

Resume: CHARLES T. CAMPBELL

ADDRESS:

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EDUCATIONAL BACKGROUND

1975, B.S., University of Texas, Austin, TX (Chem Engr.)
1979, Ph.D., University of Texas, Austin, TX (Phys. Chem., under Prof. J. M. White)

EMPLOYMENT RECORD

2012-present B. Seymour Rabinovitch Endowed Chair in Chemistry
1992-present Professor of Chemistry, University of Washington, Seattle, WA and
Adjunct Prof. of Physics (since 1994) and
Adjunct Prof. of Chemical Engineering (since 2003)
2004-2012 Lloyd E. and Florence M. West Endowed Professorship in Chemistry
2001-2006 CoDirector, PNNL / Univ. of Washington Joint Institute for Nanoscience
2003-2004 Director, Center for Nanotechnology, Univ. of Washington
1997-2003 Founding CoDirector, Center for Nanotechnology, Univ. of Washington
1989-1992 Associate Professor, University of Washington, Seattle, WA
1986-1989 Associate Professor, Indiana University, Bloomington, IN
1981-1986 Staff Member, Los Alamos National Laboratory, Los Alamos, NM
1979-1981 Postdoctoral Research Associate, University of Munich, West Germany
(under Prof. G. Ertl, winner of the 2007 Nobel Prize in Chemistry)
1977 Summer Graduate Student, Sandia National Labs, Albq., NM

HONORS / AWARDS

Inaugural Sachtler Lecturer, Northwestern University Center for Catalysis and Surface Science, Sept. 7, 2017.
The Gauss Professorship of the Göttingen Academy of Science, Germany, 2016-17.
Elected Fellow of the AVS, 2016.
Humboldt Lecture, Schloss Ringberg, Germany, 2016.
Fink Lecture, Georgia Institute of Technology, April 21, 2016.
Medard W. Welch Award (the premier award of the AVS), 2015.
Elected Member of the Washington State Academy of Sciences, 2013.
Robert Burwell Lectureship in Catalysis of the North American Catalysis Society, 2013.
Gerhard Ertl Lecture Award 2012 (Past awardees: Gabor Somorjai (2008), Jens Norskov (2009), Sir John Thomas (2010) and Roald Hoffmann (2011)).
Elected Fellow of the American Chemical Society, 2011.
Elected Fellow of the American Association for the Advancement of Science, 2010.
Ipatieff Lectureship, Northwestern University, 2010/2011.
NSF Center for Chemistry at the Space Time Limit (CaSTL) Lectureship, 2011.
H. Willard Davis Lecture, Chemistry Dept., University of South Carolina, April 24, 2009.
American Chemical Society Arthur W. Adamson Award for Distinguished Service in the Advancement of Surface Chemistry, 2007.

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Paul Hopkins Faculty Award of the Chemistry Department, University of Washington, 2006-7.

Reilly Lectureship, University of Notre Dame, 2007.

University Lectureship, University of Ottawa, Department of Chemistry, Oct. 14, 2005.

University Lectureship, University of Washington, Dept. of Chemistry, Oct. 27, 2005.

Lloyd E. and Florence M. West Endowed Professorship in Chemistry (2004-12)

Alexander von Humboldt Research Award (2003)

American Chemical Society Award in Colloid or Surface Chemistry (2001)

St. John's College, Cambridge University, England, Overseas Visiting Scholar Fellowship (1996)

John Yarwood Memorial Award of the British Vacuum Council (1989)

Camille and Henry Dreyfus Foundation Teacher/Scholar Award (1988-92)

DuPont Young Faculty Award (1988-89)

Indiana University Outstanding Young Faculty Award (1988)

Alfred P. Sloan Research Fellowship (1986-88)

Alexander von Humboldt Fellowship, University of Munich (1980-81)

NSF NATO Postdoctoral Fellowship, University of Munich (1979-80)

NSF Energy-Related Graduate Traineeship, University of Texas (1976-79)

Graduate Student Research Grant at University of Texas (1978-79)

Recipient: H. R. Henze Teaching Excellence Award - Chemistry (1975-76)

Alcoa and Dean's Office Scholarship, University of Texas (1974-75)

Lubrizol Foundation Scholarship, University of Texas (1973-74)

Valedictorian, Kelly High School, Beaumont, TX, 1971

EDITORIAL RESPONSIBILITIES

Editor-in-Chief of the journal *Surface Science Reports* (2013-present).

Editor-in-Chief of the journal *Surface Science* (1/02 – 7/12).

Guest Co-Editor with Joachim Sauer: *Chemical Reviews*, Special Issue on Surface Chemistry of Oxides (2013).

Guest Co-Editor with Younan Xia and Hong Yang: *Accounts of Chemical Research*, Special Issue on Nanoparticles for Catalysis (2013)

Guest Editor, *Topics in Catalysis*, Special issue on Structure/Function Relationships in Heterogeneous Catalysis: Insights using Well-Defined Model Catalysts, in memory of D. W. Goodman, 2013.

Guest Co-Editor with John Yates: *Proceedings of the National Academy of Science*, Feature Issue on Surface Chemistry, Volume 108, 2011.

Editorial Board of *Journal of Physical Chemistry* (2013-15).

Editorial Board of *Catalysis Reviews – Science and Engineering* (2012-2016).

Editorial Board of *Frontiers of Chemical Science and Engineering* (2010-present).

Editorial Board of *Surface Science* (2012-present).

Scientific Advisory Board of *Catalysis Letters* and *Topics in Catalysis* (2013-present)

Editorial Board of *Journal of Chemical Physics* (2002-4).

Editorial Board of *Journal of Catalysis* (1991- 2001).

SCIENTIFIC ADVISORY BOARDS

Founding Member of the Scientific Advisory Board for Northwestern University's Center for Catalysis and Surface Science (CCSS), 2017 – 2019.
International Scientific Advisory Board of the Fritz Haber Institute of the Max Planck Society, Berlin, Germany, 2005-2016.
Committee of Visitors (COV) for the National Science Foundation (NSF) Division of Chemistry, 2016
NSF Subcommittee on Food Systems, an ad hoc subcommittee of the NSF Mathematical and Physical Sciences Advisory Committee, 2013-14.
Idaho National Laboratory, Energy and Environment Science and Technology Directorate External Review Board, 2010-present.
External Advisory Board: Institute for Catalysis in Environmental Processes (ICEP), Northwestern University, 2015 (through 2018 if renewed).
DOE Energy Frontier Research Center for Atomic Level Catalyst Design, Science Advisory Board, 2012-2015.
Pacific Northwest National Lab Institute for Integrated Catalysis Advisory Board, 2013-present.
Plexera, LLC., Seattle, WA, <http://www.plexera.com/> (2009-present).
Scientific Advisory Board of the Fritz Haber Institute of the Max Planck Society – Chinese Academy of Sciences Partner Group “Structure-Activity relations of Model Systems for Heterogeneous Catalysis, 2010-2014.
Pacific Northwest National Lab EMSL Scientific Advisory Committee, 2003-2013.
Sandia National Lab, Sunshine to Petrol (S2P) Program External Advisory Board, 2009-11.
Asemblon, Inc., Seattle, WA, <http://asemblon.com/> (2005-2009).
Lumera, Inc., Bothel, WA (2004-2008)
Prolinx, Inc.; Bothell, WA (2001-2003)
University of Washington NESAC/BIO Advisory Board, 2005-2010.
Washington Technology Center, Board of Directors (1997-2000)

PROFESSIONAL SOCIETY COMMITTEES / OFFICES

ACS National Award Canvassing Committee: Arthur W. Adamson Award, 2013-16.
Board of Directors, International Workshop on Oxide Surfaces, 2006-2009
Pacific Coast Catalysis Society Representative to North American Catalysis Soc., 2006-7
National President, Phi Lambda Upsilon, Honorary Chemical Society, 2002-5
National Vice President, Phi Lambda Upsilon, Honorary Chemical Society 1999-2002
Chairman, Colloid and Surface Chemistry Division of the American Chemical Soc., 1993
Chairman-Elect, Colloid and Surface Chemistry Div. of the Am. Chemical Society, 1992
Vice-Chairman, Colloid and Surface Chemistry Div. of the Am. Chemical Soc., 1991
Co-Chairman, Continuing Symposium on Surface and Colloid Chemistry of Advanced Materials, Colloid and Surface Chemistry Div. of the Am. Chem. Soc., 1988-1991
Treasurer, Colloid & Surface Division of the American Chemical Society, 1984-1989
Executive Committee, New Mexico Chapter of American Vacuum Society, 1983-1984
President, Lamar University Chapter of Phi Eta Sigma (Freshman Honor Fraternity), 1971

SCIENTIFIC REVIEW and ADVISORY COMMITTEES

Lawrence Berkeley National Lab, DOE BES Catalysis Program Review Panel, 2014.

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Co-Chair, Science Theme Advisory Panel, Surface and Interfacial Processes, EMSL, Pacific Northwest National Lab, 2009-11.
IUPAC Task Group: Critical evaluation of thermodynamic properties of hydrogen storage materials: metal organic frameworks and metal or complex hydrides, 2009-11.
Review Committee, Department of Chemistry, University of British Columbia, 2010.
Panelist and Writer: DOE OBES Workshop on "Basic Research Needs in Catalysis for Energy Applications", Bethesda, MD, Aug. 6-8, 2007.
Sandia National Lab, Materials Science Review, 2007.
PNNL, Catalysis and Surface Science Program External Review, 2006.
German Research Foundation (DFG) Excellence Initiative: Catalysis Review Panel, 2006.
DOE OBES Workshop on Advanced Resources for Catalysis Research, Pacific Northwest National Lab, Sept. 21-2, 2004.
Lawrence Berkeley National Lab, Materials Science Review, 1998 and 2010.
DOE / Oak Ridge National Lab, Chemical Sciences Programs Review, 1997.
DOE Labs Technology Research Program Review, Catalysis/Chemical Conversion, 1996.

OTHER REVIEW COMMITTEES

Chair, Search Committee for Physics Department Chair, University of Washington, 2013.

SYMPOSIA ORGANIZED

Molecular Processes at Solid Surfaces: Chemical Modification of Surfaces, for the Spring 1984 ACS National Meeting (Colloid and Surface Chemistry Division)
Bimetallic Surface Chemistry and Catalysis, co-organized with B.E. Koel for the Fall 1987 ACS National Meeting (Colloid and Surface Chemistry Division)
Solid Surfaces and Catalysis, for the 1989 International Chemical Congress of the Pacific Basin Societies, Honolulu, Hawaii, December 1989
Model Catalytic Systems, for the North American Meeting of the Catalysis Society, Pittsburgh, PA, May 2-7, 1993.
Materials Chemistry on Oxide and Carbide Surfaces, PacifiChem 2000, Dec. 14-19, 2000, Honolulu, HA
Adamson Award Symposium Honoring J. M. White, San Diego ACS Meeting, 4/4-5/01.
Co-Chair: Gordon Research Conference on Chemical Reactions at Surfaces, Feb. 16-21, 2003, Ventura, CA.
Program Committee: 2004 Meeting of the Pacific Northwest Chapter of the American Vacuum Society combined with the 26th Annual Symposium on Applied Surface Analysis.
Program Committee: 26th Annual Symposium on Applied Surface Analysis (Surface Analysis 2004) June 16-18, 2004 in Richland, WA.
Chair: Gordon Research Conference on Chemical Reactions at Surfaces, Feb. 13-18, 2005, Ventura, CA..
Organizing Committee: North American Meeting of the Catalysis Society, CA, 2009.
Chairman, Annual meeting of the Pacific Coast Catalysis Club, Seattle, 2006.
Organizing Committee, 5th International Workshop on Oxide Surfaces (IWOX-5), Lake Tahoe, NV, Jan. 2007.

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- International Advisory Committee , 25th European Conference on Surface Science (ECOSS), July 28 -August 1, 2008, Liverpool, UK.
- DOE Contractors Annual Meeting, Catalysis and Surface Science, Chair: Future Directions, Charlottesville, VA, May 24-26, 2007.
- International Steering Committee, Joint 18th International Vacuum Congress (IVC-18), 2010 International Conference on Nanoscience and Technology (ICN+T 2010), 14th International Conference on Solid Surfaces (ICSS-14), and the 5th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-5), jointly held in Beijing, China, August 23-27, 2010.
- Scientific Program Committee: The 6th International Conference on Gold Science, Technology, and its Applications, Tokyo, Sept. 5-8, 2012.
- Organizing Committee: 2015 New Frontiers Workshop - Challenges and Opportunities for Sustainable Production of Chemicals and Fuels Beyond the Shale Gale (co-sponsored by the Dow Materials Institute at University of California, Santa Barbara, and Dow Centre for Sustainable Engineering Innovation, University of Queensland, Australia), UCSB Feb. 2, 2015

NOTABLE AWARDS OF GRADUATE, UNDERGRADUATE AND POSTDOCTORAL ADVISEES

- Nirala Singh (Postdoc 2015-7): WRF Innovation Fellowship in Clean Energy, 2016-17
- Jason Farmer (PhD 2010) won Best Dissertation from the University of Washington for 2010 from all areas of mathematics, physical sciences and engineering, and thus it was the University's nominee for the Council of Graduate Schools Distinguished Dissertation Award.
- Jose Rodriguez (PhD 1988): 2007 North American HENAAC Outstanding Technical Achievement Award for Hispanic Scientists and Engineers.
- Karl-Heinz Ernst (Postdoc 1990-91): "Distinguished Scientist" of the EMPA in Zurich (only the 2nd time this distinction has ever been awarded by this Swiss lab).
- Jennifer Shumaker-Parry (PhD 2002): NSF CAREER Award as Professor at Univ. Utah.
- Lara Gamble (PhD 1997): 2014 National AVS ASSD Peter Sherwood Mid-Career Award.
- Steven L. Tait (PhD 2005): 2014 Indiana University Outstanding Junior Faculty Award as Assistant Professor.
- Eric Karp (PhD 2012): 2014 NREL President / Director's Award
- Trent Silbaugh (PhD 2014): Jane and Joseph McCarthy Outstanding Teaching Assistant 2010-11 and 2013-14, Graduate School Fund for Excellence and Innovation Travel Award 2012.
- Stephanie Hemmingson: 2013 National Science Foundation Graduate Research Fellowship Honorable Mention; 2013 Dorothy & Earl Hoffman Travel Grant of the AVS.
- Evan Mann (undergrad): Mary Gates Research Scholarship (2014).
- Amilla Frehner (undergrad): Mary Gates Research Scholarship (2015).

INVITED TALKS AT SCIENTIFIC CONFERENCES

1. The selective epoxidation of ethylene catalyzed by silver: mechanistic details revealed by single-crystal studies, ACS National Symposium, Philadelphia, August 1984
2. Chlorine promotion of selective ethylene oxidation over Ag(110): kinetics and mechanism, ACS Regional Meeting, Albuquerque, NM, June 1984
3. Medium-pressure studies of the selective catalytic oxidation of ethylene over silver single crystals, International Chemical Congress of Pacific Basin Societies (PACS), Honolulu, December 1984
4. Mechanism and promoter effects in ethylene epoxidation over Ag: single crystal studies, ACS National Symposium, Miami, May 1985
5. Mechanism of ethylene epoxidation on chlorine and cesium modified silver single crystals studies, Gordon Research Conference on Catalysis, June 1985
6. Investigations of sulfur tolerance of water-gas shift catalysts, 6th Annual Gasification Contractors Meeting, DOE, Morgantown Energy Technology Center, June 1986
7. Kinetics and mechanisms of simple catalytic reactions at high pressures on well-defined surfaces, American Chemical Society National Symposium, Anaheim, CA, September 1986
8. Surface, kinetic, and theoretical characterization of model Cu/ZnO catalysts for water-gas shift and methanol synthesis, Spring Dinner Meeting of the Chicago Catalysis Club, April 1987
9. Kinetics and mechanisms of simple catalytic reactions on well-defined catalyst surfaces, Midwest Regional ACS Meeting, Columbus, OH, June 1987
10. The use of ultrahigh vacuum surface analytical methods in understanding high-pressure catalytic reactions, Eastern Analytical Symposium, New York, NY, September 1987
11. Model Cu/ZnO catalysts, Sixth DOE Catalysis and Surface Chemistry Research Conference, NBS, October 1987
12. Application of surface analytical techniques to the characterization of simple catalytic reactions, 34th National Symposium of the American Vacuum Society, Anaheim, CA, November 1987.
13. Testing ensemble sizes in chemisorption and catalysis, Joint Pittsburgh-Cleveland Catalysis Society/American Vacuum Society Meeting, Cleveland, OH, April 1988.
14. Probing ensemble effects in catalysis: hydrocarbon reactions on Pt(111), 62nd Colloid and Surface Science Symposium, Pennsylvania State University, June 1988.
15. Well-defined bimetallic surfaces: structural and chemisorptive properties, 8th Annual Symposium of the Arizona Chapter, Tucson, Arizona, April 1989.
16. Ensemble effects and mechanisms in hydrocarbon reactions over Model platinum catalysts, 2nd European conference on Catalysis (G.M. Schwab Honorary Symposium), Berlin, West Germany, July 1989.
17. Studies of catalytic kinetics and mechanisms over well-defined model catalysts based on single-crystal surfaces, The 1989 British Vacuum Council Annual 8th Interdisciplinary Surface Science Conference (ISSC-8) Liverpool, England, March 20-23, 1989.
18. Surface science studies of single crystal Cu and ZnO with particular relevance to methanol synthesis and water-gas shift, Eighth International Symposium on C1 Chemistry, Kingston, ONT, Canada, July 1989.

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19. Electronic promoters in Catalysis: A Surface Science Perspective, Catalytica Workshop on Catalyst Promoters, Palo Alto, CA, November 1989.
20. Studies of Model Catalyst with Well-Defined Surfaces Combining Ultrahigh Vacuum Surface Characterization with Medium-Pressure Kinetics, National Academy of Sciences and Academy of Sciences of the GDR Workshop on "Developments in Heterogeneous Catalysis," Irvine, CA, March 18-21, 1990.
21. Surface Sciences Studies of the Reactions of Simple Hydrocarbons on Pt(111), National ACS Meeting, Kendall Award Symposium, Boston, April 1990.
22. The Water-Gas Shift Reaction Over Clean and Cs-Promoted Cu Single-Crystal Catalysts: Elementary Processes, Gordon Research Conference on the "Fundamental Interactions of Water with Solid Surface," Kimball Union Academy, Meriden, NH, July 20, 1990.
23. Surface Chemistry Related to Bimetallic Catalysis, U.S.-Brazil NSF Workshop in Catalysis, Rio de Jan., Brazil, October 15, 1990.
24. The Forward and Reverse Water-Gas Shift Reactions on Model Copper Catalysts: Kinetics and Elementary Steps, ACS National Symposium, Colloid Division, April 1991, Atlanta.
25. Hydrocarbon Interactions with Clean and Metal Doped Pt(111) Surfaces, ACS National Symposium, Kendall Award Symposium, April 1991, Atlanta.
26. The Forward and Reverse Water-Gas Shift Reactions on Model Copper Catalysts: Kinetics and Elementary Steps, 18th Annual Spring Symposium of the Michigan Chapter of the American Vacuum Society, Dearborn, MI, May 15, 1991.
27. Studies of Model Catalysts Using Combined UHV Surface Characterization and Medium-Pressure Kinetics, 43rd Annual Congress of the Brazilian National Scientific Society, July 17, 1991, Rio de Janeiro.
28. Hydrocarbon Reactions on Platinum Bimetallic Surfaces, 43rd Annual Congress of the Brazilian National Scientific Society, July 19, 1991, Rio de Janeiro.
29. Studies of Water-Gas Shift and Methanol Synthesis on Model Catalysts, 1992 Gordon Conference on Catalysis, Colby-Sawyer College, New London, NH, June 30, 1992.
30. Energetics of Surface Reactions in the Presence of Additives, 1993 Gordon Conference on Chemical Reactions on Surfaces, Ventura, CA, March 8-12, 1993.
31. Model Cu/ZnO Catalysts Based on Cu Monolayers on ZnO(0001)-O Single Crystal Surfaces, Symposium on Ammonia Synthesis: Position and Future Course", Hornbaek, Denmark, Sept. 1-4, 1993.
32. A New Model for the Growth and Reactivity of Metal Films on Oxide Surfaces: Cu on ZnO(0001)-O, American Vacuum Society National Meeting, Orlando, FLA, Nov. 15-19, 1993.
33. Modelling Metal / Oxide Interactions in Cu/ZnO Catalysis, DOE/BES Heterogeneous Catalysis and Surface Chemistry Research Conference, Oconomowoc, WI, May 25, 1994.
34. Structural, Chemisorption and Catalytic Properties of Well-Defined Metal Particles on Oxide Single Crystal Surfaces, IUVESTA Workshop on Structure and Reactivity of Small Polyatomic Molecules on Surfaces, Brdo, Slovenia, April 9-15, 1995.
35. The Metal / Oxide Interface, International Symp. on Frontiers of Catalytic Surface Science, Catalysis Res. Center of Hokkaido University, Sapporo, Japan, Oct. 2-3, 1995.

