

CURRICULUM VITAE

William Dean Wulff
Professor of Chemistry

Address: Work: Home:
Department of Chemistry 1339 Silverwood Dr.
Michigan State University Okemos, MI 48864
East Lansing, MI 48824

Telephone: (517) 355-9715 ext 373

Fax: (517) 353-1793 e-mail: wulff@cem.msu.edu

Website: url: <http://www.chemistry.msu.edu/faculty/wulff/myweb26/index.htm>

Date of Birth: December 10, 1949; Eau Claire, Wisconsin

Marital Status Married: Mary Domenica Zaccari (1974)
Children: Stephen Michael (October 15, 1983)
Gina Maria (May 20, 1986)
Eric Peter (February 17, 1988)

Military Service: United States Army 1971-1974

Educational Experience:

B.S. degree - University of Wisconsin-Eau Claire, Eau Claire, Wisconsin, 1971 - Chemistry
United States Army Signal Corps, Fort Monmouth, New Jersey, 1972-microwave radio repair
Ph.D. degree - Iowa State University, Ames, Iowa, 1979 - organic chemistry
NIH Postdoctoral Fellow at Princeton 1979-1980

Honors:

Eli Lilly Young Scholar Award 1986-1987
National Institutes of Health Postdoctoral Fellowship, 1979-1980
Fellow of the American Association for the Advancement of Science, 1998
Sigma Xi Senior Meritorious Faculty Award, 2005

Research and/or Professional Experience:

Professor of Chemistry, Michigan State University, August 16, 1999 - present.
Professor of Chemistry, The University of Chicago, July 1, 1992 - August 15, 1999.
Associate Professor of Chemistry, The University of Chicago, July 1, 1986-June 30, 1992
Assistant Professor of Chemistry, The University of Chicago, August 1, 1980-June 30, 1986
Postdoctoral Fellow, Princeton University with Professor M.F. Semmelhack, 1979-1980
Research Assistant, Iowa State University with Professor T.J. Barton, 1974-1979
Laboratory Technician, 1st United States Army Medical Laboratory, Fort Meade, Maryland, 1972-1974
Laboratory Technician, Saint Agnes Hospital, Baltimore, Maryland, 1972-1974
Research Assistant, University of Wisconsin-Eau Claire with Professor L.G. Schnack, 1968-1971

Membership in Professional Societies:

American Chemical Society
Chemical Society (London)

Appointments:

Merrell Dow Pharmaceutical Inc., Indianapolis, Indiana, Consultant 1982-1984
Special Reviewer, NIH Metallobiochemistry Study Section, June 15-17, 1989.
Special Reviewer, NIH Medicinal Chemistry Study Section A, February 13-15, 1991.
Sugen Inc., Redwood City, CA. Consultant 2002 –
Special Reviewer, NIH SBC-A Study Section, February 16-17, 2005.

Research Support:

Research Corporation; "Application of chromium complexes to synthetic organic chemistry - the synthesis of aklavinone", \$12,000, 1980-1982.

American Cancer Society Institutional Grant (University of Chicago); "Anthracycline synthesis with chromium carbene complexes", \$5,000, 1980-1982.

Petroleum Research Fund (Type G); "A chromium mediated synthesis of aklavinone", \$10,000, 1981-1983.

Cancer Research Center, University of Chicago; "Synthesis of antitumor agents", \$9,000, 1982-1983.

Dow Chemical Company, "Carbene complexes in organic synthesis; Applications to heterocyclic chemistry", \$64,654, 1982-1984".

National Science Foundation, Grant CHE-8209352, "Carbene complexes in organic synthesis". Funded for the three year period 1-1-83 through 12-31-85 (years 01 - 03). Total direct support \$144,942.

National Institutes of Health, grant CA 32974, "Synthesis of Anthracyclines". Funded for the three year period 05-1-83 to 04-30-86 (years 01 - 03). Total direct support \$184,964.

Petroleum Research Fund, PRF 15100-AC1; "Mechanism of the annulation reaction of chromium carbene complexes with acetylenes", \$35,000, funded for 1983 - 1985.

National Institutes of Health, grant GM 33589, "Synthesis of antitumor agents". Funded for the three year period 12-1-83 to 11-30-86 (years 01 - 03). Total direct support \$241,780.

Petroleum Research Fund, PRF 17053-AC1-C; "The Reactions of vinyl ketene complexes of chromium with unsaturated functional groups", \$52,500, funded for 1985 - 1988.

Eli Lilly Company; \$14,400/2 years, 1986-1987.

National Science Foundation, Grant CHE-8517103, "Carbene complexes in organic synthesis". Funded for the three year period 1-1-86 through 12-31-88 (years 04 - 06). Total direct support \$126,000.

National Institutes of Health, grant CA 32974, "Synthesis of Anthracyclines". Funded for the three year period 05-1-86 to 04-30-89 (years 04 - 06). Total direct support \$237,782.

