) and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by undergraduate students supervised by CTW (cont.)**

7. Poster (3<sup>rd</sup> place prize in Catalysis and Reaction Engineering Division) - "*In Situ* Investigation of Aldehyde Adsorption and Dissociation on Pd/Al<sub>2</sub>O<sub>3</sub> and Pt/Al<sub>2</sub>O<sub>3</sub> Catalysts using Attenuated Total Reflection Infrared Spectroscopy," D. J. Owens (presenter) and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.
8. Talk - "Synthesis of Pt-Pd Bimetallic Catalysts using Dendrimer-Stabilized Nanoparticles," M. D. Casper (presenter) and C. T. Williams, AIChE Regional Meeting, Atlanta, GA, March, 2004.
9. Talk - "*In Situ* Investigation of Aldehyde Adsorption and Dissociation on Pd/Al<sub>2</sub>O<sub>3</sub> and Pt/Al<sub>2</sub>O<sub>3</sub> Catalysts using Attenuated Total Reflection Infrared Spectroscopy," D. J. Owens (presenter) and C. T. Williams, AIChE Regional Meeting, Atlanta, GA, March, 2004.
10. Poster – "Thermal Decomposition of Generation-4 Polyamidoamine Dendrimer Films", K. Pizzolato (presenter) O. Ozturk, T. J. Black, F. Parsons, J. Ratliff, K. Perrine, C. T. Williams and D. A. Chen, AIChE Annual Meeting, Austin, TX, November, 2004.
11. Poster (2<sup>nd</sup> place prize in Catalysis and Reaction Engineering Division) - "Synthesis of Copper-Palladium Bimetallic Catalysts using Electroless Deposition", A. Y. Metcalf (presenter), C. C. Stork, J. R. Monnier, and C. T. Williams, AIChE Annual Meeting, Austin, TX, November, 2004.
12. Poster - "Investigation of Acetonitrile Adsorption on a Model Support by Method of Sum Frequency Spectroscopy," J. A. Smith (presenter), S. B. Waldrup, and C. T. Williams, AIChE Annual Meeting, Cincinnati, OH, November 2005.
13. Poster - "Preparation of Silver-Platinum Bimetallic Catalysts Via Electroless Deposition," A. C. Pickerell (presenter), M. T. Schaal, C. T. Hoang, J. R. Monnier, and C. T. Williams, AIChE Annual Meeting, Cincinnati, OH, November 2005.
14. Poster – "Synthesis of Dendrimer-Derived Supported Iridium Catalysts," L. Jimenez-Padua (presenter), Y. M. López-De Jesús, and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November 2006.
15. Poster - "On the Mechanism of NaBH<sub>4</sub> Hydrolysis: Raman Spectra of Solid Species," H. S. Marsh (presenter), A. M. Beard, M. A. Matthews, C. T. Williams and E. Y. Marrero-Alfonso, AIChE Annual Meeting, Philadelphia, PA, November 2008
16. Poster - "Study of Isopropanol Oxidation On Au-Pd/SiO<sub>2</sub> Catalysts Using Temperature Programmed Techniques," J. Javier-Navarro (presenter), J. Rebelli, C. T. Williams and J. R. Monnier, AIChE Annual Meeting, Nashville, TN, November 2009
17. Poster - "Synthesis and Characterization of Gold-Platinum Bimetallic Catalyst Prepared by Electroless Deposition Method," A. A. Rodriguez-Vaquez (presenter), J. Rebelli, C. T. Williams and J. R. Monnier, AIChE Annual Meeting, Nashville, TN, November 2009

**Contributed – presented by research collaborator of CTW**

1. Talk - "Dendrimer Stabilized Nanoparticles for Next-Generation Catalysts," D. S. Deutsch (presenter), D. Liu, D. Altomare, H. Lang, B. Chandler, C. T. Williams, P. B. Balbuena, and M. D. Amiridis, AIChE Annual Meeting, Indianapolis, IN, November, 2002.
2. Talk – "Undergraduate Research: Enhancing Education with the Research Communications Studio," M. A. Matthews (presenter), E. Alford, N. Thompson and C. T. Williams, AIChE Annual Meeting, San Francisco, CA, November, 2003.
3. Talk – "Dendrimer-Based Routes to Metallic and Bimetallic Nanoparticles for Next Generation Catalysts and Reactor Systems", H. J. Ploehn (presenter), M. D. Amiridis, P. B. Balbuena, D. A. Chen, J. Ferry, C. J. Murphy, and C. T. Williams, AIChE Annual Meeting, Austin, TX, November, 2004.