36. Studies of Structure-Function Relationships and Mechanisms in Heterogeneous Catalysis Using a Surface Scientist's Approach, Fall Meeting of the Japanese Catalysis Society, Muroran, Japan, Oct 5, 1995.
37. Bismuth Postdosing Thermal Desorption Mass Spectroscopy: Probing Hydrocarbon Reaction on Pt(111), ESF Workshop on Adsorption and Catalytic Reaction Dynamics at Surfaces, Italy, Dec. 17-20, 1995.
38. A New Single-Crystal Adsorption Microcalorimeter: Applications in Metal Film Growth on Oxides, ACS Natl. Symp., Coll. Div., San Francisco, April 16, 1997.
39. Kinetics of Metal Film Growth and Island Thickening on Oxides: Cu/ZnO(0001)-O and Au / TiO₂(110), ACS Natl. Symp., Phys. Div., San Francisco, April 13, 1997.
40. The Strength of Chemical Bonding at the Metal Particle / Oxide Support Interface, and Its Effect on Dispersion and Chemisorption Properties, Keynote Address, North American Catalysis Society Meeting, Chicago, May 19, 1997.
41. Two New Methods for Characterizing Surface Reactions: Single-Crystal Adsorption Calorimetry and Surface Plasmon Resonance Spectroscopy, Engineering Foundation Conference on Surface Characterization of Adsorption and Interfacial Reactions II, Kona, Hawaii, Jan. 15, 1997.
42. "Model Catalysts from Vapor-Deposited Metal Particles on Single-Crystal Oxide Surfaces: Energetic, Structural, Chemisorption and Catalytic Properties", Southwest Catalysis Society Meeting and Inaugural Symposium of the Texas A&M Center for Catalysis, May 21, 1998.
43. The Strength of Interfacial Bonding at the Metal Particle / Oxide Support Interface, and Its Effect on Metal Catalyst Dispersion and Chemisorption Properties, 81st Canadian Society for Chemistry Conference, Wistler, BC, Canada, June 1-5, 1998.
44. Symposium on the Thermal Stability of Supported PdO/Pd Combustion Catalysts, Catalytica Combustion Systems, Inc., Mountain View, CA, July 16, 1998.
45. Single Crystal Adsorption Microcalorimetry of Metal Adsorption and Adhesion Energies on Oxide Surfaces, ACS National Meeting, Boston, Aug. 23-24, 1998.
46. Single Crystal Adsorption Calorimetry for Measuring Adsorption and Adhesion Energies of Metal Films and Particles on Well-Defined Surfaces, American Vacuum Society Annual Symposium, Baltimore, MD Nov. 2-6, 1998.
47. Calorimetric Measurements of Metal Adsorption and Adhesion Energies on Single-Crystal Oxide Surfaces: Relationship to Metal Particle Morphology and Chemisorption Properties, International Conference on Oxide Surfaces, Elmau, Germany, Jan. 25-29, 1999.
48. Calorimetric Measurements of Metal Adsorption and Adhesion Energies on Single-Crystal Oxide Surfaces: Relationship to Metal Particle Morphology and Chemisorption Properties, Gordon Conference on Chemical Reactions at Surfaces, Mar. 1-5, 1999.
49. Calorimetric Measurements of Metal Adsorption and Adhesion Energies on Single Crystalline Surfaces, Joint Surface and Materials Symposium between Rutgers and Chalmers Universities, Piscataway, NJ, March 17, 1999.
50. The Strength of Interfacial Bonding at the Metal Particle / Oxide Support Interface, and Its Effect on Metal Catalyst Dispersion and Chemisorption Properties, Tri-State Catalysis Club Dinner Meeting, Charkeston, West VA, March 18, 1999.

51. Calorimetric Measurements of Metal Adsorption and Adhesion Energies on Single-Crystal Oxide Surfaces: Relationship to Metal Particle Morphology and Chemisorption Properties, ESF Workshop on "Catalysis from First Principles", Copenhagen, May 17-19, 1999.
52. Plenary Lecture: Calorimetric Measurements of Metal Adsorption and Adhesion Energies onto Clean and Well-Defined Surfaces of Single Crystals, 54th Annual Calorimetry Conference, Tallahassee, FL, Aug. 15-20, 1999.
53. Single Crystal Adsorption Calorimetry on Oxide Surfaces, Faraday Discussion on The Surface Science of Metal Oxides, Ambleside, England, Sep. 1-3, 1999.
54. The Energetics and Dynamics of Metal Vapor Adsorption on Well-Defined Solids: Oxides, Si(100) and Polymers, IUUSTA workshop on Gas-Surface Interactions: Electronic structure, dynamics and reactivity, Sep., 26-29, 1999 at Schloss Seggau, Leibnitz, Austria
55. Quantitative Analyses of Biological Interactions using Sensors Based on Surface-Biofunctionalized Surface Plasmon Resonance Devices, American Vacuum Society Natl. Symposium, Seattle, WA, Oct. 28, 1999,
56. Quantitative Analyses of Biological Interactions using Sensors Based on Surface-Biofunctionalized Surface Plasmon Resonance Devices, SPIE BioMedical Optics Conference, San Jose, CA, Jan. 21-28, 2000.
57. Fundamental Research in the Surface Science and Physical Chemistry of Heterogeneous Catalysis: Where are We, and Where Should We be Aiming?, American Chemical Soc. Natl. Meeting, San Francisco, Mar. 26-31, 2000.
58. Kinetics of Adsorption / Desorption at the Liquid / Solid Interface, American Vacuum Society, New Mexico Chapter Annual Symposium, Albuquerque, NM, 5/24/00.
59. Model Oxide-Supported Metal Catalysts, Gordon Research Conference in Catalysis, New London, NH, June 25-30, 2000.
60. Microcalorimetric Measurements of Adsorption Energies and Adhesion Energies in Metal Film Growth: Relationships to Morphology, 10th International Conference on Solid Films and Surfaces (ICSFS-10), Princeton University, July 9-13, 2000.
61. The Energetic Stability of Cu, Ag and Pb Particles on MgO(100): Adsorption and Adhesion Energies of Metals by Calorimetry, 2nd Intl. Workshop on Oxide Surfaces, Taos, NM, 1/15-19/01.
62. Surface Thermodynamics, DOE Workshop in Catalysis Futures, Berkeley, CA, Mar. 1, 2001.
63. ACS Award Talk: Energetics of Metal Nanoparticles on MgO(100) by Adsorption Microcalorimetry, American Chemical Society Natl. Meeting, San Diego, CA, 4/1-5/01.
64. German Research Foundation Workshop on Bridging the Pressure and Materials Gap in Catalysis, Berlin, May 21-2, 2001.
65. Energetics of Metal Nanoparticles on Model Oxide-Supported Metal Catalysts by Adsorption Microcalorimetry, North American Catalysis Soc. Meeting, June 3-8, 2001.
66. Energetics of Metal Nanoparticles in Oxide Surfaces, Spanish Vacuum Soc. Workshop on Growth and Behaviour of Metal-Oxide Interfaces, Ávila, Spain. July 23-26, 2001
67. European Conf. On Surface Science, Krakow, Poland, Sep. 4-7, 2001.
68. Rideal Conference, Manchester, England, Mar. 24-7, 2002.
69. Materials Research Soc. Natl. Meeting, San Francisco, Apr. 1-4, 2002.

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70. Euroconference on Fundamental Aspects of Surface Science: Structure and Reactivity of Oxide Surfaces, Acquafredda di Maratea, Italy, June 1-6, 2002.
71. 9th Symposium on Surface Physics, Trest, Czech Republic, Sep. 2-6, 2002.
72. Workshop on Catalysis by Oxide-Supported Metallic Nanoclusters, Santa Barbara, CA, Feb. 25-27, 2003.
73. ACS National Meeting, New York City, Sept. 7, 2003.
74. Regional ACS Symposium, Pittsburgh, PA, Oct. 21, 2003.
75. AAAS Meeting: Symposium on Controlling Chemical Transformations by Catalysis, Seattle, Feb. 12-17, 2004.
76. ACS National Meeting, Symposium in Honor of Art Adamson, Apr. 1, 2004.
77. EuroConference: "Interfaces in Nanostructured Materials", Kloster Irsee, Germany, June 6-11, 2004.
78. Max Plank Gesellschaft Conference "Surface Science Quo Vadis?" in Honor of Gerhard Ertl, Ringsberg, Germany, Sept. 6-9, 2004.
79. American Vacuum Society Natl. Symposium, Anaheim, CA, Nov. 14-19, 2004.
80. ACS National Meeting, Symposium on Growth and Catalysis of Metal Overlayers, March 13-17, 2005.
81. ACS National Meeting, Symposium in Honor of Adamson Awardee, R. Hamers, March 13-17, 2005.
82. Materials Research Society Annual Symposium, San Francisco, CA, Mar. 28-31, 2005.
83. Science and Technology Roundtable, Technology Alliance, Seattle, WA, May 13, 2005.
84. Workshop on Nanoparticles and Oxide Surfaces, Schloss Ringberg, Tegernsee, Germany, Sept. 4-9, 2005.
85. Association of Biomolecular Resource Facilities Meeting (ABRF 2006), Vendor's Session, Long Beach, CA, Feb. 14, 2006.
86. ACS National Meeting, Division of Chemical Education, Symp. On Balancing the Equation: Finding a Personal <-> Professional Equilibrium, Atlanta, GA, Mar. 26-30, 2006.
87. ACS National Meeting, Symp. on Nanotechnology in Catalysis, GA, Mar. 26-30, 2006.
88. Annual Meeting of the Deutsche Bunsen Gesellschaft (German Federal Society) for Physical Chemistry, Erlangen, May 25-27, 2006.
89. ACS National Meeting, PChem Division, Symposium on Fundamentals of Oxide Catalysts, San Francisco, CA, Sept. 10-14, 2006. (given by my postdoc, Jonathan Harris)
90. Workshop on "Catalysis from First Principles" (C1P) 2006, CECAM - Psi-k, Lyon, France, 11 - 14 September 2006.
91. International Conference on Solid Films and Surfaces (ICSFS-13), San Carlos de Bariloche, Argentina, Nov. 6-10, 2006.
92. American Institute of Chemical Engineers National Meeting, San Francisco, CA, Nov. 17, 2006.
93. Workshop on Catalysis and Surface Science, Santa Barbara, CA, Dec. 13-15, 2006.
94. Gordon Research Conference: Chemical Reactions at Surfaces, Ventura, CA, Feb. 11-16, 2007.
95. Physical Electronics Conference, Urbana, IL, June 19-22, 2007.
96. Pacific Coast Catalysis Society, Pasedena, CA, Nov. 2, 2007.
97. Annual Meeting of the German Physical Society, Berlin, Feb. 25-29, 2008.

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98. ACS National Meeting, New Orleans, Apr. 6-10, 2008.
99. 6th Congress of the International Society for Theoretical Chemical Physics, Vancouver, BC, Canada, July 19-24, 2008.
100. 25 Years of Biointerface Science Symposium, University of Washington, Seattle, Aug. 24-7, 2008.
101. ACS National Meeting, Philadelphia, Aug. 17-21, 2008.
102. International Symposium on Surface Science and Nanotechnology (ISSS-5), Tokyo, Japan, Nov. 9-13, 2008.
103. Catalysis Club of Chicago Lecture, Dec. 1, 2008.
104. Michigan Catalysis Society Monthly Meeting, Dec. 9, 2008.
105. ACS National Meeting, Symposium on Convergence of Theory with Experiment in Surface Chemistry, Salt Lake City, March 22-26, 2009.
106. ACS National Meeting, Olah Award Symposium, Salt Lake City, March 22-26, 2009.
107. Interdisciplinary Surface Science Conference, Reading, UK, March 30-April 2, 2009.
108. North American Meeting of the Catalysis Society, Plenary Lecture, San Francisco, June 7-12, 2009.
109. Taylor Conference on Heterogeneous Catalysis, Plenary Lecture, Cardiff Univ., UK, June 22-25, 2009.
110. ACS National Meeting, Fuel Division (Separations & Catalysis Needs for Renewable Energy Symposium), San Francisco, March 21-25, 2010.
111. ACS National Meeting, Catalysis Directorate (Madix / Stair Awards Symposium), San Francisco, March 21-25, 2010.
112. Gordon Research Conference on Catalysis, Colby Sawyer College, NH, June 27 – July 2, 2010.
113. 6th Tokyo Conference on Advanced Catalytic Science and 5th Asian Pacific Congress on Catalysis, Sapporo, Japan, July 18-23, 2010.
114. ACS National Meeting, Petroleum Division (Symposium Honoring Henrik Topsoe's Award), Boston, Aug. 22-26, 2010.
115. AVS National Meeting, Albuquerque, NM, Oct. 17-22, 2010.
116. ACS National Meeting, Petroleum Division Symposium Honoring Jeffery Bricker (Senior Director of Research, UOP) for his ACS Award for Creative Invention), Anaheim, Mar. 27-31, 2011.
117. ACS National Meeting, Fuel Division, Symposium on Nanomaterials and Nanotechnology in Fuels and energy Production, Anaheim, Mar. 27-31, 2011.
118. Catalysis Club of Chicago Spring Symposium, Naperville, IL, May 19, 2011.
119. Faraday Discussion on Gold Catalysis, Cardiff University, UK, July 4-6, 2011.
120. Europacat X, Glasgow, Scotland, August 28-Sept. 2, 2011.
121. ACS National Meeting, Surface Science for Catalysis Symposium, Denver, Aug. 28-Sept. 1, 2011. (presented by graduate student Eric Karp).
122. CaSTL Lectureship: NSF Center for Chemical Innovation on Chemistry at the Space Time Limit (CaSTL) Annual Retreat, Sept. 14, 2011.
123. American Physical Society (APS) March 2012 National Meeting symposium on Chemical Physics for New Energy, Boston, February 27-March 2, 2012.
124. ACS National Meeting, Physical Chemistry Div. Symposium on Frontiers of Catalysis, San Diego, Mar. 25-29, 2012.

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125. ACS National Meeting, Joint Symposium in Honor of the 2012 Winners of the ACS Olah and Somorjai Awards, San Diego, Mar. 25-29, 2012.
126. Materials Genome Initiative Workshop on Building the Materials Innovation Infrastructure, Herbert C. Hoover Building, Wash. D.C., May 14-15, 2012.
127. ACS National Meeting, Catalysis Div. Symposium on "Progress in Electronic and Vibrational Spectroscopy of Catalytic Materials and Reactions", Philadelphia, Aug. 19-23, 2012. (I could not make this meeting, so this was presented by my collaborator, Ye Xu from Oak Ridge National Lab.)
128. Future of Catalysis Symposium honoring Jens Norskov, Stanford, CA, Sept. 27, 2012.
129. 2012 Scientific Meeting of the Northwestern University Center for Catalysis and Surface Science: Symposium on Nanoscience of Catalysts, Oct. 22, 2012.
130. Heraeus-Seminar "Energy-related catalysis today and tomorrow: From fundamentals to applications", March 24-27, 2013, Bad Honnef, Germany.
131. ACS National Meeting, Symposium in Honor of ACS Award in the Chemistry of Materials winner Younan Xia, New Orleans, LA, April 8th, 2013.
132. ACS National Meeting, Symposium in Honor of ACS Olah Award winner Alex Bell, New Orleans, LA, April 8th, 2013.
133. ACS National Meeting, Symposium in Honor of ACS Adamson winner Ulrike Diebold, New Orleans, LA, April 8th, 2013.
134. Faraday Discussion, Introductory Lecture, Berlin, April 10-12, 2013.
135. Gordon Research Pre-Conference Seminar on Chemical Reactions at Surfaces: Panelist, Diablerets, Switzerland, April 27-28, 2013.
136. Gordon Research Conference on Chemical Reactions at Surfaces, Kick-Off Talk, Diablerets, Switzerland, April 28-May 3, 2013.
137. Keynote Lecture, North American Meeting (NAM) of the Catalysis Society, Louisville, KY, June 2-7, 2013.
138. Telluride Conference on Catalysis, Telluride, CO, July 29-Aug. 2, 2013.
139. ACS National Meeting, Oxides in Catalysis Symp. (ENFL), Indianapolis, IN, Sept. 8-12, 2013.
140. ACS National Meeting, Computational Catalysis Symp. (CATL), Indianapolis, IN, Sept. 8-12, 2013.
141. AVS National Meeting, Surface Science Symp. on Metals and Alloys, Longbeach, CA, Oct. 27-Nov. 1, 2013.
142. New York Catalysis Society, Nov. 20, 2013.
143. Philadelphia Catalysis Society, Nov. 21, 2013.
144. Workshop on New Frontiers in Sustainable Fuels and Chemicals, UC Santa Barbara, Feb. 6, 2014.
145. ACS National Meeting, Clusters in Catalysis Symp., Dallas, TX; March 16-20, 2014.
146. ACS National Meeting, Surface and Catalytic Reactions for Energy Efficiency Symp., Dallas, TX; March 16-20, 2014.
147. Western States Catalysis Club, Albuquerque, NM March 21, 2014.
148. German Physical Society Meeting, Dresden. March 30-April 4, 2014.
149. Michigan Catalysis Society, April 22, 2014, Livonia, MI.
150. Southwest Catalysis Society, April 25, 2014, Houston, TX.

