

CURRICULUM VITAE
ELIZABETH M. SANFORD
Associate Professor of Chemistry
Hope College
Holland, MI
616-395-7632
September 4, 2014

Education and Professional Training:

B.A.	Chemistry	1987	Smith College
Ph.D.	Chemistry (Organic)	1992	University of California, Los Angeles
Postdoctoral	Organic/polymer chemistry	1994	Cornell University

Teaching Fields:

Primary: Organic Chemistry

Secondary: General chemistry, general education

Courses Taught:

Organic Chemistry I, Organic Chemistry I Lab, Organic Chemistry II, Organic Chemistry II Lab, Structure, Dynamics and Synthesis I, Introduction to Biological Chemistry and Lab, Senior Seminar "A Sense of Place"

Employment and Professional Training:

2000-present, Associate Professor of Chemistry, Hope College,

2000-2001, Visiting research associate (sabbatical), Gentex Corporation, Zeeland, Michigan

1994-2000, Assistant professor of chemistry, Hope College

Grants:

2013

Howard Hughes Medical Institute Faculty Research Grant (Hope College), "The Development of an Electrochemical Array for Sensing Technology" K. L. Brown and E. M. Sanford, \$15,000, funded

The Jacob E. Nyenhuis Faculty Development Grant for Student/Faculty Cooperative Research, "The Development of an 'Artificial Tongue' for Sensing Applications" E. M. Sanford and B. P. Mulhern, \$7,000, funded

2012

"NSF REU Site: Achieving the Next Level: Research Experiences for Underserved Populations," K. L. Brown (PI), G. F. Peaslee (PI), E. M. Sanford (senior personel), \$275,000, funded

2009

"NSF REU Site: Professional Excellence and Development in Science Through Undergraduate Research" K. L. Brown, G. F. Peaslee, E. M. Sanford, \$185,540, funded

The Jacob E. Nyenhuis Faculty Development Grant for Student/Faculty Cooperative Research, "The Preparation of Highly Conjugated Small Molecules for Device Applications" E. M. Sanford and A. Ketchum, \$6,800, funded

2007

Gentex Corporation, "Preparation of Compounds for Device Applications" E. M. Sanford, \$4,000, funded

2006

Gentex Corporation, "Preparation of Compounds for Device Applications" E. M. Sanford, \$4,000, funded

2005

Howard Hughes Medical Institute Grant to Hope College, "Enzymatic Hydrolysis of a Library of Esters," E. M. Sanford and T. Smith, \$2,500, funded

The American Chemical Society Petroleum Research Fund SRF, "Low Band Gap, n-Dopable Conjugated Oligomers and Polymers" M. D. Curtis and E. M. Sanford, \$8,000, funded

Gentex Corporation, "Preparation of Phthalocyanines", E. M. Sanford \$4,000, funded

The Jacob E. Nyenhuis Faculty Development Grant, "Surface Modification with Synthetic Polymers For Control of Cell Adhesion and Growth" E. M. Sanford, \$3,600, funded

2004

The Jacob E. Nyenhuis Faculty Development Grant, "The Preparation of Polyelectrolyte-substituted Poy(arylenevinylenes) for Use in Light Emitting Electrochemical Cells" E. M. Sanford, \$3,600, funded

1997

NSF CAREER, "The Polymerization of Small and Large Ring Propellanes and the Incorporation of Materials Science into the Hope College Curriculum" E. M. Sanford, \$200,000, funded

1995

The Petroleum Research Fund, American Chemical Society, "The Synthesis of Structurally Regular Organic and Inorganic Molecular Tubes from Cyclodextrin Dimers" E. M. Sanford, \$20,000, funded

1994

Camille and Henry Dreyfus Foundation Start-up Grant, "The Synthesis and Polymerization of Substituted [1.1.1]Propellanes to Create Rigid-Rod Polymers and The Synthesis of Molecular Tubes from Preorganized Cyclodextrins" E. M. Sanford, \$12,500, funded

Publications:

(* indicates undergraduate author)

E. M. Sanford, M. G. Tori*, T. M. Smeltzer*, C. K. Beaudoin*, Mary E. Anderson, Kenneth L. Brown, "Cyclic Voltammetric and Spectroelectrochemical Studies of Electropolymerized Films Based on (3,4-Ethylenedioxythiophene)-Substituted 3,6-Dithiophen-2-yl-2,5-dihydropyrrole[3,4-c]pyrrole-1,4- dione" *In preparation*

M. R. Roslaniec, E. M. Sanford, "Benzoylation of Ergosterol through Nucleophilic Acyl Substitution and Subsequent Formation of Ergosterol Benzoate Endoperoxide by Reaction with Singlet Oxygen Generated by Photosensitization" *J. Chem. Ed.* **2011**, *88*(2), 229-231.