**PRESENTATIONS - TECHNICAL MEETINGS (CONT)****Contributed – presented by research collaborator of CTW (cont.)**

4. Talk - “Characterization of Dendrimer-Derived Supported Metal Nanoparticles,” D. S. Deutsch (presenter), A. Siani, O. S. Alexeev, C. T. Williams, and M. D. Amiridis, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2005.
5. Talk - “Characterization of Dendrimer-Derived Supported Metal Nanoparticles,” D. S. Deutsch (presenter), A. Siani, O. S. Alexeev, C. T. Williams, and M. D. Amiridis, AIChE Annual Meeting, Cincinnati, OH, November 2005.
6. Poster - “Microscopic Characterization of Dendrimer-Derived Bimetallic Pt-Cu Catalysts”, H. Xie, D. Liu, C. T. Williams, H. J. Ploehn, J. Y. Howe (presenter), Microscopy & Microanalysis 2006 Meeting of the Microscopy Society of America, Chicago, IL, July 2006.
7. Talk – “A Flexible Chemical Engineering Curriculum,” C. T. Williams and F. Gadala-Maria (presenter), AIChE Annual Meeting, San Francisco, CA, November 2006.
8. Talk – “EXAFS Characterization of Pt/Dendrimer Nanocomposites Used for the Preparation of Pt/Al<sub>2</sub>O<sub>3</sub> Catalysts,” A. Siani, O. S. Alexeev (presenter), C. T. Williams, H. J. Ploehn, M. D. Amiridis, AIChE Annual Meeting, San Francisco, CA, November 2006.
9. Talk – “PAMAM Dendrimers as Templates for the Preparation of Supported Pt and Rh Catalysts,” A. Siani, D. S. Deutsch, O. S. Alexeev, G. Lafaye, P. T. Fanson, H. Hirata, S. Matsumoto, H. J. Ploehn, C. T. Williams, Amiridis, M. D (presenter), North American Catalysis Society Meeting, Houston, TX, June 2007.
10. Poster - “*In situ* FTIR spectroscopic studies on the mechanism of limonene epoxidation over PW-Amberlite catalyst” Rolando Barrera Zapata, Aída Luz Villa, Consuelo Montes de Correa (presenter), Christopher Williams, Southeastern Catalysis Society Meeting, Asheville, NC, September, 2008.
11. Talk - “Characterizing and designing bimetallic catalysts for selective reductions of oxygenates,” J. W. Medlin (presenter), M. P. Hyman, M. T. Schaal, J. R. Monnier, C. T. Williams and S. Ma, ACS Spring National Meeting, Salt Lake City, UT, March, 2009
12. Talk – “Use of Electroless Deposition Methods to Prepare Novel Bimetallic Catalysts,” J. R. Monnier (presenter), M. T. Schaal, K. D. Beard, J. Rebelli, C. T. Williams and J. W. Van Zee, North American Catalysis Society Meeting, San Francisco, CA, June 2009.
13. Poster – “In-Situ ATR Studies of the Mechanism of Limonene Epoxidation over PW-Amberlite,” R. B. Zapata , Chemical, A. Luz Villa , C. Montes de Correa (presenter) and C. T. Williams, North American Catalysis Society Meeting, San Francisco, CA, June 2009.
14. Talk - “Effect of chelatants on the sulfidation of NiMo/alumina catalysts,” K. Segawa (presenter), C. T. Williams and Q. Gao, ACS Fall National Meeting, Washington, DC, August 2009.
15. Talk - “In Situ ATR-IR Studies On the Mechanism of Limonene Epoxidation Over PW-Amberlite,” R. Barrera (presenter), A. Luz Villa, C. Montes de Correa, C. T. Williams, AIChE Annual Meeting, Nashville, TN, November 2009
16. Talk – “Preparation, characterization, and evaluation of silica-supported, Group IB-Pd bimetallic catalysts prepared by electroless deposition methods,” J. R. Monnier (presenter), J. Rebelli, A. A. Rodriguez, S. Abbaspour, S. Ma, and C. T. Williams, 22nd North American Catalysis Society Meeting, Detroit, MI, June, 2011.
17. Talk – “Unsupported NiMoW Sulfide Catalysts Prepared by Thermal Decomposition of Thiosalts for Hydrodesulfurization of Dibenzothiophene,” Y. Yi (presenter), C. T. Williams, G. Xiong and C. Liang, AIChE Annual Meeting, Minneapolis, MN, October 2011.
18. Talk – “Preparation of Alumina Supported Ag-Ir Bimetallic Catalysts by Electroless Deposition for CO Oxidation” Y.-J. Song, J. R. Monnier (presenter), P. T. Fanson and C. T. Williams, 23rd North American Catalysis Society Meeting, Louisville, KY, June, 2013.