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151. Keynote Address: New England Catalysis Society Meeting, Worcester, MA, May 9, 2014.
152. DOE Catalysis Science Program Meeting, Annapolis, MD, July 20-23, 2014.
153. ACS National Meeting, Fundamental of Catalysis at Surfaces Symp., San Francisco, Aug. 10-14, 2014.
154. ACS National Meeting, Advances in Molecular-Level Understanding of Surface Reactivity., San Francisco, Aug. 10-14, 2014.
155. ACS National Meeting, Symp. in Honor of Suljo Linic (Catalysis Lectureship Award), San Francisco, Aug. 10-14, 2014.
156. ACS National Meeting, Symp. in Honor of Sir David A. King, San Francisco, Aug. 10-14, 2014.
157. European Conf. on Solid Surfaces, Antalya, Turkey, Aug. 31-Sept. 5, 2014.
158. Southeast Catalysis Society, Asheville, NC, Sept. 14-15, 2014.
159. DIET 14 – International Workshop on Desorption, Interactions and Electronic Transitions at Surfaces, Monterey Bay, CA, October 13-17, 2014.
160. ACS National Meeting, Symp. on Design of Materials and Chemical Processes: the Genomic Approach, Denver, CO, March 22-26, 2015.
161. ACS National Meeting, Symp. on Surface Chemistry and Catalysis on Oxides, Denver, CO, March 22-26, 2015.
162. ACS National Meeting, Symp. on Advances in Ceria Based Catalysis, Boston, MA, Aug. 16-20, 2015.
163. SLAC and Stanford University, SUNCAT Summer School, August 24-27, 2015.
164. Pacific Coast Catalysis Society Annual Meeting, Richland, WA, Sept. 18, 2015.
165. AVS National Meeting, Medard Welch Award talk, San Jose, CA, Oct. 18-23, 2015.
166. American Institute of Chemical Engineers (AIChE) Annual Meeting, Salt Lake City, Nov. 8-13, 2015.
167. ACS National Meeting, Symposium on Elucidation of Mechanisms and Kinetics on Surfaces, San Diego, March 13-17, 2016.
168. ACS National Meeting, Symposium on Computational and experimental advances towards design of energy efficient catalysts, San Diego, March 13-17, 2016.
169. Headline invited speaker, Faraday Discussion on Designing New Heterogeneous Catalysis, April 4-6, 2016, London, UK.
170. Plenary Speaker, Centennial Celebration Symposium, University of Texas at Austin Department of Chemical Engineering, April 15, 2015.
171. Gordon Conference on Catalysis, Keynote Address, Colby Sawyer College, New London, NH, June 12-17, 2016.
172. Plenary Lecture, 16th International Congress on Catalysis (ICC 16) Beijing, China, July 3-8, 2016.
173. Humboldt Lecture, Annual Meeting of the Fritz Haber Institute, Department of Chemical Physics, Schloss Ringberg, Germany, Sept. 5, 2016.
174. Plenary Lecture, XVIII Netherlands' Catalysis & Chemistry Conference, Mar. 6-8 2017, Noordwijkerhout, The Netherlands.
175. ACS National Meeting, ACS Surface Chemistry Award Symposium in Honor of CM Friend, San Francisco, CA, Apr. 2-7, 2017.

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176. ACS National Meeting, Symposium on Mechanisms and Kinetics on Surfaces, San Francisco, CA, Apr. 2-7, 2017.
177. ACS National Meeting, Symposium in Honor of GA Somorjai's 80th Birthday, San Francisco, CA, Apr. 2-7, 2017.
178. DW Goodman Symp. On Physical and Analytical Chemistry, Texas A&M University, College Station, TX, May 8-9, 2017.
FUTURE:
179. Plenary Lecture, European Conference on Surface Science (ECOSS-33), Szeged, Hungary, Aug. 27- Sep. 1, 2017.
180. Bonn Humboldt Award Winners Forum, Bonn, Germany, Oct. 11-14, 2017.

INVITED UNIVERSITY AND INDUSTRIAL SEMINARS

1. National Bureau of Standards, 1979.
2. Los Alamos National Lab, 1979.
3. Exxon Research and Development, 1979.
4. University of Strasbourg, France, 1980.
5. University of Munich, West Germany, 1980.
6. KFA Julich, West Germany, 1980.
7. University of Texas at Austin, 1981.
8. University of Texas at Austin, 1983.
9. Lawrence Berkeley Laboratory, 1983.
10. Exxon Research and Development, 1983.
11. Stanford University (Chemical Engineering Dept.), 1983.
12. Massachusetts Institute of Technology (Surface Science Seminar), 1983.
13. Harvard University (Surface Science Seminar), 1983.
14. Sandia National Labs, 1983.
15. Cornell University, 1983.
16. University of California at Santa Barbara, Chemistry Department, 1984.
17. Shell Research and Development, Houston, 1984.
18. Union Carbide, So. Charleston, WV, 1984.
19. KFA Julich, West Germany, 1985.
20. Fritz Haber Institute of the Max Plank Gesellschaft, Berlin, West Germany, 1985.
21. California Institute of Technology, 1985.
22. Purdue University, 1985.
23. Georgia Institute of Technology, 1985.
24. Indiana University, 1985.
25. North Texas State University, 1986.
26. University of Pittsburgh, Chemistry Department, 1986.
27. Case Western Reserve University, 1986.
28. University of Missouri-Columbia, 1986.
29. General Electric Research Labs, Schenectady, NY, 1987.
30. Brookhaven National Laboratory, Upton, NY, 1987.
31. Standard Oil Research and Development, Warrensville, OH, 1987.
32. University of Illinois at Urbana, 1987.
33. University of California at Irvine (Chemistry Dept.) Feb. 24, 1988.

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34. University of California at Berkeley, Lawrence Berkeley Lab, Feb. 25, 1988
35. IBM Research Abs, San Jose, CA, Feb. 26, 1988.
36. Department of Physics, University of Warwick, Coventry, ENGLAND, March 13, 1989.
37. Department of Physical Chemistry, University of Cambridge, Cambridge, ENGLAND, March 16, 1989.
38. Department of Physics, Imperial College, London, ENGLAND, March 17, 1989.
39. Department of Chemistry, University of Washington, Seattle, WA, Feb. 14, 1989.
40. Department of Chemistry, Texas A&M University, Nov. 17, 1989.
41. Department of Chemistry, University of Texas, Nov. 18, 1989.
42. Department of Chemistry, University of Houston, Nov. 21, 1989.
43. Laboratory of Applied Physics, Technical University of Denmark, Feb. 19, 1990.
44. H. C. Orsted Institute, University of Copenhagen, Feb. 21, 1990.
45. Department of Physics, University of Aarhus, Denmark, Feb. 22, 1990.
46. Department of Chemistry, Brown University, April 27, 1990.
47. Department of Chemistry, University of California at San Diego, Jan. 1991.
48. Department of Chemistry, Oregon Graduate Institute, Beaverton, OR, Nov. 1, 1991.
49. Department of Physics, Washington State University, Pullman, Nov. 19, 1991.
50. Department of Chemical Engineering, Cornell University, Ithaca, NY, Dec. 3, 1991.
51. Department of Chemistry, Western Washington University, Bellingham, WA, May 20, 1992.
52. Department of Chemistry, University of Victoria, Canada, Feb. 11, 1993.
53. Department of Chemistry, University of Utah, Oct. 28, 1993.
54. Department of Chemistry, Brookhaven Natl. Lab, April 21, 1994.
55. University of California at Berkeley, Lawrence Berkeley Lab, Dec. 1, 1994.
56. Dept. of Chemistry, University of Southern California, March 20, 1995.
57. Dept. of Chemical Engineering, University of Washington, 1995.
58. Dept. of Chemistry, King Group, Cambridge University, England, Feb. 27, 1996.
59. Dept. of Chemistry, University of Manchester, England, Jan. 24, 1996.
60. Dept. of Chemistry, University of Reading, England, March 19, 1996.
61. Fritz Haber Institute of the Max Plank Gesellschaft, Berlin, Germany, Apr. 25, 1996.
62. ICI Katalco Research, Technology and Engineering, Billingham, Cleveland, England, Apr. 29, 1996.
63. Dept. of Physical Chemistry, Cambridge University, England, May, 1996.
64. Physics Dept., Univ. of Washington, Fall 1996.
65. Chemistry Dept., Univ. of Oregon, Feb. 27, 1998.
66. Chemistry Dept., Univ. of Texas, Mar. 12, 1998.
67. Scientific Design Co., Little Ferry, N. J., Oct. 26, 1998.
68. Dept. of Chemical Engineering, University of Washington, Nov. 16, 1998.
69. Chemistry Dept., Colorado State Univ., Nov. 19, 1998.
70. Chemistry Dept., Univ. of Colorado, Boulder, Nov. 20, 1998.
71. Sandia National Lab, Livermore, CA, Dec. 9, 1998.
72. Surface Science and Catalysis Seminar, Lawrence Berkeley National Lab, Berkeley, CA, Dec. 10, 1998.
73. Union Carbide Research Labs, So. Charleston, WV, March 19, 1999.
74. Molecular Biotechnology Departmental Seminar, Univ. of Washington, April 13, 1999.
75. Technical University of Denmark, Physics Dept., May 20, 1999 (2 talks).

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76. Center for Atomic-Scale Materials Physics, Univ. of Aarhus, Denmark, May 21, 1999 (2 talks).
77. University of Wisconsin, Analytical Chemistry Seminar, Oct. 14, 1999.
78. Los Alamos Natl. Lab, May 26, 2000.
79. UOP, July 27, 2000.
80. Texas A&M University, Chemistry Dept., Sept. 27, 2001.
81. University of Missouri-Columbia, Chemistry Dept., Sept. 28, 2001.
82. University of California at Santa Barbara, Chem. Engr. Dept., Jan. 21, 2002.
83. Northwestern Univ., Chemistry Colloquium, Feb 9, 2002.
84. Northwestern University Chemistry Dept. Colloquium, Feb. 8, 2002.
85. Univ. of California, Berkeley, Surface Chemistry / Catalysis Seminar (LBNL), Oct. 2002.
86. Cambridge University, Chemistry Department Physical Colloquium, Cambridge, England, March 4, 2003.
87. Aarhus University, Physics Dept. Seminar, Denmark, March 6, 2003.
88. Aarhus University, Nanotechnology Seminar, Denmark, March 6, 2003.
89. University College London, Chemistry Department, March 19, 2003.
90. CNRS, Campus de Luminy, Marseille, May 23, 2003.
91. Technical Univ. of Denmark, Surface Physics Department, June 13, 2003.
92. Fritz-Haber-Institute of the Max-Planck Society, Berlin, Germany, June 25, 2003.
93. University of Delaware, Chemistry Dept. Colloquium, Oct. 20, 2003.
94. University of Washington, Condensed Matter Physics Seminar, Dec. 9, 2003.
95. Sandia National Laboratory, Dec. 15, 2003.
96. Los Alamos National Laboratory, Center for Integrated Nanotechnology, Dec. 16, 2003.
97. University of Texas, Department of Chemistry Seminar, Jan. 15, 2004.
98. University of Texas, Department of Chemical Engineering Seminar, Jan. 16, 2004.
99. University of Illinois at Urbana, Chemistry Department, Feb. 2, 2004.
100. Washington University, Chemistry Dept., St. Louis, Apr. 22, 2004.
101. Southern Illinois University Carbondale, April 23, 2004.
102. Harvard University Chemistry Department Woodward Lecture, Oct. 28, 2004.
103. University of Pittsburgh Departmental Colloquium, April 7, 2005.
104. University of Ottawa, Department of Chemistry, University Lectureship, Oct. 14, 2005.
105. University of Washington, Chemistry Department, University Lectureship, Oct. 27, 2005.
106. Univ. of Florida Gainesville, Chem. Engineering Dept., April 3, 2006.
107. Univ. of California Irvine, April 11, 2006.
108. Univ. of Bochum, Germany, June 12, 2006.
109. Argonne National Lab., Chemistry Division Seminar, Oct. 9, 2006.
110. Reilly Lectureship, University of Notre Dame, 2007.
111. University of Buffalo, Chemistry Dept., May 22, 2007.
112. Beijing University, China, June 23, 2008
113. Dalian University, China, June 25, 2008
114. USTC, Hefei, China, June 26, 2008
115. Texas A&M University, Chemistry Department, April. 22, 2009.
116. University of South Carolina, H. Willard Davis Lecture, Chemistry Dept., April 24, 2009.
117. Materials Science and Engineering Dept., Univ. of Washington, Oct. 12, 2009.
118. Lawrence Berkeley Lab, Materials Sciences Div., Surface Science Seminar, Nov. 12, 2009.

CHARLES T. CAMPBELL

119. University of California at Irvine, Chemistry Dept., Feb. 23, 2010.
120. University of Wisconsin- Madison, Chemical Engineering Dept., March 16, 2010.
121. Sandia National Lab, Physical, Chemical, and Nano Sciences Center, June 24, 2010.
122. UCLA Chemistry Department, Physical Division, Sept. 27, 2010.
123. University of Florida Chemistry Department, Nov. 23, 2010.
124. Stanford University, Jan. 11, 2011.
125. Aarhus University, Interdisciplinary Nanoscience Center (iNANO), Denmark, May 3, 2011.
126. Ippatief Lectureship, Northwestern University, May 23, 2011.
127. Clemson University Chemistry Dept., April 12, 2012
128. University of California at Riverside, Chemistry Department Colloquium, June 6, 2012.
129. University of Illinois at Urbana-Champaign, Department of Chemical & Biomolecular Engineering, Oct. 16, 2012.
130. Northwestern University, Catalysis CSCC Seminar, Oct. 19, 2012.
131. Gerhard Ertl Lecture of the Berlin Universities, Humboldt University, Berlin. Dec. 10, 2012.
132. BASF Corporation, Iselin, NJ, Nov. 20, 2013.
133. Exxon-Mobil Research and Engineering, Clinton, NJ Nov. 21, 2013.
134. University of Houston, Dept. of Chemical & Biomolecular Engineering, Dec. 12-13, 2013.
135. University of California at Berkeley, Physical Chemistry Seminar, April 8, 2014.
136. Dow Chemical Research, Midland, MI, April 23, 2014.
137. University of Oklahoma, School of Chemical, Biological & Materials Engineering, April 24, 2014.
138. University of Colorado at Boulder, Chemistry Department Seminar, Sept. 12, 2014.
139. Indiana University, Physical Chemistry Seminar, Oct. 30, 2014.
140. Pennsylvania State Univ., Chemical Engineering Seminar, Nov. 6, 2014.
141. Harvard University, R.B. Woodward Lecture in the Chemical Sciences, Chemistry Department, April 16, 2015.
142. Washington State University, Dept. of Chemical Engineering Seminar, April 20, 2015.
143. University of Iceland, Department of Chemistry, Sept. 25, 2015.
144. University of Pittsburgh, Department of Chemical & Petroleum Engineering, Dec. 11, 2015.
145. SABIC Technology Center, Corporate R&D, Sugar Land, TX, Mar.29, 2016.
146. Fink Lecture, Georgia Institute of Technology, April 21, 2016.
147. Carnegie Mellon University, Dept. of Chemical Engineering, Nov. 29, 2016.
148. Karlsruhe Institute of Technology, Germany, GDCh Seminar, Jan. 19, 2017.
149. University of Göttingen, Germany, Physical Chemistry Institute, Jan. 26, 2017.
150. CNRS, Campus de Luminy, Marseille, France, Feb. 21, 2017.
151. Institute of Catalysis and Petrochemistry of the Spanish Council for Scientific Research, Autonomous University of Madrid, Spain, Feb. 27, 2017.
152. Leiden University, Institute of Chemistry, van Marum Colloquium, Mar. 8, 2017.
153. Physical Chemistry Colloquium, University of Marburg, Germany, March 30, 2017.
154. Fritz Haber Institute, Chemical Physics Department, Berlin, Germany, April 20, 2017.

FUTURE:

155. Inaugural Sachtler Lecturer, Northwestern University Center for Catalysis and Surface Science, Sept. 7, 2017.

156. Technical University of Vienna, Inst. of Applied Physics, Sept. 4, 2017.
157. University of Victoria, Department of Chemistry, Victoria, BC, Canada, Oct. 2, 2017.
158. University of Michigan, Department of Chemical Engineering, Ann Arbor, Oct. 24, 2017.
159. Department of Chemical & Biomolecular Engineering, University of Delaware, MD, date TBD.

PUBLICATIONS (Charles T. Campbell)

1. Oxygen Penetration into the Bulk of Palladium, C.T. Campbell, D.C. Foyt, and J.M. White, *J. Phys. Chem.*, 81, 491-494 (1977).
2. The Adsorption, Desorption, and Reactions of CO, O₂, and NO on Rhodium Surfaces, (Dissertation), C.T. Campbell, (Univ. Microfilms, Ann Arbor, Michigan, 1979).
3. The Adsorption, Desorption, and Reactions of CO and O₂ on Rh, C.T. Campbell and J.M. White, *J. Catal.*, 54, 289-302 (1978).
4. Chemisorption and Reactions of Nitric Oxide on Rhodium, C.T. Campbell and J.M. White, *Appl. of Surface Sci.*, 1, 347-359 (1978).
5. The Langmuir-Hinshelwood Reaction Between Oxygen and CO on Rh, C.T. Campbell, S.-K. Shi, and J.M. White, *Appl. of Surface Sci.*, 2, 382-396 (1979).
6. Kinetics of the Oxygen Titration Reaction by CO on Rh, C.T. Campbell, S.-K. Shi, and J.M. White, *J. Phys. Chem.*, 83, 2255-2259 (1979).
7. The Carbon Monoxide Oxidation Reaction Over Rh, C.T. Campbell, S.-K. Shi, and J.M. White, *J. Vac. Sci. Technol.*, 16, 605-607 (1979).
8. Electron spectroscopy of condensed multilayers: Line shape changes due to beam damage and excitation mode, P.H. Holloway, T.E. Madey, C.T. Campbell, R.R. Rye, and J.E. Houston, *Surface Sci.*, 88 121-137 (1979).
9. Surface Chemistry in Heterogeneous Catalysis: An Emerging Discipline, J.M. White and C.T. Campbell, *J. Chem. Education*, 57, 471-474 (1980).
10. Auger Spectra of Ammonia on Aluminum and Oxidized Aluminum, C.T. Campbell, J.W. Rogers, Jr., R.L. Hance, and J.M. White, *Chem. Phys. Lett.*, 69, 430-434 (1980).
11. An Electron Spectroscopy Study of Ammonia Adsorption on Clean and Oxidized Aluminum, J.W. Rogers, Jr., C.T. Campbell, R.L. Hance, and J.M. White, *Surface Sci.*, 97, 425-447 (1980).
12. A Molecular Beam Study of the Catalytic Oxidation of CO on a Pt(111) Surface, C.T. Campbell, G. Ertl, H. Kuipers, and J. Segner, *J. Chem. Phys.*, 73, 5862-5873 (1980).
13. A Molecular Beam Study of the Interactions of CO with a Pt(111) Surface, C.T. Campbell, G. Ertl, H. Kuipers, and J. Segner, *Surface Sci.*, 107, 207-219 (1981).
14. A Molecular Beam Study of the Interactions of O₂ with a Pt(111) Surface, C.T. Campbell, G. Ertl, H. Kuipers, and J. Segner, *Surface Sci.*, 107, 220-236 (1981).
15. A Molecular Beam Study on the Interaction of NO with a Pt(111) Surface, C.T. Campbell, G. Ertl, and J. Segner, *Surface Sci.*, 115, 309- 322 (1982).
16. Rotationally Inelastic Gas-Surface Scattering Investigated by Laser-Induced Florescence, F. Frenkel, J. Hager, W. Krieger, H. Walther, C.T. Campbell, G. Ertl, H. Kuipers, and J. Segner, *Phys. Rev. Lett.*, 46, 152-155 (1981).
17. The Co-adsorption of Potassium and Oxygen on Bi(0001): Accelerated Oxidation, C.T. Campbell and T.N. Taylor, *Surface Sci.*, 118, 401-414 (1982).

