Stephen A. Munk, Ph.D.

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Employment

01/97 – 04/17	Ash Stevens Inc., Riverview MI; Part of Piramal since 2016 CEO & President; Member, Board of Directors
01/97 – Present	Wayne State University, Detroit MI Adjunct Professor of Chemistry

Developed and implemented strategic plan to transition the business from Government contract research to commercial pharmaceutical development and manufacturing. Drove sales growth averaging 10% per year. Negotiated long-term alliances with pharmaceutical partners producing sales in excess of $100MM. Created over $55MM of shareholder value without the use of dilutive equity investment. Initiated and completed major plant construction projects leading to over six-fold increase in capacity. Negotiated construction tax abatements with Local and State authorities. Developed and built a high performing management team. Managed merger and acquisition activities. Provided oversight for twelve FDA manufacturing approvals including the Active Pharmaceutical Ingredients in Velcade® and Ninlaro® (Takeda), Clolar® (Genzyme), Vidaza® (Celgene), and Iclusig® (ARIAD). Administered NIH funded research contracts. Developed an Ash Stevens corporate culture of service, dedication, and integrity leading to 2014 Lilly Supplier of the Year Award; built an Ash Stevens brand with Trademarks. Served as an adjunct faculty member in chemistry at Wayne State University.

05/91 – 12/96	Drug Discovery, Allergan, Inc., Irvine, CA Co-Team Leader, α_2-Adrenergic Discovery Team Principal Scientist, Medicinal Chemistry Senior Scientist, Medicinal Chemistry Scientist, Medicinal Chemistry

Managed α_2-adrenergic discovery team. Participated in development and launch of Alphagan™, a glaucoma drug. Developed proposals consistent with corporate strategic research goals for new program areas. Introduced novel α_2-pharmacology assay protocols. Prepared novel α_2-adrenergic agonists and new reagents for their synthesis. Developed SAR of novel α_2-adrenergic agents including allergic response mechanisms relevant to design. Developed CNS-limited α_2-adrenergic agonists. Instituted computer-based management system for chemical information. Developed program with UCI to evaluate DNA cleaving agents. Reviewer for *J. Org. Chem., J. Med. Chem., BioMed. Chem.,* and *BioMedChem. Lett.*

04/88 – 04/91 Purdue University, West Lafayette, IN
American Cancer Society Postdoctoral Fellow (with D. Boger)

Pioneered the Boger group's program for the study of the sequence selectivity of DNA binding agents using the tools of molecular biology. Developed a rapid strategy for preparing singly 5'-end-labeled double stranded DNA based on M13 cloning technology. Conducted studies to identify the origin of the sequence specific binding of CC-1065 and related analogs to DNA. Designed and synthesized novel DNA alkylating agents related to CC-1065.

08/85 – 03/88 Chemical Products and Biotechnology,
Allied-Signal Engineered Materials Research Center, Des Plaines, IL
Senior Research Chemist

Developed chemical process routes toward unnatural carbohydrates. Initiated the Research Center's program in stain-proof nylon fiber. Modified enzymes for organic synthesis. Successfully responded to Air Force RFPs for High Energy Jet Fuels. Organized a symposium on the total Synthesis of Natural Products, 1987 ACS-GLR Meeting.

Education

04/88 – 04/91 American Cancer Society Postdoctoral Fellow (D. Boger)
Purdue University, West Lafayette, IN

08/79 – 07/85 Ph.D., Organic Chemistry (H. Rapoport)
Thesis Title: "*Tetrahydropurines*"
University of California at Berkeley, Berkeley, CA

01/76 – 05/79 B.S., Chemistry, *cum laude*
Undergraduate Research Participant (G. Yuen)
Arizona State University, Tempe, AZ

Publications

1. Ammoscato, V.; Wickenheiser, R.; Henderson, J.; **Munk, S.** "State-of-the-Art Process for the Safe Synthesis of Anticancer Drugs" *Drug Dev. Res.* **2010** *71*, 1.