**PRESENTATIONS – INVITED SEMINARS****Academic**

1. "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Real-Time Probe of Heterogeneous Catalytic Reactions at High Gas Pressures," C. T. Williams, (invited as a result of receiving the departmental Research Excellence Award), School of Chemical Engineering, Purdue University, West Lafayette, IN, March, 1997.
2. "Surface-Enhanced Raman Spectroscopy as an *In-Situ* Probe of Heterogeneous Catalytic Reactions," C. T. Williams, Department of Chemical Engineering, The Ohio State University, Columbus, OH, February, 1998.
3. "New Prospects for *In-Situ* Investigation of Heterogeneous Catalytic Reactions," C. T. Williams, Department of Chemical Engineering, University of South Carolina, Columbia, SC, January, 1999.
4. "New Prospects for *In-Situ* Investigation of Heterogeneous Catalytic Reactions," C. T. Williams, Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, PA, February, 1999.
5. "New Prospects for *In-Situ* Investigation of Heterogeneous Catalytic Reactions," C. T. Williams, Department of Chemical Engineering, University of Kansas, Lawrence, KA, March, 1999.
6. "New Prospects for *In-Situ* Investigation of Heterogeneous Catalytic Reactions," C. T. Williams, Department of Chemical Engineering, Columbia University, New York, NY, March, 1999.
7. "New Prospects for *In-Situ* Investigation of Heterogeneous Catalytic Reactions," C. T. Williams, Department of Chemical Engineering, Penn State University, University Park, PA, March, 1999.
8. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemistry, Miami University, Oxford, OH, July, 2003.
9. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering, North Carolina State University, Raleigh, NC, October, 2003.
10. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Center for Catalysis and Surface Science and Institute for Environmental Catalysis, Northwestern University, Evanston, IL, October, 2003.
11. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering, Clemson University, Clemson, SC, December, 2003.
12. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Surface Science and Catalysis Group, University of California at Berkeley, Berkeley, CA, April, 2004.
13. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, September, 2004.
14. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering, University of Delaware, Newark, DE, November, 2004.
15. "Dendrimer-Stabilized Nanoparticles for Synthesis of Controlled-Structure Supported Metal Catalysts," C. T. Williams, Department of Chemical Engineering, University of Puerto Rico, Mayaguez, PR, October, 2005.
16. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering, University of Osaka, Osaka, Japan, December, 2005.
17. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, American Society for Metals – Oak Ridge Chapter, Educational Symposium: Catalysis, Oak Ridge, TN, April, 2006.
18. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemistry, University of Tokyo, Tokyo, Japan, October 2006.
19. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Chemical Resources Laboratory, Tokyo Institute of Technology, Yokohama, Japan, October 2006.
20. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemistry and CNRS, University of Poitiers, Poitiers, France, May 2007.
21. "Dendrimer-Metal Nanocomposites for Synthesis of Controlled-Structure Supported Metal Catalysts," C. T. Williams, Institute for Chemical and Bio-Engineering, ETH, Zurich, Switzerland, June 2007.