18. The Interaction of Cl₂ with Bi(0001): Incipient BiCl₃ Formation and Decomposition, C.T. Campbell and T.N. Taylor, *Surface Sci.*, 122, 119-136 (1982).
19. A Surface Science Investigation of the Role of Potassium Additives in Nickel Catalysts for CO Hydrogenation, C.T. Campbell and D.W. Goodman, *Surface Sci.*, 123 413-426 (1982).
20. The Interaction of Oxygen with Bi(0001): Kinetic, Electronic, and Structural Features, T.N. Taylor, C.T. Campbell, J.W. Rogers, W.P. Ellis, and J.M. White, *Surface Sci.*, 134, 529-546 (1983).
21. Book Review of "Springer Tracts in Modern Physics. Volume 91. Structural Studies of Surfaces", C.T. Campbell, *Surface Sci.* 105 2518 (1983) (not refereed)
22. Summary Abstract: The Role of Potassium Additives in Nickel Catalysts for CO Hydrogenation: A Surface Science Investigation, C.T. Campbell and D.W. Goodman, *J. Vac. Sci. Technol.*, A1, 1265-1266 (1983).
23. Catalytic Oxidation of CO on Pt(111): The Influence of Surface Defects and Composition on the Reaction Dynamics, J. Segner, C.T. Campbell, G. Doyen, and G. Ertl, *Surface Sci.*, 138, 505-523 (1984).
24. A Surface Science Study of Selective Ethylene Epoxidation Catalyzed by the Ag(110) Surface: Structural Sensitivity, C.T. Campbell, *J. Vac. Sci. Technol.*, A2, 1024-1027 (1984).
25. Model Studies of Ethylene Epoxidation Catalyzed by the Ag(110) Surface, C.T. Campbell and M.T. Paffett, *Surface Sci.*, 139, 396-416 (1984).
26. The Role of Chlorine Promoters in Ethylene Epoxidation Over the Ag(110) Surface, C.T. Campbell and M.T. Paffett, *Appl. Surface Sci.*, 19, 28-42 (1984).
27. The Interactions of O₂, CO, and CO₂ with Ag(110), C.T. Campbell and M.T. Paffett, *Surface Sci.*, 143, 517-535 (1984).
28. Hydrogen Adsorption on Cu/Pt(111): A Comparison Between Electrochemistry and Surface Science, M.T. Paffett, C.T. Campbell, T.N. Taylor, and S. Srinivasan, Extended Abstract for Proceedings of the 165th Electrochem. Soc. Meeting, p. 540, Cincinnati, Ohio, May 1984.
29. Design Considerations for Simple Gas Dosers in Surface Science Applications, C.T. Campbell and S.M. Valone, *J. Vac. Sci. Technol.*, A3, 408-411 (1985).
30. Chlorine Promoters in Selective Ethylene Oxidation over Ag(110): Kinetics and Mechanism, C.T. Campbell and B.E. Koel (U. of Colorado, Boulder), *J. Catal.*, 92, 272-283 (1985).
31. The Selective Epoxidation of Ethylene Catalyzed by Silver: Mechanistic Details Revealed by Single-Crystal Studies, C.T. Campbell, ACS Symposium Series No. 288: Catalyst Characterization Science, eds. M.L. Deviney and T.L. Gland, p. 210, Philadelphia, Pennsylvania, August 1984 invited review.
32. Cu Adsorption on Pt(111) and its Effects on Chemisorption: A Comparison with Electrochemistry, M.T. Paffett, C.T. Campbell, T.N. Taylor, and S. Srinivasan, *Surface Sci.*, 154, 284-302 (1985).
33. Structure of Ag on Rh and Its Effect on the Adsorption of D₂ and CO, H.C. Peebles, D.D. Beck, J.M. White and C.T. Campbell, *Surface Sci.*, 150, 120-142 (1985).
34. Selective Epoxidation of Ethylene Catalyzed by Ag(111): A Comparison with Ag(110), C.T. Campbell, *J. Catal.*, 94, 436-444 (1985).

35. The Structure of Bi on Pt(111) and Its Effects on Chemisorption: CO, H₂, and O₂, M.T. Paffett, C.T. Campbell, and T.N. Taylor, *J. Vac. Sci. Technol.*, A3, 812-816 (1985).
36. Atomic and Molecular Oxygen Adsorption on Ag(111), C.T. Campbell, *Surface Sci.*, 157, 43-60 (1985).
37. Chlorine Promoters in Selective Ethylene Epoxidation Over Ag(111): A Comparison with Ag(110), C.T. Campbell, *J. Catal.*, 99, 28- 38 (1986).
38. Surface Chemical Properties of Ag/Pt(111): Comparison Between Electrochemistry and Surface Science, M.T. Paffett, C.T. Campbell and T.N. Taylor, *Langmuir*, 1, 741-747 (1985).
39. Cesium-Promoted Ag(111): A Model Study of the Selective Epoxidation of Ethylene, C.T. Campbell, *J. Phys. Chem.*, 89, 5789-5795 (1985).
40. Metal Radii in Surface Science, C.T. Campbell, *Surface Sci.*, 167, L181-L186 (1986).
41. An XPS Study of Molecular Chemisorbed Oxygen on Ag(111), C.T. Campbell, *Surf. Sci.*, 173, L641 (1986).
42. Combined Electrochemical/Surface Science Investigations of Pt/Cr Alloy Electrodes, K.A. Daube, M.T. Paffett, S. Gottesfeld, and C.T. Campbell, *J. Vac. Sci. Technol.*, A4, 1617-1620 (1986).
43. Adsorption of Oxygen and Hydrogen on Au(110)-(1x2), A. Sault, R.J. Madix, and C.T. Campbell, *Surface Sci.*, 169, 347-356 (1986).
44. Testing Site Size Requirements in Chemisorption: Experiment and Theory, A.F. Voter, M.T. Paffett, and C.T. Campbell, *J. Vac. Sci. Technol.*, A4, 1342-1346 (1986).
45. The Interactions of Ethylene Epoxide with Ag(110) and Pt(111) Surfaces Relevance to Selective Ethylene Oxidation, C.T. Campbell and M.T. Paffett, *Surface Sci.*, 177, 417-430 (1986).
46. Adsorption and Growth Modes of Bi on Pt(111), M.T. Paffett, C.T. Campbell, and T.N. Taylor, *J. Chem. Phys.*, 85, 6176-6185 (1986).
47. The Structures of Alkali Promoters on Catalysts Prepared by Traditional versus Surface Science Methods: A Case Study with Cs on Ag(111), C.T. Campbell and K.A. Daube, *J.Catal.*, 106, 301-306 (1987).
48. Electrochemical and Surface Science Investigations of PtCr Alloy Electrodes, M.T. Paffett, K.A. Daube, S. Gottesfeld, and C.T. Campbell, *J. Electroanal. Chem.*, 220, 269-285 (1987).
49. Cu/ZnO(0001) and ZnO_x/Cu(111): Model Catalysts for Methanol Synthesis, C.T. Campbell, K.A. Daube, and J.M. White, *Surface Sci.*, 182, 458-476 (1987).
50. A Surface Science Investigation of the Water-Gas Shift Reaction on Cu(111), C.T. Campbell and K.A. Daube, *J.Catal.*, 104, 109-119 (1987).
51. Investigations of Sulfur Tolerance of Water-Gas Shift Catalysts, C.T. Campbell, in Proceedings of the 6th Annual Gasification Contractors Meeting, eds. M.R. Ghate and L.A. Baker (DOE, Morgantown Energy Technology Center, Morgantown, W.Va., 1986) p. 192-200 (not refereed).
52. H₂S/Cu(111): A Model Study of Sulfur Poisoning of Water-Gas Shift Catalysts, C.T. Campbell and B.E. Koel, *Surface Sci.*, 183, 100-112 (1987).
53. Quantum Chemical Studies on the Effects of Electron-Transferring Ligands Upon CO Chemisorption on Cu(100), J.A. Rodriguez and C.T. Campbell, *J. Phys. Chem.*, 91, 2161-2171 (1987).

54. A Model Study of Alkali Promotion of Water-Gas Shift Catalysts: Cs/Cu(111), C.T. Campbell and B.E. Koel, *Surface Sci.*, 186, 393-411 (1987).
55. Surface Science Studies of the Water-Gas Shift Reaction on a Model Cu(111) Catalyst, C.T. Campbell, B.E. Koel, and K.A. Daube, Proceeding of the 6th International Conference on Solid Surfaces, *J. Vac. Sci. Technol.*, A5, 810-813 (1987).
56. Quantum Chemical Studies of Formate on Cu(100) and Cu(110), J.A. Rodriguez and C.T. Campbell, *Surface Sci.*, 183, 449-468 (1987).
57. Comments on: The Activity and State of the Copper Surface in Methanol Synthesis Catalysts, C.T. Campbell, *Applied Catalysis Letter*, **32**, 367-369 (1987).
58. Quantum Chemical Studies of CN on Copper Surfaces, J.A. Rodriguez and C.T. Campbell, *Surface Sci.*, 185, 299-318 (1987).
59. A Quantum Chemical Study of ZnO, Cu/ZnO, Cu₂O and CuO Clusters and CO Chemisorption on ZnO(0001), CuZnO(0001) and Cu/ZnO(0001) Surfaces, J.A. Rodriguez and C.T. Campbell, *J. Phys. Chem.*, 91, 6648-6658 (1987).
60. The Interaction of Aluminum with the Ru(0001) Surface and Its Influence Upon CO Chemisorption, C.T. Campbell and D.W. Goodman, *J. Phys. Chem.*, 92, 2569-2573 (1988).
61. A Quantum Chemical Study of the Chemisorption of Ammonia, Pyridine, Formaldehyde, Formate and Methoxy on ZnO(0001), J.A. Rodriguez and C.T. Campbell, *Surface Sci.*, 194, 475-504 (1988).
62. Model Cu/ZnO Catalysts for Water-Gas Shift and Methanol Synthesis Based on Single Crystals, C.T. Campbell, *Stud Surf. Sci. Catal.*, 38, 783-790, *Catalysis 1987 - Proc. 10th North American Catalysis Society Meeting*, ed. J. H. Ward (Elsevier, Amsterdam, 1988).
63. Applications of Surface Analytical Techniques to the Characterization of Catalytic Reactions, C.T. Campbell, *J. Vac. Sci. Technol.*, A6, 1108-1112 (1988).
64. A Quantum Chemical Study of the Adsorption of Water, Formaldehyde and Ammonia on Copper Surfaces and Water on ZnO(0001), J.A. Rodriguez and C.T. Campbell, *Surface Sci.*, 197, 567-578 (1988).
65. A New Method for Analysis of Reactive Adsorbed Intermediates: Bismuth Postdosing in Thermal Desorption Mass Spectroscopy (BPTDS), C.T. Campbell, J.A. Rodriguez, F.C. Henn, J.M. Campbell, and S.G. Seimanides, *J. Chem. Phys.*, 88, 6585-6593 (1988).
66. The Chemisorption of Ethylene Epoxide and Carbonate on Silver: A Quantum-Chemical Study, J.A. Rodriguez and C.T. Campbell, *Surface Sci.*, 206, 424-450 (1988).
67. Probing Ensemble Effects in Surface Reactions: I. Site-Size Requirements for the Dehydrogenation of Cyclic Hydrocarbons on Pt(111) Revealed by Bismuth Site Blocking, C.T. Campbell, J.M. Campbell, P.J. Dalton, F.C. Henn, and S.G. Seimanides, *J. Phys. Chem.*, 93, 806-814 (1989).
68. Probing Ensemble Effects in Surface Reactions: II. Benzene Adsorption on Clean and Bismuth-Covered Pt(111), J.M. Campbell, S.G. Seimanides, and C.T. Campbell, *J. Phys. Chem.*, 93, 815-826 (1989).
69. Probing Ensemble Effects in Surface Reactions: III. Cyclohexane Adsorption on Clean and Bismuth-Covered Pt(111), J.A. Rodriguez and C.T. Campbell, *J. Phys. Chem.*, 93, 826-835 (1989).

70. Probing Ensemble Effects in Surface Reactions: IV. Cyclopentene Adsorption on Clean and Bismuth-Covered Pt(111), F.C. Henn, P.J. Dalton, and C.T. Campbell, *J. Phys. Chem.*, 93, 836-846 (1989).
71. A Multitechnique Surface Analysis Study of the Adsorption of H₂, CO and O₂ on Bi/Pt(111) Surfaces, M.T. Paffett, C.T. Campbell, R.G. Windham, and B.E. Koel, *Surface Sci.*, 207, 274-296 (1989).
72. Studies of Model Catalysts with Well-Defined Surfaces Combining Ultrahigh Vacuum Surface Characterization with Medium and High Pressure Kinetics, C.T. Campbell, *Advances in Catalysis*, 36, 1-54 (1989).
73. Cyclohexene Adsorption and Reactions on Clean and Bismuth-Covered Pt(111), J.A. Rodriguez and C.T. Campbell, *J. Catal.*, 115, 500-520 (1989).
74. A New Method for Analysis of Reactive Adsorbed Intermediates, C.T. Campbell, J.A. Rodriguez, F.C. Henn and J.M. Campbell, *J. Vac. Sci. Technol.*, A7, 2207-2208 (1989).
75. Adsorption of CO and CO₂ on Clean and Cesium-Covered Cu(110), J.A. Rodriguez, W.D. Clendening, and C.T. Campbell, *J. Phys. Chem.*, 93, 5238-5248 (1989).
76. The Chemisorption and Coadsorption of Water and Oxygen on Cs-Dosed Cu(110), W.D. Clendening, J.A. Rodriguez, J.M. Campbell, and C.T. Campbell, *Surface Sci.*, 216, 429-461 (1989).
77. The Growth Modes of Vapor-Deposited Bismuth on a Cu(110) Surface, W.D. Clendening and C.T. Campbell, *J. Chem. Phys.*, 90, 6656- 6663 (1989).
78. Chemisorption Studies on Cs/Cu(110): Model Studies of Cesium Promoters on Copper-Based Catalysts, J.A. Rodriguez, W.D. Clendening, J.M. Campbell, W. Min, and C.T. Campbell, *J. Vac. Sci. Technol.*, A7, 2118- 2120 (1989).
79. The Interactions of Cyclopentane with Clean and Bismuth-Covered Pt(111), J.M. Campbell and C.T. Campbell, *Surface Sci.*, 210, 46-68 (1989).
80. Does CO₂ Dissociatively Adsorb on Cu Surfaces?, J. Nakamura, J.A. Rodriguez and C.T. Campbell, *J. Phys.: Condens. Matter*, 1, Supplement B, SB149-SB160 (1989).
81. Magic Angle Thermal Desorption Mass Spectroscopy, S. Pauls and C.T. Campbell, *Surface Sci.*, 226, 250-256 (1990).
82. Kinetics and Mechanism of the Water-Gas Shift Reaction Catalyzed by the Clean and Cs-Promoted Cu(110) Surface: A Comparison to Cu(111), J. Nakamura, J.M. Campbell and C.T. Campbell, *Faraday Trans.*, 86 2725-2734 (1990).
83. Adsorption and Reactions of HCOOH on Doped Cu(110): Coadsorption with Cesium, Oxygen and Cs_a+O_a, F.C. Henn, J.A. Rodriguez and C.T. Campbell, *Surface Sci.*, 236, 282-312 (1990).
84. Bimetallic Surface Chemistry, C.T. Campbell, *Annual Reviews of Physical Chemistry*, 41, 775-837 (1990).
85. A Simple Means for Reproducibly Dosing Low Vapor Pressure and/or Reactive Gases to Surfaces in UHV, F.C. Henn, M.E. Bussell and C.T. Campbell, *J. Vac. Sci. Technol.*, A9, 10-13 (1991).
86. Analysis of Catalytic Reactions over Single Crystals, J.Nakamura and C.T. Campbell, *Shokubai (Catalyst)* (Japanese), 32, 522-530 (1990).
87. Energy Requirements for Dissociative Adsorption of H₂ on Cu(110), J.M. Campbell, M.E. Domagala and C.T. Campbell, *J. Vac. Sci. Technol.*, A9, 1693-1697 (1991).

88. The Coadsorption of Cyclic Hydrocarbons and Cesium on Pt(111): Electronic and Ensemble Effects, J. Davidsen, F.C. Henn, G. Rowe and C.T. Campbell, *J. Phys. Chem.*, 95, 6632-6642 (1991).
89. Trends in Preexponential Factors and Activation Energies in Dehydrogenation and Dissociation of Adsorbed Species, C.T. Campbell, Y.-K. Sun and W.H. Weinberg, *Chem. Phys. Lett.*, 179, 53-57 (1991).
90. The Mechanism of CO Oxidation over Cu(110): Effect of CO Gas Energy, M.E. Domagala and C.T. Campbell, *Catalysis Lett.*, 9, 65-70 (1991).
91. A Kinetic Model of the Water-Gas Shift Reaction, C.V. Ovesen, P. Stoltze, J.K. Norskov and C.T. Campbell, *J. Catal.*, 134, 445-468 (1992).
92. The Dissociative Adsorption of H₂ and D₂ on Cu(110): Activation Barriers and Dynamics, J.M. Campbell and C.T. Campbell, *Surface Sci.*, 259, 1-17 (1991).
93. The Titration of Oxygen Adatoms by H₂ from the Cs-Promoted Cu(110) Surface, K.H. Ernst, M.E. Domagala, C.T. Campbell and G. Moretti, *Surface Sci.*, 259, 18-25 (1991).
94. The Forward and Reverse Water-Gas Shift Reactions on Model Copper Catalysts: Kinetics and Elementary Steps, C.T. Campbell and K.H. Ernst, in "Surface Science of Catalysis: In Situ Probes and Reaction Kinetics" *ACS Symposium Series*, No. 482, eds. D. Dwyer and F.M. Hoffmann, (Am. Chem. Soc., Washington, DC, 1992) pp. 130-142.
95. A Reversal in Dipole Moment for Adsorbed Hydrocarbons on Pt(111) Due to Coadsorbed Alkali, K.H. Ernst and C.T. Campbell, *Surface Science (Letters)* 259, L736-738 (1991).
96. Kinetics of the Reverse Water-Gas Shift Reaction over Cu(110), K.H. Ernst, C.T. Campbell and G. Moretti, *J. Catal.* 134, 66-74 (1992).
97. Model Studies of Cesium Promoters in Water-Gas Shift Catalysts: Cs/Cu(110), J.M. Campbell, J. Nakamura and C.T. Campbell, *J. Catal.*, 136, 24-42 (1992).
98. Coverage Dependence of the Adsorption Site Geometry in the Cs/Ru(0001) System - A Leed Analysis, H. Over, H. Bludau, M. Skottke-Klein, G. Ertl, W. Moritz and C. T. Campbell, *Phys. Rev. B*, 45, 8638-8649 (1992).
99. The Decomposition of Cyclohexene on Pt(111): A BPTDS and HREELS Study, F. C. Henn, A. L. Diaz, M. E. Bussell, M. B. Hugenschmidt, M. E. Domagala and C. T. Campbell, *J. Phys. Chem.*, 96, 5965-5974 (1992).
100. A BPTDS and HREELS Study of the Interaction of Cyclohexane with the Pt(111) Surface, M. E. Bussell, F. C. Henn and C. T. Campbell, *J. Phys. Chem.*, 96, 5978-5982 (1992).
101. The Interaction of Cyclohexadiene with Pt(111) Studied by BPTDS and HREELS, M. B. Hugenschmidt, A. L. Diaz and C. T. Campbell, *J. Phys. Chem.*, 96, 5974-5978 (1992).
102. The Effects of Postdosed Bismuth on the Chemistry of CH₃ and CH₃I on Pt(111), M. B. Hugenschmidt, M. E. Domagala and C. T. Campbell, *Surface Science*, 275, 121-130 (1992).
103. Promoters and Poisons in the Water-Gas Shift Reaction, C. T. Campbell, Chapter 9 in: THE CHEMICAL PHYSICS OF SOLID SURFACES AND HETEROGENEOUS CATALYSIS, Vol. 6, Coadsorption, Promoters and Poisons, eds. D. A. King and D. P. Woodruff (Elsevier, Amsterdam, 1993) p. 287-310.
104. Bismuth Postdosing TDS: Performance and Limitations, M. B. Hugenschmidt, M. E. Domagala, and C. T. Campbell, *J. Vac. Sci. Technol.*, A10, 2556-2559 (1992).

