

CURRICULUM VITAE

Thomas M. Orlando
School of Chemistry and Biochemistry
Georgia Institute of Technology
Atlanta, GA 30332

PERSONAL DATA:
Birth Date: February 9, 1960
Citizenship: USA
Marital Status: Married, 2 Sons
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EDUCATION

Long Island University	Chemistry	B.S. 1982
State University of New York @ Stony Brook	Chemistry	Ph.D. 1988
Universität Basel Switzerland	Chemical Physics	Postdoctoral 1988
Sandia National Laboratory	Solid-State Physics	Postdoctoral 1989-90

CURRENT RESEARCH INTERESTS

Nanostructures and Imaging: Nano-patterning using quantum-interference effects and standing wave stimulated desorption. Electron-holography to image nanostructures.

Metabolomics /Radiation Effects in Biological Media/Cell Imaging: Mechanisms of DNA damage and the interaction of radiation with biological molecules and cells. Mass spectrometry based mapping of metabolites and integrative systems biology approach to drug discovery.

Catalysis: Low-temperature plasma-activated surface catalysis. Development of novel metal-insulator-metal devices and nanoparticle assemblies for on-demand hydrogen production.

Cosmochemistry and Astrobiology: Electron-, Ion- and Vacuum Ultraviolet (VUV) photon-stimulated reactions on and within low-temperature ices. Pre-biotic synthesis on mineral surfaces.

Environmental Science: Photochemical reactions at wet oxide interfaces and on/within stratospheric cloud particles.

CURRENT POSITIONS

2003–present *Chair*, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA 30332
2000–present *Professor*, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA 30332
2000–present *Adjunct Professor*, School of Physics, Georgia Institute of Technology, Atlanta, GA 30332

PREVIOUS PROFESSIONAL EXPERIENCE

1997-2000 *Visiting Research Scientist/Professor*, Istituto di Struttura della Materia-CNR and Dipartimento di Energetica, Università di Roma, La Sapienza, Roma, Italia
1999-2000 *Affiliate Professor*, Dept. of Chemical Engineering, University of Washington, Seattle, WA.
1996-2000 *Chief Scientist*, Chemical Structure and Dynamics Group, W. R. Wiley, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA.
1991-1996 *Sr. Research Scientist*, Chemical Structure and Dynamics Group, W. R. Wiley, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA.

- 1989-1991 *Associated Western Universities Postdoctoral Fellow*, Solid State Sciences Division, Sandia National Laboratories, Albuquerque, NM.
- 1988-1989 *Postdoctoral Research Associate*, Institut für Physikalische Chemie, Universität Basel, Basel, Switzerland.
- 1983-1988 *Graduate Research and Teaching Assistant*, Dept. of Chemistry, State University of New York at Stony Brook, Stony Brook, NY.
- 1982-1983 *Research Assistant*, NOAA Aeronomy Laboratory, Boulder, CO.
- 1980-1982 *Student Research Assistant*, Department of Atmospheric and Environmental Sciences, Brookhaven National Laboratory, Upton, NY.
- 1979-1980 *Student Research Assistant*, Skidaway Institute of Oceanography, Savannah, GA.

EDUCATIONAL AND PROFESSIONAL HONORS

- Elected Fellow, American Association for the Advancement of Science, 2004
- Elected Fellow, American Physical Society, Atomic, Molecular and Optical Physics, 2003
- North Atlantic Treaty Organization Co-operative Research Fellowship, 1997- 2002
- National Institute of Health Young Investigator Travel Award, 1996
- New York State Regents Scholar, 1978-82
- Southampton College Presidential Scholar, 1978-82
- Tri Beta Biological Honor Society, 1978
- National Honor Society, 1978

PROFESSIONAL AFFILIATIONS

- American Association for the Advancement of Science
- American Physical Society
- American Geophysical Society
- American Vacuum Society
- American Chemical Society
- Radiation Research Society

TEACHING ACTIVITIES

- Chem. 6482 Chemical Kinetics and Reaction Dynamics, Georgia Institute of Technology
- Chem. 3411 Physical Chemistry I (Thermodynamics and Statistical Mechanics), Georgia Institute of Technology
- Chem. 8840: Special Topics in Surface Chemistry and Physics, Georgia Institute of Technology
- Chem. Eng. 599: "The Interaction of Electrons with Surfaces." Co-instructor with Prof. Eric Stuve, Dept. of Chemical Engineering, University of Washington

NATIONAL/INTERNATIONAL ACTIVITIES AND SERVICES

- Member, External Program Review Committee, University of Texas, Arlington, March, 2007
- Scientific Advisory Board, Acquired Brain Injury at Crawford Research Institute, Shepherd Center, Atlanta, GA. (2005-present)
- Member, International Steering Committee for Bi-annual Surface Physics Workshop on Desorption Induced by Electronic Transitions (2004-present)
- Consultant, Loomis Industries, CA (2002-present)
- Consultant, Interface Research Corp. (2002-present)
- Consultant, British Petroleum (2007-present)
- Panel Review Team for NASA's Outer Solar System Discovery Mission Program (2006)

- Panel Review Team Lead for NASA Planetary Atmospheres Program (2001) and Outer Solar System Program (2004)
- Associate Editor 1999-2002; *J. Geophysical Research, Planets*.
- Reviewer for Research Programs and Proposals: U.S. Department of Energy, Offices of Basic Energy Sciences, Environmental Management and Health and Environmental Research, NASA Planetary Atmospheres Section, NASA Outer Solar System Section and National Science Foundation, Chemistry and Physics section (1992 – present)
- Reviewer for *Science, Nature, Phys. Rev. Lett., Phys. Rev. B., J. Chem. Phys., J. Phys. Chem., Rad. Res., J. Appl. Phys., Appl. Phys. Lett., Nucl. Instr. and Meth. in Physics Res. B, Surf. Sci., Appl. Surf. Sci., J. Am. Chem. Society* (1992-present)
- Manuscripts/proposals reviewed: ~ 20/yr

WORKSHOPS AND CONFERENCE PLANNING ACTIVITIES

- American Physical Society Division of Materials Physics Focused Session Organizer, Interfacial Phenomenon in Environmental Materials, Los Angeles, CA, March 16-20, 1998
- Invited Participant, Workshop on “Research Needs and Opportunities in Radiation Chemistry”, Chesterton, IN, April 19-22, 1998
- Invited Speaker, Workshop on “Composition of the Surfaces of the Icy Galilean Satellites”, Winthrop, WA, June 22-25, 1998
- Session Chair, Gordon Research Conference on “Radiation Chemistry”, Salve Regina, RI, July 5-10, 1998
- Invited Speaker, Workshop on “The Physics and Chemistry of Ice”, Richland, WA, Aug. 13-14, 1998
- Invited Speaker, Workshop on “Electron- and Photon-Induced Chemistry”, Berkeley, CA, Oct. 8-10, 1998
- Invited Speaker, Workshop on “The Surface Composition of the Icy Gallilean Satellites”, Winthrop, WA, Sept. 27 – Oct. 1, 1999
- Invited Speaker, Workshop on “Atomic, Molecular, Optical Physics and Surface Modification”, sponsored by the U. S. Dept. of Energy, Office of Basic Energy Sciences, Boulder, CO, Oct. 24-27, 1999
- Co-organizer: Department of Energy, Basic Energy Sciences Workshop on “Electron-Induced Processes”, Stevens Institute of Technology, NJ, March 17, 18, 2000
- Invited Speaker, Workshop on “Photolysis and Radiolysis of Outer Solar System Ices”, sponsored by NASA and the Applied Physics Laboratory of Johns Hopkins University, Baltimore, MD. March 27-29, 2000
- Invited Speaker, Workshop on “Understanding the Role of Water on Electron-Initiated Processes and Radical Chemistry”, sponsored by the U. S. Dept. of Energy, Office of Basic Energy Sciences, Richland, WA, Sept. 26-28, 2002
- Co-organizer-Materials Research Society Symposium on “3-D Nano-engineered Assemblies”, Boston, Mass., Dec. 1-5, 2002
- Invited Speaker, Japan-United States joint Workshop on “The Role of Resonances in Physics, Chemistry and Biology”, Shonan Village, Hayama, Japan, Dec. 18-20, 2002
- Invited Speaker, Mesilla Chemistry Workshop on “Environmental Chemistry at Interfaces – Insights from a Molecular Perspective”, New Mexico, Feb. 8-12, 2003
- Invited Speaker, Institute of Theoretical Atomic and Molecular Physics Workshop on “Low-energy Electron Interactions with Biological Targets”, Harvard University, Oct. 16-18, 2003
- Invited Speaker, Workshop on “Non-equilibrium Plasmas and Micro-discharge Devices”, Stevens Institute of Technology, New Jersey, Oct. 20-21, 2004

