

Ray James Hoobler, Ph.D.

Employment:

The University of Utah
Director, Professional Master of Science and Technology
Supervisor: Professor David Kieda, Dean of The Graduate School

KLA-Tencor
Product Marketing Manager: April 2011 - December 2015
Supervisor: Mr. Scott Corboy, Director of Marketing and Customer Engagement

Purfresh, Inc., Fremont CA
Senior Scientist: October 2006 – March 2011
Supervisors:
Mr. Andy Smith, V.P. Products
Mr. Michael Weber, V.P. Engineering

NANOmetrics, Inc., Milpitas, CA
Product Marketing Manager, September 2005 – December 2005
Supervisor: Dr. Peter Gise, V.P. Marketing

Scientist, Optical Critical Dimension (OCD) Engineering Group, September 2003 – September 2005
Supervisor: Dr. Pablo Rovira, Manager OCD Systems

Applications Scientist, December 2000 - September 2003
Supervisor: Mr. Nagesh Avadhany, V.P. Applications

University of South Alabama, Mobile, AL
Assistant Professor, 1998 - December 2000 Department of Chemistry,
Chair: Prof. John Harrington (current address: SUNY, New Platz)

Grants and Research Support Funded:

Cottrell College Science Award, 2000
"Laboratory Investigations of Multiphase Processes of the Troposphere"

University of South Alabama Arts and Sciences Support and Development Award, 2000
"A Chemical Kinetics Database for Environmental Scientists, Research Chemists, Combustion Engineers, and Process Chemists"

University of South Alabama Research Council, 1999
"Probing Multiphase and Heterogeneous Processes of the Troposphere"

Camille and Henry Dreyfus Faculty Start-up Grant for Undergraduate Institutions, 1998
"Laboratory investigations of gas/liquid interfacial processes of the troposphere"

Postdoctoral Associate, 1995 - 1998
JILA, University of Colorado, Boulder, CO
Advisor: Prof. Stephen R. Leone (Current address: U.C. Berkeley, Department of Chemistry)

Education:

Ph.D., Chemistry, 1995 The Pennsylvania State University
University Park, PA
Advisor: Prof. Robert A. Bernheim (retired)
Laser-Guided Chemistry: Effect of Optical Orientation on Atom-Dimer Equilibria in Alkali Metal Vapors

B.S. in Chemistry, 1991 Marshall University, Huntington, WV
Advisor: Prof. Michael P. Castellani

Professional Affiliations:

American Chemical Society
National Professional Science Master's Association

Publications:

(26) *Analysis of Marketing Practices in the PSM Community*, Kelly March, Heidi Harkins, and Ray J. Hoobler, *The Innovator* (National Professional Science Master's Association), Fall 2018, 4-11.

(25) *Using Facebook Ads to Promote PSM Programs: A NPSMA Pilot Program*, Ray J. Hoobler and Courtney Thornton, *The Innovator* (National Professional Science Master's Association), Fall 2018, 12-17.