105. Segregation Effects in Noble-Metal Film Growth on Bi(0001): Insights from Auger Analysis, T. N. Taylor and C. T. Campbell, *Surface Sci.*, 280, 277-288 (1993).
106. Comment on: "Interaction of CO₂ with Clean and Oxygenated Cu(110) Surfaces," by T. Schneider, et al., C. T. Campbell, *Catal. Lett.*, 16, 455-457 (1992).
107. Growth Model for Metal Films on Oxide Surfaces: Cu on ZnO(0001)-O, K. H. Ernst, A. Ludviksson, R. Zhang, J. Yoshihara and C. T. Campbell, *Phys. Rev. B*, 47, 13782-13796 (1993).
108. The Chemisorption of CO on Cu Films on ZnO(0001)-O, A. Ludviksson, K. H. Ernst, R. Zhang, and C. T. Campbell, *J. Catal.*, 141, 380-388 (1993).
109. The Chemisorption of H₂O and O₂ on Cu Films on ZnO(0001)-O, R. Zhang, A. Ludviksson and C. T. Campbell, *Surface Sci.*, 289, 1-9 (1993).
110. The Structure of Coadsorbed Bismuth and Hydrocarbons on Pt(111), M. E. Domogala and C.T. Campbell, *J. Vac. Sci. Technol.*, A114, 2128-2132 (1993).
111. The Adsorption and Reactions of Tetraethoxy Silane on Clean and Water-Dosed TiO₂(110), L. Gamble, M. B. Hugenschmidt, C. T. Campbell, T. A. Jurgens and J. W. Rogers, *J. Am. Chem. Soc.*, 115, 12096-12105 (1993).
112. The Interaction of H₂O with a TiO₂(110) Surface, M. B. Hugenschmidt, L. Gamble and C.T. Campbell, *Surface Sci.*, 302, 329-340 (1994).
113. Bismuth Postdosing Thermal Desorption Mass Spectrometry (BPTDS), C. T. Campbell, *Critical Reviews in Surface Chemistry* 4, 49-75 (1994).
114. Micro- and Macro-Kinetics : Their Relationship in Heterogeneous Catalysis, C. T. Campbell, *Topics in Catalysis (Proc. of Topsoe / Nielsen Symp., 1993)*, 1, 353-366 (1994).
115. Model for the Growth and Reactivity of Metal Films on Oxide Surfaces: Cu on ZnO(0001)-O, C. T. Campbell and A. Ludviksson, *J. Vac. Sci. Technol.* A12, 1825-31 (1994).
116. The Chemisorption and Reactions of Formic Acid on Cu Films on ZnO(0001)-O, A. Ludviksson, R. Zhang, and C. T. Campbell and K. Griffiths, *Surface Sci.*, 313, 64-82 (1994).
117. The Chemisorption of Methanol on Cu Films on ZnO(0001)-O, R. Zhang, A. Ludviksson and C. T. Campbell, *Catal. Lett.*, 25, 277-292 (1994).
118. The Chemistry of Bibenzyl on Pt(111) as Probed by BPTDS, M. E. Domagala and C. T. Campbell, *Surface Sci.* 301, 151-164 (1994).
119. The Identification of Adsorbed Benzyl on Pt(111) Using D₂-BPTDS, M. E. Domagala and C. T. Campbell, *Langmuir*, 10, 2636-2639 (1994).
120. Particle and Phase Thicknesses from XPS Analysis of Supported Bimetallic Catalysts : Calcined Co-Rh/Nb₂O₅, A. Frydman, M. Schmal, D.G. Castner and C. T. Campbell, *J. Catal.* 152, 164-178 (1995).
121. Bimetallic Model Catalysts, C. T. Campbell, invited Chapter 4.5 in *The Handbook of Heterogeneous Catalysis*, eds. G. Ertl, H. Knozinger, J. Weitkamp (Wiley-VCH, Weinheim, Germany, 1997), p. 814-826.
122. Methanol Synthesis and Reverse Water-Gas Shift Kinetics over Clean Polycrystalline Copper, J. Yoshihara, S. Parker, A. Schafer and C. T. Campbell, *Catalysis Lett.*, 31, 313-324, 1995.

123. The Interaction of Silane Coupling Agents with TiO₂(110), L. Gamble, L. Jung and C. T. Campbell, *Langmuir* 11, 4505-4514, 1995.
124. A Method for Accurate Quantitative XPS Analysis of Multimetallic or Multiphase Catalysts on Support Particles, A. Frydman, M. Schmal, D.G. Castner and C. T. Campbell, *J. Catal.*, 157, 133-144 (1995)
125. Dehydrogenation of Methylcyclohexane on Pt(111), by C. Xu, B E Koel, N Frei, M A Newton, and C T Campbell, *J. Phys. Chem.* 99, 16670-16675, 1995.
126. Benzyl Coupling on Bismuth-Modified Pt{111}, Mark A. Newton and Charles T. Campbell, *Catal. Letts.* 37, 15-23, 1996.
127. A High Pressure Cell and Transfer Rod for Ultrahigh Vacuum Chambers, A. Ludviksson, J. Yoshihara and C. T. Campbell, *Rev. Sci. Instruments* 66, 4370-4374, 1995.
128. Decomposition and Protonation of Surface Ethoxys on TiO₂(110), L. Gamble, L. S. Jung, and C. T. Campbell, *Surface Sci.*, 348, 1-16, 1996.
129. Metal Films and Particles on Oxide Surfaces: Structural, Electronic and Chemisorptive Properties, C. T. Campbell, *J. Chem. Soc., Faraday Trans.* 92, 1435-1445, 1996 (Invited "Research Article").
130. A Quantitative Investigation of the Decomposition of Cyclooctene on Pt(111) using BPTDS, N. Frei and C. T. Campbell, *J. Phys. Chem.* 100, 8402-8407, 1996.
131. The Adsorption of Cs on TiO₂(110), A. W. Grant and C. T. Campbell, *Phys. Rev. B*, 55, 1844-1851, 1997.
132. Methanol Synthesis and Reverse Water-Gas Shift Kinetics over Cu(110) Model Catalysts: Structural Sensitivity, J. Yoshihara and C. T. Campbell, *J. Catalysis*, 161, 776-782, 1996.
133. XPS Studies of Ce/Al₂O₃ and on Co-Rh/Nb₂O₅ Catalysts, L. G. Appel, A. Frydman, C. A. C. Perez, J. G. Eon, D. G. Castner, C. T. Campbell and M. Schmal, *Phys. Stat. Sol.* B192, 477-491, 1995.
134. Applications of BPTDS in the Kinetics and Mechanisms of Hydrocarbon Conversion Reactions over Pt(111): Methylcyclohexane Dehydrogenation, M. A. Newton and C. T. Campbell, *Z. Phys. Chem.* (special invited paper in issue in honor of G. Ertl) 198, 169-187 (1997).
135. The Promoting Effect of Noble Metal Addition on Niobia-Supported Cobalt Catalysts, F. B. Noronha, A. Frydman, D. A. G. Aranda, C. Perez, R. R. Soares, B. Morawek, D. Castner, C. T. Campbell, R. Frety and M. Schmal, *Catalysis Today* 28, 147-157, 1996.
136. Influence of Cu Overlayers on the Interaction of CO and CO₂ with ZnO(0001)-O, A. Gutierrez-Sosa, S. Crook, s. Haq, R. Lindsay, A. Ludviksson, S.C. Parker, C. T. Campbell and G. Thornton, *Faraday Disc.* 105, 335-368, 1996.
137. Ultrathin Metal Films on Oxide Surfaces: Structural, Electronic and Chemisorptive Properties, C. T. Campbell, *Surface Science Reports*, 227, 1-111, 1997.
138. A New Single-Crystal Adsorption Calorimeter for Determining Metal Adsorption and Adhesion Energies, J. T. Stuckless, D. E. Starr, D. Bald and C. T. Campbell, *Materials Research Symp. Proc. Vol. 440* (Materials Research Society, 1997) p. 103-108.
139. Metal Adsorption and Adhesion Energies on Clean Single-Crystal Surfaces, J. T. Stuckless, D. E. Starr, D. J. Bald and C. T. Campbell, *J. Chem. Phys.* 107, 5547-5553, 1997.

140. Calorimetric Measurements of the Energetics of Pb Adsorption on and Adhesion to Mo(100), J.T. Stuckless, D.E. Starr, D.J. Bald and Charles T. Campbell, *Phys. Rev. B* 56, 13,496-13,502, 1997.
141. A Novel Single-Crystal Adsorption Calorimeter and Additions for Determining Metal Adsorption and Adhesion Energies, J. T. Stuckless, N. Frei and C. T. Campbell, *Rev. Sci. Instruments* 69, 2427-2438, 1998.
142. Organofunctionalization of TiO₂(110): (3,3,3-Trifluoropropyl)-trimethoxysilane Adsorption, L. Gamble, M. A. Hendersen and C. T. Campbell, *J. Phys. Chem. B* 102, 4536-4543, 1998.
143. Quantitative Interpretation of the Response of Surface Plasmon Resonance Sensors to Adsorbed Films, L. S. Jung, C. T. Campbell, T. M. Chinowsky, M. Mar, and S. S. Yee, *Langmuir* 14, 5636-5648, 1998.
144. Cu Films on a Zn-Terminated ZnO(0001) Surface: Structure and Electronic Properties, J. Yoshihara, J. M. Campbell and C. T. Campbell, *Surface Sci.* 406, 235-245, 1998.
145. Chemisorption of Formic Acid and CO on Cu Particles on the Zn-Terminated ZnO(0001) Surface, J. Yoshihara and C. T. Campbell, *Surface Sci.* 407, 256-267, 1998.
146. Characterization of Apatite and Related Calcium Phosphate Surfaces by XPS, H. Lu, C. T. Campbell and B. D. Ratner, *Trans. 24th Ann. Meet. Soc. Biomaterials*, Vol. XXI, S. B. Goodman, ed. (Society for Biomaterials, Minneapolis, 1998) p. 35.
147. SPR Measurements of Binding and Disassociation of Wild-Type and Mutant Streptavidin on Mixed Biotin-Containing Alkyl-Thiolate Monolayers, L. S. Jung, K. E. Nelson, C. T. Campbell, P. Stayton, S. S. Yee, V. Perez-Luna, G. Lopez, *Sensors and Actuators B*, 54, 137-144, 1999.
148. Island Growth Kinetics During Vapor Deposition of Cu onto the Zn-Terminated ZnO(0001) Surface, J. Yoshihara, S. C. Parker and C. T. Campbell, *Surface Sci.* 439, 153-62, 1999.
149. Chemisorption on Metal Films on Oxide Surfaces, C. T. Campbell, *Current Opinion in Solid State and Materials Science* (invited review), 3, 439-445, 1998.
150. NEXAFS Study of CO Adsorption on ZnO(000-1) and Cu/ ZnO(000-1), R. Lindsay, A. Gutierrez-Sosa, G. Thornton, A. Ludviksson, S. C. Parker, and C. T. Campbell, *Surface Sci.* 439, 131-8, 1999.
151. Oxygen Adsorption on Well-Defined Gold Particles on TiO₂(110), V. Bondzie, S. C. Parker and C. T. Campbell, *J. Vac. Sci. Technol. A* 17, 1717-20, 1999.
152. Carbon Monoxide Hydrogenation on Co-Rh/Nb₂O₅ Catalysts, A. Frydman, D. G. Castner, C. T. Campbell and M. Schmal, *J. Catal.* 188, 1-13, 1999.
153. Island Growth Kinetics During the Vapor Deposition of Gold onto TiO₂(110), S. C. Parker, A. W. Grant, V. A. Bondzie and C. T. Campbell, *Surface Sci.* 441, 10-20 1999.
154. Pyroelectric Detectors For Adsorption Microcalorimetry: Analysis of Pulse Shape and Intensity, J. T. Stuckless, N. A. Frei and C. T. Campbell, *Sensors and Actuators B* 62, 13-22, 2000.
155. Attachment of Functionalized Poly(Ethylene Glycol) Films to Gold Surfaces, H. B. Lu, C. T. Campbell, and D. G. Castner, *Langmuir* 16, 1711-1718, 2000.
156. A Microcalorimetric Study of the Heat of Adsorption of Copper on Well-Defined Oxide Thin Film Surfaces: MgO(100), p(2x1)-Oxide on Mo(100), and Disordered W Oxide, J. T. Ranney, D. E. Starr, J. E. Musgrove, D. J. Bald and C. T. Campbell, *Faraday*

- Discussions (Invited Article), 114, 195-208, 1999.
157. Surface Characterization of Hydroxyapatite and Related Calcium Phosphates by XPS and TOF-SIMS, H. B. Lu, C. T. Campbell and B. D. Ratner, *Analytical Chemistry* 72, 2886-94, 2000.
 158. The Kinetics of CO Oxidation by Adsorbed Oxygen on Well-Defined Gold Particles on TiO₂(110), V. Bondzie, S. C. Parker and C. T. Campbell, *Catalysis Letters* 63, 143-151, 1999.
 159. Novel Approach to Multichannel SPR Sensing, J. Homola, H. B. Lu, S. S. Yee and C. T. Campbell, *Proceedings of SPIE Photonics East Conference*, 19-22 September 1999, Boston, USA.
 160. Quantification of Tight Binding to Surface-Immobilized Phospholipid Vesicles using Surface Plasmon Resonance: Binding Constant of Phospholipase A₂, L. S. Jung, J. S. Shumaker-Parry, C. T. Campbell, S. S. Yee and M. H. Gelb, *J. Am. Chem. Soc.* 122, 4177-84, 2000.
 161. Adsorption of Chlorine on ZnO(0001)-Zn and Coadsorption with HCOOH, A. W. Grant, A. Jamieson, C. T. Campbell, *Surface Sci.* 458, 71-79, 2000.
 162. The Influence of Chlorine on the Dispersion of Cu Particles on Cu/ZnO(0001) Model Catalysts”, by Ann W. Grant, Jeffrey T. Ranney, Charles T. Campbell, T. Evans and G. Thornton, *Catalysis Letters* 65, 159-68, 2000.
 163. Sticking Probabilities in Adsorption from Liquid Solutions: Alkylthiols on Gold, L. S. Jung and C. T. Campbell, *Phys. Rev. Letters* 84, 5164-67, 2000.
 164. Surface Characterization of Mixed Self-Assembled Monolayers Designed for Streptavidin Immobilization, K. E. Nelson, L. S. Jung, L. Gamble, M. Boeckl., E. Naemi, S. L. Golledge, T. Sasaki, D. G. Castner, C. T. Campbell and P. Stayton, *Langmuir* 17, 2807-16, 2001.
 165. Binding and Dissociation Kinetics of Wild-Type and Mutant Streptavidins on Mixed Biotin-Containing Alkylthiolate Monolayers” by Linda S. Jung, Kjell E. Nelson, P. S. Stayton and Charles T. Campbell, *Langmuir* 16, 9421-32, 2000.
 166. Probing Protein:DNA Interactions Using a Uniform Monolayer of DNA and Surface Plasmon Resonance, by J. S. Shumaker-Parry, C. T. Campbell, G. D. Stormo, F. S. Silbaq, R. H. Aebersold, in *Scanning and Force Microscopies for Biomedical Applications II*, S. Nie, E. Tayima and E. S. Yeung, eds., *Proceedings of SPIE*, Vol. 3922, 158-166 (2000).
 167. Sticking Probabilities in Adsorption of Alkylthiols from Liquid Ethanol Solution onto Gold, L. S. Jung and C. T. Campbell, *J. Phys. Chem.* 104, 11168-78, 2000.
 168. Modifying Behaviour of Cu on the Orientation of Formate on ZnO(000-1)-O, A. Gutierrez-Sosa, T. Evans, A. P. Woodhead, R. Lindsay, C. A. Muryn, G. Thornton, J. Yoshihara, S. C. Parker and C. T. Campbell, *Surface Sci.* 477, 1-7, 2001.
 169. Enthalpies of Adsorption of Metal Atoms on Single-Crystalline Surfaces by Microcalorimetry, J. H. Larsen, D. E. Starr, C. T. Campbell, *J. Chemical Thermodynamics* 33, 333-345, 2001.
 170. Surface Functionalization for Self-referencing Surface Plasmon Resonance Biosensors by RF-plasma-deposited Thin Films and Self-assembled Monolayers, H.B. Lu, J. Homola, V. Y. Pan, C. T. Campbell, B. D. Ratner, S. S. Yee, *Trans. Sixth World Biomaterials Congress (Society for Biomaterials, Minneapolis, MN)*, p. 151, May 15-20,

- 2000, Kamuela, Hawaii, USA.
171. Apatite Coated Surface Plasmon Resonance Biosensors , H. B. Lu, B. J. Tarasevich, C. T. Campbell, B. D. Ratner, Trans. Sixth World Biomaterials Congress (Society for Biomaterials, Minneapolis, MN), p. 154, May 15-20, 2000, Kamuela, Hawaii, USA.
 172. Model Oxide-Supported Metal Catalysts: Energetics, Particle Thicknesses, Chemisorption and Catalytic Properties, C. T. Campbell, A. W. Grant, D. E. Starr, S. C. Parker and V. E. Bondzie, Topics in Catalysis (invited paper in issue honoring Gabor Somorjai), 14, 43-51, 2001.
 173. Adsorption energetics of Ag on MgO(100), J. H. Larsen, J. T. Ranney, D. E. Starr, J. E. Musgrove and C. T. Campbell, Phys. Rev. B 63, 195410 (8 pages), 2001.
 174. Microcalorimetric measurements of the heat of adsorption of Pb on well-defined oxides: MgO(100) and p(2x1)-oxide on Mo(100), D. E. Starr, D. J. Bald, J. E. Musgrove, J. T. Ranney and C. T. Campbell, J. Chem. Phys. 114, 3752-64, 2001.
 175. Orientation of benzene and phenoxy on the polar ZnO(0001)-Zn surface, , A. Gutierrez-Sosa, T. M. Evans, S. C. Parker, C. T. Campbell and G. Thornton, J. Phys. Chem. B **105**, 3783-3785, 2001.
 176. Future directions in catalysis science – Workshop, G. A. Somorjai, S. Benkovic, C. T. Campbell and 34 other authors, Catalysis Letters 76, 111-124, 2001.
 177. Low-temperature adsorption microcalorimetry: Pb/MgO(100), D. E. Starr and C. T. Campbell, J. Phys. Chem. (invited paper: John Yates Festschrift), B105, 3776-82, 2001.
 178. Protein contact printing for a surface plasmon resonance biosensor with on-chip referencing, H.B. Lu, J. Homola, C. T. Campbell, G. G. Nenninger, S. S. Yee and B. D. Ratner, Sensors and Actuators B 74, 91-99, 2001.
 179. Measurement of the energetics of metal film growth on a semiconductor substrate: Ag / Si(100)-2x1, D. E. Starr, J. T. Ranney, J. H. Larsen, J. E. Musgrove and C. T. Campbell, Phys. Rev. Letters 87, 106102, 2001.
 180. Methanol Decomposition on Pt/ZnO(0001)-Zn Model Catalysts, A. W. Grant, J. H. Larsen, C. A. Perez, S. Lehto, M. Schmal and C. T. Campbell, J. Phys. Chem. 105, 9273-9, 2001.
 181. Finding the Rate-Determining Step in a Mechanism: Comparing DeDonder Relations with the “Degree of Rate Control”, C. T. Campbell, J. Catal. 204, 520-4, 2001.
 182. Propene adsorption on gold particles on TiO₂(110), H. M. Ajo, V. A. Bondzie and C. T. Campbell, Catalysis Letters 78, 359-68, 2002.
 183. Geometry of C₁₋₃ oxygenates on ZnO(0001)-Zn, A. Gutiérrez-Sosa, T. M. Evans, S. C. Parker, C. T. Campbell, G. Thornton, Surface Sci. 497, 239-46, 2002.
 184. Catalysts Under Pressure (Perspectives: Surface Science), Charles T. Campbell, Science 294, 1471-2, 2001.
 185. Education in Nanotechnology: Launching the First Ph.D. Program, V. Vogel and C. T. Campbell, International Journal of Engineering Education 18, 498-505, 2002.
 186. Heat of Adsorption of Cu and Pb on Hydroxyl-covered MgO(100), D. E. Starr, S. F. Diaz, J. E. Musgrove, J. T. Ranney, D. J. Bald, L. Nelen, H. Ihm and C. T. Campbell, Surface Sci. 515, 13-20, 2002.
 187. Metal Adsorption and Adhesion Energies on MgO(100), C. T. Campbell and D. E. Starr, J. Am. Chem. Soc. 124, 9212-18, 2002.
 188. The Effect of Size-Dependent Nanoparticle Energetics on Catalyst Sintering, C. T.