**PRESENTATIONS – INVITED SEMINARS (CONT.)****Academic (cont.)**

22. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering, University of Notre Dame, South Bend, IN, October 2007.
23. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering, State Key Laboratory for Physical Chemistry of Solid Surfaces and Department of Chemistry, Xiamen University, Xiamen, China, July 2008.
24. "Bridging the 'Liquid Gap': In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Division of Applied Chemistry and Biotechnology, Chiba University, Chiba, Japan, July 2008.
25. "Dendrimer-Metal Nanocomposites as Precursors for Supported Metal Catalysts: Progress and Prospects," C. T. Williams, Department of Chemical Engineering, University of Osaka, Osaka, Japan, July 2008.
26. "Dendrimer-Metal Nanocomposites for Synthesis of Controlled-Structure Supported Metal Catalysts," C. T. Williams, Department of Chemical Engineering and State Key Laboratory for Fine Chemicals, Dalian University of Technology, Dalian, China, May 2009.
27. "Bimetallic Supported Catalysts Prepared using Electroless Deposition Methods," C. T. Williams, Department of Chemical Engineering and State Key Laboratory for Fine Chemicals, Dalian University of Technology, Dalian, China, May 2009.
28. "Bridging the Liquid Gap: In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemical Engineering and State Key Laboratory for Fine Chemicals, Dalian University of Technology, Dalian, China, May 2009.
29. "Bridging the Liquid Gap: In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, Department of Chemistry and State Key Laboratory of Inorganic Synthesis and Preparative Chemistry, Jilin University, Changchun, China, May 2010.

**Industrial**

1. "Bridging the Liquid Gap: In-Situ Vibrational Spectroscopy of Solid-Liquid Catalytic Interfaces," C. T. Williams, ExxonMobil Research and Engineering Company, Annandale, NJ, June 2008.

**FUNDING – FUNDAMENTAL RESEARCH****Principal Investigator (specific amounts for CTW indicated)**

1. South Carolina Commission on Higher Education, "Investigation of Novel Heterogeneous Catalytic Routes for the Production of Pharmaceuticals," \$97,209, 01/01/00-12/31/00, C. T. Williams (PI@\$58,000) and M. D. Amiridis (co-PI)
2. USC Spons. Programs and Research, "Development of Model Supported-Metal Catalysts for In-Situ Vibrational Spectroscopic Investigations of Heterogeneous Catalysis," \$15,000, 01/01/00-12/31/00, C. T. Williams (PI)
3. Petroleum Research Fund, "In-Situ Vibrational Spectroscopic Investigation of Heterogeneous Asymmetric Hydrogenation on Model Supported Catalysts," \$25,000, 09/01/00-08/31/02, C.T. Williams (PI)
4. National Science Foundation CAREER Award, "Investigations of Catalysis at Solid-Liquid Interfaces by Non-Linear Optical Spectroscopy," \$391,000 (including REU supplements), 2/01/01-1/31/06, C. T. Williams (PI)
5. USC Nanocenter Seed Grant, "Preparation of Novel Nanoscale Bimetallic Catalysts Using Electroless Deposition Methods," \$20,000, 3/15/04 – 3/14/05, C. T. Williams (PI@\$10,000), J. R. Monnier (co-PI).
6. National Science Foundation "Operando Vibrational Spectroscopic Investigation of Heterogeneous Asymmetric Hydrogenation on Transition Metal Catalysts," \$300,000, 9/01/07-8/31/11, C. T. Williams (PI).
7. BP Oil International Limited, "Scoping Study of the Fuel/Additive/Iron Interface," \$39,956, 9/01/07-2/29/08, C. T. Williams (PI).