2. Thompson, C.D.; Macdonald T.L., Garst, M.E.; Wiese A.; **Munk, S.A.** "Mechanisms of Adrenergic Agonist Induced Allergy; Bioactivation and Antigen Formation" *Exp. Eye Res.*, **1997** *64*, 767.

3. Thompson, C.D.; Vachaspati, P.R.; Kolis, S.P.; Gulden, P.H.; Garst, M.E.; Wiese, A.; **Munk, S.A.**; Harmon, W.D.; Macdonald, T.L. "Mechanisms of Adrenergic Agonist Induced Allergy: Bioactivation and Antigen Formation" *Chem. Res. Toxicol.* **1997** *10*, 1032.

4. **Munk, S.A.**; Harcourt, D. Arasasingham, P.N.; Burke, J.A.; Kharlamb, A.; Manlapaz, C.; Padillo, E.U.; Roberts, D.; Runde, E.; Williams, L.; Wheeler, L.; Garst, M.E. "Synthesis and Evaluation of *N*-Aryl Aminoimidazoles as α_2-Adrenoceptor Agonists" *J. Med. Chem.*, **1997** *40*, 18.

5. Acheampong, A.A.; Chien, D.-S.; Lam, S.; Vekich, S.; Breau, A.; Usansky, J.; Harcourt, D.; **Munk, S.A.**; Nguyen, H.; Garst, M.; Tang-Liu, D. "Brimonidine Metabolism with Rat, Rabbit, Dog, Monkey, and Human Liver Fractions and Aldehyde Oxidase, and Structural Characterization of Metabolites" *Xenobiotica* **1996** *26*, 1035.

6. **Munk, S.A.**; Harcourt, D.; Ambrus, G.; Denys, L.; Gluchowski, C.; Burke, J.A.; Kharlamb, A.; Manlapaz, C.; Padillo, E.; Runde, E.; Wheeler, L.; Garst, M.E. "Synthesis and Evaluation of 2-(5-methyl-benz-1-ox-4-azin-6-yl)imino imidazoline: A Potent, Peripherally Acting α_2-Adrenoceptor Agonist" *J. Med. Chem.* **1996** *39*, 3533.

7. **Munk, S.A.**; Lai, R.; Burke, J.; Arasasingham, P.; Kharlamb, A.; Manlapaz, C.; Wijono, M.; Wheeler, L.; Garst, M. "Synthesis and Pharmacologic Evaluation of AGN 192403: A potent Imidazoline$_1$ Receptor Specific Agent" *J. Med. Chem.* **1996** *39*, 1193.

8. **Munk, S.A.**; Harcourt, D.; Arasasingham, P. Gluchowski, C.; Wong, H.; Burke, J.; Kharlamb, A.; Manlapaz, C.; Padillo, E.; Williams, L.; Wheeler, L.; Garst, M. "Analogs of UK 14,304: Structural Features Responsible for α_2-Adrenoceptor Activity" *BioMedChem. Lett.* **1995** *5*, 1745.

9. Sullivan, R.W.; Coghlan, V.M.; **Munk, S.A.**; Reed, M.W.; Moore, H.W. "DNA Cleavage by 4-Alkynyl-3-methoxy-4-hydroxycyclobutenes" *J. Org. Chem.* **1994** *59*, 2276.

10. **Munk, S.A.**; Gluchowski, C.; Dolby, L.; Wong, H.; Burke, J.; Kharlamb, A.; Manlapaz, C.; Padillo, E.; Rodgers, D.; Ohta, B.; Wheeler, L.; Garst, M. "Analogs of UK 14,304 as α_2-Adrenoceptor Agonists. Twist and Agent Polarity as Design Elements" *BioMedChem. Lett.* **1994** *4*, 459.

11. Boger, D.L.; **Munk, S.A.**; "DNA Alkylation Properties of Enhanced Functional Analog of CC-1065 Incorporating the 1,2,9,9*a*-Tetrahydrocycloprop[1,2-*c*] benz[1,2-*e*]indole-4-one (CBI) Alkylation Subunit" *J. Amer. Chem. Soc.* **1992** *114*, 5487.