- (24) *What is the ROI on Graduate Education for PSM Programs?* Ray J. Hoobler, *The Innovator* (National Professional Science Master's Association), Fall 2017, 13-18.
- (23) *Yes, you are responsible for PSM PR*, Sheila Tobias and Ray J. Hoobler, *The Innovator* (National Professional Science Master's Association), Fall 2017, 10-12.
- (22) *Advanced Spectroscopic Ellipsometry Application for Multi-Layers Sige At 28nm Node and Beyond*, Teng-Chun Hsuan, Yi-Cheng Hu, Ming Chih Hsu, Dian-Zhen Zhan, Stan Yu, Chin-Cheng Chien, Shao-Ju Chang, Sheng-Min Chiu, Chien-Jen Huang, Chao-Yu Cheng, Juli Cheng, Getin Raphael, Zhiming Jiang, Ygartua Carlos, Zhengquan Tan, Ray Hoobler, *ECS Transactions*, 2013, Vol. 58(7), 137-144.
- (21) *Models for reticle performance and comparison of direct measurement*, Terrence E Zavec and Ray Hoobler, *Optical Microlithography XVIII*, 2005, Vol. 5754, 1029-1039.
- (20) *Integrated metrology adopts stronger APC role*, Peter Gise, and Ray Hoobler, *Semiconductor International*, May 2004.
- (19) *Photomask ADI, AEI and QA measurements using normal incidence optical-CD metrology*, E. Apak, T.P. Sarathy, W.A. McGahn, P.I. Rovira, R.J. Hoobler, *Photomask Japan*, April 2004, SPIE, Vol 5446, 708-719.
- (18) *Intra-wafer CDU characterization to determine process and focus contributions based on scatterometry metrology*, Mircea Dusa, Richard Moerman, Bhanwar Singh Paul Friedberg, Ray Hoobler, Terry Zavec, *Proceedings of SPIE*, 2004, Vol 5378, 93-104.
- (17) *Measurement of semi-isolated polysilicon gate structure with the optical critical dimension technique*, Deepak Shivaprasad, Jiangtao Hu, Milad Tabet, and Ray Hoobler, *J. Vac. Sci. Technol. B* 21(6), Nov/Dec 2003.
- (16) *Optical Critical Dimension (OCD) Measurements for Profile Monitoring and Control: Applications for Mask Inspection and Fabrication*, Ray Hoobler and Ebru Apak, 23rd Annual BACUS Symposium on Photomask Technology, *Proceedings of SPIE* (Accepted, *Proceedings of SPIE*, 2004).
- (15) *Identifying Critical Parameters for Process Control using Normal Incidence Spectroscopic Ellipsometry for Gratings in a Damascene Stack*, Chandra Saravanan, Ray Hoobler, Jiangtao Hu, *Semicon West 2003*, SEMI Technology Symposium: Innovations in Semiconductor Manufacturing, July 2003.
- (14) *Depth profile characterization of hydrogen implanted silicon using spectroscopic ellipsometry*, T. Gubiotti, D. Jacy, R. J. Hoobler, *Proceedings of SPIE*, Vol 5041, 2003.
- (13) *Optical critical dimension technology: Normal-incidence spectroscopic ellipsometry for process monitoring and control*, Ray J. Hoobler, *Microlithography World*, February 2003.
- (12) *New optical critical dimension (OCD) technology: Groundbreaking results and potential applications for mask fabrication*, Ray J. Hoobler, *BACUS monthly news*, December 2001.
- (11) *Characterization of interfacial layers and surface roughness using spectroscopic reflectance, spectroscopic ellipsometry and atomic force microscopy*, Ray J. Hoobler, Rahul Korlahalli, Ed Boltich, and Joe Serafin, *Proceedings of SPIE*, Vol 4689, 2002.
- (10) *Conformations of NADH studied by fluorescence excitation transfer spectroscopy*, Robert V. Hull*, Paul Conger* and Ray J. Hoobler, *Biophysical Chemistry*, 2001, 90, 9.
- (9) *Direct measurements of rate coefficients for the reaction of the ethynyl radical (C₂H) with C₂H₂ at 90 and 120 K using a pulsed Laval nozzle apparatus*, Seonkyung Lee, David A. Samuels, Ray J. Hoobler, and Stephen R. Leon, *Journal of Geophysical Research – Planets*, 2000, 105, 15085.
- (8) *A pulse Laval nozzle apparatus with laser ionization mass spectroscopy for direct measurement of rate coefficients at low temperatures with condensable gases*, Seonkyung Lee, Ray J. Hoobler, and Stephen R. Leone, *Review of Scientific Instruments*, 2000, 71, 1816.
- (7) *Low-Temperature Rate Coefficients for Reactions of the Ethynyl Radical (C₂H) with C₃H₄ Isomers Methylacetylene and Allene*, R. J. Hoobler and S. R. Leone, *Journal of Physical Chemistry A*, 1999, 103, 1342.
- (6) *Laser Controlled Chemical Equilibria in a Multi component Metal Vapor*, R. J. Hoobler and R. A. Bernheim, *Journal of Chemical Physics*, 1998, 57, 1967.
- (5) *Rate Coefficients for Reactions of the Ethynyl Radical (C₂H) with Hydrogen Cyanide and Acetonitrile: Implications for the Formation of Complex Nitriles on Titan*, R. J. Hoobler and S. R. Leone, *Journal of Geophysical Research*, 1997, 102, 28717.
- (4) *Low-Temperature Rate Coefficients for Reactions of Ethynyl Radical (C₂H) with Propane, Isobutane, n-Butane and Neopentane*, R. J. Hoobler, B. J. Opansky and S. R. Leone, *Journal of Physical Chemistry*, 1997, 101, 1338.
- (3) *Multiphoton LIF in atomic ⁶Li*, M. K. Ballard, R. J. Hoobler, C. He, L. P. Gold, R. A. Bernheim and P. Biechi, *Canadian Journal of Physics*, 1994, 72, 808.
- (2) *Synthesis, Characterization, and Crystal Structure of the (5 -C₅Ph₅)Cr(CO)₃ Radical*, R. J. Hoobler, M. A. Hutton, M. M. Dillard, M. P. Castellani, A. L. Rheingold, A. L. Rieger, P. H. Rieger, T. C. Richards and W. Geiger, *Organometallics*, 1993, 10, 116.

(1) *Synthesis, Molecular Structure and 1H NMR Analysis of Bis(tetraphenylcyclopentadienyl) ruthenium(II)*, R. J. Hoobler, J. V. Adams, M. A. Hutton, T. W. Francisco, B. S. Haggerty, A. L. Rheingold and M. P. Castellani, *Journal of Organometallic Chemistry*, 1991, 412, 157.