**FUNDING – FUNDAMENTAL RESEARCH (CONT.)****Principal Investigator (specific amounts for CTW indicated) (cont.)**

8. UOP, “Strategies For the Production of Sulfur Free Fuels: Effect of Chelating Reagent on the Sulfidation of NiMo Catalysts,” \$81,794, 4/01/08-3/31/09, C. T. Williams (PI@\$65,000), K. Segawa (co-PI).
9. National Science Foundation, “REU Supplement: Operando Vibrational Spectroscopic Investigation of Heterogeneous Asymmetric Hydrogenation on Transition Metal Catalysts” \$8,000, 6/01/08 – 8/31/11, C. T. Williams (PI).
10. National Science Foundation, “Graduate Research Supplement: Operando Vibrational Spectroscopic Investigation of Heterogeneous Asymmetric Hydrogenation on Transition Metal Catalysts” \$38,800, 9/01/08 – 8/31/11, C. T. Williams (PI).
11. Toyota, “Synthesis and Characterization of Supported Metal Catalysts for Automotive Applications,” \$163,799, 11/01/08-02/28/10, C. T. Williams (PI@\$111,000), M. D. Amiridis (co-PI).
12. National Science Foundation, “REU Supplement: Operando Vibrational Spectroscopic Investigation of Heterogeneous Asymmetric Hydrogenation on Transition Metal Catalysts” \$6,000, 6/01/09 – 8/31/11, C. T. Williams (PI).
13. UOP, “Strategies For the Production of Sulfur Free Fuels: Effect of Chelating Reagent on the Sulfidation of NiMo Catalysts,” \$40,000, 12/01/09-11/30/10, C. T. Williams (PI@\$40,000), K. Segawa (co-PI).
14. Toyota, “Synthesis and Characterization of Supported Metal Catalysts for Automotive Applications,” \$165,101, 3/01/10-02/28/11, C. T. Williams (PI@\$83,000), M. D. Amiridis (co-PI).
15. Toyota, “Synthesis and Characterization of Supported Metal Catalysts for Automotive Applications,” \$175,266, 3/01/11-02/28/12, C. T. Williams (PI@\$88,000), M. D. Amiridis (co-PI).
16. Toyota, “Synthesis and Characterization of Supported Metal Catalysts for Automotive Applications,” \$174,937, 3/01/12-02/28/13, C. T. Williams (PI@\$88,000), M. D. Amiridis (co-PI).
17. National Science Foundation, “Collaborative Research: Electrochemical Reduction of CO<sub>2</sub> to Small Organic Fuels on Encapsulated Metal Catalysts in Gas Diffusion Electrode Environment” \$120,000, 9/01/12 – 8/31/15, C. T. Williams (PI).

**Co-Principal/Senior Investigator (specific amounts for CTW indicated)**

1. National Science Foundation NIRT Program, “Dendrimer-Stabilized Nanoparticles for Next Generation Catalysts,” \$2,000,000, 7/1/01-6/31/06, H. J. Ploehn (PI), C. T. Williams (Senior Investigator@\$280,000), M. D. Amiridis (co-PI), P. B. Balbuena (Senior Investigator), C. J. Murphy (co-PI), D. A. Chen (Senior Investigator), J. L. Ferry (Senior Investigator).
2. NSF-I/UCRC Center for Fuel Cells at USC, “Catalysts for Impurity-free Hydrogen,” \$94,500, 1/01/03 – 12/31/05, C. T. Williams (co-PI@\$47,250), M. D. Amiridis (co-PI).
3. Toyota, “Synthesis and Characterization of Supported Metal Catalysts for Automotive Applications,” \$563,656, 11/01/04-10/31/08, M. D. Amiridis (PI) and C. T. Williams (co-PI@\$270,000).
4. National Science Foundation, “Collaborative Research: Tailoring Solid Catalysts for Selective Reaction of Multifunctional Molecules,” \$240,251 (including REU supplements), 9/01/05 – 8/31/09, J. R. Monnier (PI), C. T. Williams (co-PI@\$121,000), J. W. Medlin (co-PI – U. Colorado, separate budget).
5. Center for Manufacturing and Technology of USC, “Preparation and Evaluation of Novel Bimetallic Catalysts for Catalytic Applications,” \$10,000, 11/01/05 - 4/30/06, J. R. Monnier (PI), C. T. Williams (co-PI@\$5,000), Engelhard Corporation (industrial partner).
6. National Science Foundation, “GOALI: Collaborative Research: Phase Behavior and Reactivity of a Hygroscopic System,” \$335,693, 05/16/08 – 05/15/11, M. A. Matthews (PI), T. A. Davis, C. T. Williams (Senior Investigator@30,000).

