

**BARBARA H. MUNK, PH.D.**  
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## EDUCATION

**Wayne State University**, Doctor of Philosophy in Chemistry, May 2009, Thesis Topic: "Applications of Electronic Structure Theory to Problems in Zinc Oxide Chemical Vapor Deposition and DNA Nucleobase Mutations".

**Purdue University**, Master of Science in Management, Marketing Option, 1990. Graduate research topics: "Retail Credit as an Economic Indicator" and "Brand Equity: A Survey of Current Literature".

**Arizona State University**, Bachelor of Science in Chemistry, *cum laude*, 1979.  
Undergraduate research topic: "Preservation of Rock Art, Sandstone and Adobe Structures Utilizing In-situ Polymerization of Methyl Methacrylate".

## PUBLICATIONS

Thapa, B.; **Munk, B.H.**; Burrows, C.; Schlegel, H.B. "Computational Study of Oxidation of Guanine by Singlet Oxygen ( $^1\Delta_g$ ) and Formation of Guanine: Lysine Cross-Links", *Chemistry – A European Journal*, 2017, 23 (24), 5804-5813.

Moos, W.; Miller, S.; Munk, S.A.; **Munk, B.H.** *Managing the Drug Discovery Process: How to Make it More Efficient and Cost Effective, 1<sup>st</sup> Edition*, (2016), Woodhead Publishing.

Thapa, B.; **Munk, B.H.**; Burrows, C.; Schlegel, H.B. "Computational Study of the Radical Mediated Mechanism of the Formation of C8, C5 and C4 Guanine:Lysine Adducts in Presence of the Benzophenone Photosensitizer; *Chemical Research in Toxicology*, 2016, 29 (9), 1396–1409.

Wentworth, R and **Munk, B.H.** "*Experiments in General Chemistry*" 10<sup>th</sup> edition. (2012) Belmont: Brooks/Cole Cengage Learning

Psciuk, B.; Lord, R.; **Munk, B.H.**; Schlegel, H. B. "Theoretical Determination of One-Electron Oxidation Potentials for Nucleic Acid Bases", *Journal of Chemical Theory and Computation*, 2012, 8, 5107–5123.

Ye, Y., **Munk, B.H.**, Muller, J.G., Cogbill, A., Burrows, C.J., Schlegel, H.B. "Mechanistic and Kinetic Aspects of the Formation of Guanidinohydantoin from Spiroiminodihydantoin under Acid Conditions", *Chem. Res. Toxicol.*, **2009**, 22, 526-535.

Verdolino, V., Cammi, R., **Munk, B.H.**, Schlegel, H.B. "Efforts Toward the Development of a Computational Procedure for Predicting the  $pK_a$  of DNA Nucleobases and their Oxidation Products", *J. Chem. Phys. B*. **2008**, 130,5245-5256.

**Munk, B.H.**, Burrows, C.J., Schlegel, H.B. "An Exploration of Mechanisms for the Transformation of 8-oxoguanine to Guanidinohydantoin and Spiroiminodihydantoin by Density Functional Theory", *J. Am. Chem. Soc.* **2008**, 130, 5245-5256.

**Barbara H. Munk**

**Curriculum Vitae**

**Page 2**

**PUBLICATIONS (cont.)**

**Munk, B.H.**, Burrows, C.J., Schlegel, H.B.; Exploration of Mechanisms for the Transformation of 8-Hydroxy Guanine Radical to FAPyG by Density Functional Theory. *Chem. Res. Toxicol.* **2007**, *20*, 432-444.

**Munk, B.H.**, Schlegel, H.B.; Molecular Orbital Studies of Zinc Oxide Chemical Vapor Deposition: Gas Phase Radical Reactions. *Chem. Mater.* **2006**, *18*, 1878-1884 Skelton, P., **Munk, B.H.** and Collins, H.C., "Formulation of Pesticide Microemulsions", Pesticide Formulations and Application Systems: 8<sup>th</sup> Volume, ASTM STP 980, D.A. Hovde and G.B. Beestman, Eds., American Society for Testing and Materials, Philadelphia, **1988**.

**PATENTS AND COPYRIGHTS**

Colborn, D.W., Coyne, T.S., Emrie, C.P. and **Munk, B.H.**, "Movement Activated Odor Control Animal Litter", U.S. Patent 4,407,231.

Smith, W.L. and **Munk, B.H.**, "Thickened Aqueous Pre-Wash Composition", U.S. Patent 4,648,987.

**Munk, B.H.**, "Method of Improving the Storage Life of Liquid Compositions Containing Enzymes", U.S. Patent 4,801,544.

**Munk, B.H.** "Stepan Specialty Surfactants for Microemulsions", The Stepan Company, copyright 1987.

**POSTERS AND ORAL PRESENTATIONS**

**Munk, B.H.**, Verdolino, V., Cammi, R., Schlegel, H.B. "Efforts Toward the Development of a Computational Procedure for Predicting the pKa of DNA Nucleobases and their Oxidation Products", Poster, 10th Annual Chemistry Graduate Research Symposium, Wayne State University, 2008.

