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EXPERIENCE

2007- Chair of Chemistry Department- Bowdoin College
2006 - Professor of Chemistry – Bowdoin College
2004-05 Visiting Scholar - UNC, Chapel Hill Dept of Chemistry
2000-06 Associate Professor of Chemistry - Bowdoin College
1993-2000 Assistant Professor of Chemistry - Bowdoin College
1998-99 Visiting Scientist - Los Alamos National Laboratory (LANL)
1990-93 Postdoctoral Fellow - MIT Dept. of Chemistry
1988-90 Research Assistant - UCLA Dept. of Chemistry
1985-88 Teaching Fellow/Teaching Assistant - UCLA Dept. of Chemistry
1985 Analytical Laboratory Technician - Parke-Davis Division of Warner-Lambert
1983-84 Undergraduate Research Assistant - Hope College Dept. of Chemistry

EDUCATION

1991-93 Massachusetts Institute of Technology, Cambridge, MA
Postdoctoral Fellow
1985-90 University of California, Los Angeles, Los Angeles, CA
Doctor of Philosophy (Organic Chemistry)
1981-85 Hope College, Holland, MI
Bachelor of Science (Chemistry)

GRANTS, HONORS, AND AWARDS

2001-05 DOE/Los Alamos National Lab: "Lanthanides as Catalytic Actinide Models" (PI, \$155K)
2004-05 Bowdoin College Porter Fellowship for Advanced Study (Competitive sabbatical salary supplement)
2004-05 NSF ROA- Supplement to M. Brookhart funding Sabbatical (\$25K)
2001-03 Petroleum Research Fund, Type B "Convergent Synthesis of Highly Substituted, Tethered, Cp Ligands and their Use in Lanthanocene Catalyzed Reactions" (PI, \$30K)
2001-03 NSF MRI: Acquisition of a CCD-Detected X-ray Diffractometer (Co-PI, \$328K Instrument at Colby College)
2001 Pfizer Summer Undergraduate Research Fellowships in Chemistry to Support Kris Bosse (\$5K)
1998 Karofsky Teaching Prize for Junior Faculty (Bowdoin)
1997-99 NSF MRI: Acquisition of a 400 MHz NMR (PI, \$107K)
1997 Council on Undergraduate Research Summer Research Fellowship for Jennifer Krumper (\$5K)
1995-99 NSF Faculty Early CAREER Development Program Grant (PI, \$135K)
1994-96 Research Corporation Cottrell College Science Award (PI, \$36K)
1993-95 Camille and Henry Dreyfus Faculty Start-up Grant for Undergraduate Institutions Awardee (PI, \$10K)
1994-2010 Fourteen Surdna Foundation Fellowships to support rising seniors for summer research (Competitive Bowdoin awards requiring joint student faculty proposal: ~\$3K average award)

- 1986 Du Pont Departmental Teaching Assistant Award (UCLA)
1985 Sigma Xi Summer Research Award (Hope)

COURSES TAUGHT

Organic Chemistry I
Organic Chemistry II
Molecular Structure Determination in Organic Chemistry
Physical Organic Chemistry
Organometallics
Research Methods in Chemistry
Science of Food and Wine

COLLEGE AND DEPARTMENT SERVICE (2000-)

- 2010-11 Radiation Safety
2008-09 Committees: Athletic Review, Biochemistry
2005-08 Committees: Judicial Board, Athletic Review.
Faculty Representative to NCAA.
2006-07 Ad Hoc Committees on Summer Research and Enhancing Student
Engagement
2006 Search Committee- Dean for Admissions and Financial Aid
2003-04 Committee: Library Advisory.
2003 Coordinated and authored department review self study.
2000-03 Committee: Curriculum and Education Policy. Secretary 2000-02
Chair, New Course Subcommittee 2003. Faculty Representative to
Trustee Committee 2002-03.
2000-2008 Invited and hosted 30 speakers to departmental seminar series.
2001 Science Librarian Search Committee
1999-2004 Coordinated and administered Coles Summer Research program.