- Invited Speaker, 4th. International Workshop on “Basic Aspects of Non-equilibrium Plasmas Interacting with Surfaces:-Negative Ions and their Function and Designability”, Shirahama, Japan, January 30-Feb. 1, 2006
- American Chemical Society Symposium Organizer on “Experimental and Theoretical Advancements in Low-Energy Electron Interactions with Complex Targets”, Atlanta, GA, March 26-30, 2006
- Co-Organizer, Southeastern Regional Meeting of the American Chemical Society (SERMACS) Symposium on “The Chemical Origins of Life”, Nov. 15-19, 2006
- Invited Speaker, Workshop on Japan, Nov. 5-12, 2007
- American Geophysical Union Meeting, Co-organizer Symposium on “ “, Dec. 9-15, 2007
- Elected Co-Chair, 2008 Gordon Research Conference on “Radiation Physics, Chemistry and Biology”
- International Gaseous Electronics Conference, Special Symposium Organizer on “Electron Interactions with Surfaces”, 2008
- Elected Organizer, 14th International Workshop on Desorption Induced by Electronic Transitions, Jekyll Island, GA, March 12-18, 2009
- Elected Chair, 2010 Gordon Research Conference on “Radiation Physics, Chemistry and Biology”

PUBLICATIONS

1. J. S. Gaffney, E. T. Premuzic, **T. Orlando**, S. Ellis, and P. Snyder, "Gas Chromatography-Circular Dichroism System for Detection of Optically Active Substances," *J. of Chrom.* **262**, 321 (1983).
2. **T. M. Orlando**, L. Li, S. L. Anderson, and M. G. White, "Third Harmonic Interference Effects in the MPI Spectrum of Acetylene," *Chem. Phys. Lett.* **129**, 31 (1986).
3. J. R. Appling, M. G. White, **T. M. Orlando**, and S. L. Anderson, "Observation of Circular Dichroism in Photoelectron Angular Distributions," *J. Chem. Phys.* **85**, 6803 (1986).
4. **T. M. Orlando**, S. L. Anderson, J. R. Appling, and M. G. White, "Multiphoton Ionization Photoelectron Spectroscopy of *Ungerade* Excited States of Acetylene: Intermediate State Mixing and Ion-State Selection," *J. Chem. Phys.* **87**, 852 (1987).
5. **T. M. Orlando**, B. Yang, and S. L. Anderson, "The Effects of Bending and Stretching Vibration on the Reaction of Acetylene Cations with Methane," *J. Chem. Phys.* **90**, 1577 (1989).
6. B. Yang, **T. M. Orlando**, Y. Chiu, and S. L. Anderson, "Vibrational Mode Effects on Ion-Molecule Reactions," *XVI ICPEAC Proceedings*, NY (1989).
7. **T. M. Orlando**, B. Yang, Y. Chiu, and S. L. Anderson, "The Effects of Different Vibrational Modes and Collision Energy on the Reaction of Acetylene Cations with Carbonyl Sulfide," *J. Chem. Phys.* **92**, 7356 (1990).
8. **T. M. Orlando**, A. Friedmann, and J. P. Maier, "Photodissociation Spectroscopy of the (OCS:C₂H₂)⁺ Cluster Ion," *J. Chem. Phys.* **92**, 7365 (1990).

9. **T. M. Orlando**, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Electron-Stimulated Production of NO₂(g) from O₂ Coadsorbed with NO on Pt(111)," *J. Chem. Phys.* **93**, 9197 (1990).
10. **T. M. Orlando**, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Quantum Resolved Studies of Electron-Stimulated Reactions on Adsorbate Covered Pt(111) Surfaces," *Nucl. Instr. and Meth. in Phys. Res.* **B. 58**, 477 (1991).
11. A. R. Burns, **T. M. Orlando**, D. R. Jennison, and E. B. Stechel, "State-Resolved Study of Coadsorption Effects on the Stimulated Dissociation of NO₂ on Pt(111)," *J. Vac. Sci. and Tech.* **A9**, 1774 (1991).
12. **T. M. Orlando**, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Resonance Ionization Detection of Neutral O (³P_J) Produced from Stimulated Surface Processes," *J. Vac. Sci. and Tech.* **A9**, 1769 (1991).
13. A. R. Burns, E. B. Stechel, D. R. Jennison, and **T. M. Orlando**, "Effects of Coadsorbed Atomic Oxygen on the Electron-Stimulated Desorption of Neutral NO from Pt(111)," *Phys. Rev.* **B. 45**, 1373 (1992).
14. **T. M. Orlando**, A. R. Burns, D. R. Jennison, and E. B. Stechel, "Electronically Stimulated Adsorbate Dissociation in the Presence of an Electronegative Coadsorbate: (NO₂ + O) on Pt(111)," *Phys. Rev.* **B. 45**, 8679 (1992).
15. **T. M. Orlando**, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Quantum-Resolved Stimulated Surface Reactions," *Desorption Induced by Electronic Transitions, DIET V*, edited by A. R. Burns, E. B. Stechel, and D. R. Jennison (Springer-Verlag, New York), 194, (1993).
16. **T. M. Orlando**, J. P. Cowin, G. Teeter, and S. E. Barlow, "Dynamical Acceleration Effects in Laser-Induced Particle Emission from Surfaces," pgs. 341-346, *Lecture Notes in Physics, Laser Ablation Mechanisms, and Applications*, edited by J. C. Miller and R. Haglund, Jr. (Springer-Verlag, New York), (1994).
17. G. A. Kimmel, **T. M. Orlando**, C. Venzia, and L. Sanche, "Low-Energy (5-50 eV) Electron-Stimulated Production of Molecular Hydrogen from Amorphous Water Ice," *J. Chem. Phys.* **101**, 3282 (1994).
18. G. A. Kimmel, R. G. Tonkyn, and **T. M. Orlando**, "Kinetic and Internal Energy Distributions of Molecular Hydrogen Produced from Amorphous Ice by Impact of 100 eV Electrons," *Nucl. Instr. and Meth. in Phys. Res.* **B.101**, 179 (1995).
19. A. Perrung, J. P. Cowin, S. E. Barlow, G. Teeter, and **T. M. Orlando**, "Space-Charge Induced Acceleration of Ions Emitted by Laser-Irradiated Surfaces," *J. of Appl. Physics* **78**, 481 (1995).
20. R. A. Bradley, Jr., E. J. Lanzendorf, M. I. McCarthy, **T. M. Orlando**, and W. P. Hess, "Laser Interactions with an Ionic Molecular Crystal: Sodium Nitrate Ablation in the 6 eV Valence Band," *J. Phys. Chem.* **99**, 11715 (1995).