**Munk, B.H.**, Ye, Y., Burrows, C.J., Schlegel, H.B. "Computational Evaluation of Mechanisms for the Formation of Guanidinohydantoin from Spiroiminodihydantoin, Oral Presentation", American Chemical Society 236<sup>th</sup> National Meeting, August 2008.

**Munk, B.H.**, Burrows, C.J., Schlegel, H.B. "An Exploration of Mechanisms for the Transformation of 8-Oxoguanine to Guanidinohydantoin and Spiroiminodihydantoin by Density Functional Theory", American Chemical Society 234<sup>th</sup> National Meeting, August 2007.

**Munk, B.H.**, Smith, S.M., Hratchian, H.P., Schlegel, H.B. "Molecular Orbital Studies of Zinc Oxide Chemical Vapor Deposition: Gas-Phase Radical Reactions of Diethyl Zinc and Water", Graduate Student Symposium, Wayne State University, October 2004.

Lew-Kaya, D.A., **Munk, B.H.**, and Sefton, J., "Overview of Azelaic Acid in the Treatment of Acne Vulgaris", American Academy of Dermatology Summer Meeting, July 1995.

**Munk, B.H.**, "Your Role in the Product Development Process", American Association of University Women, Spring Meeting, March 1990.

**Munk, B.H.**, "A Novel Approach to the Development of Microemulsions", American Oil Chemists Society Annual Meeting, May 1988.

Skelton, P., **Munk, B.H.** and Collins, H.C., "An Approach to the Development of Pesticide Microemulsions", ASTM Pesticide Division Annual Meeting, October 1987.

**Munk, B.H.**, "An Approach to the Development of Cosmetic Microemulsions", American Oil Chemists, Arizona Chapter, Winter Meeting, October 1987.

## **Barbara H. Munk**

### **Curriculum Vitae**

#### **Page 3**

#### **ACADEMIC HONORS, SCHOLARSHIPS, PROFESSIONAL RECOGNITION**

2014-2015 Excellence in Teaching Award, Wayne State University, College of Liberal Arts and Sciences

Dan Trivich Memorial Award for Research in Physical Chemistry, Wayne State University, April 2009

Thomas C. Rumble University Graduate Fellowship recipient, Wayne State University, 2004-2005.

Regulatory Affairs Professional Society, certification in regulatory affairs, 1998.

Received Krannert Scholar Award as top graduate in program, Krannert Graduate School of Management, 1990.

American Association of University Women, Project Renew grantee, 1989.

Phi Lambda Upsilon Chemistry Honorary Society inductee, 1978.

University of Arizona, Academic Scholarship recipient, 1975.

#### **EMPLOYMENT HISTORY**

**Wayne State University, Department of Chemistry (Detroit, MI) 2009 to present**

Senior Lecturer 2010 to present

Part-Time Faculty/Lecturer 2009 to 2010

- Responsible for teaching a variety of undergraduate chemistry classes on an as needed basis determined by student enrollment and full-time faculty availability. Classes taught to date include: analytical chemistry lecture and lab (CHM 2280, CHM 2290), general chemistry lecture and lab (CHM 1220, CHM 1230), conceptual chemistry (CHM 1000), and physical chemistry lab (CHM 5550).

Graduate Research Assistant for Professor H. B. Schlegel 2004 to 2009

- Assisted with the execution of computational studies focused on understanding of reaction mechanisms for oxidation of guanine to form DNA nucleobase mutations and for chemical vapor deposition of zinc oxide films.

**Pfizer, Inc. (Ann Arbor, MI) 1999 to 2004**

Education Advisor, Pfizer Research University (PRU) 2001 to 2004

- Developed, updated and participated in the delivery of Pfizer Research University curriculum to Pfizer colleagues. The curriculum included single-day workshops on the Pfizer drug development processes as well as multi-day cross-department scientific symposia on issues affecting the discovery and development of new medicines (e.g. QT interval prolongation, bioavailability and pharmacokinetics of medicines, intellectual property protection and drug design strategies).
- Worked with Site Director to develop Drug Discovery and Development workshop suitable for external audiences. Delivered program to external audiences including physicians, local business leaders, students, and teachers.
- Monitored enrollment, recruited participants, and maintained training database. Ensured timely preparation of metrics for quarterly and annual status reports.
- Participated in science demonstrations as part of Pfizer's Scientific Education Task Force. This outreach program was designed to stimulate interest in science among 4<sup>th</sup> and 5<sup>th</sup> grade elementary school children.