SERVICE TO PROFESSIONAL COMMUNITY (2000-)

Manuscript Reviewer for: *Chemical Communications*, *Chemical Reviews*,
Journal of the American Chemical Society, *Journal of Organic Chemistry*,
Langmuir, *Organometallics*
Proposal Reviewer for: Research Corporation, National Science
Foundation, ACS Petroleum Research Fund, Austrian Science Fund
(FWF)
Panelist for NSF MRI-MU
Member LANL Laboratory Directed Research and Development –
Exploratory Research Proposal Evaluation Committee
Tenure Reviewer for: Harvey Mudd College, University of South
Alabama, Williams College
External Reviewer for Bates College Honors Thesis

PUBLICATIONS (Underlined Name Denotes Bowdoin Student.)

L. A. Colip, A. T. Koppisch, R. D. Broene, J. A. Berger,
S. M. Baldwin, M. N. Harris, L. J. Peterson, B. P. Warner
E. R. Birnbaum "A rapid method for quantifying heavy atom
derivatives for multiple isomorphous replacement in protein
crystallography", *J Appl. Cryst.*, **2009**, *42*, 329-332.

R. L. Christensen, M. G. I. Galinato, E. F. Chu, J. N. Howard, R. D. Broene, H. A. Frank "Energies of Low-Lying Excited States of Linear Polyenes" *J. Phys. Chem. A* **2008**, *112*, 12629–12636.

R. D. Broene "Reductive Coupling of Unactivated Alkenes and Alkynes" in *Metal Catalyzed Reductive C-C Bond Formation* in "Topics in Current Chemistry" vol . 279, Michael Krische Editor, Springer Verlag, Heidelberg, **2007**, 209.

R. D Broene, M Brookhart, W. M. Lamanna, A. F. Volpe, Jr. "Cobalt Catalyzed Dimerization of α -Olefins to give Linear α -Olefin Products" *J. Am. Chem. Soc.* **2005**, *127*, 17194.

R. L. Christensen, E. A. Barney, R. D. Broene, M. G. Galinato, and H. A. Frank "Linear Polyenes: Models for the Spectroscopy and Photophysics of Carotenoids" *Arch. Biochem. Biophys.* **2004**, *430*, 30.

R.D. Broene, R.T Baker "Disilylation", in *Encyclopedia of Catalysis*, vol 3. p 79, I. Horvath, Ed. Wiley Interscience, New York **2003**

R.D. Broene, R.T . Baker "Diboration", in *Encyclopedia of Catalysis*, vol 3. p 92, I. Horvath, Ed. Wiley Interscience, New York **2003**

R.D. Broene, R.T. Baker " Distannylation", in *Encyclopedia of Catalysis*, vol 3. p 103, I. Horvath, Ed. Wiley Interscience, New York **2003**.

C. A. G. Carter, K. D. John, Mann, G., R. L. Martin, T. M. Cameron, R. T. Baker, K. L. Bishop, R. D. Broene, and S. A Wescott in "Advances in Group 13 Element Chemistry", eds. P. S. Shapiro and D. A. Atwood, *ACS Symp. Ser.* **2002**, *822*, 70.

F.M. de Rege, D.K. Morita, K.C. Ott, W. Tumas, R.D. Broene " Non-covalent Immobilization of Homogeneous Cationic Chiral Rhodium-phosphine Catalysts on Silica Surfaces " *J.C.S. Chem. Commun.* **2000**, 1797.

F.M. de Rege, D.K. Morita, K.C. Ott, W. Tumas, R.D. Broene "Immobilized Chiral Rhodium Complexes on Silicas Show Enhanced Enantioselectivity in Hydrogenation of Enamide Esters" in *Catalysis of Organic Reactions*, M.E. Ford, Ed., Marcel Dekker, New York, **2000**, 439.

A.T. Gilbert, B.L. Davis, T.J. Emge, R.D. Broene "Synthesis, Structure, and Catalytic Reactions of 1,2-Bis(Indenyl) Ethane-Derived Lanthanocenes." *Organometallics*, **1999**,*18*, 2125.