21. B. Lerner, J. Birmingham, R. G. Tonkyn, S. E. Barlow, and **T. M. Orlando**, "Decomposition of Trichloroethylene by a Large Scale, High Flow Packed-Bed Gas-Phase Corona Reactor," *Proceedings of 12th. Int. Symp. on Plasma Chemistry* (1995).
22. G. A. Kimmel and **T. M. Orlando**, "Low-Energy (5-120 eV) Electron-Stimulated Dissociation of Amorphous D₂O Ice: D(²S), O(³P_{2,1,0}), and O(¹D₂) Yields and Velocity Distributions," *Phys. Rev. Lett.* **75**, 2606 (1995).
23. K. Knutsen and **T. M. Orlando**, "Low-Energy (5-80 eV) Electron-Stimulated Desorption of H⁺(D⁺), OH⁺ (OD⁺), O⁺, and NO⁺ from Solution Grown NaNO₃ Crystals," *Surf. Sci.*, **348**, 143 (1996).
24. M. C. Hsiao, B. T. Merritt, B. M. Penetrante, G. E. Vogtlin, P. H. Wallman, R. G. Tonkyn, R. Shah, and **T. M. Orlando**, "Plasma Assisted Oxidation of Propene," *J. of Adv. Oxid. Tech.* **1**, 79 (1996).
25. O. Kornienko, S. Brynjelsen, L. Hanley, and **T. M. Orlando**, "Analysis of EDTA Samples via Laser Desorption in a Quadrupole Ion Trap," *Proc. 42nd ASMS Conf. Mass Spectrom. Allied Topics*, (1996).
26. R. G. Tonkyn, S. E. Barlow, and **T. M. Orlando**, "Decomposition of Carbon Tetrachloride Using a Packed-Bed Corona Reactor," *J. of Appl. Physics* **80**, 4877 (1996).
27. K. Knutsen, Y. Su, K. Keefer, and **T. M. Orlando**, "Mechanisms of Radiolytic Decomposition of Complex Nuclear Waste Forms," *Proc. Am. Nucl. Soc. Progress in Hazardous Waste Cleanup*, Vol. **1**, pg. 616 - 619 (1996).
28. G. A. Kimmel and **T. M. Orlando**, "Observation of Negative Ion Resonances in Amorphous Ice via Low-Energy Electron-Stimulated Production of Molecular Hydrogen", *Phys. Rev. Lett.* **77**, 3983 (1996).
29. R. G. Tonkyn, M. Balmer, S. Barlow, **T. M. Orlando** and D. Goulette, "Vehicle Exhaust Treatment Using Electrical Discharge Methods", *Society of Automobile Engineers Proceedings on Emissions Control*, Paper 971716 (1997).
30. G. A. Kimmel, **T. M. Orlando**, P. Clouthier, and L. Sanche, "Low-Energy (5-50 eV) Electron-Stimulated Desorption of Atomic Hydrogen and Metastable Emission from Amorphous Ice", *J. Phys. Chem. B.* **101**, 6301 (1997).
31. K. Knutsen and **T. M. Orlando**, "Photon-Stimulated Desorption of O (³P_J) and NO (²Π) from NaNO₃ Single Crystals", *Phys. Rev. B.* **55**, 13246 (1997).
32. M. T. Sieger, W. C. Simpson, and **T. M. Orlando**, "The Electron-Stimulated Desorption of D⁺ from D₂O Ice: Surface Structure and Electronic Excitations", *Phys. Rev. B.* **56**, 4925 (1997).
33. M. T. Sieger and **T. M. Orlando**, "Effect of Surface Roughness on the Electron-Stimulated Desorption of D⁺ from Micro-porous D₂O Ice", *Surf. Sci.* **390**, 92 (1997).

34. **T. M. Orlando** and G. A. Kimmel, "The Role of Excitons and Substrate Temperature in the Low-Energy (5-50 eV) Electron-Stimulated Dissociation of Amorphous D₂O Ice", *Surf. Sci.* **390**, 86 (1997).
35. W. C. Simpson, M. T. Sieger, G. A. Kimmel, L. Parenteau, L. Sanche, and **T. M. Orlando**, "Dissociative Electron Attachment Resonances in Nanoscale Ice Films", *Rad. Res.* **148**, 491 (1997).
36. W. C. Simpson, L. Parenteau, R. S. Smith, L. Sanche, and **T. M. Orlando**, "Electron-Stimulated Desorption of D⁻ (H⁻) from D₂O (H₂O) Films", *Surf. Sci.* **390**, 79 (1997).
37. W. C. Simpson, M. T. Sieger, **T. M. Orlando**, L. Parenteau, K. Nagesha and L. Sanche, "Dissociative Electron Attachment in Nanoscale Ice Films: Temperature and Morphology Effects", *J. Chem. Phys.* **107**, 8668 (1997).
38. R. G. Tonkyn, M. L. Balmer, S. E. Barlow, **T. M. Orlando** and D. Goulette, "Vehicle Exhaust Treatment Using Electrical Discharge and Materials Chemistry", *Proc. of 1997 Diesel Exhaust Reductions Workshop*, 115 - 122.
39. D. Meisel, A. Cook, D. Camaioni, and **T. M. Orlando**, "Chemistry, Radiation and Interfaces in Suspensions of Nuclear Waste Simulants", *Photoelectrochemistry* - Ed. K. Rajeshwar, L. M. Peter, A. Fujishima, D. Meisner, M. Tomkiewicz, The Electrochemical Society Pub. Vol. **97-20**, 350 (1997).
40. W. C. Simpson, **T. M. Orlando**, L. Parenteau, and L. Sanche, "Dissociative Electron Attachment in Nanoscale Ice Films: Thickness and Charging Effects", *J. Chem. Phys.* **108**, 5027 (1998).
41. K. Knutsen and **T. M. Orlando**, "Low-Energy (5-100 eV) Electron- and Ultraviolet (6.4 eV) Photon-Stimulated Desorption of Neutral Fragments from NaNO₃ Single Crystals", *Appl. Surf. Sci.* **127-129**, 1 (1998).
42. D. P. Taylor, W. C. Simpson, K. Knutsen, M. A. Henderson, and **T. M. Orlando**, "Photon-Stimulated Desorption and Laser Ablation of Ytria-Stabilized ZrO₂(100) Crystals", *Appl. Surf. Sci.* **127-129**, 101 (1998).
43. M. T. Sieger, W. C. Simpson, and **T. M. Orlando**, "Production of O₂ on Icy Satellites by Electronic Excitation of Low-Temperature Water Ice", *Nature* **394**, 554 (1998).
44. M. L. Balmer, R. G. Tonkyn, A. Kim, S. Yoon, D. Jimenez, **T. M. Orlando**, S. E. Barlow, and J. Hoard, "Diesel NO_x Reduction on Surfaces in Plasma", *Society of Automobile Engineers Proceedings on Emissions Control* (1998).
45. M.L. Balmer, R. Tonkyn, A.Y. Kim, J. Hoard, I. S. Yoon, D. Jimenez, **T. M. Orlando**, and S. Barlow, "Nitrogen Measurement from NO_x Reduction for a Plasma-Catalyst System in Simulated Diesel Exhaust," *Proceedings of the 1998 Diesel Engine Emissions Reduction Workshop*.
46. W. C. Simpson, W. K. Wang, J. A. Yarmoff and **T. M. Orlando**, "Electron- and Photon-Stimulated Desorption of O⁺ from Zirconia", *Surf. Sci.*, **423**, 225 (1999).