- Campbell, S. C. Parker and D. E. Starr, *Science* 298, 811-4, 2002.
189. Benzene Adsorption and Dehydrogenation on Pt / ZnO(0001)-O Model Catalysts, L. T. Ngo, L. Xu, A. W. Grant and C. T. Campbell, *J. Phys. Chem. B* 107, 1174-1179, 2003.
 190. Cyclohexane Dehydrogenation and H₂ Adsorption on Pt Particles on ZnO(0001)-O, A. W. Grant, L. T. Ngo, K. Stegelman and C. T. Campbell, *J. Phys. Chem. B* 107, 1180-1188, 2003.
 191. Adsorption and Adhesion Energies of Pb on (1x1)-Mo₂C / Mo(100) by Calorimetry, M. Smedh, S. F. Diaz and C. T. Campbell, *Phys. Rev. B* 67, art. no. 205401, 2003.
 192. Waltzing with O₂ (Perspective: Surface Science), C. T. Campbell, *Science*, 299, 357, 2003.
 193. Quantitative Methods for Spatially-Resolved Adsorption / Desorption Measurements in Real Time by SPR Microscopy, J. Shumaker-Parry and C. T. Campbell, *Anal. Chem.* 76, 907-917, 2004.
 194. Microspotting Streptavidin and Double-Stranded DNA Arrays on Gold for High-Throughput Studies of Protein – DNA Interactions by SPR Microscopy, J. Shumaker-Parry, M. H. Zareie, R. A. Aebersold and C. T. Campbell, *Anal. Chem.* 76, 918-929, 2004.
 195. Microkinetic Modeling of Ethylene Oxidation over Silver, K. Stegelmann, N. C. Schiødt, C. T. Campbell and P. Stoltze, *Journal of Catalysis* 221, 630-649, 2004.
 196. Parallel, Quantitative Measurement of Protein Binding to a 120-Element Double-Stranded DNA Array in Real Time Using SPR Microscopy, J. Shumaker-Parry, R. A. Aebersold and C. T. Campbell, *Anal. Chem.* 76; 2071-2082, 2004.
 197. A Streptavidin Linker Layer that Functions after Drying, N. Xia, J. Shumaker-Parry, H. Zareie, C. T. Campbell and D. G. Castner, *Langmuir* 20, 3710-16, 2004.
 198. Monocyte Activation on Polyelectrolyte Multilayers, J. J. Hwang, S. Jelacic, N. T. Samuel, R. V. Maier, C. T. Campbell, David G. Castner, Allan S. Hoffman, and P. S. Stayton, *Journal of Biomaterials Science, Polymer Edition* 16, 237-251, 2005
 199. Calorimetric Measurement of the Heat of Adsorption of Benzene on Pt(111), H. Ihm, H. M. Ajo, J. M. Gottfried, P. Bera and C. T. Campbell, *J. Phys. Chem. B*, 108, 14627-33, 2004. (Issue in honor of G. Ertl).
 200. A Calorimeter for Adsorption Energies of Large Molecules on Single Crystal Surfaces, H. M. Ajo, H. Ihm, David E. Moilanen and C. T. Campbell, *Review of Scientific Instruments* 75, 4471-80, 2004.
 201. Metal-carbon bond energies for adsorbed hydrocarbons from calorimetric data, H. Gross, C. T. Campbell and D. A. King, *Surface Science* 572, 179-190, 2004.
 202. Growth and Sintering of Pd Clusters on α -Al₂O₃(0001), by S. L. Tait, L. T. Ngo, Q. Yu, S. C. Fain, Jr., and C. T. Campbell, *J. Chem. Phys.* 122, art. 064712, 2005 (9 pages).
 203. Adsorption of Pb on NiAl(110): Energetics and structure, J. F. Zhu, S. F. Diaz, L. R. Heeb, C. T. Campbell, *Surface Sci.* 574, 34-42, 2004.
 204. Pyroelectric heat detector for measuring adsorption energies on thicker single crystals, S.F. Diaz, J.F. Zhu, N. Shamir, and C. T. Campbell, *Sensors and Actuators, B* 107, 2005, 454-460.
 205. The active site in nanoparticle gold catalysis (A Perspective), C. T. Campbell, *Science* 306, 234-5, 2004.
 206. Surface products and coverage dependence of dissociative ethane adsorption on

- Pt{110}-(1×2), J. J. W. Harris, V. Fiorin, C. T. Campbell and D. A. King, *J. Phys. Chem. B* 109, 4069-4075, 2005
207. Toward tomorrow's catalysts, C. T. Campbell, *Nature (News and Views)*, 432, 282-3, 2004.
 208. n-Alkanes on MgO(100): I. Coverage-dependent Desorption Kinetics of n-Butane, S. L. Tait, Z. Dohnálek, C. T. Campbell, B. D. Kay, *J. Chem. Phys.* 122, 164707, 2005 (9 pages).
 209. n-Alkanes on MgO(100): II. Chain Length-dependence of Kinetic Desorption Parameters for Small n-Alkanes, S. L. Tait, Z. Dohnálek, C. T. Campbell, B. D. Kay, *J. Chem. Phys.* 122, 164708, 2005 (13 pages).
 210. Heats of adsorption of Pb on pristine and electron-irradiated poly(methyl methacrylate) by microcalorimetry, S.F. Diaz, J.F. Zhu, J.J.W. Harris, P. Goetsch, L. Merte and C. T. Campbell, *Surface Sci.* 598, 22-34, 2005.
 211. Small Pd clusters, up to the tetramer at least, are highly mobile on the MgO(100) surface, L. Xu, G. Henkelman, C. T. Campbell and H. Jonsson, *Phys. Rev. Letts.* 95, 146103, 2005 (4 pages).
 212. Methane adsorption and dissociation and oxygen adsorption and reaction with CO on Pd nanoparticles on MgO(100) and on Pd(111), S. L. Tait, Z. Dohnálek, C. T. Campbell, B. D. Kay, *Surface Sci.* 591, 90-107, 2005.
 213. Oxygen Vacancies and Catalysis on Ceria Surfaces (Perspective), Charles T. Campbell and Charles H. F. Peden, *Science* 309, 713-14 (2005).
 214. Transition metal oxides: extra thermodynamic stability as thin films, Charles T. Campbell, *Physical Review Letters* 96, 066106 (2006) 4 pages.
 215. Simulated measurement of small metal clusters by frequency modulation non-contact atomic force microscopy (ncAFM), S C Fain, Jr., C A Polwarth, S L Tait, C T Campbell, and R H French, *Nanotechnology* 17, S121-127 (2006).
 216. Thermodynamics of Statherin Adsorption onto Hydroxyapatite, R. Goobes, G. Goobes, C. T. Campbell and P. S. Stayton, *Biochemistry* 45, 5576-86 (2006).
 217. Pd diffusion on MgO(100): the role of defects and small cluster mobility, L. Xu; G. Henkelman; C. T Campbell; H. Jonsson, *Surface Sci.* 600, 1351-62 (2006).
 218. A Demonstration of High-throughput Immunoassay and Small Molecule Binding on Protein Microarrays with SPR Microscopy, G. Kim, L. Jiang, P.K. Rathod, C.T. Campbell, A. Nishimoto and V. Casasanta, *NSTI-Nanotech 2005 (Proc. 2005 Nano Science and Technology Institute Conference)* Vol. 1, Chapter 7.2, 381-4, 2005.
 219. The Heat of Adsorption of Naphthalene on Pt(111) Measured by Adsorption Calorimetry, J. M. Gottfried, E. K. Vestergaard, P. Bera, and C. T. Campbell, *J. Phys. Chem. B* 110, 17539-45 (2006).
 220. Interactions of O₂ with Pd nanoparticles on α-Al₂O₃(0001) at low and high O₂ pressures, S. Penner, P. Bera, S. Pedersen, L.T. Ngo, J. Harris and C. T. Campbell, *J. Phys. Chem. B* 110, 24577-84 (2006).
 221. Pd-Catalyzed Growth of Pt Nanoparticles or Nanowires as Dense Coatings on Polymeric and Ceramic Particulate Supports, E. P. Lee, J. Chen, Y. Yin, C. T. Campbell Y. Xia, *Adv. Materials (Rapid Communication)* 18, 3271-74 (2006).
 222. Design and operating characteristics of a transient kinetic analysis catalysis reactor system employing in-situ transmission FTIR, Y. Yang, R.S. Disselkamp, J. Szanyi,

- C.H.F. Peden, C.T. Campbell, J. G. Goodwin, Jr., Review of Scientific Instruments, 77, Art. No. 094104 (2006).
223. n-Alkanes on Pt(111) and on C(0001) / Pt(111): Chain Length-dependence of Kinetic Desorption Parameters, S. L. Tait, Z. Dohnálek, C. T. Campbell, B. D. Kay, J. Chem. Phys. 125, Art. No. 234308, 15 pages (2006).
224. Thermodynamic Roles of Basic Amino Acids in Statherin Recognition of Hydroxyapatite, R. Goobes, G. Goobes, W. J. Shaw, G. P. Drobny, C. T. Campbell and P. S. Stayton, Biochemistry 46, 4725-4733 (2007).
225. SPR Microscopy and Its Applications to High-Throughput Analyses of Biomolecular Binding Events and Their Kinetics, C. T. Campbell and G. Kim, Biomaterials 28. 2380–2392 (2007).
226. A Kinetic Model for Sintering of Supported Metal Particles with Improved Size-dependent Energetics, and Applications to Au on TiO₂(110), S. C. Parker and C. T. Campbell, Phys. Rev. B 75, Art. No. 035430, 15 pages (2007).
227. Adsorption Energy, Growth Mode and Sticking Probability of Ca on Poly(methyl methacrylate) Surfaces with and without Electron Damage, J. Zhu, P. Goetsch, N. Ruzycski and C. T. Campbell, Journal of the American Chemical Society 129, 6432 -6441 (2007).
228. Reactivity and sintering kinetics of Au / TiO₂(110) model catalysts: particle size effects, S. C. Parker and C. T. Campbell, Topics in Catalysis 44, 3-13 (2007).
229. Kinetic Monte Carlo simulations of Pd deposition and island growth on MgO(100), L. Xu; G. Henkelman; C. T Campbell; H. Jonsson, Surface Sci. 601, 3133-42 (2007).
230. Catalyst Sintering Kinetics and its Effect on Particle Size Distributions, with Examples for Gold Supported on TiO₂, C. T. Campbell and S. C. Parker, Proceedings on the 2007 Meeting of the North American Catalysis Society (Houston).
231. Growing Pt Nanowires as a Densely Packed Array on Metal Gauze, E. P. Lee, Z. Peng, D. M. Cate, Ho. Yang, C. T. Campbell and Y. Xia, *Journal of the American Chemical Society (Rapid Communication)*, 129, 10634-5 (2007).
232. The structure, dynamics, and energetics of protein adsorption - lessons learned from adsorption of statherin to hydroxyapatite, G. Goobes, R. Goobes, W.J. Shaw, J.M. Gibson, J.R. Long, V. Raghunathan, O. Schueler-Furman, J.M. Popham, D. Baker, C.T. Campbell, P.S. Stayton, and G.P. Drobny, *Magnetic Resonance in Chemistry*, 45: S32-S47 (2007).
233. Ca Adsorption on MgO(100): Energetics, Structure and Role of Defects, J. F. Zhu, J. A. Farmer, N. Ruzycski, L. Xu; C. T Campbell and G. Henkelman, *Journal of the American Chemical Society* 130, 2314-22 (2008).
234. Large Entropy Difference Between Terrace and Step Sites on Surfaces, D. E. Starr and C. T. Campbell, *Journal of the American Chemical Society* 130, 7321-7 (2008).
235. SPR Imaging for high-throughput, label-free interaction analysis, Christopher Lausted, Z. Y. Hu, Leroy Hood, and C. T. Campbell, *Combinatorial Chemistry and High-Throughput Screening*, 12(8), 741-51 (2009).
236. Energetics of Cyclohexene Adsorption and Reaction on Pt(111) by Low-Temperature Microcalorimetry, O. Lytken, W. Lew, J. J.W. Harris, E. K. Vestergaard, J. M. Gottfried and C. T. Campbell, *J. Am. Chem. Soc.* 130, 10247-57 (2008).
237. Catalytic Reaction Energetics by Single Crystal Adsorption Calorimetry: Hydrocarbons

- on Pt(111), O. Lytken, W. Lew and C. T. Campbell, *Chemical Society Reviews* (invited paper for special issue in honor of Ertl's Nobel Prize) 37, 2172 – 2179 (2008).
238. Isotope effects in methanol synthesis and the reactivity of copper formate on a Cu/SiO₂ catalyst, Y. Yang, C. Mims, R. Disselkamp, D. Mei, J.-H. Kwak, J. Szanyi, C. H. F. Peden and C. T. Campbell, *Catalysis Letters* 125, 201-8 (2008).
239. Erratum: Oxygen adsorption on well-defined gold particles on TiO₂(110) (vol 17, pg 1717, 1999), C. T. Campbell, *J. Vac. Sci. Technol.* 26, 1546 (2008).
240. Experimental measurements of the energetics of surface reactions, C. T. Campbell and O. Lytken, *Surface Science* 603, 1365-1372 (2009) (invited paper for special issue in honor of Ertl's Nobel Prize).
241. Defect Sites and their distributions on MgO(100) by Li and Ca adsorption calorimetry, J. A. Farmer, C. T. Campbell, L. Xu; and G. Henkelman, *Journal of the American Chemical Society* 131, 3098-3103 (2009).
242. The degree of rate control: how much the energies of intermediates and transition states control rates, C. Stegelmann, A. Andreasen, C. T. Campbell, *Journal of the American Chemical Society* 131, 8077-82 (2009) (Cover Article, highlighted in *Science* and web page of *Nature Chemistry*).
243. Simultaneous MS-IR studies of surface formate reactivity under methanol synthesis conditions on Cu/SiO₂, Y. Yang, C. Mims, R. Disselkamp, C. H. F. Peden and C. T. Campbell, *Topics in Catalysis* 52, 1440-47 (2009).
244. Lithium Adsorption on MgO(100): Calorimetric Energies and Structure, J. A. Farmer, N. Ruzycki, J. F. Zhu and C. T. Campbell, *Physical Review B* 80, art. no. 035418 (2009), 8 pages.
245. Formation of the calcium / poly(3-hexylthiophene) interface: structure and energetics, J. Zhu, F. Bebensee, W. Hieringer, W. Zhao, J. H. Baricuatro, J. A. Farmer, Y. Bai, H-P. Steinrück, J. M. Gottfried and C. T. Campbell, *Journal of the American Chemical Society* 131, 13498-507 (2009).
246. Correction: The degree of rate control: how much the energies of intermediates and transition states control rates, C. Stegelmann, A. Andreasen, C. T. Campbell, *Journal of the American Chemical Society* 131, 8077-82 (2009), and its erratum: 131, 13563 (2009).
247. Improved pyroelectric detectors for single crystal adsorption calorimetry from 100 to 350 K, W. Lew, O. Lytken, J. A. Farmer, M. C. Crowe, and C.T. Campbell, *Review of Scientific Instruments* 81, Art. No. 024102 (2010) 9 pages.
248. Interface Formation between calcium and electron-irradiated poly(3-hexylthiophene), F. Bebensee, J. Zhu, J. H. Baricuatro, J. A. Farmer, Y. Bai, H-P. Steinrück, C. T. Campbell and J. M. Gottfried, *Langmuir* 26, 9632-39 (2010).
249. Particle size dependent heats of adsorption of CO on supported Pd nanoparticles as measured with a single crystal microcalorimeter, J. H. Fischer-Wolfarth, J. A. Farmer, J. M. Flores-Camacho, A. Genest, I. V. Yudanov, N. Rösch, C. T. Campbell, S. Schauermann and H. J. Freund, *Physical Review B (Rapid Communication)* 81, 241416(R) (2010), 4 pages.
250. A sinter-resistant catalytic system based on Pt nanoparticles supported on TiO₂ nanofibers and covered by porous silica, Y. Dai, B. Lim, Y. Yang, C. M. Cobley, W. Li, E. C. Cho, B. Grayson, P. T. Fanson, C. T. Campbell, Y. Sun and Y. Xia, *Angewante Chemie* 49, 8165-8 (2010).