B.P. Warner, S.P. Millar, R.D. Broene, S.L. Buchwald "Controlled Acceleration and Inhibition of Bergman Cyclization by Metal Chlorides" *Science*, **1995**, *269*, 814.

R.D. Broene "The Reductive Coupling of Unsaturated Organic Species by Early Transition Metal Complexes" in *Comprehensive Organometallic Chemistry-II*, Pergamon, London, **1995**, Vol. 12, 323.

S.L. Buchwald, R.D. Broene "Synthetic Applications of Zirconocene Complexes of Arynes" in *Comprehensive Organometallic Chemistry-II*, Pergamon, London, **1995**, Vol. 12, 771.

POSTDOCTORAL, GRADUATE AND UNDERGRADUATE PUBLICATIONS

R.D. Broene, S.L. Buchwald "Asymmetric Hydrogenation of Unfunctionalized Trisubstituted Olefins with a Chiral Titanocene Catalyst" *J. Am. Chem. Soc.* **1993**, *115*, 12569.

R.D. Broene, S.L. Buchwald "Zirconocene Complexes of Unsaturated Molecules: New Vehicles for Organic Synthesis" *Science* **1993**, *261*, 1696.

K.D. Deshayes, R.D. Broene, I. Chao, C.B. Knobler, F. Diederich; "Synthesis of Helicopodands" *J. Org. Chem.* **1991**, *56*, 6787.

R.D. Broene, F. Diederich "The Synthesis of Circumanthracene" *Tetrahedron Lett.* **1991**, *32*, 5227.

M.P. Doyle, S.N. Mahapatro, R.D. Broene, J.K. Guy "Oxidation and Reduction of Hemoproteins by Trioxodinitrate(II). The Role of Nitrosyl Hydride and Nitrite" *J. Am. Chem. Soc.* **1988**, *110*, 593.

INVITED TALKS (2000-)

Bates College
University of Southern Maine
Bowdoin College Faculty Seminar Series
University of North Carolina, Chapel Hill
Smith College
Furman University
Hope College
College of William and Mary

STUDENT RESEARCH PROJECTS- Name, "Title", Duration, Current Positions (Degree Program, Completed). Listed by Graduation year.

55 undergraduate student researchers mentored.

2010-2011 Kaitlin Clifford "Synthesis of a Sterically Hindered Metallocene Catalyst" Summer + Fall
Katherine Rawden "Ligand Variation for a Cobalt Catalyst to Dimerize Linear alpha-Olefins" Summer
Taylor Vozniak "8-Quinoliny-Cyclopentadiene". Summer

- 2009-2010 Alex Carpenter "8-Quinoliny-Cyclopentadiene: A Ligand for Cobalt Catalyzed α -Olefin Dimerization". 2 Summers and Honors Organic Chemistry UC San Diego
James Chen "Cp*Co(ethane)L: Ligand Variations for Regioselection" Spring
- 2008-09 Michael Farthing "Catalyst Optimization for the Synthesis of Poly(silyl ether)s" Summer
Oronde Cruger "Ligands for Cobalt Catalysts" Summer
- 2007-08 Michael Ardolino "The synthesis of phosphabenzene and its Co complexes" Honors + 2 summers Boston College (PhD)
Jonathan Freedman "New Synthesis of Chromones" Honors Med School
David Soohoo "The Use of a Cobalt (I) Catalyst in the Production of Linear α -olefin Products" Med School SUNY Stony Brook Honors.
Anh Tran "Polysilylethers via Iridium-catalyzed Dehydrocoupling of Diols with Disilanes" Ind Study Deloitte and Touche
- 2006-07 Kristen Brownell "The Synthesis of Enepolyynes" Honors Stanford University (PhD)
Ethan Van Arnam "Improving Selectivity of Linear α -Olefin Dimerization to Linear α -Olefin Products by Cobalt Catalysis: Attempted Synthesis of Phosphabenzene as a Cobalt Ligand" Honors plus one summer. Cal Tech (PhD) California Institute of Technology – Organic Chemistry(PhD)
- 2005-06 Evron Legall Two summers, two semester Ind Study
- 2004-05 John Haines "Synthesis of Ferrocene Based Lanthanide Sulfonamide Catalysts" Honors plus two summers University of Maryland (MD)
Andrew Parsons "Towards the Synthesis of C₂-Symmetric Ferrocenyl Bis-N-Heterocyclic Carbene Ligands" Honors plus two summers University of North Carolina, Chapel Hill- Organic Chemistry (PhD 2010)
Lauren Sarno "The Polymerization of COT and Hexadiene using Schrock's and Grubbs' Catalysts" One summer (Joint with Christensen)
Emma Leonard "Metathesis Route to Bridged Bis(allylindenyl) Lanthanocene Chlorides" One summer UT Austin (M Arch)