12. Boger, D.L.; Ishizaki, T.; Sakya, S.M.; **Munk, S.A.**; Kitos, P.A.; Jin, Q.; Besterman, J. "Synthesis and Preliminary Evaluation of (+)-CBI-Indole$_2$: an Enhanced Functional Analog of (+)-CC-1065" *BioMedChem. Lett.* **1991** *1*, 115.

13. Boger, D.L.; **Munk, S.A.**; Zarrinmayah, H. "(+)-CC-1065 DNA Alkylation: Key Studies Demonstrating a Noncovalent Binding Selectivity Contribution to the Alkylation Selectivity" *J. Amer. Chem. Soc.* **1991** *113*, 3980.

14. Boger, D.L.; **Munk, S.A.**; Zarrinmayah, H.; Ishizaki, T.; Haught, J.; Bina, M. "An Alternative and Convenient Strategy for Generation of Substantial Quantities of Singly 5'-^{32}P-End-Labeled Double-Stranded DNA for Binding Studies: Development of a Protocol for Examination of Functional Features of (+)-CC-1065 and Duocarmycins that Contribute to Their Sequence-Selective DNA Alkylation Properties" *Tetrahedron* **1991** *47*, 2661.

15. Boger, D.L.; **Munk, S.A.**; Ishizaki, T. "The (+)-CC-1065 DNA Alkylation: Observation of an Unexpected Relationship Between Cyclopropane Electrophile Reactivity and Intensity of DNA Alkylation" *J. Amer. Chem. Soc.* **1991** *113*, 2779.

16. Boger, D.L.; Zarrinmayah, H.; **Munk, S.A.**; Kitos, P.A.; Suntornwat, O. "Demonstration of a Pronounced Effect of Noncovalent Binding Selectivity on the (+)-CC-1065 DNA Alkylation and Identification of the Pharmacophore of the Alkylation Subunit" *Proc. Natl. Acad. Sci. U.S.A.* **1991** *88*, 1431.

17. Boger, D.L.; Ishizaki, T.; Zarrinmayah, H.; **Munk, S.A.**; Kitos, P.A.; Suntornwat, O. "Duocarmycin-Pyrindamycin DNA Alkylation Properties and Identification, Synthesis, and Evaluation of Agents Incorporating the Pharmacophore of the Duocarmycin/Pyrindamycin Alkylation Subunit. Identification of the CC-1065-Duocarmycin Common Pharmacophore" *J. Amer. Chem. Soc.* **1990** *112*, 8961.

18. Boger, D.L.; Coleman, R.S.; Invergo, B.J.; Ishizaki, T.; **Munk, S.A.**; Sakya, S.M.; Zarrinmayah, H.; Kitos, P.A.; Thompson, S.C. "Synthesis and Evaluation of Aborted and Extended CC-1065 Functional Analogs: (+)- and (-)-CPI-PDEI$_1$, (+)/-)-, (+)-, and (-)-CPI-CDPI$_3$. Preparation of Key Partial Structures and Definition of an Additional Functional Role of the CC-1065 Central and Right-Hand Subunits" *J. Amer. Chem. Soc.* **1990** *112*, 4623.

19. Boger, D.L.; Ishizaki, T.; Wysocki, R.J.; **Munk, S.A.**; Kitos, P.A.; Suntornwat, O. "Total Synthesis and Evaluation of (+/-)-*N-(tert* Butyloxycarbonyl)-CBI, (+/-)-CBI-$CDPI_1$, and (+/-)-CBI-$CDPI_2$: CC-1065 Functional Agents Incorporating the Equivalent 1,2,9,9*a*-Tetrahydrocyclopro[1,2-*c*]benz[1,2-*e*]indol-4-one (CBI) Left-Hand Subunit" *J. Amer. Chem. Soc.* **1989** *111,* 6461.