National Institutes of Health, grant GM 33589, "Synthesis of antitumor agents". Funded for the three year period 12-1-86 to 11-30-89 (years 04 - 06). Total direct support \$380,457.

National Science Foundation, Grant CHE-8821326, "Carbene complexes in organic synthesis". Funded for the three year period 3-1-89 through 2-28-92 (years 07 - 09). Total direct support \$164,164.

National Institutes of Health, grant CA 32974, "Synthesis of Anthracyclines". Funded for the five year period 05-1-89 to 04-30-94 (years 07 - 12). Total direct support \$517,763.

National Institutes of Health, grant GM 33589, "Synthetic Applications of Carbene Complexes", Funded for the four year period 4-1-91 to 3-31-95 (years 07 - 10). Total direct support \$569,839.

National Science Foundation, Grant CHE-8821326, "Carbene complexes in organic synthesis", Special Creativity Extension for the two year period 3-1-92 through 2-28-94 (years 10 - 11). Total direct support \$134,837.

National Institutes of Health, grant GM 45326, "New Ligands for Asymmetric Synthesis and Catalysis", Funded for the three year period 08-01-93 to 07-31-96 (years 01 - 03). Total direct support \$293,635.

National Science Foundation, Grant CHE-9422517, "Organometallic Processes in Organic Synthesis". Funded for the three year period 3-1-95 through 2-28-98 (years 12 - 14). Total direct support \$237,611.

National Institutes of Health, grant GM 33589, "Synthetic Applications of Carbene Complexes", Funded for the four year period 12-1-95 to 11-30-99 (years 11 - 14). Total direct support \$694,826.

National Science Foundation, Grant CHE-9422517, "Organometallic Processes in Organic Synthesis". Funded for the three year period 3-1-95 through 2-28-98 (years 12 - 14). Total direct support \$237,611.

UOP Company, "Development of New Asymmetric Catalysts", Funded for the two year period 5/1/97 to 4/31/99. Total Support \$100,000.

National Institutes of Health, grant GM 33589, "Synthetic Applications of Carbene Complexes", Funded for the four year period 12-1-99 to 11-30-03 (years 15 - 18). Total direct support \$701,938.

National Institutes of Health, grant GM 63019, "Development of New Asymmetric Catalytic Processes", Funded for the four year period 6-5-02 to 5-31-06 (years 1 - 4). Total direct support \$700,000. Total Support \$1,002,167.

National Science Foundation, Grant CHE-0750319, "Total Synthesis of Phomactins with Transition Metal Carbene Complexes". Funded for the three year period 2-1-08 through 1-31-11. Total support \$375,000.

National Institutes of Health, grant GM094478, "New Chiral Brønsted Acids for Asymmetric Synthesis", Funded for the four year period 4-1-11 to 3-31-15 (years 1 - 4). Total direct support \$760,000. Total Support \$1,051,054.

Lectures:

5th International Symposium on Organosilicon Chemistry, August 14-18, 1978, Karlsruhe, West Germany.

Merrell Dow Pharmaceuticals, Indianapolis, Indiana, March 9, 1982.

Monsanto Company, St. Louis, Missouri, November 4, 1982.

Merrell Dow Pharmaceuticals, Indianapolis, Indiana, November 23, 1982.

Northern Illinois University, Dekalb, Illinois, March 24, 1983.

University of Wisconsin - LaCrosse, LaCrosse, Wisconsin, November 17, 1983.

Hope College, Holland, Michigan, December 2, 1983.

Dow Chemical Company, Midland, Michigan, December 9, 1983

Searle Company, Skokie, Illinois, January 11, 1984.

Northwestern University, Evanston, Illinois, February 2, 1984.

Syracuse University, Syracuse, New York, March 9, 1984.

University of Illinois - Chicago, Chicago, Illinois, May 1, 1984.

General Electric, Schenectady, New York, June 20, 1984.

Loyola University, Chicago, Illinois, September 19, 1984.

Rohm and Haas, Philadelphia, Pennsylvania, October 1, 1984.

Princeton University, Princeton, New Jersey, October 2, 1984.

University of Illinois - Urbana, Champaign, Illinois, October 8, 1984.

University of California - Berkeley, California, October 18, 1984.

University of Wisconsin - Eau Claire, Eau Claire, Wisconsin, October 26, 1984.

Marquette University, Milwaukee, Wisconsin, November 2, 1984.

Illinois Institute of Technology, Chicago, Illinois, November 21, 1984.

University of Wisconsin - Oshkosh, Wisconsin, November 30, 1984.

Columbia University, New York, January 24, 1985.

Indiana University, Bloomington, Indiana, March 18, 1985.

North Carolina State University, Raleigh, North Carolina, September 16, 1985.

Dupont Central Research Station, Wilmington, Delaware, September 17, 1985.