**FUNDING – FUNDAMENTAL RESEARCH (CONT.)****Co-Principal/Senior Investigator (specific amounts for CTW indicated) (cont.)**

7. National Science Foundation, “Collaborative Research: Preparation, Characterization, and Evaluation of Bimetallic Catalysts Using Electroless Deposition Methods for Selective Oxidation of Biomass-Related Alcohols,” \$329,888, 8/01/09 – 7/30/12, J. R. Monnier (PI), C. T. Williams (co-PI@ \$165,000).
8. National Science Foundation, “Complex Hydrides of Lithium, Aluminum and Boron for Hydrogen Storage,” \$300,000, 9/01/09 – 8/31/12, J. A. Ritter (PI), A. D. Ebner (co-PI), C. T. Williams (co-PI@ \$30,000).
9. USC Nanocenter/Future Fuels Initiative, “Seed Grant: Catalytic Liquid-Phase Deoxygenation of Biomass to Hydrocarbon Fuels for Transportation and Stationary Applications,” \$150,000, 8/16/09 – 8/15/10, C. T. Williams (co-PI@ \$50,000), A. Heyden (co-PI@ \$50,000), F. Chen (co-PI@ \$50,000).
10. National Science Foundation, “Graduate Research Supplement: Collaborative Research: Preparation, Characterization, and Evaluation of Bimetallic Catalysts Using Electroless Deposition Methods for Selective Oxidation of Biomass-Related Alcohols,” \$40,050, 8/01/10 – 7/31/11, J. R. Monnier (PI), C. T. Williams (co-PI@ \$20,000).
11. National Science Foundation, “Graduate Research Supplement: Collaborative Research: Preparation, Characterization, and Evaluation of Bimetallic Catalysts Using Electroless Deposition Methods for Selective Oxidation of Biomass-Related Alcohols,” \$42,000, 8/01/11 – 7/31/12, J. R. Monnier (PI), C. T. Williams (co-PI@ \$21,000).
12. Office of Research APIRE-II Program, “Catalytic Conversion of Biomass-Derived Platform Molecules into High Octane Biofuels,” \$100,000, 05/15/2012-8/14/2013, A. Heyden (PI), C. T. Williams (co-PI@ \$33,000), R. D. Adams (co-PI).
13. National Science Foundation, “Rational Design of Selective Hydrodeoxygenation Catalysts for Organic Acids,” \$400,000, 8/15/12 – 8/14/15, A. Heyden (PI), C. T. Williams (co-PI@ \$200,000), J. R. Monnier.

**FUNDING – APPLIED RESEARCH AND TESTING****Principal Investigator (specific amounts for CTW indicated)**

1. Center for Manufacturing and Technology of USC, “Raman and Optical Imaging of Composites Produced by Resin Transfer Molding,” \$14,984, 4/1/02-6/30/02, C. T. Williams (PI@ \$9,000), T. D. Papathanasiou (co-PI).
2. Directed Technologies, Inc., “Analysis of Carbon Deposition on Metal Surfaces,” \$30,000, 9/01/03 – 12/31/03, C. T. Williams (PI).
3. Kemira Finchem, “Peroxide Manufacture in a PEM Fuel Cell Reactor,” \$30,000, 5/01/06 – 04/30/07, C. T. Williams (PI@ \$20,000), J. W. Weidner (co-PI).
4. Alstom Power Inc., “Testing of CO<sub>2</sub> Amine Interactions,” \$43,117, 6/01/08-12/31/08, C. T. Williams (PI).
5. Alstom Power Inc., “Testing of CO<sub>2</sub> Amine Interactions,” \$108,119, 1/01/09-11/30/09, C. T. Williams (PI).

**FUNDING – EQUIPMENT****Co-Principal Investigator**

1. Office of Research Support Programs of USC, “Acquisition of a Scanning Probe Microscopy System,” \$100,000 1/1/02-1/1/03, H. J. Ploehn (PI), C. T. Williams (co-PI), M. D. Amiridis (co-PI), P. B. Balbuena (co-PI), C. J. Murphy (co-PI), D. A. Chen (co-PI), J. L. Ferry (co-PI).
2. Office of Research Support Programs of USC, “Acquisition of a High-Performance Computer Cluster for the Design of Dendrimer-Based Nano-Catalysts,” \$33,160, 1/1/02-1/1/03, P. B. Balbuena (PI), C. T. Williams (co-PI), M. D. Amiridis (co-PI), H. J. Ploehn (co-PI), C. J. Murphy (co-PI), D. A. Chen (co-PI), J. L. Ferry (co-PI).
3. Office of Research Support Programs of USC, “Equipment to Expand the Capabilities of the High-Pressure Adsorption Laboratory: Development of Hydrogen Storage Materials and Systems,” \$60,000 1/1/02-1/1/03, J. A. Ritter (PI), C. T. Williams (co-PI).