Invited Presentations

1. **Munk, S.A**. "Transformation of a Government Research Laboratory into a Commercial Manufacturer: 20 years as CEO of Ash Stevens Inc." US FDA, Office of Pharmaceutical Quality: Drug Quality Forum Lecture, December 12, 2017

2. **Munk, S.A**. "Chemical Development of Anticancer Drugs: The Translation of a Potent Agent into an Approved Drug" Virginia Tech, Department of Chemistry Highlands in Chemistry Seminar, October 26, 2012.

3. **Munk, S.A.** "Chemistry's Role in the Development and Manufacture of Drugs" University of Arizona, Department of Medicinal Chemistry Seminar, November 6, 2008.

4. **Munk, S.A.** "Chemistry's Role in the Development and Manufacture of Drugs" University of Michigan, Department of Medicinal Chemistry Seminar, October 30, 2008.

5. **Munk, S. A.** Honors Convocation Keynote Speaker, Wayne State University, Department of Chemistry Graduation Program, April 23, 2007.

6. **Munk, S.A.** "Chemical Development and Manufacturing of New Drug Substances." Andrews University Chemistry Department of Chemistry Seminar, February 1, 2007.

7. **Munk, S. A**. "Manufacture of Potent Compounds using Barrier Isolation Technology" Containment of Potent Compounds Symposium, Barnett International, Philadelphia, PA; June, 2005.

8. **Munk, S.A.** "Chemistry's Role in the Development and Manufacturing of Drugs." Oakland University Department of Chemistry Seminar, February 23, 2005.

9. **Munk, S.A.** "Alpha-2 Adrenoceptors: Pharmacology, Chemistry and Drug Design of CNS Limited Agents." Wayne State University Department of Medicinal Chemistry Seminar, January 13, 1999.

10. **Munk, S.A.** "Mechanisms of Apraclonidine Induced Ocular Allergy: Bioactivation and Antigen Formation" Continuing Medical Education Program, Tufts University Medical School, November 5, 1996.

11. **Munk, S.A.** "Synthesis and Structural Features of Agents Responsible for α_2 Adrenoceptor Agonist Activity and CNS Penetration" University of Virginia Department of Chemistry Seminar, October 18, 1996.

12. **Munk, S.A.** "The Design and Evaluation of AGN 193080: A Potent, Peripherally Acting α_2 Agonist" University of California at Irvine, Graduate Course in Industrial Chemistry, February 23, 1996.

13. **Munk, S.A.** "AGN 193080: A Potent, Peripherally Acting α_2 Agonist" Western Biotech Conference, San Diego, CA, October 18-21, 1995.

14. **Munk, S.A.** "Structural Features of Agents Responsible for α_2 Adrenoceptor Agonist Activity and CNS Penetration" University of Michigan, Department of Medicinal Chemistry Seminar, October 5, 1995.

15. **Munk, S.A.** "Structural Features of CC-1065 Contributing to its Sequence Selective DNA Binding. A Rapid Strategy for Studying Agent: DNA Interactions" University of California at Santa Cruz, Department of Chemistry Seminar, October 26, 1992.

Presentations and Abstracts

1. **Munk, S.A.** "Ash Stevens: A small pharmaceutical chemical company going strong at fifty years." SCHB 18; 240th American Chemical Society National Meeting Dallas, March 2014.

2. Gupta, P.K.; **Munk, S.A.**; "Novel Approaches Toward the Synthesis of Cladribine and 2'-Deoxyadenosine Nucleosides" ORGN 120, 224th American Chemical Society National Meeting Boston August 2002.

3. Kharlamb, A.B.; Burke, J.A.; Manlapaz, C.A.; Padillo, E.U.; **Munk, S.A.**; Lai, R.K. "AGN 192403: "A Potent I_1 Specific Agent That Lacks Physiologic Function" ARVO 3791, Association for Research in Vision and Ophthalmology National Meeting, Fort Lauderdale, FL, May, 1997.