47. M. T. Sieger, G. C. Schenter, and **T. M. Orlando**, "Stimulated Desorption by Surface Electron Standing Waves", *Phys. Rev. Lett.* **82**, 3348 (1999).
48. N. Petrik, D. P. Taylor, and **T. M. Orlando**, "Laser-Stimulated Luminescence of ZrO₂(100) and (110) Single Crystals: Carrier Recombination Kinetics and Defects States", *J. of Appl. Physics*, **85**, 6770 (1999).
49. **T. M. Orlando**, G. A. Kimmel and W. C. Simpson, "Quantum-Resolved Electron Stimulated Interface Reactions: D₂ Formation from D₂O Films", *Nucl. Instr. and Meth. in Physics Res. B.* **157**, 183 (1999).
50. **T. M. Orlando**, M. T. Sieger and W. C. Simpson, "Laboratory Studies of the Production of O₂ on Icy Satellites by Electronic Excitation", *Lunar and Planetary Science XXX*, Lunar and Planetary Institute, Houston, TX, (1999).
51. T. B. McCord, G. B. Hansen, **T. M. Orlando**, M. Sieger, J. K. Crowley, C. A. Hibbitts, and L. Van Keulen, "Properties of Hydrated Salts Including Under Europa Conditions", *Lunar and Planetary Science XXX*, Lunar and Planetary Institute, Houston, TX., (1999).
52. N. G. Petrik, A. Alexandrov, **T. M. Orlando**, and A. I. Hall, "Radiation-Induced Processes at Oxide Interfaces Relevant to Spent Nuclear Fuel Storage", *American Nuclear Society Transactions*, **81**, 101 (1999).
53. T. B. McCord, F. P. Fanale, G. B. Hansen, **T. M. Orlando**, M. T. Sieger, N. G. Petrik, and J. Crowley, "On Hydrated Sulfates and Carbonates on Europa's Surface"(abstract) *Bull. Am. Astron. Soc.* **31**, 1171 (1999).
54. T. B. McCord, G. B. Hansen, **T. M. Orlando**, M. T. Sieger, G. Teeter, N. G. Petrik, L. Van Keulen, and J. K. Crowley, "Hydrated Sulfates and Carbonates and their Stability on Europa's Surface" (abstract) *EOS Tran. AGU*, **80 (46)**, Fall Meet Suppl. F599 (1999).
55. T. B. McCord, G. B. Hansen, D. Matson, **T. M. Orlando**, M. T. Sieger, N. G. Petrik, L. Van Keulen and J. K. Crowley, "Behavior of Hydrated Sulfates and Carbonates under Europa's Surface Conditions" *Lunar Planet Sci. [CD-ROM] XXXI* , Lunar and Planetary Institute, Houston, TX, (1999) abstract 1541 (2000).
56. N. G. Petrik, K. Knutsen, E. Papparazzo, S. Lea, D. Camaioni, and **T. M. Orlando**, "Electron-Beam Induced Damage of NaNO₃ Single Crystals", *J. Phys. Chem. B.* **104**, 1563 (2000).
57. M. T. Sieger and **T. M. Orlando**, "Probing Low-Temperature Water Ice Phases Using Electron-Stimulated Desorption", *Surf. Sci.* **451**, 97 (2000).
58. T. B. McCord, G. Teeter, G. B. Hansen, M. T. Sieger, and **T. M. Orlando**, "Frozen Brines on Europa's Surface", *Bull. Astron. Soc.* **32**, 1068 (2000).
59. A. Alexandrov, M. Piacentini, R. G. Tonkyn, M. T. Sieger, N. Zema, and **T. M. Orlando**, "Electron-Stimulated Desorption of I from KI(100): An Energy and Temperature Dependent Study", *Surf. Sci.* **451**, 208 (2000).

60. M. T. Sieger and **T. M. Orlando**, "Incident Beam Diffraction in Electron Stimulated Desorption", *Surf. Sci.* **451**, 31 (2000).
61. **T. M. Orlando** and D. Mesiel, "Radiation-Induced Processes in Aqueous Suspensions of Nanoparticles and Nanoscale Water Films: Relevance to H₂ Production in Mixed Waste and Spent Nuclear Fuel", ACS Symposium Series 778, *Nuclear Site Remediation, First Accomplishments of the Environmental Management Science Program*, Ed. W. Heineman and G. Eller Chapter 17, pgs. 284-298 (2001).
62. D. Meisel, D. Camaioni, and **T. M. Orlando**, ACS Symposium Series 778, "Radiation Chemistry and Nuclear Waste: The NO_x System and Organic Aging" *Nuclear Site Remediation, First Accomplishments of the Environmental Management Science Program*, Ed. W. Heineman and G. Eller Chapter 21, pgs. 342-363 (2001).
63. V. Shuttanandan, S. Thevuthasan, J. S. Young, **T. M. Orlando**, and W. J. Weber, "Hydrogen Damage Interactions in Yttria-Stabilized Zirconia", *J. Nucl. Mat.* **289**, 128 (2001).
64. A. Alexandrov, M. Piacentini, N. Zema A. Felici, and **T. M. Orlando**, "The Role of Surface Excitons of Stimulated Desorption of KI(100)", *Phys. Rev. Lett.* **86**, 536 (2001).
65. T. B. McCord, **T. M. Orlando**, G. Teeter, G. B. Hansen, M. T. Sieger, N. G. Petrik, and L. Van Keulen, "Thermal and Radiation Stability of the Hydrated Salt Minerals Epsomite, Mirabilite and Natron Under Europa Environmental Conditions". *J. Geophys. Res.* **106**, 3311 (2001).
66. T. Madey, R. E. Johnson, and **T. M. Orlando**, "Far-out Surface Science: Radiation-Induced Surface Processes in the Solar System", *Surf. Sci.* **500**, 838 (2002).
67. T. B. McCord, G. Teeter, G. B. Hansen, M. T. Sieger and **T. M. Orlando**, "Brines Exposed to Europa Surface Conditions", *J. Geophys. Res.* **107**, 4-1 (2002).
68. **T. M. Orlando** and M. T. Sieger, "The Role of Electron-Stimulated Production of O₂ from Water Ice in the Radiation Processing of Outer Solar System Surfaces", *Surf. Sci.* **528**, 1 (2003).
69. L. Siller, M. T. Sieger, and **T. M. Orlando**, "Electron-stimulated Reactions Involving D₂O Co-adsorbed with CO₂ Ice at VUV/EUV Energies" *J. Chem. Phys.* **118**, 8898 (2003).
70. **T. M. Orlando**, A. Alexandrov, and J. Herring, "Electron-stimulated Desorption of H⁺, H₂⁺, OH⁺ and H⁺(H₂O) from Water Covered Zirconia surfaces" *J. Phys. Chem.* **118**, 8898, (2003).
71. **T. M. Orlando**, L. Merhari, D. P. Taylor and K. Ikuta, Editors, "Three-Dimensional Nanoengineered Assemblies", Materials Research Society Proceedings, Volume 739, (2003).
72. **T. M. Orlando**, A. Alexandrov, A. Lebsack, J. Herring, and J. Hoard, "The reactions of NO₂ and CH₃CHO with Na-Y Zeolites and the Relevance to Plasma Activated Lean NO_x Catalysis" *Catalysis Today*, **89**, 151 (2004).
73. **T. M. Orlando**, D. Oh, M. T. Sieger, and C. Lane, "Electron Collisions with Complex Targets: Diffraction Effects in Stimulated Desorption", *Physica Scripta*, **T110**, 256 (2004).

74. J. Herring, A. Alexandrov, and **T. M. Orlando**, “The Stimulated Desorption of Cations from Pristine and Acidic Low-temperature Ice Surfaces” *Phys. Rev. Lett.* **92**, 187602-1 (2004).
75. H. Chen, Y. Chen, A. Alexandrov, J. Dong, M. Liu and **T. M. Orlando**, “Charging Effects on Electron-stimulated Desorption of Cations from Gadolinia-doped Ceria Surfaces”, *Appl. Surf. Sci.* **243**, 166-77 (2005).
76. B. C. Garrett, et. al. including **T. M. Orlando**, “Role of Water in Electron-initiated Processes and Radical Chemistry: Issues and Scientific Advances” *Chem. Rev.*, **105**, 355 (2005).
77. H.-Y. Chen, A. Alexandrov, Y. Chen, S. Zhua, M. Liu and **T. M. Orlando**, “Probing Water Interactions and Vacancy Production on Gadolinia-doped Ceria Surfaces using Electron-Stimulated Desorption”, *J. Phys. Chem. B* **109**, 11257-62 (2005).
78. J. Herring-Captain, G.A. Grieves, A. Alexandrov, M.T. Sieger, H.-Y. Chen and **T.M. Orlando**, “Low-energy (5-250 eV) Electron Stimulated Desorption of H^+ , H_2^+ and $H^+(H_2O)_n$ from Low-temperature Water Ice Surfaces,” *Phys. Rev. B* **72**, 035431 (2005).
79. **T.M. Orlando**, T.B. McCord and G.A. Grieves “The Chemical Nature of Europa Surface Material and the Relation to a Sub-surface Ocean,” *Icarus*, **177**, 528 (2005).
80. G.A. Grieves and **T.M. Orlando**, “The Importance of Pores in the Electron Stimulated Production of H_2 and O_2 in Low Temperature Ice,” *Surf. Sci.* **593**, 180 (2005).
81. C. D. Lane, K. R. Shepperd, A. B. Alexandrov and **T. M. Orlando**, “Electron Stimulated Desorption of Cations from $SiCl_4$ Multilayers Adsorbed on Si(111)”, *Surf. Sci.* **593**, 173 (2005).
82. R.E. Johnson, P.D. Cooper, T. Quickenden, G.A. Grieves and **T.M. Orlando**, “Production of Oxygen by Electronically-induced Dissociations in Ice,” *J. Chem. Phys.* **123**, 184715-1 (2005).
83. J. Summerour, Y. Chen. M. Josowicz, **T. M. Orlando**, J. Janata and A. Paulenova, “A beta micro-irradiator”, *Rad. Physics and Chem.*, **75**, 369 (2006).
84. C. D. Lane and **T. M. Orlando**, “Low-energy Electron Stimulated Desorption of Neutrals from $SiCl_4$ Multilayers Adsorbed on Si(111)”, *J. Chem. Phys.* **124**, 164702 (2006).
85. H.-Y. Chen, A. Alexandrov, Mei-lin Lui, and **T. M. Orlando**, “Highly Efficient Electron Stimulated Desorption of O^+ from Gadolinia-doped Ceria Surfaces”, *J. Phys. Chem.* **110**, 10779 (2006).
86. D. Oh, M. T. Sieger and **T. M. Orlando**, “Zone Specificity in the Low-energy Electron Stimulated Desorption of Cl^+ from Reconstructed Si(111)- 7×7 surfaces”, *Surf. Sci.*, 600(19), L245-L249 (2006).
87. Y. Chen, C. Sullards, T. Huang, S. May and **T. M. Orlando**, “Analysis of Organoselenium and Organic Acid Metabolites by Laser Desorption Single Photon Ionization Mass Spectrometry”, *Anal. Chem.* **78**(24), 8386 (2006).