**FUNDING – EQUIPMENT (CONT.)****Co-Principal Investigator (cont.)**

4. National Science Foundation MRI Program, “Development of a 2-D Vibrational Spectrometer for Materials Characterization Based on NMR Analogs,” \$500,001, 8/1/02-7/31/04, M. A. Berg (PI), C. T. Williams (Senior Investigator, as user), U. Bunz (Senior Investigator), C. J. Murphy (Senior Investigator), K. Shimizu (Senior Investigator), M. Wyatt (Senior Investigator), H. zur Loye (Senior Investigator).
5. USC Nanocenter, “Catalysis Thrust Area Proposal, FY 2003-04,” \$55,000, 5/01/04-12/31/04, C. T. Williams (co-PI, lead author), H. J. Ploehn (co-PI).

**FUNDING – EDUCATIONAL/TRAINING****Principal Investigator**

1. National Science Foundation, “IGERT: Functional Nanomaterials for Sustainable Energy Solutions,” \$3,000,000, 09/01/13 – 08/31/18, C. T. Williams (PI), J. A. Lauterbach (co-PI), D. A. Chen (co-PI), W. R. Sandberg (co-PI).

**Co-Principal Investigator**

1. National Science Foundation, “REU: Green Chemistry in Chemical Engineering,” \$284,932, 05/01/06 – 04/30/09, J. W. Weidner (PI), C. T. Williams (co-PI).
2. National Science Foundation, “REU: Sustainable Energy in Chemical Engineering,” \$300,000, 09/01/09 – 8/31/13, C. T. Williams (PI), E. P. Gatzke (co-PI).

**RESEARCH SUPERVISION**

\*Indicates co-supervision with other tenure-track USC faculty member

\*\* Indicates co-advisement with other tenure-track USC faculty member

\*\*\* Indicates co-advisement with non-tenure track USC research professor

\*\*\*\* Indicates co-advisement with faculty from foreign university and degree from that university

**Postdoctoral Fellows (time period) [placement]**

1. Dr. Wei Chu (2000-2002) [ConocoPhillips Company, OK]
2. Dr. Michael R. Strunk (2001-2004) [Bio Spectroscopy Start-Up, Boston, MA]
3. Dr. Oleg S. Alexeev\* (2002-2003) [Research Associate Professor, University of South Carolina, Columbia, SC]
4. Dr. Gwendoline Lafaye\* (2002-2004) [Associate Professor, Dept. of Chemistry, Univ. Poitiers, Poitiers, France]
5. Dr. Snigdhamayee Prahara\* (2007-2008) [Automotive Oils Division, Indian Oil R&D, Faridabad, India]
6. Dr. Gengshen Hu (2008-2010) [Assoc. Prof., Inst. of Physical Chemistry, Zhejiang Normal U., Zhejiang, China]
7. Dr. Yaritza M. López-De Jesús (2009-2010) [Senior Application Engineer, Johnson Matthey, Malvern, PA]

**PhD Students (date awarded) [placement]**

1. Rene J. LeBlanc (December 2004) [FMC Corporation, Bessemer City, NC]
2. Ivelisse Ortiz-Hernandez (August 2006) [Professor, Midlands Tech, Columbia, SC]
3. Hong Xie\*\* (August 2007) [Post Doctoral Associate, Northwestern U., Chicago, IL]
4. S. Beau Waldrup (December 2007) [ExxonMobil, Beaumont, TX]
5. Dongxia Liu (May 2009) [Johnson Matthey, Wayne, PA]
6. Melanie T. Schaal\*\*\* (May 2009) [UOP, Des Plaines, IL]
7. Yaritza M. López-De Jesús (August 2009) [Johnson Matthey, Malvern, PA]
8. Jayakiran Rebelli\*\*\* (May 2011) [Evonik Degussa, Calvert City, KY]
9. Qiang Gao\*\*\* (December 2011) [BASF, Shanghai, China]
10. Xiaojing Sun (May 2013) [Homemaker]
11. Shuai Tan (May 2013) [Post Doctoral Associate, Georgia Institute of Technology, Atlanta, Ga]
12. Yuliana Lugo-José (PhD expected May 2014)
13. You-Jung Song (PhD expected May 2013)
14. Abraham A. Rodríguez-Vaquero\*\*\* (PhD expected December 2014)
15. Yunya Zhang\*\*\* (PhD expected May 2015)
16. José L. Contreras-Mora (PhD expected May 2018)