4. **Munk, S.A.**; Arasasingham, P.; Manlapaz, C.; Kharlamb, A.; Padillo, E.; Runde, E.; Hasson D.; Wijono, M.; Lai, R.; Burke, J.; Wheeler, L.; Garst, M. "Synthesis and Evaluation of Conformationally Restrained Amino Oxazolines as α_2-Adrenergic Agents" MEDI 29, 213th American Chemical Society National Meeting, San Francisco, CA, April, 1997.

5. Thompson, C.D.; **Munk, S.A.**; Wiese, A.; Macdonald, T.L. "Mechanism of *p*-Aminoclonidine Allergenicity: Bioactivation and Antigen Formation" Poster No. 30, Gordon Research Conference on Drug Metabolism, Holderness School, Plymouth NH, July, 1996.

6. **Munk, S.A.**; Thompson, C.E.; Wiese, A.; Macdonald, T. "Oxidation Potential and Allergic Response of α_2 Agonists" ARVO 3839, Association for Research in Vision and Ophthalmology National Meeting, Fort Lauderdale, FL, April, 1996.

7. Chun, T.; **Munk, S.A.**; Wheeler, L.; Lai, R. "Permeability Rates of Novel Ocular Hypotensive α_2 Adrenergic Agonists in Rabbit Ocular Tissues" ARVO 366, Association for Research in Vision and Ophthalmology National Meeting, Fort Lauderdale, FL, April, 1996.

8. **Munk, S.A.**; Harcourt, D.; Arasasingham, P.; Manlapaz, C.; Padillo, E.; Kharlamb, A.; Roberts, D.; Runde, E.; Williams, L.; Burke, J.; Wheeler, L.; Garst, M. "*N*-Aryl Aminoimidazoles: Synthesis and Evaluation as α_2 Adrenergic Agonists" MEDI 22, 211th American Chemical Society National Meeting, New Orleans, LA, March, 1996.

9. **Munk, S.A.**; Harcourt, D.; Wong, H.; Acheampong, A.; Breau, A.; Tang-Liu, D.; Burke, J.; Wheeler, L.; Garst, M. "Synthesis and Characterization of Degradation Products and Metabolites of Brimonidine, a Potent α_2 Adrenergic Agonist" MEDI 21, 211th American Chemical Society National Meeting, New Orleans, LA, March, 1996.

10. Burke, J.; Manlapaz, C.; Kharlamb, A.; Runde, E.; Padillo, E.; Spada, C.; Nieves, A.; **Munk, S.A.**; Macdonald, T.; Garst, M.; Rosenthal, A.; David, R.; Walt, J.; Wheeler, L. "Therapeutic Use of α_2-Adrenoceptor Agonists in Glaucoma" American Society for Pharmacology and Experimental Therapeutics, Nashville, TN, October, 1995.

11. **Munk, S.A.**; Harcourt, D.; Burke, J.; Lai, R,; Roberts, D.; Small, D.; Gluchowski, C.; Manlapaz, C.; Padillo, E.; Kharlamb, A.; Runde, E.; Wheeler, L.; Garst, M. "Synthesis and Biological Evaluation of AGN 193080. A Potent and Selective Ocular Antihypertensive Agent" MEDI 193, 209th American Chemical Society National Meeting, Anaheim, CA, April 1995.

12. **Munk, S.A.**; Arasasingham, P.; Gluchowski, C.; Ryan, C.; Wong, H.; Manlapaz, C.; Padillo, E.; Kharlamb, A.; Runde, E.; Burke, J.; Wheeler, L.; Kaplan, L.; Chandraratna, R.; Garst, M. "*N*-(Alkylcycloalkyl)amino oxazolines: α_2 Adrenergic Agonists" MEDI 232, 207th American Chemical Society National Meeting, San Diego, CA, March 1994.

13. **Munk, S.A.**; Ryan, C.; Wong, H.; Gluchowski, C.; Machado, C.; Padillo, E.; Kharlamb, A.; Runde, E.; Burke, J.; Wheeler, L.; Garst, M.; Chandraratna, R. "Potent α_2 Selective Agonists: 2-Substituted Cycloalkylamino Oxazolines" MEDI 165, 203rd American Chemical Society National Meeting, San Francisco, CA, April 1992.