251. Ag Adsorption on Reduced CeO₂(111) Thin Films, J. A. Farmer, J. H. Baricuatro and C. T. Campbell, *J. Physical Chemistry C* (invited for D. W. Goodman issue) 114, 17166–72 (2010).
252. Ceria Maintains Smaller Metal Catalyst Particles by Strong Metal - Support Bonding, J. A. Farmer and C. T. Campbell, *Science* 329, 933-936 (2010).
253. The (non) formation of methanol by direct hydrogenation of formate on copper catalysts, Y. Yang, C.A. Mims, R.S. Disselkamp, J-H. Kwak, C.H.F. Peden and C.T. Campbell, *J. Physical Chemistry C* 114, 17205–11 (2010).
254. Towards Well-Defined Metal-Polymer Interfaces: Temperature-Controlled Suppression of Subsurface Diffusion and Reaction at the Ca / P3HT Interface, F. Bebensee, M. Schmid, H-P. Steinruck, C. T. Campbell, J. M. Gottfried, *J. Am. Chem. Soc. (Communication)*, 132, 12163-5 (2010).
255. Kinetics of Leucine-Lysine Peptide Adsorption and Desorption at –CH₃ and –COOH Terminated Alkylthiolate Monolayers, J. S. Apte, L. J. Gamble, D. G. Castner and C. T. Campbell, *Biointerphases* 5, 97-104 (2010).
256. Surface chemistry: Key to control and advance myriad technologies, J. T. Yates Jr. and C. T. Campbell, *Proc. National Academy of Sciences* 108, 911-916 (2011).
257. An improved single-crystal adsorption calorimeter for determining gas adsorption and reaction energies on complex model catalysts, J-H. Fischer-Wolfarth, J. Hartmann, J. A. Farmer, J. M. Flores-Camacho, C. T. Campbell, S. Schauermaann and H-J. Freund, *Review of Scientific Instruments* 82, art. No. 024102 (2011) (15 pages).
258. Adsorption Microcalorimetry: Recent Advances in Instrumentation and Application, M. C. Crowe and C. T. Campbell, *Annual Rev. Analytical Chemistry*, Vol. 4, 41-58 (2011).
259. Growth, structure and stability of Ag on CeO₂(111): synchrotron radiation photoemission studies, D. Kong, G. Wang, Y. Pan, S. Hu, J. Hou, H. Pan, C. T. Campbell and Junfa Zhu, *J. Phys. Chem. C* 115, 6715–25 (2011).
260. The Energy of Molecularly Adsorbed Water on Clean Pt(111) and with Coadsorbed Oxygen by Calorimetry, W. Lew, M. C. Crowe, E. Karp and C. T. Campbell, *J. Phys. Chem. C* 115, 9164–70 (2011).
261. The Energy of Adsorbed Hydroxyl on Pt(111) by Microcalorimetry, W. Lew, M. C. Crowe, E. Karp, O. Lytken, J. A. Farmer, L. Árnadóttir, C. Schoenbaum and C. T. Campbell, *J. Phys. Chem. C* 115, 11586–94 (2011).
262. The Energy of Hydroxyl Coadsorbed with Water on Pt(111), W. Lew, M. C. Crowe, C. T. Campbell, J. Carrasco, A. Michaelides, *J. Phys. Chem. C* 115, 23008–23012 (2011).
263. Insights into Catalysis by Gold Nanoparticles and their Support Effects through Surface Science Studies of Model Catalysts, C. T. Campbell, J. C. Sharp, Y. X. Yao, E. M. Karp and T. L. Silbaugh, *Faraday Discussions* 152, 227-239 (2011) (invited).
264. Adsorption energetics of CO on supported Pd nanoparticles as a function of particle size by single crystal microcalorimetry, J. M. Flores-Camacho, J.-H. Fischer-Wolfarth, M. Peter, C. T. Campbell, S. Schauermaann and H.-J. Freund, *Phys. Chem. Chem. Phys.* 13, 16800–16810 (2011).
265. Built-in potential in conjugated polymer diodes with changing anode work function: Interfacial states and deviation from the Schottky-Mott limit, B. A. MacLeod, N. E. Horwitz, E. L. Ratcliff, J. L. Jenkins, N. R. Armstrong, A. J. Giordano, P. J. Hotchkiss, S. R. Marder, C. T. Campbell and D. S. Ginger, *J. Phys. Chem. Letters*, 3, 1202–7

- (2012).
266. A highly reactive and sinter-resistant catalytic system based on Pt nanoparticles embedded on the inner surfaces of CeO₂ hollow fibers, K. Yoon, Y. Yang, P. Lu, K. Stamm Masias, P. T. Fanson, C. T. Campbell and Y. Xia, *Angewante Chemie* 51, 9543-9546 (2012).
 267. Catalyst-Support Interactions: Electronic Perturbations, C. T. Campbell, *Nature Chemistry* (News and Views) 4, 597-8 (2012).
 268. The energetics of oxygen adatoms, hydroxyl species and water dissociation on Pt(111), E. M. Karp, C. T. Campbell, F. Studt, F. Abild-Pedersen and J. K. Nørskov, *J. Phys. Chem. C* 116, 25772–76 (2012).
 269. Ca carboxylate formation at the calcium / poly(methyl methacrylate) interface, H. Ju, X. Feng , Y. Ye, L. Zhang, H. Pan, C. T. Campbell, J. F. Zhu, *J. Phys. Chem. C* 116, 20465–71 (2012).
 270. Mechanistic Studies of Methanol Synthesis over Cu from CO/CO₂/H₂/H₂O Mixtures: the Source of C in Methanol and the Role of Water, Y. Yang, C.A. Mims, D.H. Mei, C.H.F. Peden and C.T. Campbell, *J. Catalysis* 298, 10-17 (2013).
 271. The Entropies of Adsorbed Molecules, C. T. Campbell and J. R. V. Sellers, *Journal of the American Chemical Society* 134, 18109–15 (2012). [This paper was highlighted in *Science* magazine with a Perspective by J. F. Weaver: 339, 39-40 (2013).]
 272. The Energetics of Adsorbed Methanol and Methoxy on Pt(111) by Microcalorimetry, E. M. Karp, T. L. Silbaugh, M. C. Crowe and C. T. Campbell, *Journal of the American Chemical Society*, 134, 20388–20395 (2012).
 273. Enthalpies and Entropies of Adsorption on Well-Defined Oxide Surfaces: Experimental Measurements, C. T. Campbell and J. R. V. Sellers, *Chemical Reviews* 113, 4106–4135 (2013).
 274. The Energetics of Supported Metal Nanoparticles: Relationships to Sintering Rates and Catalytic Activity, C. T. Campbell, *Accounts of Chemical Research* 46, 1712-1719 (2013).
 275. Energetics of Adsorbed CH₃ on Pt(111) by Calorimetry, E. M. Karp, T. L. Silbaugh and C. T. Campbell, *Journal of the American Chemical Society* 135, 5208–5211 (2013).
 276. Energetics of Adsorbed CH₃ and CH on Pt(111) by Calorimetry: Dissociative Adsorption of CH₃I, E. M. Karp, T. L. Silbaugh and C. T. Campbell, *Journal of Physical Chemistry C* 117, 6325–6336 (2013).
 277. Kinetic Prefactors of Reactions on Solid Surfaces, C. T. Campbell, L. Árnadóttir and J. R. V. Sellers, *Z. Physikalische Chemie* (invited, for special issue celebrating Eyring / Polanyi paper introducing transition states) 227, 1435–1454 (2013).
 278. Surface Kinetics and Energetics from Single Crystal Adsorption Calorimetry Lineshape Analysis: Methyl from Methyl Iodide on Pt(111), T. L. Silbaugh, E. M. Karp and C. T. Campbell, *Journal of Catalysis* 308, 114–121 (2013). (invited for journal's 50th Anniversary special issue).
 279. Introduction: Surface Chemistry of Oxides, C. T. Campbell and J. Sauer, *Chemical Reviews* (special issue on Surface Chemistry of Oxides) 113, 3859–3862 (2013).
 280. Introductory Lecture: Anchored Metal Nanoparticles: Effects of Support and Size on Their Energy, Sintering Resistance and Reactivity, C. T. Campbell and J. R. V. Sellers, *Faraday Discussion* 162, 9–30 (2013) DOI:10.1039/C3FD00094J.

281. D. W. (“Wayne”) Goodman: A Pioneer in Elucidating the Relationships between Surface Structure of Catalysts and their Performance, and in Using Model Catalysts for that Purpose, C. T. Campbell, *Topics in Catalysis* (Introduction to a special issue in memory of D. W. Goodman), 56, 1273-1276 (2013).
282. Nanoparticles in Catalysis (Introduction to special issue), Younan Xia, Hong Yang and C. T. Campbell, *Accounts of Chemical Research* 46, 1671-1672 (2013).
283. Calcium thin film growth on a cyano-substituted poly(*p*-phenylene vinylene): interface structure and energetics”, J. C. Sharp, F. Bebensee, J. H. Baricuatro, H.-P. Steinrück, J.M. Gottfried and C. T. Campbell, *J. Phys. Chem. C*, 117, 23781-23789 (2013)
284. Adsorption Calorimetry during Metal Vapor Deposition on Single Crystal Surfaces: Increased Flux, Reduced Optical Radiation, and Real-Time Flux and Reflectivity Measurements, J. R.V. Sellers, T. E. James, J. A. Farmer, S. L. Hemmingson and C. T. Campbell, *Review of Scientific Instruments* 84 , art. 123901 (9 pages) (2013); doi.org/10.1063/1.4832980.
285. A Sinter-resistant Catalytic System Fabricated by Maneuvering the Selectivity of SiO₂ Deposition onto TiO₂ Surface versus Pt Nanoparticle Surface, P. Lu, C. T. Campbell and Y. Xia, *Nano Letters* 13, 4957-4962 (2013) (highlighted in IOP’s *NanotechWeb.org* website).
286. Silver Nanoparticles on Fe₃O₄(111): Energetics by Ag Adsorption Calorimetry and Structure by Surface Spectroscopies, J. C. Sharp, Y. X. Yao and C. T. Campbell, *J. Phys. Chem. C* 117, 24932–24936 (2013).
287. Adsorption Energy of tert-Butyl on Pt(111) by Dissociation of tert-Butyl Iodide: Calorimetry and DFT, T. L. Silbaugh, J. B. Giorgi, Ye Xu, A. Tillekaratne, F. Zaera, and C. T. Campbell, *J. Physical Chemistry C* 118, 427–438 (2014).
288. Calcium thin film growth on polyfluorenes: interface structure and energetics” by J. C. Sharp, X.F. Feng, J.A. Farmer, Y.X. Guo, F. Bebensee, J.H. Baricuatro, E. Zillner, J.F. Zhu, H.-P. Steinrück, J.M. Gottfried and C. T. Campbell, *J. Phys. Chem. C* 118, 2953-2962 (2014).
289. Correction to: Ag Adsorption on Reduced CeO₂(111) Thin Films, J. A. Farmer, J. H. Baricuatro and C. T. Campbell, *J. Physical Chemistry C* 114, 17166–72 (2010): *J. Physical Chemistry C* 117, 27167–27167 (2013).
290. Energetics of formic acid conversion to adsorbed formates on Pt(111) by transient calorimetry, T. L. Silbaugh, E. M. Karp and C. T. Campbell, *Journal of the American Chemical Society* 136, 3964–3971 (2014). (Highlighted with a JACS Spotlight by Lucas Laursen, 136, 3715 (2014)).
291. Bond energies of molecular fragments to metal surfaces track their bond energies to H atoms, E. M. Karp, T. L. Silbaugh and C. T. Campbell, *Journal of the American Chemical Society Communication* 136, 4137–4140 (2014). (Highlighted in article by Mitch Jacoby in *C&E News*, April 21, 2014 p. 34.)
292. Low-temperature growth improves metal/polymer interfaces: vapor-deposited Ca on PMMA, H. X. Ju, Y. Ye, Y. F. Feng, H. B. Pan, J. F. Zhu, N. Ruzycski and C. T. Campbell, *J. Phys. Chem. C* 118, 6352–6358 (2014).
293. Single Crystal Adsorption Calorimetry on Well-Defined Surfaces: from Single Crystals to supported Nanoparticles, S. Schauer mann, T. L. Silbaugh and C. T. Campbell, *Chemical Record* 14, 759–774 (2014).

294. "Book Review: "An American Scientist: The Autobiography of Gabor A Somorjai with Mitch Jacoby", C. T. Campbell, *Catalysis Letters* 144, 1472–1473 (2014).
295. Energetics of Adsorbed CH₂ and CH on Pt(111) by Calorimetry: the Dissociative Adsorption of Diiodomethane, C.A. Wolcott, I. X. Green, T. L. Silbaugh, Y. Xu and C. T. Campbell, *J. Phys. Chem. C*, John C. Hemminger Festschrift (invited) 118, 29310–29321 (2014).
296. Report of the NSF Mathematical and Physical Sciences Division Subcommittee for Studying *The Role of NSF/MPS in Food Systems* (see link at <http://www.nsf.gov/pubs/2015/nsf15040/nsf15040.jsp>).
297. Quantitative Modelling of Electron Spectroscopy Intensities for Supported Nanoparticles: The Hemispherical Cap Model for Non-Normal Detection, J. C. Sharp and C. T. Campbell, *Surface Science Letters* 632, L5-L8 (2015).
298. Method for Direct Deconvolution of Heat Signals in Transient Adsorption Calorimetry, C.A. Wolcott and C. T. Campbell, *Surface Science* 633, 17–23 (2015) (highlighted as Editor's Choice in *Science* 347, 40 (2015)).
299. A benchmark database for adsorption bond energies to transition metal surfaces and comparison to selected DFT functionals, J. Wellendorff, T. L. Silbaugh, D. Garcia Pintos, J. K. Nørskov, T. Bligaard, F. Studt, and C. T. Campbell, *Surface Science* 640, 36–44 (2015).
300. Degree of Rate Control Approach to Computational Catalyst Screening, C. A. Wolcott, A. J. Medford, F. Studt, and C. T. Campbell, *J. Catalysis*, 330, 197-207 (2015).
301. Ion Scattering Spectroscopy Intensities for Supported Nanoparticles: the Hemispherical Cap Model, C. T. Campbell and T. E. James, *Surface Science*, 641, 166-169 (2015).
302. The Energetics of Cu Adsorption and Adhesion onto Reduced CeO₂(111) Surfaces by Calorimetry, T. E. James, S. L. Hemmingson, T. Ito and C. T. Campbell, *J. Physical Chemistry C* 119, 17209-17217 (2015).
303. The Energy of Supported Metal Catalysts: from Single Atoms to Large Metal Particles, T. E. James, S. L. Hemmingson and C. T. Campbell, *ACS Catalysis*, 5, 5673–5678 (2015) (highlighted as *Editor' Choice* in *ACS Catalysis* and in *Chemical and Engineering News*, 93 (35) p. 33, September 7, 2015).
304. Calcium Thin Film Growth on Phenyl-C₆₁-Butyric Acid Methyl Ester (PCBM): Interface Structure and Energetics, J. M. Lownsbury, J. C. Sharp, E. J. Mann, and C. T. Campbell, *J. Phys. Chem. C* 119, 18444–18451(2015)(DOI: 10.1021/acs.jpcc.5b05638).
305. Surface Bound Intermediates in Low Temperature Methanol Synthesis – Participants and Spectators, Y. Yang, D. H. Mei, C.H.F. Peden, C.T. Campbell and C.A. Mims, *ACS Catalysis* 5, 7328–7337 (2015) (DOI: 10.1021/acscatal.5b02060).
306. Energetics of Methanol and Formic Acid Oxidation on Pt(111): Mechanistic Insights from Adsorption Calorimetry, T. L. Silbaugh, E. M. Karp and C. T. Campbell, *Surface Science* (special issue in honor of RJ Madix) 650, 140–143 (2016) DOI: 10.1016/j.susc.2015.12.008.
307. Equilibrium Constants and Rate Constants for Adsorbates: Two-Dimensional (2D) Ideal Gas, 2D Ideal Lattice Gas, and Ideal Hindered Translator Models, C. T. Campbell, L. H. Sprowl and L. Árnadóttir, *J. Physical Chemistry C* 120, 10283–10297 (2016) DOI: 10.1021/acs.jpcc.6b00975.
308. Hindered Translator and Hindered Rotor Models for Adsorbates: Partition Functions

- and Entropies, L. H. Sprowl, C. T. Campbell and L. Árnadóttir, *J. Physical Chemistry C* 120, 9719–9731(2016) DOI: 10.1021/acs.jpcc.5b11616.
309. Using degrees of rate control to improve selective n-butane oxidation over model MOF-encapsulated catalysts: sterically-constrained Ag₃Pd(111), S. T. Dix, J. K. Scott, R. B. Getman and C. T. Campbell, *Faraday Discussion: Designing New Heterogeneous Catalysts* 188, 21 – 38 (2016) DOI: 10.1039/c5fd00198f.
310. Catalysis: Quantifying charge transfer, T. E. James and C. T. Campbell, *Nature Energy* (News & Views), 1, art. #16002 (2016), DOI: 10.1038/NENERGY.2016.2.
311. Benton Seymour Rabinovitch 1919 – 2014, C. T. Campbell and R. A. Rabinovitch, *Biographical Memoirs of Fellows of the Royal Society* 62, 505–524 (2016) <http://dx.doi.org/10.1098/rsbm.2015.0021>.
312. Towards Benchmarking in Catalysis Science: Best Practices, Opportunities, and Challenges, T. Bligaard, R. M. Bullock, C. T. Campbell, J. G. Chen, B. C. Gates, R. J. Gorte, C. W. Jones, W. D. Jones, J. R. Kitchin, S. L. Scott, *ACS Catalysis* (Perspective) 6, 2590–2602 (2016) DOI: 10.1021/acscatal.6b00183 (featured as ACS Editor’s Choice).
313. Adsorption and Adhesion of Au on Reduced CeO₂(111) Surfaces at 300 K and 100 K, S. L. Hemmingson, T. E. James, G. M. Feeley, A. M. Tilson and C. T. Campbell, *J. Physical Chemistry C* 120, 12113–12124 (2016) DOI: 10.1021/acs.jpcc.6b03789.
314. Calcium Vapor Adsorption on the Metal-Organic Framework NU-1000: Structure and Energetics, J. M. Lownsbury, I. A. Santos-López, W. Zhang, C. T. Campbell, H. S. Yu, W-G. Liu, C. J. Cramer, D. G. Truhlar, T. Wang, J. T. Hupp and O. K. Farha, *J. Physical Chemistry C* 120, 16850–16862 (2016). DOI: 10.1021/acs.jpcc.6b05707.
315. Reply to “Comment on ‘Equilibrium Constants and Rate Constants for Adsorbates: Two-Dimensional (2D) Ideal Gas, 2D Ideal Lattice Gas, and Ideal Hindered Translator Models,’” C. T. Campbell, L. H. Sprowl, and L. Árnadóttir. *J. Physical Chemistry C*, 120, 20481–20482 (2016). DOI: 10.1021/acs.jpcc.6b07756.
316. Energies of Formation Reactions Measured for Adsorbates on Late Transition Metal Surfaces, T. L. Silbaugh and C. T. Campbell, *J. Physical Chemistry C* (Invited Review) 120, 25161–25172 (2016).
317. Water Dissociative Adsorption on NiO(111): Energetics and Structure of the Hydroxylated Surface, Wei Zhao, M. Bajdich, S. Carey, A. Vojvodic, J. K. Nørskov and C. T. Campbell, *ACS Catalysis* 6, 7377–7384 (2016). DOI: 10.1021/acscatal.6b01997).
318. Electrocatalytic Hydrogenation of Phenol over Platinum and Rhodium: Unexpected Temperature Effects Resolved, N. Singh, Y. Song, O. Y. Gutiérrez, D. M. Camaioni, C. T. Campbell, J. A. Lercher, *ACS Catalysis* 6, 7466–7470 (2016). DOI: 10.1021/acscatal.6b02296.
319. A DFT-Based Method for More Accurate Adsorption Energies: An Adaptive Sum of Energies from RPBE and vdW Density Functionals, A. J. R. Hensley, K. Ghale, C. Rieg, T. Dang, E. Anderst, F. Studt, C. T. Campbell, J-S. McEwen and Y Xu, *J. Physical Chemistry C* 121, 4937–4945 (2017).
320. The Energetics of Adsorbed Methyl and Methyl Iodide on Ni(111) by Calorimetry: Comparison to Pt(111) and Implications for Catalysis, S. J. Carey, Wei Zhao, A. Frehner and C. T. Campbell, *ACS Catalysis* 7, 1286–1294 (2017).
321. Calorimetric Measurement of Adsorption and Adhesion Energies of Cu on Pt(111), T.