### **MS Students (date awarded) [placement]**

1. Qiang Gao\*\*\*\* (December 2007) [BASF, Shanghai, China]

### **Undergraduate Students**

Over 40 undergraduate students, with 18 of them being REU students from other Universities. Among them were 3 NSF Graduate Fellowship recipients, 1 NSF Graduate Fellowship Honorable Mention, 2 Barry M. Goldwater Scholarship recipients, and 1 EPA Star Fellowship recipient.

### **Visiting International Students (home institution and dates visited) [current placement]**

1. Aurelie Vicente (U. Poitiers, Poitiers, France, 11/07-3/08) [Assoc. Prof., University of Caen, Caen, France]
2. Rolando Barrera (U. Antioquia, Medellin, Colombia, 5/08-7/08) [Prof., Colombia U., Bucaramanga, Colombia]
3. Edwin Alarcon (U. Antioquia, Medellin, Colombia, 8/08-12/08) [Instructor, U. Antioquia, Colombia]
4. Haruhiko Mori (U. Osaka, Osaka, Japan, 12/08-1/09) [Industrial Position, Chiba, Japan]
5. Christophe Poupin (U. Poitiers, Poitiers, France, 6/10-10/10) [Post Doctoral Associate, Belgium]
6. Xiao Chen (Dalian U. Technology, Dalian, China, 8/11-10-11) [PhD candidate, Dalian U. Technology]

### **Visiting International Professors (home institution and dates visited)**

1. Dr. Takayoshi Hara (Chiba University, Chiba, Japan, 9/10-10/10)

### **ADMINISTRATIVE AND COMMITTEE SERVICE**

#### **Professional Societies**

Treasurer, Catalysis Science and Technology (CATL) Division, ACS, 09/10 - Present  
National Vice-Chair of Programming, CRE Division, Section 20a Catalysis, AIChE, 07/07 – 06/10  
1<sup>st</sup> Vice-Chair, National Student Chapters Committee, AIChE, 11/09 – 10/10  
2<sup>nd</sup> Vice-Chair, National Student Chapters Committee, AIChE, 11/08 – 10/09  
President, Southeastern Catalysis Society, 10/07 – 9/10  
President-Elect, Southeastern Catalysis Society, 10/05 – 9/07  
Secretary, Southeastern Catalysis Society, 10/03 - 9/05

#### **University Level**

University Committee on Tenure and Promotion, 8/11 – 7/13  
Catalysis Thrust Area Leader, USC Nanocenter, 11/05-Present

#### **College Level**

Chemical Engineering Chair Search Committee, College of Engineering and Computing, 10/10-12/10  
Chair, College Scholarships Committee, College of Engineering and Computing, 02/08 – 5/13  
College Undergraduate Curriculum Committee, College of Engineering and Computing, 08/07 – 07/08  
Chemical Engineering Chair Search Committee, College of Engineering and Information Tech., 06/06-08/06  
Distance Learning Task Force, College of Engineering and Information Technology, 04/00 - 8/00

#### **Department Level**

Chair, Undergraduate Recruitment Committee, Department of Chemical Engineering, 09/07 - Present  
Undergraduate Committee, Department of Chemical Engineering, 08/99 – 07/08  
Seminar Coordinator, Department of Chemical Engineering, 8/00 - 7/05  
Freshman Recruiting and Scholarships Committee, Department of Chemical Engineering, 2/01 - Present  
AIChE Student Chapter Faculty Advisor, Department of Chemical Engineering, 05/02 - 07/06, 08/07 – 07/11.  
Web Site Committee, Department of Chemical Engineering, 5/04 – 5/05  
Faculty Search Committee, Department of Chemistry, 8/01 - 5/02  
Faculty Search Committee, Department of Chemical Engineering, 8/02 - 5/03, 8/08-7/10  
ABET Self Study Committee, 4/05 - 11/05