88. C. D. Lane and **T. M. Orlando**, "Inelastic Electron Scattering and Energy-selective Negative Ion Reactions on Silicon Surfaces and Interfaces", *Appl. Surf. Sci.* (2007).
89. C. D. Lane, N. G. Petrik, **T. M. Orlando** and G. A. Kimmel, "Electron-Stimulated Oxidation of Thin Films Adsorbed on TiO₂(110)", *J. Phys. Chem. C*, **111**, 16319 (2007).
90. C. D. Lane, N. G. Petrik, **T. M. Orlando** and G. A. Kimmel, "Site-Dependent Electron-Stimulated Reactions in Water Films on TiO₂(110)", *J. Chem. Phys. C*, **127**, 224706, (2007).
91. H. Chen, A. Alexandrov, M. Lui, and **T. M. Orlando**, "Oxygen Adsorption Intermediates on Gd-doped Ceria Surfaces Investigated by Electron Stimulated Desorption", *App. Surf. Sci.* (in press).
92. G. A. Grieves, N. Petrik, J. Herring-Captain, B. Olanrewaju, A. Aleksandrov, R. G. Tonkyn, S. A. Barlow, G. A. Kimmel, and **T. M. Orlando**, "Photoionization of Sodium Salt Solutions in a Liquid Jet", *J. Phys. Chem. C*, (accepted).
93. **T. M. Orlando**, D. Oh, and Y. Chen, "The Role of Diffraction and Compound Feshbach Resonances in Low-energy Electron Induced Damage of Hydrated DNA", *J. Chem. Phys.* (accepted).
94. Y. Chen, H. Chen, A. Aleksandrov, and **T. M. Orlando**, "The Roles of Water, Acidity and Surface Morphology on Surface Assisted Laser Desorption", *J. Phys. Chem.* (accepted).

REVIEW ARTICLES IN PREPARATION

1. T. M. Orlando, "The Interaction of Low-Energy Electrons with Amorphous Ice and the Relevance to Planetary Space Issues," in prep. *Accts. of Chem. Res.* (**invited article**).
2. T. M. Orlando and L. Sanche, "Electronic Excitations of Ice Surfaces and Water Interfaces", in prep. *Surf. Sci. Reports* (**invited review article**).

INVITED TALKS

1. T. M. Orlando, "Quantum-Resolved Studies of Electron-Stimulated Dissociation and Desorption of Coadsorbed Molecules," AT&T Materials and Molecular Chemistry Seminar Series, Columbia University, New York, NY, June 18, 1990.
2. T. M. Orlando, "Quantum-Resolved Stimulated Surface Processes," Institut für Physikalische Chemie, Universität Basel, Basel, Switzerland, September 14, 1990.
3. T. M. Orlando, "Quantum-Resolved Studies of Electron-Stimulated Reactions on Adsorbate Covered Pt(111) Surfaces," FOM Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands, October 1, 1990.
4. T. M. Orlando, "Quantum-Resolved Stimulated Surface Chemistry," March American Physical Society Meeting, Condensed Matter Physics Symposium, Cincinnati, OH, March 18-22, 1991.
5. T. M. Orlando, "Quantum-Resolved Studies of Stimulated Surface Reactions," Physical Chemistry Seminar, Dept. of Chemistry, University of Washington, Seattle, WA, April 29, 1992.

6. T. M. Orlando, "Quantum-Resolved Studies of Electronically Stimulated Surface Reactions," Condensed Matter Seminar, Exxon Research and Engineering Company, Annandale, NJ, June 23, 1992.
7. T. M. Orlando, "Electronically Stimulated Surface Reactions," Physical Chemistry Seminar, Dept. of Chemistry, SUNY at Stony Brook, Stony Brook, NY, June 25, 1992.
8. T. M. Orlando, "Electronically Stimulated Surface Reactions," GAANN Lecture, Dept. of Physics, Washington State University, Pullman, WA, October 13, 1992.
9. T. M. Orlando, "Quantum-Resolved Electron-Stimulated Interface Reactions," Dept. of Chemistry, Tulane University, New Orleans, LA, April 26, 1993.
10. T. M. Orlando, "Electron-Stimulated Reactive Scattering in Amorphous Water Ice," National American Chemical Society Meeting, San Diego, CA, March 13-18, 1994.
11. T. M. Orlando, "Low-Energy (5-50 eV) Electron-Stimulated Reactive Scattering in Amorphous Water Ice," Chemical Physics Colloquium, University of Oregon, Eugene, OR, April 18, 1994.
12. T. M. Orlando, "Low-Energy Electron Stimulated Production of Molecular Hydrogen from Amorphous Water Ice," Dept. of Physics, University of Washington, Seattle, WA, May 10, 1994.
13. T. M. Orlando, "Electron-Stimulated Production of Molecular Hydrogen from Amorphous Water," Dept. of Nuclear Medicine and Radiobiology, University of Sherbrooke, Sherbrooke, Quebec, Canada, July 5, 1994.
14. T. M. Orlando, "Low-Energy (5-50 eV) Electron Stimulated Production of Molecular Hydrogen from Amorphous Water Ice," Gordon Research Conference on Radiation Chemistry, Newport, RI, July 17-22, 1994.
15. T. M. Orlando, "Quantum-Resolved Studies of Electron-Stimulated Reactions in Amorphous and Crystalline Water Ice," Physical Chemistry Colloquium, University of Basel, Switzerland, September 13, 1994.
16. T. M. Orlando, "Quantum-Resolved Studies of Electron-Stimulated Production of Molecular Hydrogen from Amorphous and Crystalline Water Ice," Chemical Physics Colloquium, University of Colorado, Boulder, CO, October 21, 1994.
17. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy (5-120 eV) Electron-Stimulated Interactions at Wet Interfaces," Dept. of Chemical Engineering, University of Washington, Seattle, WA, March 1, 1995.
18. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy (5-120 eV) Electron-Stimulated Interactions at Wet Interfaces," Physical Chemistry Colloquium, Dept. of Chemistry, University of Illinois, Chicago, IL, May 15, 1995.
19. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy (5-120 eV) Electron-Stimulated Interactions at Wet Interfaces," Argonne National Laboratory, Argonne, IL, May 16, 1995.

20. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy (5-120 eV) Electron-Stimulated Interactions at Wet Interfaces," Physical Chemistry Colloquium, Dept. of Chemistry, Northwestern University, Evanston, IL, May 17, 1995.
21. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy (5-120 eV) Electron-Stimulated Interactions at Wet Interfaces," Radiation Laboratory, Notre Dame University, South Bend, IN, May 18, 1995.
22. T. M. Orlando, "The Destruction of Chlorinated Hydrocarbons in Packed-Bed Coronas," American Physical Society 48th Annual Gaseous Electronics Conference, Berkeley, CA. Oct. 9-13, 1995.
23. T. M. Orlando, "Quantum-Resolved Studies of Electron-Stimulated Reactions in Amorphous and Crystalline Water Ice," Physical Chemistry Colloquium, Dept. of Chemistry, University of Utah, Salt Lake City, UT, October 16, 1995.
24. T. M. Orlando, "Quantum-Resolved Studies of Electron-Stimulated Reactions in Amorphous and Crystalline Water Ice," Physical Chemistry Colloquium, Dept. of Chemistry, University of Rochester, Rochester, NY, November 27, 1995.
25. T. M. Orlando, "Probing Radiolysis via Quantum-Resolved Studies of Low-Energy (5-120 eV) Electron Stimulated Reactions in Amorphous Ice," Brookhaven National Laboratory, Upton, NY, November 28, 1995.
26. T. M. Orlando, "State-Resolved Measurements of Electron- and Photon-Stimulated Processes in Condensed Water Films," Photoionization Probes of Complex Systems Symposium, National American Chemical Society Meeting, New Orleans, LA, March 20-24, 1996.
27. T. M. Orlando, "State-Resolved Measurements of Electron- and Photon-Stimulated Processes in Condensed Water Films," Dept. of Physics, Tulane University, New Orleans, LA, March 25, 1996.
28. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy Electron Stimulated Interfacial Reactions in Amorphous Ice," Radiation Chemistry at Interfaces Symposium, 44th Annual Radiation Research Society Meeting, Chicago, IL, April 14-17, 1996.
29. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy Electron Stimulated Interfacial Reactions in Amorphous Ice," Argonne National Laboratory, Argonne, IL, April 19, 1996.
30. T. M. Orlando, "Non-thermal Interfacial Processes and the Relevance to Plasma Activated Surface Reactions", Ford Motor Co., Dearborn, MI, June 7, 1996.
31. T. M. Orlando, "Probing Mixed (Radioactive/Chemical) Wastes Using Laser Spectroscopy and Surface Science Techniques", NSF- REU "Science, Ethics, and the Environment", Seminar Series, California State University, Fullerton, CA, July 17, 1996.
32. T. M. Orlando, "Quantum-Resolved Electron and Photon-Stimulated Interface Reactions," Hyperthermal Energy Molecule Surface Reactions Symposium, National American Chemical Society Meeting, Orlando, FL, August 25-29, 1996.

33. T. M. Orlando, "Photon- and Electron-Stimulated Processes at Environmental Interfaces," Workshop on X-ray Spectroscopies of Environmental Interfaces: Theory and Experiment, Richland, WA, Sept. 9, 1996.
34. T. M. Orlando, "Photon and Electron-Stimulated Desorption From Surfaces," American Physical Society, 49th Annual Gaseous Electronics Conference, Argonne, Ill. Oct. 20-24, 1996.
35. T. M. Orlando, "Probing Material Effects in Dielectric Barrier/Packed Bed Corona Reactors", Advanced Oxidation Technologies 3rd Conference, Cincinnati, OH, Oct. 26-29, 1996.
36. T. M. Orlando, "Quantum-Resolved Studies of Low-Energy (5-100 eV) Electron-Stimulated Interactions in Molecular Solids," 7th International Workshop on Desorption Induced by Electronic Excitations, Lake District, England, April 8-11, 1997.
37. T. M. Orlando, "UV Photon- and Low-Energy (5-150 eV) Electron-Stimulated Processes at Environmental Interfaces," The 24th IEEE International Conference on Plasma Science", San Diego, CA, May 19-22, 1997.
38. T. M. Orlando, "A Comparison Between UV-Photon and Low-Energy Electron-Stimulated Desorption Processes from Wide Band-Gap Materials", The Fourth International Conference on Laser Ablation, COLA '97, Monterey, CA July 21-25, 1997.
39. T. M. Orlando, "Vehicle Exhaust Treatment Using Electrical Discharge and Materials Chemistry", Diesel Engine Emissions Reduction Workshop, San Diego, CA July 27-31, 1997.
40. T. M. Orlando, "Quantum State-Resolved Desorption Studies of Wide Band-gap Materials", Columbia University Radiation Laboratory Seminar Series, NY, NY December 9, 1997.
41. T. M. Orlando, "Quantum State-Resolved Desorption Studies of Wide Band-gap Materials", Dept of Physics, Rutgers, The State University of New Jersey, Piscataway, NJ, Jan. 15, 1998.
42. T. M. Orlando, "Electron-Stimulated Desorption of D₂O Ice: Surface Structure and Electronic Excitations", Symposium on Interfacial Water, National American Chemical Society Meeting, Dallas, Texas, March 29 - April 2, 1998.
43. T. M. Orlando, "The Production of Atomic and Molecular Oxygen in Low Temperature Ice via Electronic Excitation", 2nd International Workshop on the Structure of Oxygen Radicals in Irradiated Solids, SORIS-98, Nieborow, Poland, May 30 - June 2, 1998.
44. T. M. Orlando, "Quantum State-Resolved Desorption Studies of Wide Band-gap Materials", Dept. of Physics and Astronomy, Nanophysics Laboratory, Univ. of Birmingham, Birmingham, UK, June 8, 1998.
45. T. M. Orlando, "Low-Energy Electron Interactions with Solids", Department of Earth and Geosciences, Stanford University, Palo Alto, CA, Oct. 8, 1998.
46. T. M. Orlando, "Low-Energy Electron Interactions with Solids from the Atomic to Astrophysical Scale", Argonne National Laboratory, Argonne, Ill, Oct. 26, 1998.

47. T. M. Orlando, "Low-Energy Electron Interactions with Solids from the Atomic to Astrophysical Scale", Dept. of Chemistry and Radiation Laboratory, University of Notre Dame, South Bend, IN, Oct. 27, 1998.
48. T. M. Orlando, "Low-Energy Electron Interactions with Solids: Modifications of Material Surfaces", Dept. of Chemistry and Catalysis Center, Northwestern University, Chicago, Ill, Oct. 29, 1998.
49. T. M. Orlando, "Low-Energy Electron Interactions with Solids", Physical Chemistry Colloquium, Dept. of Chemistry, John Hopkins University, Baltimore, MD, Nov. 3, 1998.
50. T. M. Orlando, "Quantum-Resolved Electron-Stimulated Interfacial Reactions", Twelfth International Workshop on Inelastic Ion-Surface Collisions, South Padre Island, Texas, January 24 - 29, 1999.
51. T. M. Orlando, "Thermal and Radiolytic Processes on Oxide Surfaces and the Relevance to Spent Fuel Storage", Los Alamos National Laboratory, Los Alamos, New Mexico, Feb. 22, 1999.
52. T. M. Orlando, "Non-thermal Processes on Oxide Surfaces and Interfaces", Department of Chemistry, University of Utah, Salt Lake City, Feb. 26, 1999.
53. T. M. Orlando, "Non-thermal Processes on Oxide Surfaces and Interfaces", Dept. of Chemistry, University of Houston, Houston, TX, March 17, 1999.
54. T. M. Orlando, "Quantum and Energy Resolved Reactions of Ions and Radicals in Condensed Films", Symposium on Free Radicals in the Condensed Phase, National American Chemical Society Meeting, Los Angeles, CA, March 21 - 28, 1999.
55. T. M. Orlando, "Low-Energy Electron Interactions with Molecular Solids and Applications to Solar System and Interstellar Materials", Hawaii Institute of Geophysics and Planetology, University of Hawaii, May 4, 1999.
56. T. M. Orlando, "Nonthermal Surface and Interface Processes", Dept. of Chemistry, Univ. of Notre Dame, Oct. 5, 1999.
57. T. M. Orlando, "Nonthermal Surface and Interface Processes", School of Chemistry and Biochemistry, Georgia Institute of Technology, Nov. 5, 1999.
58. T. M. Orlando, "The Role of Electronic Excitation in the Aging and Processing of Materials Relevant to the Galilean Satellites", Symposium on "The Surface Composition of the Icy Gallilean Satellites", sponsored by the American Geophysical Society, San Francisco, CA, Dec. 13-17, 1999.
59. T. M. Orlando, "Nonthermal Processes at Environmental Interfaces", Symposium on "Radiation Effects in the Environment", sponsored by the National Radiation Research Society, Albuquerque, NM, April 29 - May 3, 2000.