University of Delaware, Newark, Delaware, September 18, 1985.

University of Michigan, Ann Arbor, Michigan, October 2, 1985.

Emory University, Atlanta, Georgia, October 15, 1985.

Massachusetts Institute of Technology, Boston, Massachusetts, November 7, 1985.

Stanford University, Stanford, California, November 13, 1985.

California Institute of Technology, Pasadena, California, November 20, 1985.

Iowa State University, Ames, Iowa, December 5, 1985.

Purdue University, West LaFayette, Indiana, January 21, 1986.

Michigan State University, Lansing, Michigan, January 23, 1986.

University of Akron, Akron, Ohio, February 25, 1986.

Case Western Reserve University, Cleveland, Ohio, February 27, 1986.

University of Wisconsin, Madison, Wisconsin, May 1, 1986.

Eli Lilly Company, Indianapolis, Indiana, June 19, 1986.

Kalamazoo College, Kalamazoo, Michigan, October 21, 1986.

College of Wooster, Wooster, Ohio, October 29, 1986.

Cornell University, Ithaca, New York, April 20, 1987.

Stuart Pharmaceuticals, Wilmington, Delaware, March 24, 1987.

University of South Carolina, Columbia, South Carolina, May 1, 1987.

Cincinnati ACS section, November 11, 1987.
University of Cincinnati, Cincinnati, Ohio, November 12, 1987.
New York University, New York, New York, November 13, 1987.
Squibb Institute for Medical Research, Princeton, New Jersey, November 19, 1987.
Boston University, Boston, Massachusetts, November, 30, 1987.
Polaroid Corporation, December 1, 1987.
University of Pittsburgh, Pittsburgh, Pennsylvania, January 13, 1988.
Pennsylvania State University, University Park, Pennsylvania, January 14, 1988.
University of Virginia, Charlottesville, Virginia, March, 25, 1988.
University of Minnesota, Minneapolis, Minnesota, May 25, 1988.
Wayne State University, Detroit, Michigan, September 7, 1988.
Illinois Institute of Technology, Chicago, Illinois, October 12, 1988.
Illinois State University, Normal, Illinois, February 24, 1989.
University of Fribourg, Fribourg, Switzerland, April 24, 1989.
University of Neuchatel, Neuchatel, Switzerland, April 25, 1989.
University of Lausanne, Lausanne, Switzerland, April 26, 1989.
University of Geneva, Geneva, Switzerland, April 27 - 28, 1989.
University of Maryland, College Park, Maryland, September 19, 1989.
Eastern Illinois University, Charleston, Illinois, October 9, 1989.
University of Nebraska, Omaha, Nebraska, December 1, 1989.
UpJohn Company, Kalamazoo, Michigan, March 19, 1990.
Washington University, St. Louis, Missouri, March 22, 1990.
University of Wisconsin-Milwaukee, Milwaukee, Wisconsin, March 26, 1990.
University of Southern California, Los Angeles, California, April 12, 1990.
California Institute of Technology, Pasadena, California, April 13, 1990.
University of California-San Diego, La Jolla, California, April 16, 1990.
Hoffmann-La Roche Company, Nutley, New Jersey, April 19, 1990.
American Cyanamid Company, Pearl River, New York, June 12, 1990.
University of Waterloo, Waterloo, Canada, September 16, 1990.
Governor's State University, University Park, Illinois, October 17, 1990.
University of Rochester, Rochester, New York, April 3, 1991.
University of Pennsylvania, Philadelphia, PA, April, 29, 1991.
Merck Sharp & Dohme Laboratories, Rahway, New Jersey, May, 1, 1991.
Columbia University, New York, N Y, May 2, 1991.
University of Texas, Austin, Texas, September 20, 1991.
Tulane University, New Orleans, Louisiana, October 21, 1991.
Stanford University, Stanford, California, October 30, 1991.
Northeastern University, Boston, Massachusetts, January 28, 1992.
Notre Dame University, South Bend, Indiana, February 12, 1992.
University of Florida, Gainesville, Florida, September 17, 1992.
Northwestern University, Evanston, Ill, April 1, 1993.
Abbott Laboratories, North Chicago, Ill, April 26, 1993.
University of Florida, Gainesville, Florida, January 24, 1994.
Northern Illinois University, DeKalb, Illinois, February 28, 1994.
University of North Carolina, Chapel Hill, NC March 25, 1994.
University of Wisconsin, LaCrosse, April 8, 1994.
Sandoz Pharmaceuticals, East Hanover, NJ April 15, 1994.
Abbott Laboratories, North Chicago, Ill, May 4, 1994.
University of Illinois at Chicago, September 13, 1994.
IUPUI-Indianapolis, Indianapolis, Indiana, September 21, 1994.
Calvin College, Grand Rapids, Michigan, September 29, 1994.
Hope College, Holland, Michigan, September 30, 1994.
DuPont/Merck, Wilmington, Delaware, April 10, 1995.