14. **Munk, S.A.**; Boger, D.L.; Bina, M. "A Convenient Strategy for Generation of Substantial Quantities of Singly 5'-^{32}P End-Labeled Double-Stranded DNA for Binding Studies: A Demonstration of Functional Features of (+)-CC-1065 that Contribute to its Sequence-Selective DNA Binding Properties" ORGN 301, 199th American Chemical Society National Meeting, Boston, MA, April 1990

15. **Munk, S.A.**; Boger, D.L. "A Study of the Structural Features of (+)-CC-1065 and Functional Analogs Contributing to their Sequence Selective DNA Binding Properties" ORGN 26, 199th American Chemical Society National Meeting, Boston, MA, April 1990.

Patents

1. Ammoscato, V.; Bishop, J. E.; Chui, F.-T.; Geiser, A.; Gomez, J.-M.; Hett, R.; Koellner, C.; Kulkarni, V. R.; Lo, Y.; **Munk, S.**; Pickersgill, F. "Synthesis of Boronic Ester and Acid Compounds." U.S. Patent No. 8,283,467.

2. Gupta, P.K.; **Munk, S.A.**; "Process for the Preparation of 9-Beta Anomeric Nucleoside Analogs", U.S. Patent No. 6,884,880.

3. Chow, K.; Gil, D.; Burke, J.; Harcourt, D.; Garst, M.; Wheeler. L.; **Munk, S.A.**; Gomez, D.; Hiedelbaugh, T. "Imidazoles having Reduced Side Effects", U.S. Patent No. 6,841,684 B2.

4. **Munk, S.A.**; Burke, J.A.; Garst, M.E. "Conformationally Rigid Bicyclic and Adamantane Derivatives Useful as α_2-Adrenergic Blocking Agents", U.S. Patent No. 6,706,747

5. **Munk, S.A.**; Burke, J.A.; Garst, M.E. "Conformationally Rigid Bicyclic and Adamantane Derivatives Useful as α_2-Adrenergic Blocking Agents", U.S. Patent No. 6,569,884.

6. Chow, K.; Gil, D.W.; Burke, J.A.; Harcourt, D.A.; Garst, M.E.; Wheeler, L.A.; **Munk, S.A.** "Methods of Treating Pain and Other Conditions", U.S. Patent No. 6,329,369.

7. **Munk, S.A.**; Garst, M.E.; Burke, J.A. "Conformationally Rigid Bicyclic and Adamantane Derivatives Useful as Alpha-2 Adrenergic Blocking Agents", U.S. Patent No. 6,319,935.

8. **Munk, S.A.**; Garst, M.E.; Burke, J.A. "Conformationally Rigid Bicyclic and Adamantane Derivatives Useful as Alpha-2 Adrenergic Blocking Agents", U.S. Patent No. 6,150,389.

9. **Munk, S.A**.; Burke, J.A.; Lai, R.K. "Aryl-imidazolines and aryl-imidazoles useful as alpha-2 adrenergic agonists without cardiovascular side effects", U.S. Patent No. 6,087,361.

10. **Munk, S.A.**; Garst, M.E.; Burke, J.A. "Conformationally Rigid Bicyclic and Adamantane Derivatives Useful as Alpha-2 Adrenergic Blocking Agents", U.S. Patent No. 5,731,337.

11. Green, G.D.; **Munk, S.A.**; Barnes, D.K. "Stain Resistant Polymers Derived from Itaconic Acid Useful as Coating for Fibers", U.S. Patent No. 5,149,754.

12. Green, G.D.; **Munk, S.A.**; Barnes, D.K. "Stain Resistant Polymers Derived from Itaconic Acid Useful as Coatings for Fibers", U.S. Patent No. 5,006,408.