**Barbara H. Munk**

**Curriculum Vitae**

**Page 4**

**EMPLOYMENT HISTORY (cont.)**

**Pfizer, Inc. (Ann Arbor, MI)**

**1999 to 2004**

Manager/Senior Clinical Communications Scientist, Clinical Sciences

1999 to 2001

Clinical Communications Scientist

- Managed Clinical Communications departmental responsibilities associated with the Clinical Sciences (Phase I) Development Operations Team, including defining strategy for content, preparation, review and completion of research reports and New Drug Applications.
- Directed the activities of five functional area colleagues and tracked status of projects, providing overall management of team.
- Managed departmental resources; participated in staffing and recruiting activities.
- Worked with other division managers to prepare, revise and/or deliver appropriate training seminars to Pfizer colleagues.
- Participated in science demonstrations as part of Pfizer's Scientific Education Task Force. This outreach program was designed to stimulate interest in science among 4<sup>th</sup> and 5<sup>th</sup> grade elementary school children.

**PORT Systems, LLC (Ann Arbor, MI)**

**1997-1999**

Manager, Regulatory Affairs

- Lead in-house efforts related to the preparation and submission of Investigational New Drug applications.
- Reviewed and assisted with the preparation of standard operating procedures created to comply with Good Laboratory Practice (GLP), Good Manufacturing Practice (GMP) and Good Clinical Practice (GCP) regulations.
- Conducted internal training seminars on GLP and GCP requirements.
- Interfaced with investigational site and internal scientific staff to facilitate the conduct of non-clinical and clinical trials in compliance with GLP and GCP.

**Barbara H. Munk**

**Curriculum Vitae**

**Page 5**

**EMPLOYMENT HISTORY (cont.)**

**Allergan, Inc. (Irvine, CA)**

**1992-1996**

Section Manager

Principal Clinical Research Associate

Senior Clinical Research Associate

Clinical Research Associate

- Managed the development of detailed clinical research plans and budgets for Allergan's Phase III dermatological program.
- Participated in the construction and filing of New Drug Applications for dermatologicals used in the treatment of acne and psoriasis. Prepared Investigational New Drug annual updates and Clinical Investigator's Brochures for various investigational drugs.
- Prepared and delivered presentations to senior Allergan management on the efficacy and safety of dermatological products. Participated in senior management and FDA discussions of a sunscreen drug product recall/withdrawal from the market.
- Managed and/or executed all aspects of human clinical research studies including protocol development, investigator selection, budget formulation, case report form creation, investigational supplies preparation, clinical data verification, and final report completion.
- Worked with Quality Assurance department to create and deliver training on clinical standard operating procedures and to prepare investigational sites for FDA audits.
- Participated actively as a member of several multi-departmental product development teams. Supervised junior and senior level Clinical Research Associates.

**University of California, Irvine (Irvine, CA)**

**1992**

UC-ACCESS Project Manager/Analyst, Technology Transfer Office

- Prepared a successful grant application (\$300K/year) to the California State Department of Commerce requesting funding for the UC-ACCESS project. UC-ACCESS was to be an online database listing all University of California intellectual property available for licensing.
- Generated a project implementation plan outlining the methodology needed to gather relevant information and constructed the UC-ACCESS Research Centers & Institutes and Corporations databases.
- Prepared and delivered demonstrations communicating benefits of UC-ACCESS to external corporations and UCI faculty/staff.

**Great Lakes Chemical Corporation (West Lafayette, IN)**

**1990-1991**

Business Consultant-Regulatory Affairs & Commercial Development Departments

- Constructed and submitted applications for registration of water treatment biocides with the Environmental Protection Agency and the California Food and Agriculture Department. Obtained exemptions from Department of Transportation for new bulk shipping containers for oxidizing biocides.
- Analyzed financial, regulatory, and technical feasibility of new markets for oxidizing biocides. Generated marketing plans for expansion into the most promising areas.

**Barbara H. Munk**

**Curriculum Vitae**

**Page 6**

**EMPLOYMENT HISTORY (cont.)**

**Credit Research Center, Purdue University (West Lafayette, IN)**

**1989-1990**

Research Assistant

- Utilized regression models and statistics to define the predictive value of consumer credit spending patterns as a method of forecasting inventory requirements. Provided written report to Executive Director of Research Center.

**Stepan Company (Northfield, IL)**

**1985-1988**

Product Specialist, Commercial Development Department

- Completed laboratory research on the chemical and physical properties of specialty chemicals used in agricultural chemicals, cosmetics, flame retardants, and building materials. Identified commercial applications. Provided summary of findings to Executive Vice President of Research.
- Designed technical literature for external investigators that was distributed within the pharmaceutical, cosmetic and agrochemical industries, and explained novel methodology for formulating microemulsions.
- Developed and presented seminars on microemulsifier product line to a cross section of industrial companies.
- Organized and presented monthly safety awareness seminars to 80 member R&D technical staff. Served as Vice Chairman of in-house Safety Committee.

**The Clorox Company**

**1979-1985**

Project Leader

Senior Scientist

Scientist

Assistant Scientist

- Worked with Regulatory Department to obtain necessary toxicology testing and government approvals prior to market introduction of new consumer products.
- Developed and managed research project budgets.
- Reformulated non-bleach laundry additive, Clorox PreWash.
- Invented "Fresh Step" cat litter.
- Extended air freshener product line and improved two hard surface cleaners. Supervised two B.S. level scientists and two A.A. level technicians.