University of Oklahoma, Norman, Oklahoma, April 13, 1995.
Eli Lilly, Indianapolis, IN April 18, 1995
IIT, Chicago, IL, April 19, 1995.
Bristol Meyers Squibb, New Brunswick, NJ May 16, 1996.
3-M Company, Minneapolis, Minnesota April 3, 1996.
Emory University, Atlanta, Georgia, April 10, 1996.
Parke-Davis, Ann Arbor, MI, Sept 9, 1996.
University of Michigan, Sept 10, 1996.
Wyeth/Ayerst, Pearl River, N.Y., Nov 8, 1996.
University of California, Santa Cruz, Feb 24, 1997.
Johnson and Johnson, Raritan, N. J., Mar 6, 1997.
University of West Virginia, Mar 26, 1997.
University of Pittsburgh, Mar 27, 1997,
Brandeis University, April 7, 1997.
American Cyanamid, Princeton, NJ, Nov 10, 1997.
Pharmeco Company, Lexington, MA March 5, 1998.
Williams College, Williamstown, MA March 6, 1998.
Washington University, St. Louis, MO March 19, 1998.
Michigan State University, Lansing, MI June 22, 1998.
University of Maryland, College Park, MD, September 3, 1998.
Duke University, Durham, NC, September 15, 1998.
University of Missouri, Columbia, MO September 18, 1998.
Indiana University, Bloomington, IN December 7, 1998.
Symyx Technologies, Santa Clara, CA, May 5, 1999.
Albion College, Albion MI, Sept. 15, 2000
University of Windsor, Windsor, Canada, Nov. 10, 2000.
University of North Carolina, Chapel Hill, NC, Oct. 4, 2001.
Western Ontario University, London, Ontario, February 6, 2002.
Washington University, St. Louis Missouri, April 19, 2002.
Sugen Pharmaceuticals, Inc. South San Francisco, CA June 18, 2002
Florida State University, Tallahassee, FL October 1, 2002.
University of Rochester, Rochester NY, Oct 8, 2003.
Novartis Pharmaceuticals, Summit, NJ, November 5, 2003.
University of Minnesota, Minneapolis, MN, December 12, 2003
Calvin College, September 30, 2004.
Hope College, October 1, 2004.
Wayne State University, February 26, 2005.
University of South Florida, April 29, 2006.
Loyola University of Chicago, September 20, 2007.
Merck Sharp & Dohme Laboratories, Rahway, New Jersey, February, 6, 2008.
University of Alberta, Edmonton, Canada, September 4, 2009.
National Institute of Biological Sciences, Beijing, China, May 17, 2010.
Oakland University, Rochester, MI January 26, 2011.
Iowa State University, Ames, IA May 13, 2011.
University of Chicago, Chicago, IL June 3, 2011.
Princeton University, Princeton, NJ, November 19, 2011.
Iowa State University, Ames, IA, May 12, 2012.
West Virginia University, Morgantown, WV, October 17, 2012.

Invited Lectures and Symposia:

Symposium on "Advances in Catalysis of Organic Reactions", Joint Great Lakes and Central Regional ACS meeting, Kalamazoo, Michigan, May 23-25, 1984

NSF Workshop on Organometallic Chemistry, Chapel Hill, North Carolina, May 30-June 2, 1984.

Symposium on "Organometallic Reagents in Organic Synthesis", at the 67th Canadian Chemical Conference, Montreal, Canada, June 4-6, 1984.

NSF Workshop on Organic Synthesis and Natural Products Chemistry, Holderness, New Hampshire, July 18-22, 1984.

Short course on "New Methods in Synthetic Organic Chemistry", Rohm and Haas Company, Philadelphia, Pennsylvania, October 1-3, 1984.

Symposium on "Transition Metals in Organic Synthesis" at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, December 16-21, 1984.

Symposium on "Cycloaddition Reactions in Organic Synthesis", Columbus, Ohio, April 13, 1985.

Gordon Research Conference on "Organic Reactions and Processes" at the New Hampton School, New Hampton, New Hampshire, July 14-20, 1985.

Short course on "Transition Metal Organometallics in Organic Synthesis", Monsanto Company, St. Louis, Missouri, December 17 and 18, 1985.

ACS Awards Symposium in honor of Robert Bergman, 191st National ACS Meeting, New York, New York, April 13-18, 1986.

Gordon Research Conference on "Organometallic Chemistry", Proctor Academy, Andover, New Hampshire, August 10-16, 1986.

NSF International Programs Division sponsored symposium entitled "Synthetic Selectivity, A Time of Opportunity", B.M. Trost, Chairman, Stockholm, Sweden, August 25-29, 1986.

Symposium on "Carbometallation Reaction" at the 192nd National Meeting of the American Chemical Society, Anaheim, California, September 7-12, 1986.