- E. M. Sanford, C. C. Lis*, N. R. McPherson*, "The Preparation of Allyl Phenyl Ether and 2-Allyl Phenol Using the Williamson Ether Synthesis and Claisen Rearrangement" *J. Chem. Ed.* **2009**, *86*(12), 1422-1423.
- E. M. Sanford, T. L. Smith, "The Preparation and Enzymatic Hydrolysis of a Library of Esters" *J. Chem. Ed.* **2008**, *85*(7), 944-945.
- T. S. Guarr, K. E. Roberts, R. Lin, K. L. Baumann, D. A. Theiste, P. Giri and E. M. Sanford (Gentex Corporation, Zeeland, Michigan) "Controlled Diffusion Coefficient Electrochromic Materials for use in Electrochromic Mediums and Associated Electrochromic Devices" U. S. Patent 6 710 906, **2004**.
- E. M. Sanford, H. Hermann*, "Bromination, Elimination and Polymerization: A 3-Step Sequence for the Preparation of Polystyrene from Ethylbenzene" *J. Chem. Ed.* **2000**, *77*, 1343-1344.
- E. M. Sanford, A. L. Perkins*, B. Tang*, A. M. Kubasiak*, J. T. Reeves*, K. W. Paulisse*, "A Comparison of 1,4-Bis(halomethyl)benzenes as Monomers for the Modified Gilch Route to Poly[2-methoxy-5-((2'-ethylhexyl)-oxy)-*p*-phenylenevinylene]" *Chem. Comm.* **1999**, *23*, 2347-2348.
- E. M. Sanford, K. W. Paulisse*, J. T. Reeves*, "A Computational Study of 2,5-Dibenzylidenecyclopentanone and 2,6-Dibenzylidenecyclohexanone, Model Compounds for Poly(arylidene cycloalkanones)" *J. Appl. Poly. Sci.* **1999**, *74*, 2255-2257.
- K. Pollack, E. M. Sanford, J. M. J. Frechet, "A Comparison of Two Methods for the Preparation of Dendritic Porphyrins: Core Functionalization vs. Porphyrin Assembly" *J. Mater. Chem.* **1998**, *8*(3), 519-527.
- P. J. Dandliker, F. Diederich, A. Zingg, J.-P. Gisselbrecht, M. Gross, Louati, Alain and E. Sanford, "Dendrimers with Porphyrin Cores: Synthetic Models for Globular Heme Proteins" *Helvetica Chimica Acta* **1997**, *80*(6), 1773-1801.
- J. M. J. Frechet, I. Gitsov, R. B. Grubbs, C. J. Hawker, M. Henmi, M. Leduc, E. Sanford and K. Yui, "New Approaches to Dendritic Macromolecules" *Polym. Mater. Sci. Eng.* **1995**, *73*, 271-272.
- P. J. Dandliker, F. Diederich, M. Gross, C. B. Knobler, A. Louati, E. M. Sanford, "Dendritic Porphyrins: Modulating Redox Potentials of Electroactive Chromophores with Pendant Multifunctionality," *Angew. Chem. Int. Ed. Engl.* **1994**, *33*, 1739-1742.
- E. M. Sanford, J. M. J. Frechet, K. L. Wooley, C. J. Hawker, "Amphiphilic Dendritic Block Copolymers and Approaches to their Accelerated Synthesis," *Polym. Prepr.* **1993**, *34*, 654-655.
- W. L. Jorgensen, T. B. Nguyen, E. M. Sanford, I. Chao, K. N. Houk, "Enhanced View of Structure and Binding for Cyclophane-Arene Complexes through Joint Theoretical and Experimental Study," *J. Am. Chem. Soc.* **1992**, *114*, 4003-4004.
- F. Diederich, D. B. Smithrud, E. M. Sanford, T. B. Wyman, S. B. Ferguson, D. R. Carcanague, I. Chao, K. N. Houk, "Solvent Effects in Molecular Recognition," *Acta. Chim. Scan.* **1992**, *46*, 205-215.
- S. B. Ferguson, E. M. Sanford, E. M. Seward, F. Diederich, "Cyclophane-Arene Inclusion Complexation in Protic Solvents: Solvent Effects Versus Electron Donor-Acceptor Interactions," *J. Am. Chem. Soc.* **1991**, *113*, 5410-5419.
- D. B. Smithrud, E. M. Sanford, I. Chao, S. B. Ferguson, D. R. Carcanague, J. D. Evanseck, K. N. Houk, F. Diederich, "Solvent Effects in Molecular Recognition," *Pure and Appl. Chem.* **1990**, *62*, 2227-2236.
- E. G. Janzen, Y. Kotake, F. Diederich, E. M. Sanford, "Group Recognition by an Octamethoxy-Substituted Cyclophane Host as Studied by Electron Spin Resonance," *J. Org. Chem.* **1989**, *54*, 5421-5422.
- S. B. Ferguson, E. M. Seward, E. M. Sanford, M. Hester, M. Uyeki and F. Diederich, "Molecular Recognition by Cyclophane Hosts," *Pure and Appl. Chem.* **1989**, *61*, 1523-1528.