- 2003-04 Laura Phillips "Catalysis Of Carbon-Carbon Bond Forming Reactions By Chiral Ligand Modified Lanthanide Catalysts" Honors plus two summers
Will Stetler: "Synthesis of C₂-Symmetric Lanthanocene Catalysts" Honors plus one summer
 University of Alabama (MD 2009)
James Wilkins: "Synthesis of C₂-Symmetric Disulfonamides ligands from 1,1'-Binaphthyl-2,2'-Diamine" Honors plus one Summer
 Oxford University- Genetics (PhD, Marshal Scholar) Harvard (MD)
- 2002-03 Adam Kinney: "The Synthesis of Tethered Bis-4,7-Diisopropylindene Ligands: Diastereoselectivity and Metallocene Catalysts" Summer 02
 Northwestern University Physical Chemistry (PhD)
Sara Wiltshire: "Synthesis, Purification, and Characterization of Methyl-Terminated Polyenes. (Joint with Christensen) 1 Semester, Summer 02
 University of California, Davis - Forensic Science (MS)
Mara Grossman: Room-temperature Molten Salts and their Potential use as Solvents in Lanthanide-catalyzed Reactions" (Univesrity of Maryland (MD) One semester and one summer
Libby Barney: "Synthesis, Purification and Photochemical Characterization of Dimethyl Polyenes. (aka Fun with Polyenes)" (Joint with Ron Christensen) Honors plus one summer
 Tufts University (DVM 2010)
Ariele Hanek "Synthesis of Bis(Sulfonamide)Ferrocenyl Ligands for Lanthanide Series Metal Catalysis" Honors plus two summers.
 California Institute of Technology- Organic Chemistry (PhD 2009)
Elise Meoli: The Enantioselective Catalytic Capabilities of a Lanthanide-Sulfonamide complex with a Ferrocene Backbone.
 Honors plus one summer
 University of Rochester (MD)
- 2001-02 Kristopher Bosse: " The Synthesis of Bis-cyclopentadienyl Ligands for Enantioselective Catalysis 2 Summers 2 semesters. Honors
 University of Pennsylvania (MD)
Matthew Stanton: " Synthesis of 4,7-Diisopropylindenene for Use in the Diastereoselective Synthesis of Lanthanocene Catalysts." 1 summer, 2 semesters. Honors
 University of Texas, Austin- Analytical Chemistry (MS), UNC Chapel Hill (MBA 2008)
- 2000 -01 Karyn Bishop: "Deoxygenation of Epoxides, Sulfoxides, and Sulfones using B₂Cat'₂ and Wilkinson's Catalyst." 1 Summer
 Market Strategist- Portland Maine
Erik Woodbury: "The Synthesis of C₂ Symmetric Lanthanocene Catalysts through the Zirconium-mediated Coupling of Two Alkynes." Honors plus 1 summer
 University of California, Davis- Organic Chemistry (PhD)
Eri Yoshida: "Synthesis of C₂-Symmetric *ansa* Lanthanocenes." 3 semesters, Honors plus one semester and summer

University of Utah- Organic Chemistry (MS, 2002)