Joint Chinese, Japanese, and American Conference on Organometallic Chemistry, Kobe, Japan, September 16-20, 1986.

Fourth IUPAC Symposium on Organometallic Chemistry Directed Toward Organic Synthesis, Vancouver, Canada, July 26-30, 1987.

Nato Advanced Research Workshop on Carbene Chemistry, Fefor, Norway, August 30 - September 4, 1987.

Lilly Grantee Symposium; Indianapolis, Indiana, March 7-8, 1988.

Korea/US Joint Seminar on New Methods in Organic Synthesis, S. D. Burke US organizer, NSF sponsored, Seoul, Korea, November 7-11, 1988.

Visiting Lecturer in Organic Chemistry for the French Speaking Universities in Switzerland, April 23-29, 1989.

Symposium on Organometallics in Organic Synthesis, American Chemical Society 21st Central Regional Meeting, Cleveland, Ohio, May 30 - June 2, 1989.

Royal Society of Chemistry - Dalton and Perkin Divisions International Symposium, "Synthetic Application of Transition Metals, St Andrews, Scotland, September 11 - 14, 1989.

Symposium on "Metals in Organic Synthesis", Joint Central-Great Lakes Regional ACS Meeting, Indianapolis, Indiana, May 29-31, 1991.

Gordon Research Conference on "Organometallic Chemistry", Newport, RI, July 15-19, 1991.

Thirteenth International Congress of Heterocyclic Chemistry, Corvallis, Oregon, August 11-16, 1991.

Symposium on the Chemistry of Plant Materials, Richmond, Virginia, November 12-14, 1991.

8th Nozaki Conference on Organic Synthesis, Kurashiki, Okayama, Japan, September 17-18, 1993.

U.S./Korea Symposium on Organic Synthesis, Sponsored by KOSEF, Seoul, Korea, January 5-7, 1995.

Organometallics in Organic Synthesis, 78th Canadian Society for Chemistry Conference and Exhibition (SCSCCE), Guelph, Ontario, May 28- June 1, 1995.

Gordon Research Conference on "Organic Reactions and Processes" at the New Hampton School, New Hampton, New Hampshire, July 16-21, 1995.

Great Lakes Regional ACS Meeting, Normal, Illinois, April 21, 1996.

Symposium on Natural Products Chemistry, Southeast Regional ACS Meeting, Greenville, SC, Nov 9-12, 1996.

Great Lakes Regional ACS Meeting, Chicago, Illinois, May 29, 1997.

Chiral Europe 97, London, England, October 16-17, 1997.

Chiral USA 99, San Francisco, CA, May 3-4, 1999.

International Symposium on Lewis Acid Catalysts for Selective Organic Synthesis, Nagoya Conference Center, Japan, November 1-3, 1999.

The Centennial of Ketenes, Pacificchem Conference, Honolulu, December 15-20, 2005.

Retirement Symposium for Professor Richard Larock, May 13-14, 2011, Ames Iowa

Retirement Symposium for Professor Martin Semmelhack, November 19, 2011, Princeton, New Jersey

Retirement Symposium for Professor Thomas J. Barton, May 12, 2012, Ames, IA

Research Associates:

- 1) Ralph W. Kaesler, Ph.D., Michigan State University, 1983, October 1983-June 1985. Present position: Technical Director of Corporate Research, Nalco Chemical Company, 1801 Diehl Rd., Naperville, IL 60566: (708) 305-2028.
- 2) Fen-Ann Kunng, Ph.D., University of Maryland, 1985 August - August 1987. Present position: Monsanto Agricultural Company, 800 N. Lindberg Blvd., St. Louis, Missouri, 63167: (314) 694-4365. She has left the company but no new contact info.
- 3) Adam Gilbert, Ph.D., Columbia University, September 1992-August 1994. Present position: Wyeth-Ayerst Research, 401 North Middletown Road, Bldg 222, Rm 3109, Pearl River, NY 10965. 845-732-4865; email: GILBERA@wyeth.com.
- 4) Ken Wilson, Ph. D., University of Virginia, November 1992-October 1994. First position: Steritech, Inc., 2525 Stanwell Drive, Suite 300, Concord, California 94520. 510-603-9071. Second position: 3-Dimensional Pharmaceuticals, Eagleview Corporate Center, 665 Stockton Drive, Suite 104, Exton, PA 19341, 610-458-5264 ext 6556. Email: wilson@3dp.com. Present position: R. W. Johnson, Pharmaceutical Research Institute, email: KWILSO10@prdus.jnj.com
- 5) Eugene Grant, Ph. D., University of South Carolina, July 1994-May 1996. Present position: R. W. Johnson, Pharmaceutical Research Institute, 1000 Route 202, P. O. Box 300, Raritan, N. J., 08869. 908-218-6589. Email: egrant@its.jnj.com
- 6) Daniel R. Goldberg, Ph. D., Emory University, October 1996-1998. Present position: Boehringer-Ingelheim Pharmaceuticals, Inc. Research and Development Center, 900 Ridgebury Rd., P.O. Box 368, Ridgefield, CT 06877-0368. 203-778-7828, email: dgoldber@rdg.Boehringer-Ingelheim.com
- 7) Song Xue, Ph. D., Rutgers University, May 1997 August 1998. Present position: Novartis Institutes for BioMedical Research, Chemical and Analytical Development, One Health Plaza, East Hanover, NJ 07936-1080, 862-778-6897: email: song.xue@pharma.novartis.com
- 8) Su Yu, Ph. D., University of Tennessee, October 1998 – Oct 2000. Present position: Abbott Laboratories, Global Pharmaceutical Research and Development, Dept. R450, R13-4, 1401 Sheridan Road, North Chicago, IL 60064. 847-935-7246, email: Su.Yu@abbott.com
- 9) Hongqiao Wu, B. S., Beijing, Univ., 1988; M. S., Beijing, 1991; Ph. D., Case Western Reserve, 1999. 2000- 2002. Present position: Ricerca Biosciences, 7528 Auburn Rd., Concord, OH 44077, 440-357-3350; email: Wu_H@Ricerca.com.
- 10) Catherine Gatzemeyer (nee Loncaric), Ph. D., University of Rouen, 1999. Jan 2000-2002. Postdoctoral with Shu Kobayashi, University of Tokyo, 2002-2003. Present position: Bristol-Myers Squibb Company, email: catherine.gatzemeyer@bms.com
- 11) Yong Rok Lee, B. S., Chonbuk National University, 1982; M. S., Seoul National, 1984, Ph. D. Seoul National (Eun Lee), 1992. Postdoc, Duke (Pirrung) 1993-1995, Postdoc, Ohio State (Paquette), 1995; Assistant Professor, Yeungnam University 1995-present), School of Engineering and Technology, Kyongsan 712-749, Korea: email: yrlee@yu.ac.kr. 2000-

- 12) Xuejun Liu, B. S. and M. S., Beijing University of Chemical Technology, 1984, 1987; Ph. D., Karlsruhe, 1997, Postdoctoral, University of Nebraska (P. Dussault), 1997-2000. 2000- 2001. First Position: Albany Molecular Research, Inc., Chemical Development, 21 Corporate Circle, P. O. Box 15098, Albany, NY 12212-5098; Current position: Senior Scientist, Norac Pharma, 405 South Motor Avenue, Azusa, California 91702, 626-812-5518, email: XUEJUNL@NORAC.COM
- 13) Sreenivasan Balasubramanian Ph. D., 1990, Indian Institute of Science & Sathya Sai Institute. Postdoctoral, 1991-1994 Indian Institute of Science, Dept. of Chemistry, Bangalore. Postdoctoral, 1994-1996 Indian Institute of Science, Dept. of Biophysics, Postdoctoral 1996-1997 Tel Aviv University, Postdoctoral 1997-2000 Michigan State University, National Food Safety Center. Postdoctoral, 2000-2001. Current position: Canadaiqua Wine Company, Mission Bell Winery, 12667, Road 24, Madera, CA 93639 559-661-3466: email: bala@cwine.com
- 14) Aniruddha P. Patwardhan, B. Sc. And M. Sc., University of Bombay 1990 and 1992; M. S. University of Minnesota, Duluth, Ph. D. 2000, Purdue University. 2000-2002. Current position: Roche Diagnostics, 9115 Hague Road, P. O. Box 50457, Indianapolis, IN 46250-0457, 317-521-4869. Email: apatward28@hotmail.com
- 15) Yonghong Deng, B. S., Wuhan University, 1985; M. S. Institute of Materia Medica, Academia Sinica, Shanghai, 1988; Ph. D. Boston University, 2000. Dec 2000 – May 2004. Present position: ImmunoGen, Inc., 128 Sidney Street, Cambridge, MA 02139. 617-444-2006. email: Yonghong.Deng@immunogen.com.
- 16) William Mitchell, B. Sc.; University of Strathclyde, Glasgow 1993. Ph. D.; Imperial College, London, 2001. May 2001 – May 2003.
- 17) Veera Reddy Pulgam, b. 6/4/68. BS and MS Osmania University, Hyderabad, India, 1989 and 1992. Ph. D., IIT, Bombay, 1999 with S. V. Bhat. Postdoctoral; MSU with B. Borhan 1999-2001. January 1, 2002 – April, 2004. Present position: Dendretic Nanotechnology, Inc., 2625 Denison Drive, Suite B, Mount Pleasant, MI 48858, 989-774-2800, pulgam@dnanotech.com.
- 18) Mathew J. Vetticatt, BE, Mumbai University Institute of Chemical Technology, 2005. Ph. D. Texas A&M University, 2009. Postdoctoral, Albert Einstein School of Medicine, 2009-2011. Postdoctoral, Michigan State University, August 2011 – present.