13. Green, G.D.; **Munk, S.A.**; Barnes, D.K. "Stain Resistant Polymers Derived from Itaconic Acid Useful as Coatings for Fibers", U.S. Patent No. 4,925,906.

14. Lapin, S.C.; **Munk, S.A.** "Vinyl Ether Terminated Ester Oligomers", U.S. Patent No. 4,749,807.

15. **Munk, S.A.**; Malloy, T.P. "Imparting Stain Resistance to Certain Fibers", U.S. Patent No. 4,699,812.

Books, Chapters, Editorships, Symposia

1. Miller, S.; Moos, W.; Munk, B.; **Munk, S.** "Managing the Drug Discovery Process: How to Make it more Efficient and Cost-Effective. Woodhead Publishing, an Imprint of Elsevier, 2016.

2. **Munk, S. A.**, Chairperson: "From Chemistry to the Clinic: Pathways for Drug Discovery and Development Part 4: Chemical Development: Translating a Potent Agent into a Registered Product" American Association for Cancer Research Annual Meeting, Chicago, IL, April, 2012.

3. **Munk, S. A.**, Chairperson: "From Chemistry to the Clinic: Pathways for Drug Discovery and Development Part 3: Chemical Development: Translating a Potent Agent into a Registered Product" American Association for Cancer Research Annual Meeting, Orlando FL, April, 2011.

4. **Munk, S. A.**, Chairperson: "From Chemistry to the Clinic: Pathways for Drug Discovery and Development Part 3: Chemical Development: Translating a Potent Agent into a Registered Product" American Association for Cancer Research Annual Meeting, Washington, DC, April, 2010.

5. **Munk, S. A.**, Chairperson: "From Chemistry to the Clinic: Pathways for Drug Discovery and Development Part 4: Chemical Development: Translating a Potent Agent into a Registered Product" American Association for Cancer Research Annual Meeting, Denver, CO, April, 2009.

6. **Munk, S. A.**, Chairperson: "From Chemistry to the Clinic: Pathways for Drug Discovery and Development Part 4: Chemical Development: Translating a Potent Agent into a Registered Product" American Association for Cancer Research Annual Meeting, San Diego, CA, April, 2008.

7. Special Edition of Drug Dev. Res. "Small Molecule Discovery and Development in Emerging Pharmaceutical Companies and Biotechnology." **Munk, S.A.** Ed., 2007 *68 (4)*.

8. **Munk, S.A.** "The Role of the Chemical Development, Quality, and Regulatory Affairs Team in Turning a Potent Agent into a Registered Product" in COMPREHENSIVE MEDICINAL CHEMISTRY II, Volume 2: Research and Development; Moos, W.H. Volume Ed.; Taylor, J.B. and Triggle, D.J. Eds. Elsevier, Oxford*; 2007*.

9. **Munk, S.A.**, Organizer, "Total Synthesis of Natural Products", 1987 American Chemical Society - Great Lakes Regional Meeting.

Board Memberships, Committees, and Community Service

2013-2017	National Science Foundation Review Panelist
2010-2013	SOCMA Board of Governors
2010	NIH-National Heart, Lung, and Blood Institute Special Emphasis Panel
2009-Present	Henry Ford Community College Biotechnology Advisory Board
2011-2015	American Association for Cancer Research / Chemistry in Cancer Research (AACR-CICR); Chairman (2014)
2008-2010	American Association for Cancer Research / Chemistry in Cancer Research (AACR-CICR) Steering Committee
2008-2014	MichBio Board of Directors; Chairman, 2009-2014

2007-2010	SciTech Development Scientific Advisory Board
2000-2006	Advisory Board Member, The Center for Biomedical Research (CBR) Oakland University's College of Arts & Sciences
2011-2017	Detroit Symphony Orchestra Board of Governing Members
2008-2017	Michigan Opera Theater Board of Directors Artistic Director Search Committee
2000-2017	Michigan Opera Theater Board of Trustees
2000-2007	Cascade Hemophilia Foundation Board of Directors; a not-for-profit Pharmacy serving the needs of the bleeding disorders community