- 1999-2000 Robin Bellanca: "Zirconocene Mediated Coupling of Eneidyne." 1 semester.
Harvard University (JD 2004)
- 1997-98 Benjamin Davis: "Design and Synthesis of C₂-Symmetric *Ansa* Lanthanocenes." Two semesters, 2 summers. Honors
University of California, Irvine- Inorganic Chemistry (PhD 2003)
Jennifer Krumper: "Zirconium-mediated Reductive Cyclization of Alkenes in the Total Synthesis of Rosemarinecine." Three semesters 1 summer. Honors
University of California, Berkeley- Organic Chemistry (PhD, 2003)
Jeffrey Rodhe: "Synthesis of a C₂-Symmetric Diphenyl Aziridine for Use as a Chiral Auxiliary." 2 semesters, 1 summer. Honors
University of Texas Southwest Medical Center (MD)
Jessica Brannon: "New Routes to a Cp-based Ligand." 1 semester, 1 summer.
J. Anthony D'Alessio: "Synthesis of a Triendiyne for Titanocene-mediated Cyclization." 1 semester, 1 summer.
University of California, Berkeley- Research Assistant
- 1996-97 Matthew Weiss: "The Total Synthesis of Rosemarinecine." 3 semesters 1 summer. Honors
Yale University- Organic Chemistry (PhD 2002)
Christina Jeffris: "Zirconocene-based Cyclization Reactions to Produce Ligands for Lanthanide Complexes." 1 semester.
University of Washington Medical School (MD 2002)
Michael Kaufmann: "Synthesis of Zirconocene Ligands." 1 semester
University of Rochester Medical School (MD).
Christina Marchetti: "A Palladium-catalyzed Route to Decapentaene." 2 semesters.
Johns Hopkins University- Molecular Biophysics (PhD 2003)
Artur Treyster: "Zirconium-mediated Alkene + Alkyne Coupling." 1 semester.
Cornell University (MD 2004)
- 1995-96 Jennifer Krumper: "The Synthesis of Decapentaene" 1 semester
Michael Miller: "Synthesis and Stabilization of Strained Organic Compounds and the Isolation of Elusive Molecules." 2 semesters, 1 summer. Honors
University of California, Los Angeles- Organic Chemistry (PhD, 2000)
Benjamin Nolan: "Synthesis and Hydrogenation/Cyclic Amination of Imino Olefins by Lanthanocene Complexes." 2 semesters, 2 summers. Honors
Colorado State University- Inorganic Chemistry (PhD, 2000)
Scott Sternson: "The Synthesis of (-) Rosmarinecine Utilizing a Zirconium-Mediated Ring Closure" 2 semesters. Honors
Harvard University- Organic Chemistry (PhD, 2001)
Florence Lucas: "Bis-Cp* Lanthanide Complexes as Catalysts for Imine Hydrogenation." 1 summer.

Environmental Consultant, Portland, ME

- 1994-95 Rachael Cleaves: "The Production of C₂-Symmetric Ligands for use in Lanthanocene Catalysts." 1 semester.
Veterinary Assistant- Anchorage, Alaska
Andrew Gilbert: "Synthesis of Chiral C₂-Symmetric *Ansa*-Lanthanocenes." 2 semesters, 1 summer. Honors
University of Maine, Forestry (MS, 2001)
Daniel Pippel: "1,3,5,7,9-Decapentaene Synthesis, Optical Spectroscopy, and Temperature Dependence of Fluorescence.")Joint with Christensen) 2 semesters.
University of Illinois, Chemistry (PhD)
Heather Standley: "Stabilization of Strained Cyclic Organic Molecules through Zirconocene Complexation." 1 semester.
- 1993-94 Joanne Holland: "Stabilization of Strained Species by Zirconocene Complexation." 2 semesters. Honors
University of Pennsylvania- Organic Chemistry (PhD, 1999),
Susan Millar: "The Synthesis of Novel C₂-Symmetric Ligands for Lanthanocene Catalyzed Reactions." 2 semesters, 1 summer. Honors
University of Rochester- Inorganic Chemistry (PhD, 1999)