Invited Book Chapters:

Handbook of Mask Making Technology, Editor: Syed Rizvi; Publisher: Marcel Dekker Inc. New York, 2005
Chapter 21: Optical CD Metrology

Patents (granted):

Shipping Container Ozonation System; Patent No.: EP2107936B1, Date of Patent: Aug. 1, 20112
Methods to Increase Crop Yield; Patent No.: US 8,012,911 B2, Date of Patent: Sep. 6, 2011

Patents (submitted):

Sunscreen Formulations for Use in the Production of Organic Crops; Publication date: 5/22/2009
Adjustable Aperture for Plant Tissue Packaging; Publication date: 7/17/2008
Distributed Networked Ozonation System; Publication date: 6/4/2009
Improved Plant Tissue Packaging Process; Publication date: 7/17/2008

Presentations:

"Ethylene mitigation by controlled ozone injection: kinetic modeling and applications", Ray J. Hoobler, Paul Dick, David Brantner and Michael Weber, 8th International Symposium on the Plant Hormone Ethylene, June 2009

"Real-time ultra-trace monitoring of ethylene production via cavity ring-down spectroscopy (CRDS) for pre-climacteric fruit in ozone-treated regular and controlled atmospheres," Eric Crosson, et al. 2007 FLAIR Conference, Florence Italy, September 2007.

"Optical scatterometry for characterization of sub-100nm critical dimensions," Ye Feng, Beverly Cheung, Ray Hoobler, *Semicon China*, April 2004.

"Advanced litho cell process control based on scatterometry: characterization of the principal sources of CD variation," Lars Markwort, Thomas Gubiotti and Ray Hoobler, 5th European Advanced Equipment Control/Advanced Process Control (AEC/APC) Conference, April 2004.

"Identifying critical parameters for process control using normal incidence spectroscopic ellipsometry for gratings in a damascene stack," Chandra Saravanan, Ray Hoobler, Jiangtao Hu, *Semicon West 2003*, SEMI Technology Symposium: Innovations in Semiconductor Manufacturing, July 2003,

"Applications of integrated optical critical dimension (OCD) metrology for advanced process control (APC)," Pablo Rovira and Ray Hoobler, First European Scatterometry Workshop, April 2003.

"Monitoring dielectric etch: application of optical critical dimension technology for dual damascene structures," Ray J. Hoobler, Jiangtao Hu, Rahul Korlahalli and Howard Li, AEC/APC Symposium XIV, Sept 2002.

"Conformational studies of NADH using fluorescence excitation transfer spectroscopy"
Paul Conger*, Robert V. Hull* and Ray J. Hoobler, 220th American Chemical Society National Meeting, Washington, D.C. August 2000.

"Preparing a multiphase system using a vibrating orifice aerosol generator (VOAG)"
Paul Conger*, Robert V. Hull*, Du Nguyen* and Ray J. Hoobler, 7th Annual Research Forum, University of South Alabama, March 2000.

"Using tunable diode lasers in undergraduate research"
Robert V. Hull* and Ray Hoobler, 218th American Chemical Society National Meeting, New Orleans, LA, August 1999.

"Doppler-free spectroscopy: Hyperfine structure of atomic lithium using intermodulated fluorescence"
Du Nguyen* and Ray Hoobler, 218th American Chemical Society National Meeting, New Orleans, LA, August 1999.

"IR and UV-Vis Spectroscopy" Presented at the University of South Alabama *Science in Motion* Introduction to Chemistry Instrumentation, University of South Alabama, Mobile, AL, July 1999.

"Lasers in Chemistry" Presented at the University of South Alabama *Science in Motion* Advanced Chemistry Instrumentation, University of South Alabama, Mobile, AL, June 1999.

"Low-Temperature Rate Coefficients" with Stephen R. Leone, Poster presented at the 214th American Chemical Society National Meeting, Las Vegas, September 1997.

"Laboratory Studies of Low-Temperature Rate Coefficients" with Brian J. Opansky, and Stephen R. Leone. Presented at the Fourth International Conference on Chemical Kinetics, Gaithersburg, MD, July 1997.

"Rate Coefficients of the Ethynyl Radical" with Brian J. Opansky and Stephen R. Leone. Presented at the Third Annual Rocky Mountain Symposium on Photons and Chemistry, Estes Park, CO, 1997.

"Low-Temperature Rate Coefficients of the Ethynyl Radical" with Brian J. Opansky and Stephen R. Leone. Presented at the Second Annual Rocky Mountain Symposium on Photons and chemistry, Estes Park, CO, 1996.

* Undergraduate student, University of South Alabama, Department of Chemistry