Graduate Students:

- 1) Peng-Cho Tang, B.S.; Chinese University of Hong Kong, October 1980-August 1984. Research Associate, Columbia University with G. Stork, 1984 - 86. First position: Natural Products Department, Hoffman-LaRoche, Nutley, New Jersey 07110: (201) 235-3912. Second position: Glycomed Inc., 860 Atlantic Ave, Allameda, CA 94501; 510-814-3261. Third position: Senior Director, Medicinal Chemistry, Sugem, Inc., 515 Galveston Dr., Redwood, CA 94063. 415-306-7790: email: cho-tang@sugen.com. Present position: Chief Scientific Officer, Shanghai Hengrui Pharmaceuticals, Co. Ltd., phone: 86 21 54759101; Email: tangpc@shhrp.com
- 2) J. Stuart McCallum, B.S.; Stanford University, October 1980-November 1985. Research Associate, Berkeley with R. Bergman, 1985 - 87. Research Associate, Emory University with

- L. Liebeskind, 1987-1993. Present position: SIBIA Neurosciences, Inc. 505 Coast Blvd, South, Suite 300, La Jolla, CA 92037, 619-452-5892 ext 248: email: mccallum@cts.com.
- 3) Kin-Shing Chan, B.S.; University of Hong Kong, October 1981-July 1986. Research Associate with Jack Halpern, 1986-1988. Present position: Professor, Department of Chemistry, The Chinese University of Hong Kong, Shatin, N. T., Hong Kong, 852-2609-6376, email: ksc@cuhk.edu.hk
 - 4) Dominic C. Yang, B.S.; University of Chicago, October 1981-September 1986. Research Associate, MIT with R. Schrock, 1986 - 88. 1988-1994 position: IBM, GTD 70 A, Route 52, Hopewell Junction, New York, 12533. Second position: Motorola, 2100 East Elliot Road, Maildrop EL 615, Tempe, AZ 85284. 602-413-3548. Present position: 1996 - Shipley Korea: email: dyang@shipley.com
 - 5) Glen A. Peterson, B.S.; University of Puget Sound, October 1981- September 1987. First position: Room PS 327, SRI International, 333 Ravenswood Avenue, Menlo Park, CA 94025, 415-859-2399. Second Position: ISP Fine Chemicals, 1979 Atlas St., Columbus, Ohio, 43228-9342. 614-876-3637. Third Position: Cambridge Chemical, Inc., N115 W19392 Edison Drive, Milwaukee, Wisconsin, 53022, 414-251-5044. Present position: Hestia laboratories, Inc., 16336 Glendale Drive, New Berlin, WI 53151-2842, 262-780-1856. Email: PetersonTR@aol.com
 - 6) Scott R. Gilbertson, B.S.; University of Wisconsin-LaCrosse, October 1982- May 1988. Research Associate, University of Chicago with D. Lynn, 1988-90. 1990-2003: Professor, Department of Chemistry, Washington University, Campus Box 1134, One Brookings Drive, St. Louis, Missouri, 63130-4899. Present position: Robert A. Welch Distinguished University Chair in Chemistry, Department of Pharmacology and Toxicology, University of Texas Medical Branch, Galveston Texas, 77555, 409-772-9703. email: srgilber@utmb.edu.
 - 7) Yao-Chang Xu, B.S.; Nanjing University, October 1983-August 1988. Research Associate, University of Sherbrooke with P. Deslongchamps, Quebec, Canada. First position: IAF BioChem International Inc., 531 boul. des Parairies Blvd., Ville de Laval, Quebec H7V 1B7, Canada. Second position, Lilly Research Laboratories, Lilly Corporate Center, Indianapolis, Indiana 46285. 317-277-2284. Present Position: Executive Director, Global Discovery Chemistry, Novartis Institutes for Biomedical Research, Shanghai.
 - 8) Katherine L. Faron, B.S.; Loyola University, October 1983-October 1988. Present position: E. I. duPont de Nemours & Company, Advanced Materials Systems, E328, Rm 234, Experimental Station, Wilmington, Delaware, 19898, 302-695-3314.
 - 9) William E. Bauta, B.S.; Loyola University, October 1984-January 1990. First position: Research Associate, University of Texas with Professor P. Magnus, 512-471-8617. Second position: Sandoz Research Institute, 59 Route 10, East Hanover, New Jersey 07936. Second Position: : RW Johnson Pharmaceutical Research Institutes, Route 202, P.O. Box 300, Raritan, New Jersey 08869. 908-218-6723. Present Position: 1999 - ILEX Oncology, 14785 Omicron Dr., San Antonio, Texas 78245, 210-949-8469. Email: wbauta@ilexonc.com.
 - 10) Christopher Murray, B.S.; Hope College, October, 1984- January 1990. Research Associate, University of Colorado with Professor G. Molander, 1990-91. First position: Hauser Chemical Research, 5555 Airport Blvd., Boulder, CO 80301, 303-443-4662 ext 1067. Present Position: Director of Manufacturing, ARIAD Pharmaceuticals, Inc., 26 Landsdowne, St., Cambridge, MA 02139-4234. Phone 617-494-0400, email: chris.murray@ariad.com