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- E. James, S. L. Hemmingson, J. R.V. Sellers and C. T. Campbell, *Surface Science* 657, 58–62 (2017) (Selected as *Editor's Choice*).
322. Trends in Adhesion Energies of Metal Nanoparticles on Oxide Surfaces: Understanding Support Effects in Catalysis and Nanotechnology, S. L. Hemmingson and C. T. Campbell, *ACS Nano* 11, 1196-1203 (2017). DOI: [10.1021/acsnano.6b07502](https://doi.org/10.1021/acsnano.6b07502).
323. Correction to: “Trends in Adhesion Energies of Metal Nanoparticles on Oxide Surfaces: Understanding Support Effects in Catalysis and Nanotechnology”, S. L. Hemmingson and C. T. Campbell, *ACS Nano* 11, 1196-1203 (2017), *ACS Nano* 11, 4373 (2017).
324. Energetics of 2D and 3D Gold Nanoparticles on MgO(100): Influence of Particle Size and Defects on Gold Adsorption and Adhesion Energies, S. L. Hemmingson, G. M. Feeley, N. J. Miyake and C. T. Campbell, *ACS Catalysis* 7, 2151-2163 (2017) DOI: 10.1021/acscatal.6b03173.
325. The Degree of Rate Control: A Powerful Tool for Catalysis Research, C. T. Campbell, *ACS Catalysis (Invited Viewpoint)* 7, 2770-2779 (2017) <http://dx.doi.org/10.1021/acscatal.7b00115> .
326. The Mechanism of Alumina Film Growth by ALD of Trimethylaluminum and Water Revealed by Adsorption Calorimetry, J. M. Lownsbury and C. T. Campbell, *J. Phys. Chem.* (submitted).
327. Direct Measurements of Half-Cycle Reaction Heats during Atomic Layer Deposition Provide Mechanistic Insights, J. M. Lownsbury, J. A. Gladden, C. T. Campbell, I. S. Kim, A. B. F. Martinson, *Chemistry of Materials* (submitted).
328. Energetics of Adsorbed Formate and Formic Acid on Ni(111) by Calorimetry” Wei Zhao, Spencer J. Carey, Sawyer E. Morgan and Charles T. Campbell, *Journal of Catalysis* 352, 300–304 (2017). <http://dx.doi.org/10.1016/j.jcat.2017.05.023>.
329. Correction to: “Enthalpies and Entropies of Adsorption on Well-Defined Oxide Surfaces: Experimental Results”, C. T. Campbell and J. R. V. Sellers, *Chem. Rev.* 2013, 113, 4106-4135, *Chem. Rev.* 117, 6632 (2017).

PATENTS- COMMERCIALIZED

1. U.S. Patent No. 4,985,657, January 15, 1991: “High Flux Ion Gun Apparatus and Method for Enhancing Ion Flux Therefrom”, C.T. Campbell. Commercialized in ion guns sold by LK Technologies, Bloomington, IN.

PATENTS- OTHERS

1. U.S. Patent No. 8,349,761 B2, Jan. 8, 2013: “Dual-Oxide Sinter Resistant Catalyst”, Y. Xia, Y. Dai, B. Lim, C. T. Campbell, B. A. Grayson and P. T. Fanson (with Toyota Research, USA).

Ph.D. STUDENTS SUPERVISED

<u>Name</u>	<u>Thesis Topic</u>	<u>Date Degree Granted</u>
Rodriguez, Jose' A.	Interaction of Single Molecules with Cu Pt, Ag and ZnO Surfaces (now a staff member at Brookhaven Natl. Lab)	1988 (I.U.)
Henn, Fredrick C.	Reactions of Simple Molecules on Bi/Pt(111) (now with Omicron, Inc.)	1991 (I.U.)

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Campbell, Joseph M.	Mechanistic Studies of Water-Gas Shift and Methanol Synthesis over Cs/Cu(110) (Now staff member at Helsinki University of Technology, Center for Chemical Analysis, FINLAND)	1991 (I.U.)
Domagala, Melanie	The Use of Bismuth Adatoms for Investigating the Surface Chemistry of Adsorbed Hydrocarbons on Pt(111) (now with DEA lab in Chicago)	1993
Frydman, Arnaldo	XPS, TPR and Catalytic Characterization of Co/Rh Bimetallic Catalysts on Niobia Supports (now w/ H Power, Inc., Montreal, Canada)	1995 (URJ)
Frei, Nathan	Adsorption Microcalorimetry	deceased 1996
Gamble, Lara J.	Organofunctionalization of Oxide Surfaces with Alkoxysilanes: Model Studies on TiO ₂ (110) (now w/ Zyomyx, Inc., Hayward, CA)	1997
Yoshihara, Jun	Model Cu/ZnO Catalysts (now w/ Mitsubishi Gas Chemical, Japan)	1997
Jung, Linda	Sensor Surfaces (now w/ Zyomyx, Inc., Hayward, CA)	1999
Carlos Andre de Perez	Metals on Oxides (U.Rio de Janiero, Co-advised with Martin Schmal)	1999
Lu, Hongbo (Bioengr.)	Surface Functionalization / Biosensors / Protein Adsorption on Hydroxyapatite (now w/ Zyomyx, Inc., Hayward, CA)	2000
Starr, David E.	Adsorption Microcalorimetry (now at Lawrence Berkeley Lab)	2001
Parker, Stephen C.(Physics,)	Sintering kinetics of metal nanoparticles on oxides (now teaching at Carleton College)	2001
Grant, Ann W.	Metals on Oxides (Now on permanent staff at Volvo Research Labs)	2001
Ajo, Henry M.	Adsorption microcalorimetry of hydrocarbons on Pt(111) (Now a Postdoc at U. Minn.)	2003
Jennifer Shumaker Parry (and Nanotech)	Surface Plasmon Resonance Microscopy Studies of Protein – DNA Interactions (now an Assistant Prof. at U. Utah)	2003
Ngo, Lien T. (and Nanotech)	Catalysis and sintering studies of metal particles on oxides (Now a postdoc in Ireland.)	2004
Diaz, Steven	Adsorption Microcalorimetry of Metal Binding to Oxides (now at Intel)	2005
Xu, Lijun	Theoretical Studies of Metal Nanoparticles on Oxides (co-advised with Hannes Jonsson) (Now at Univ. Texas Austin as postdoc.)	2006
Stephen L. Tait, Jr. (Physics)	Chemical reactivity and sintering of Pd nanoparticles on MgO(100) and Al ₂ O ₃ (0001). (Now a group leader in Klaus Kern's group at Uni. Stuttgart, Germany)	2005
Jason Farmer	Adsorption calorimetry to probe metal nanoparticles. His dissertation was selected as best dissertation from the University of Washington for 2010 from all areas of mathematics, physical sciences and engineering , and thus it was the University's nominee for the Council of Graduate Schools Distinguished Dissertation Award. Now at Intel.	2010
Wanda Lew	Direct measurements of energetics of molecules adsorbing on Pt(111) using single crystal microcalorimetry	2011
Eric Karp (Chemical Engineering)	Energetics of Adsorbed Catalytic Intermediates on Pt(111) Surfaces. Now at NREL.	2012

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Jason Sellers	Adsorption and Thin-Film Adhesion on Single-Crystalline Surfaces: Enthalpies, Entropies, and Kinetic Prefactors for Surface Reactions	2013
James Sharp	Metal / Organic and Metal / Inorganic Interfaces: Interfacial Bond Energies, Structure and Energy- Level Alignment	2014
Trent Silbaugh (Chemical Engr.)	Thermodynamics and Kinetics of Elementary Surface Reaction Steps in Catalysis by Single Crystal Adsorption Calorimetry	2014
Chris Wolcott (Chemical Engineering)	Energetics of Elementary Steps in Catalysis and Their Use to Search for New Catalysts	2014
Trevor James	Now at Sonata Materials (ALD research) in Connecticut	2016
James Lownsbury (Chem. Engineering)	Now at Maxim Integrated, Beaverton OR	2016
Stephanie Hemmingson	Now at Maxim Integrated, Beaverton OR	2016
Spencer J. Carey		future
Wei Zhang		future
Zhongtian Mao		future
Griffin Ruehl (Chemical Engineering)		future

M.S. STUDENTS SUPERVISED

<u>Name</u>	<u>Thesis Topic</u>	<u>Date Degree Granted</u>
Dalton, P.J.	Dehydrogenation Reactions and Ensemble Requirements on Bi/Pt(111)	1987
Madison, R.	Bismuth Coadsorption with Hydrocarbons on Pt(111)	1990
Davidson, J.	The Coadsorption of Cyclic Hydrocarbons and Cesium on Pt(111)	1991
Musgrove, Jana	Adsorption Microcalorimetry, M.S. in Chemistry	2000
Musgrove, Jana	Computer Interfacing to Calorimetry Apparatus, M.S. in Applied Physics	2002
Soren Pedersen	Metal nanoparticles supported on ceria: reactivity and STM studies	2006
Inge Mygind Jensen	Transient kinetic studies of elementary step kinetics in catalytic reactions for H ₂ production	2007
Lucas Cameron (Chemical Engineering)	Elucidating the Reverse Water Gas Shift Mechanism on Platinum by Comparison to the Rate of Carbon Dioxide Dissociation	2008
Sawyer Morgan (Chemical Engineering)	Energetics of Formic Acid Conversion to Adsorbed Formates on Ni(111) by Transient Calorimetry	2016

UNDERGRADUATE (and HIGH SCHOOL) STUDENTS SUPERVISED IN RESEARCH

<u>Name</u>	<u>Major</u>	<u>Dates</u>
Anthony Diaz	Chemistry (now a professor at Central Washington University)	1990
Jay Hong	Chemistry	1990
Eric Zimmerman	Electrical Engineering	1990
David Lyons	Architecture	1991
Dae Hwan Kim	Electrical Engineering	1992
Michele Mak	Chemical Engineering	1993

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Arkan Kayihan	Chemical Engineering	1993
Angella McFadden	Chemical Engineering	1993
Amy Schumacher	Chemistry	1994
Adam Schaffer	Chemistry	1994
Cheryl Dee	Chemical Engineering	1994-5
A. Esposito	Chemistry	1995
Ann Grant	Chemistry	1995
Andrew Jamieson	Chemistry (MIT)	1996, 1997
Chris Brugos	Biochemistry	1996-1997
Robert Bowman	Chemical Engineering	1997
Sarah Lehto	Chemistry (Whitman College)	1998
Jaime Jimenez	Chemistry	1999
Brian Johnson	undecided	1999-2000
Carsten Stegelman	Physics, Aalborg University Esbjerg, Denmark	summer 2000
Siobhan Quinn	Chemical Engineering	1999-2000
Aaron Lewis	Bioengineering	2000-present
Matthew Stavis	Chemistry (Oberlin College), NSF REU Awardee	2001
Matthew Gratt	Mercer Island High School (won 2 nd place Washington State Research Science champion, 2003, based on work in my lab)	2001
Aaron Lewis	Bioengineering	2001-2
David Moilanen	Physics and Chemistry (Mary Gates Fellowship). Wen on to grad school at Stanford Univ., Chemistry Dept.	2002-
David Sunderland	Chemistry and Biochemistry	2002
Hsin-Pin Lin	Chemistry	2003
Gina Fridley	Lakeside High School	2003
Libby Heeb	Chemistry	2003-4
Paul Goetsch	Chemistry (full time summer 2005- went on to grad school)	2004-5
Lindsay Merte	Chemistry and Physics	2004
Lynell R. Skewis	Chemistry	2004-5
Kelly Stecker	Chemistry	2005-6
Caitlin Levenson	Roosevelt High School (got paid)	summer 2006
Griffin Canning	Chemistry	summer-fall, 2007
Alex Tanielian	Physics and Chemistry	2007-8
Han-Ching (Joyce) Chiu	Chemistry and Biochemistry	2007-8
Diane Lancaster	Chemistry (now in grad school, U. Wisconsin)	2008-9
Carolyn Schoenbaum	Physics and Chemistry	2008-9
(Gates Fellowship)	(now in grad school, U. Colorado)	
Chelsea Hess	Chemistry	2009-10
Eric Manley	Chemistry	Summer 2010
(Carleton College)		
Linda Youn	Biology and International Studies	2009-10
Hunter Sismaet	Chemistry	2010-11
Jennifer (Hyun Joo)	Chemistry	2010-11
Hwang		
Evan Nelson	Chemistry and Electrical Engineering double major	2011-3

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Trevor Johnston	Honors Biochemistry major (worked at the ISB with Lee Hood)	2011-12
Timothy Large	Triple major: Physics, Math and Chemistry (Won award. Went to Grad School at UC Boulder)	2011-13
Amanda Newill	Chemistry	2012
Aaron Azose	Undeclared	2012
Sally Turner	Chemistry (shared Cross Award)	2013
Evan Jennings Mann	Chemistry (Mary Gates Research Scholarship: 2014).	2013-14
Ashley Tilson	Chemistry	2013-14
Amilla Frehner	Chemistry	2014-15
Samuel Hwang	Chemical Engineering	2014-15
Minako Goh	Chemistry	2014
Rogelio Valdez	Chemistry	2014
Naomi Miyake	Chemistry (now pursuing PhD in ChemE with R. Davis, U. VA)	2015-16
Mitchell E. Kaiser	Chemistry	2016
John Ehren Eichler	Chemistry (working on subgroup Cal1)	2016-17
Kuan Chen	Chemical Engineering (working on subgroup Cal2)	2016-17
Gregory Arps	Chemical Engineering (working on subgroup Cal2)	Fall 2017-

POSTDOCTORAL ADVISEES

<u>Name</u>		<u>Dates</u>
Mark Paffett	Ph.D. from Cal. Tech., now staff member at Los Alamos N. L.	1984-85
Karen Daube	Ph.D. from M.I.T., now staff member: General Electric Res. Labs	1985-86
Savaas Seimanides	PhD at Boston University, now in Greece	1987
Junji Nakamura	Japan, now Professor at Tskuba University	1988-89
Mark Bussell	Ph.D. from Berkeley, now a Prof. at Western Washington University	1990
Karl-Heinz Ernst	PhD at Freie Uni. Berlin, Postdoctoral Fellowship from Deutsch Forschungs Gemeinascchaft (now staff member at EMPA, Switz.)	1990-91
Markus Hugenschmidt	PhD at Uni. Bonn, Feodor Lynen Fellowship of Alex. Von Humboldt Foundation (now with company in Munich, Germany)	1991-92
Audunn Ludviksson	Ph.D. from U.C. Santa Barbara; now at U. of New Mexico	1992-93
Ruiming Zhang	Ph.D. from Univ. of Illinois at Urbana	1992
Mark Newton	Ph.D. from Univ. Liverpool, England; now at Univ. Southampton	1993
Todd Stuckless	Ph.D. from U. Toronto, Canada; now Assist. Prof. at Univ. of British Columbia	1994-97
Dan Bald	Ph.D. from Princeton University now at Intel in Calif	1996-99
Victor Bondzie	Ph.D. in Physics, Univ. of Maine, now at UC Riverside (Pdoc)	1997-99
Jeffrey T. Ranney	Ph.D. in Chemical Engineering , U. Michigan (now an Engineer for Harris Group, Seattle, WA)	1998-2000
Huilin Zhou	Ph.D. in Chemistry, Stanford University (now on faculty of Pharmacy at UC San Diego)	1998-99
Jane H. Larsen	PhD in Physics, Technical University of Denmark (now Professor of Physics at the Technical Univ. of Denmark)	1999-00
Hyeran Ihm	PhD at U. Texas at Austin, TX (Mike White's gp.)	2000-2003
Louis Nelen	PhD at U. Missouri, Columbia, MO	2000-01
Hadi Zareie	PhD in Bioengineering at Hacettepe U., Turkey	2001-2002
Maria Smedh	Ph.D. in Physics at Lund University, Sweden	2001-2003
Gibum Kim	PhD at Texas A&M University (Paul Cremer's gp.)	2002-2005

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Partho Bera	PhD at Indian Institute of Science, Bangalore, India (M.S. Hegde's gp.)	2003-5
Junfa Zhu	Now a Professor at Univ. of Science and Technology of China (USTC), Hefei, China (where he got his PhD). Had done prior postdoc at Uni. Erlanger, Germany (H-P. Steinrueck's gp.)	2003-7
Michael Gottfried	Now Professor at Univ. of Marburg, Germany. PhD at Freie University Berlin, Germany (Klaus Christmann gp.) (Fyodor Lynnen Awardee / Alexander von Humboldt Foundation)	2003-4
Jonathan Harris	PhD at Cambridge University, England (David King's group)	2004-5
Simon Penner	PhD at University of Innsbruck, Austria (Konrad Hayek's gp.) (Postdoctoral Fellowship Awardee / Austrian Science Foundation)	2004-5
Victor M. Atuzar Aguilar	PhD at National Polytechnic Institute, Mexico City (Fulbright Scholar).	2004-5
Ebbe Kruse Vestegaard	PhD at Aarhus Univ., Denmark (F. Besenbacker's gp.)	2004-6
Nancy Ruzycki	PhD at Tulane Univ. (Ulrike Diebold gp.)	2005-6
Ole Lytken	PhD at Technical University of Denmark (Ib Chorkendorff gp.)	2006-8
Jack Baricuatro	PhD at Texas A&M (now at Cal Tech)	2006-7
Matthew C. Crowe	PhD at Univ. of Texas	2008-10
Yunxi Yao	PhD at Dalian Institute of Chemical Physics (Bao's group)	2009-10
Yong Yang	PhD at UC Santa Barbara	2009-11
Isabel X. Green	PhD at U. Virginia (John Yates' group), now Assistant Professor at Illinois State Univ., Dept. of Chemistry	2012-13
Iván Santos López	PhD at Universidad Autónoma de San Luis Potosí, Mexico, CONACyT Postdoctoral Fellowship from Mexico.	2014-15
Wei Zhao	PhD at U. Erlangen in Germany, MS at USTC in China	2015-present
Nirala Singh	PhD in Chem Engr at UC Santa Barbara (with Eric McFarland)	2015-present

VISITING SENIOR SCIENTISTS SUPERVISED

<u>Name</u>		<u>Dates</u>
Dr. Giuliano Moretti	(U. "La Sapienza", Roma, Italy) – NATO Fellowship	1990
Teresa Evans	U. Manchester, PhD student under Geoff Thornton	1997
Karsten Stegelman	Aalborg University Esbjerg, Denmark	2000
Dr. Noah Shamir	Physics Dept., Nuclear Res. Center- Negev, Beer Sheva, Israel	2002-3
Prof. Ronald Imbihl	Physical Chemistry Department, Univ. Hannover, Germany	2002-3
Dr. Ricardo Chimentao	Rovira i Virgili University – Spain	2005-6
Dr. Svetlana Schauermann	Fritz Haber Institute of the Max Planck Society, Berlin, Germany	April-July, 2007
Fabian Bebensee	University of Erlangen, Germany (Michael Gottfried's group)	June-Sept., 2007
Dr. Noah Shamir	Physics Dept., Nuclear Res. Center- Negev, Beer Sheva, Israel	2007-8
Elisabeth Zillner	University of Erlangen, Germany (Michael Gottfried's group)	Jan. –May, 2008
Dr. Noah Shamir	Physics Dept., Nuclear Res. Center- Negev, Beer Sheva, Israel	2007-8
Prof. Michael Gottfried	Chemistry, Univ. Erlangen, Germany	summer 2008
Prof. Falko Netzer	Physics, Univ. Graz, Austria	summer 2008
Prof. Whikun Yi	Chemistry, Hanyang Univ., Seoul, Korea	2009-10

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Prof. Vladimir Matolin	Physics Dept., Charles University, Prague, Czech Republic	summer 2008, 2009
Prof. Yuanyuan Ma	Xi'an Jiaotong University, Frontier Institute of Science and Technology (FIST), China	2015-2016
Prof. Yongquan Qu	Xi'an Jiaotong University, FIST, China	summer 2015
Prof. Linhai Duan	Professor, Liaoning Shihua University, China	2015-2016
Prof. Ronald Imbihl	Physical Chemistry Department, Univ. Hannover, Germany	2012-13
Dr. Shawn Lin	Visiting professor from National Taiwan University of Science and Technology	2012
Dr. Tsuyoshi Ito	Hitachi Research, Japan	2012-13
Prof. Yongquan Qu	Frontier Institute of Science and Technology Xi'an Jiaotong University	Summer 2015
Prof. Yaun Yaun Ma	Frontier Institute of Science and Technology Xi'an Jiaotong University	2015-16
Prof. Linhai Duan	Liaoning Shihua University, China	2016
Prof. Junfa Zhu	USTC (University of Science and Technology of China), Hefei	2016-17