S. B. Ferguson, E. M. Seward, F. Diederich, E. M. Sanford, A. Chou, P. Inocencio-Szweda, C. B. Knobler, "Strong Enthalpically Driven Complexation of Neutral Benzene Guests in Aqueous Solution," *J. Org. Chem.* **1988**, *53*, 5593-5595.

S. M. Rosenfeld, E. M. Sanford, "Conformational Mobility in 3,6-Diketo[8](9,10)Anthroacenophane," *Tetrahedron Lett.* **1987**, *28*, 4775-4778.

External Presentations:

"The Preparation of Ferrocene and Porphyrin Functionalized EDOT Films for Electrochemical Sensing" Bioanalytical Sensors (Gordon Research Conference), Salve Regina University, Newport, RI, June, 2014.

"The Preparation and Characterization of Diketopyrrolopyrrole Functionalized PEDOT Films" National Organic Symposium, University of WA, Seattle, WA, June, 2013.

"The Preparation and Electropolymerization of Thiophene-Substituted Diketopyrrolopyrroles" Bioinspired Materials (Gordon Research Conference), Davidson College, Davidson, NC, June, 2012.

"Where Do Medicines Come From" Woman's Literary Club, Holland, MI, January, 2010.

"The Preparation of Highly Conjugated Compounds for Device Applications and the Preparation of Functionalized Sol-Gels for Control of Cell Growth" Andrews University, Berrien Springs, MI, March, 2010.

"Thiophene Derivatives for Device Applications" The 33rd Reaction Mechanisms Conference, University of Massachusetts, Amherst, MA, June, 2010.

"Preparing for a Postdoctoral and Academic Position in Chemistry" Notre Dame University, South Bend, IN, October, 2009.

"NMR as an Analytical Tool", Gentex Corporation, Zeeland, MI, February, 2009.

"Polyether Substituted Poly(phenylenevinylenes) for Use in Light Emitting Electrochemical Cells" National Organic Symposium, Duke University, Durham, NC, June, 2007.

"A Double Feature: The Preparation of Polyether Substituted Poly(phenylenevinylenes) for Device Applications and the Preparation of Functionalized Sol Gels for Control of Cell Growth" Washington University, St. Louis, MO, April, 2007.

"New Materials for Medicine" Winter Happening, Holland, MI, February, 2006.

"The Preparation of Polyether Substituted Poly(phenylenevinylenes) for use in Light Emitting Devices" National Organic Symposium, Salt Lake City, Utah, June, 2005.

"Rearrangements Encountered in the Preparation of Spirosubstituted [1.1.1]Propellanes" 30th Reaction Mechanisms Conference, Northwestern University, Evanston, IL, June, 2004.

"The Preparation of Polyether Substituted PPV's for use in Light Emitting Electrochemical Cells" National Science Foundation 12th Workshop on Materials Chemistry and Nanoscience, Broomfield, CO, October, 2004.

"Careers at Undergraduate Institutions: What you need to know" Indiana University, Bloomington, IN, April, 2002.

"The Preparation of Spiro-Substituted [1.1.1]Propellanes" Indiana University, Bloomington, IN, April, 2002.

"The Preparation of Spiro-Substituted [1.1.1]Propellanes" NSF Workshop for Physical Organic Chemistry, Warner Springs, CA, June, 2000.

"The Preparation of Spiro-Substituted [1.1.1]Propellanes" National Organic Symposium, U. of WI, Madison, WI, June, 1999.

"What [1.1.1]Propellanes Do Under Stress" Grand Valley State University, Allendale, MI, Fall, 1998.

"Finding a Job at a Liberal Arts Institution" Council for Undergraduate Research, North Carolina Central University, Durham, NC, June, 1996.

"The Role of the Library at a Research-Rich Undergraduate Institution" Project Kaleidoscope Meeting, Hope College, Holland, MI, Spring, 1996.

"Developing a Career at a Research-Rich Undergraduate Institution" Project Kaleidoscope meeting, Hope College, Holland, MI, Spring, 1996.

"Functionalized Dendrimers: What's New and What's Next" University of Michigan, Ann Arbor, MI, Fall, 1995.