60. Invited Speaker, "Radiation-Induced Surface Processes in the Outer Solar System", Gordon Research Conference on Radiation Chemistry, Salve Regina University, Rhode Island, June 26-30, 2000.
61. T. M. Orlando, "Electron Interactions with Surfaces: From Single-Site Scattering Events to Europa's Oceans", AACP Seminar Series, Georgia Institute of Technology, Atlanta, GA, Nov. 12, 2000.
62. T. M. Orlando, "Initial State Effects in Stimulated Desorption", PacificChem. 2000, Honolulu, HI, Dec. 14-19, 2000.
63. T. M. Orlando, "Initial State Effects in Stimulated Desorption", Dept. of Physics, Georgia Institute of Technology, Jan. 25, 2001.
64. T. M. Orlando, "Diffraction and Initial State Effects in Stimulated Desorption", Dept. of Physics and Astronomy, Vanderbilt University, Nashville, TN, April 5, 2001.
65. T. M. Orlando, "Inelastic Electron Collisions with Adsorbates and the Relevance to Environmental Issues", Joint Canadian/American Division of Atomic, Molecular and Optical Physics (DAMOP) Meeting, London, Ont. May 16-19, 2001.
66. T. M. Orlando, "Quantum-Resolved Studies of Inelastic Electron Scattering Processes in Condensed Water Films", International Symposium on Electron-Molecule Collisions and Swarms, Lincoln, NE, July 14-16, 2001.
67. T. M. Orlando, "Role of Electronic Excitations in the Chemistry of the Galilean Satellite Surfaces", National American Chemical Society Meeting, Chicago, IL, Aug. 26-31, 2001.
68. T. M. Orlando, "Diffraction and Initial State Effects in Stimulated Desorption", Dept. of Chemistry, University of Florida, Sept. 11, 2001.
69. T. M. Orlando, "Non-thermal Surface Processes at Environmental Interfaces." 17th Asilomar Conference on Mass Spectrometry, Pacific Grove, CA, Oct. 19-23, 2001.
70. T. M. Orlando, "Quantum-, "The Role of DIET and Electron-Stimulated Reactions in Astrophysics and Planetary Science", 9th International Workshop on Desorption Induced by Electronic Excitations, Modane, France, June 4-7, 2002.
71. T. M. Orlando, "The Role of Electron-Stimulated Reactions in Environmental and Planetary Surface Science", University of Tennessee, Chattanooga, Sept. 6, 2002.
72. T. M. Orlando, "The Role of Electron-Stimulated Reactions in Environmental and Planetary Surface Science", University of North Carolina, Wilmington, Nov. 1, 2002.
73. T. M. Orlando, "Electron Scattering with Complex Targets: Gas-Phase Similarities vs. Interference and Many Body Effects", 55th Annual Gaseous Electronics Conference, Minn., Oct. 15-18, 2002.
74. T. M. Orlando, "The Interaction of HCl with Low-Temperature Water Ice: To Be or Not To Be?", Dept. of Chemistry, University of Minnesota, Oct. 17, 2002.

75. T. M. Orlando, "The Interaction of HCl with Low-Temperature Water Ice: To Be or Not To Be?", Ford Motor Company, Oct. 18, 2002.
76. T. M. Orlando, "Low-Energy Electron Beam Assisted Growth and Nano-patterning: Spatial Control via Interference Effects", Tokyo Institute of Technology, Dec. 2002
77. T. M. Orlando, "Non-thermal Processes at Environmental Interfaces", Los Alamos National Laboratory, Feb.11, 2003.
78. T. M. Orlando, "The Interaction of HCl with Low-Temperature Water Ice: To Be or Not To Be?", University of Georgia, April 18, 2003.
79. T. M. Orlando, "Electron-Collisions with Complex Targets" XXIII International Conference on Photonic, Electronic and Atomic Collisions, Stockholm, Sweden, July 23-29, 2003.
80. T. M. Orlando, "Low-Energy Electron Beam Assisted Growth and Nano-patterning: Spatial Control via Interference Effects", NATO-Advanced Study Institute, Crete, Greece –Aug. 21 Sept. 5, 2003.
81. T. M. Orlando, "Role of Defect Configurations in the Excitation and Ionization of Condensed Water", National American Chemical Society Meeting, New, York, New York, Sept. 8-12, 2003.
82. T. M. Orlando, "Low-Energy Electron Beam Assisted Growth and Nano-patterning: Spatial Control via Interference Effects", Department of Chemistry, University of Rochester, Oct. 23-26, 2003.
83. T. M. Orlando, "Electron-Stimulated Reactions in Ice", Symposium on Surface Chemistry on Condensed Molecules, Okochi Hall, RIKEN, Wako, Saitama, Japan, Dec. 12-13, 2003.
84. T. M. Orlando, "Nano-patterning of 3-D Structures Using Quantum-Interference Effects in Electron-Stimulated Desorption", Materials Research Society Meeting, April.12-16, 2004.
85. Department of Energy, "Electron-Collisions with Complex Targets", Office of Basic Energy Sciences Atomic, Molecular and Optical Sciences Research Meeting, September 12, 2004.
86. Department of Energy, "Electron-Collisions with Complex Targets", Office of Basic Energy Sciences Interfacial Molecular Science Research Meeting, October 24-27, 2004.
87. T. M. Orlando, "Probing reactions on low-temperature water ice surfaces using low-energy electron-stimulated desorption", National American Chemical Society Meeting, San Diego, CA, March 15-18, 2005.
88. T. M. Orlando, "The Role of Diffraction in the Electron-stimulated Desorption of Cl⁺ from Si Surfaces", Department of Physics, Univ. of Alabama, Birmingham, AL Nov. 4, 2005.
89. T. M. Orlando, "Low-energy Electron Interactions with Nanoscale Water Films and DNA:water Interfaces", PacifiChem, Honolulu, Hawaii, Dec. 15-20, 2005.
90. T. M. Orlando, "The Effects of Porosity on Non-thermal Reactions within Interstellar and Planetary Ices", PacifiChem, Honolulu, Hawaii, Dec. 15-20, 2005.

91. T. M. Orlando, "Non-thermal Surface Processes on Low-temperature Ice and the Relevance to Planetary Science", California Institute of Technology, Pasadena, CA, March 1, 2006.
92. T. M. Orlando, "Low-energy Electron-interactions with Complex Biological Targets", American Physical Society, Division of Atomic, Molecular and Optical Physics National meeting, Knoxville, TN, May, 2006.
93. T. M. Orlando, "Geometric and Electronic Structure Effects on Stimulated Reactions on Low-temperature Ice Surfaces", Physics and Chemistry of Ice, Bremen, Germany, July 23-28, 2006.
94. T. M. Orlando, "Low-energy Electron-induced Damage of DNA: The Role of Resonances and Diffraction", Malta, Sept. 15-19, 2006.
95. T. M. Orlando, "Low-energy Electron-induced Damage of DNA: The Role of Resonances and Diffraction", Chemical Physics Symposium Series, California Institute of Technology, Pasadena, CA, Oct. 24, 2006.
96. T. M. Orlando, "Electron Bombardment of Icy Solar Systems Surfaces: H^+ , H, H_2 , O, O_2 , CO and CO_2 Production and Release", Jet Propulsion Laboratory, Pasadena, CA, Oct. 25, 2006.
97. T. M. Orlando, "Analysis of Organoselenium and Organic Acid Metabolites by Laser Desorption Single Photon Ionization Mass Spectrometry", PITTCON07, Chicago, IL. Feb. 25-Mar. 2, 2007.
98. T. M. Orlando, "Low-Energy Electron Interactions with Hydrated DNA and Complex Biological Interfaces", National American Chemical Society Meeting, Boston, MA August, 2007.
99. T. M. Orlando, "Low-Energy Electron Interactions with Hydrated DNA and Complex Biological Interfaces", Gaseous Electronics Conference, Crystal City, VA, Oct. 2007.
100. T. M. Orlando, "Low-Energy Electron Interactions with Hydrated DNA and Complex Biological Interfaces", Dept. of Physics, Tulane Univ., New Orleans, Oct. 30, 2007.
101. T. M. Orlando, "The Formation and Fate of Oxidants on Icy Satellite Surfaces", American Geophysical Society Meeting, Dec. 9-15, 2007.
102. T. M. Orlando, "Low-Energy Electron Interactions with Hydrated DNA and Complex Biological Interfaces", Department of Physics, University of Alabama, Jan. 25, 2008.

PATENTS

S. E. Barlow, T. M. Orlando, and R. G. Tonkyn, "Method and Apparatus for Processing Exhaust Gas with Corona Discharge" Patent No. 5,914,015

T. M. Orlando, P. N. First and M. T. Sieger, "Method and Apparatus for Patterning using Low-energy Electron Stimulated Deposition (PLEESD)". (Provisional patent filed Feb. 2007)

CONTRIBUTED TALKS AND POSTERS

1. T. M. Orlando and S. L. Anderson, "Multiphoton Ionization Studies for Ion State Selection," 191st American Chemical Society National Meeting, New York, NY, April 13-18, 1986.
2. T. M. Orlando, S. L. Anderson, J. R. Appling, and M. G. White, "Multiphoton Ionization State-Selection Studies of Acetylene," Gordon Conference on Multiphoton Processes, New London, NH, June 9-13, 1986.
3. T. M. Orlando and S. L. Anderson, "Multiphoton Ionization State-Selection Studies of Acetylene," 193rd ACS National Meeting, Denver, CO, April 7, 1987.
4. T. M. Orlando, B. Yang, and S. L. Anderson, "The Effect of Reagent Excitation on Collision Induced Dissociation of Acetylene Cations," 1987 Conference on the Dynamics of Molecular Collisions, Wheeling, WV, July 12- 17, 1987.
5. B. Yang, Z. Jin, T. M. Orlando, and S. L. Anderson, "MPI (2+1) Photoelectron Spectroscopy and State-Selected Ion-Molecule Reactions of Acetylene Cations," 3rd International Laser Science Conference, Atlantic City, NJ, November 1-5, 1987.
6. B. Yang, T. M. Orlando, and S. L. Anderson, "Multiphoton Ionization Photoelectron Spectroscopy and State-Selected Ion-Molecule Reactions of OCS," Gordon Research Conference on Multiphoton Processes, New London, NH, June 13-17, 1988.
7. T. M. Orlando, B. Yang, and S. L. Anderson, "The Effects of Vibrational and Translational Energy in the $C_2H_2^+ + CH_4$, CD_4 Reactions: Mode Specificity and Complex Formation," Gordon Research Conference on Multiphoton Processes, New London, NH, June 13-17, 1988.
8. T. M. Orlando, B. Yang, and S. L. Anderson, "Multiphoton Ionization Vibrational State-Selection Studies of Acetylene Cation Reaction Dynamics," Gordon Research Conference on Atomic and Molecular Interactions, Plymouth, NH, August 1-6, 1988.
9. B. Yang, T. M. Orlando, Y. Chui, and S. L. Anderson, "Vibrational Mode Effects on the Reactions of $C_2H_2^+$ and OCS^+ ," Conference on the Dynamics of Molecular Collisions, Asilomar, CA, July 16-21, 1989.
10. T. M. Orlando, A. Friedmann, J. P. Maier, B. Yang, Y. Chui, and S. L. Anderson, "Spectroscopic Investigations of the $(OCS:C_2H_2)^+$ Reaction System," Conference on the Dynamics of Molecular Collisions, Asilomar, CA, July 16-21, 1989.
11. B. Yang, T. M. Orlando, Y. Chui, and S. L. Anderson, "Vibrational Mode Effects on Ion-molecule Reactions," XVI ICPEAC, New York, NY, July 26-Aug. 1, 1989.
12. T. M. Orlando, A. R. Burns, E. B. Stechel, D. R. Jennison, "Electron-Stimulated Dissociation of NO_2 Coadsorbed with Atomic O on Pt(111)," American Physical Society Meeting, Los Angeles, CA, March 12-16, 1990.
13. T. M. Orlando, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Electron-Stimulated Dissociation of NO_2 Coadsorbed with Atomic O on Pt(111): State Resolved Detection of $O(^3P_j)$ and NO Fragments," New Mexico Chapter of the American Vacuum Society, 26th Symposium, Albuquerque, NM, April 24-27, 1990.

14. T. M. Orlando, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Quantum-Resolved Studies of Electron-Stimulated Reaction and Dissociation Events in Coadsorbed Systems," Gordon Research Conference on Atomic and Molecular Interactions, Newport, RI, July 29-Aug. 3, 1990.
15. E. B. Stechel, D. R. Jennison, A. R. Burns, and T. M. Orlando, "Spin-Orbit Population Inversions for Stimulated Desorption of Open-Shell Diatomics: Theory," 37th National American Vacuum Society Symposium, Toronto, Ontario, Canada, October. 8-12, 1990.
16. D. R. Jennison, E. B. Stechel, A. R. Burns, and T. M. Orlando, "Realistic Models of Weakly-Bound Adsorbates," 37th National American Vacuum Society Symposium, Toronto, Ontario, Canada, October 8-12, 1990.
17. T. M. Orlando, A. R. Burns, E. B. Stechel, and D. R. Jennison, "Resonance Ionization Detection of $O(^3P_J)$ Produced from Stimulated Surface Processes," 37th National American Vacuum Society Symposium, Toronto, Ontario, Canada, October 8-12, 1990.
18. A. R. Burns, T. M. Orlando, E. B. Stechel, and D. R. Jennison, "State-Resolved Study of Coadsorption Effects on the Stimulated Dissociation of NO_2 on Pt(111)," 37th National American Vacuum Society Symposium, Toronto, Ontario, Canada, October, 8-12, 1990.
19. A. R. Burns, T. M. Orlando, E. B. Stechel, and D. R. Jennison, "Surface Reactions by Electronic Transitions: NO_2 from O_2 and NO on Pt(111)," New Mexico Chapter of the American Vacuum Society, 27th Symposium, Albuquerque, NM, April, 1991.
20. D. R. Jennison, A. R. Burns, E. B. Stechel, and T. M. Orlando, "Auger Spectroscopy and Electronically-Stimulated Surface Processes," International Workshop on Auger Spectroscopy, Stockholm, Sweden, September 1991.
21. A. R. Burns, T. M. Orlando, E. B. Stechel, and D. R. Jennison, "State-Resolved Angular Distributions of Neutral Products of Electron-Stimulated Surface Processes," 38th National American Vacuum Society Symposium, Seattle, WA, November, 11-15, 1991.
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93. Y. Chen, H. Yen, C. Lane, and T. M. Orlando “Surface Enhanced Laser Desorption of Amino Acids”, – 55th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, November, 2003.
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106. G. A. Grieves and T. M. Orlando, "The Importance of Pores in the Electron Stimulated Production of H₂ and O₂ in Low Temperature Ice", American Geophysical Union Meeting, Dec. 2005.
107. T. M. Orlando, G. A. Grieves and T. M. McCord, "The Chemical Nature of Europa Surface Material and the Relation to a Subsurface Ocean", Europa Focus Group Workshop, NASA-Ames Research Center, Moffet-Field, CA. Feb. 27-28, 2006.
108. T. M. Orlando, "The Formation of Reactive Atomic Fragments via Dissociative Recombination, Dissociative Electron Attachment and Coulomb Explosions", European Group on Atomic and Molecular Physics, Ischia, Italy 2006.
109. G. Grieves, E. DiMauro, and T. M. Orlando, "The Formation of Pre-biotic Molecules on Mineral Surfaces", Southeastern Regional Meeting of the American Chemical Society, SERMACS, Nov. 2006.
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- Prof. Robert E. Johnson, Dept. of Materials Science and Engineering Physics, University of Virginia, Charlottesville, VA 22901.
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