- 11) Oak Kim, M.S.; Seoul National University, October, 1984-February 1990. Research Associate, Columbia University with Professor K. Nakanishi 1990-1992. First position: Bristol-Myers Squibb Pharmaceutical Research Institute, Dept. 303, 5 Research Parkway, P. O. Box 5100, Wallingford, CT 06492-7660. 203-284-6793; Fax: 203-284-7702 (anti-infective). Current position: Paratek Pharmaceuticals, 75 Kneeland St., Boston, MA 02111 617-275-0400 (ext 468). Email: pkim@paratekpharm.com.
- 12) Cynthia A. Challener, B.S.; Stanford University, October, 1986-June 1990. First Position: Arco Chemical Company, 3801 Westchester Pike, Newtown Square, Pennsylvania, 19073. Current position: Bedovkian Research Inc., 21 Finance Drive, Danbury, CT 06762. 203-830-4000.
- 13) Vera Dragisich, B.S.; Northwestern University, October, 1985-August 1990. First Position: Nalco Company, Naperville, Illinois, 708-305-2235. Second position: Director of Organic Laboratories, The University of Chicago. Present position: Executive Administrator, Department of Chemistry, The University of Chicago, 773-702-3071. Email: v-dragisich@uchicago.edu.
- 14) Ross A. Miller, B.S.; University of Wisconsin - Madison, October, 1985-September 1990. First position: Research Associate, University of California-San Diego with Professor K. C. Nicolaou. 619-435-7061. Present position: Merck & Company, P.O. Box 2000, RY801-207, Rahway, NJ 07065; 908-594-1358.
- 15) Timothy A. Brandvold, B.S.; Gonzaga University, October, 1985-September 1990. Present Position: UOP, 50 East Algonquin Road, Des Plaines, Illinois 60117, 708-391-3728 (391-3727 fax).
- 16) Mary Ellen Bos, B.S.; Duke University, October, 1985 - December 1990. First position: Research Associate, University of Texas with Professor P. Magnus. Second position: RW Johnson Pharmaceutical Research Institutes, Route 202, P.O. Box 300, Raritan, New Jersey 08869. 908-704-5764. Present address: 19502 Encino Gap, San Antonio, TX 78259, 210-497-1362.
- 17) Ben A. Anderson, B.S.; Wittenberg College, October, 1986 - August 1991. Research Associate, Harvard University with David Evans, 617-496-8569. First position: Lilly Research Laboratories, Lilly Corporate Center, Mail Code 4813, Indianapolis, Indiana 46285, 765-477-4418. Second position: Director, Chemical Process R&D, Lilly Development Centre S. A., Parc Scientifique de Louvain-la-Neuve, Rue Granbonpre, 11, B-1348 Mont-Saint-Guibert, Belgium. +32(0) 10476408. Email: b.anderson@lilly.com. Present Position: Lilly in Japan
- 18) Betty S. L. Wang, B.S.; Chinese University of Hong Kong, October, 1986 - December 1991. Research Associate, Penn State University with Steve Benkovic. Present address: 21 Carnawon Rd., 2/F Kowloon, Hong Kong, 332-2638.
- 19) Jianming Bao, B. S.; University of Peking, 1988 -1993. Postdoctoral 93-94, Steven Pedersen, Berkeley. Present position, Merck Research Laboratories, Department of medicinal Chemistry, P.O. Box 2000, Rahway, NJ 07065, 732-594-6650. Email: bao_jianming@merck.com
- 20) Timothy S. Powers, B. S.; University of California, Davis, 1988 - 1993. Sphinx Pharmaceuticals Cambridge, 840 Memorial Drive, Cambridge, MA 02139: 1993-1997.

- Second position: Symyx Technology, 420 Oakmead, Sunnyvale, CA 94086. 408-328-3147. Director of Chemistry, Libraria, Inc., 2372 Qume Dr., Suite D, San Jose, CA 95131. 408-383-0790 ext 109. 2003 Director of Medicinal Chemistry, Alantos Pharmaceuticals, 790 Memorial Drive, Cambridge, MA 02139, 617-577-0011 ext 2109, powers@alantos.com Present position: Amgen in California
- 21) Steve Chamberlin, B. S.; Illinois Wesleyan, 1988 - 1993. Present position: Assoc. Director, CMC Coordination, Global Pharmaceutical & Analytical Sciences, Abbott Laboratories, 200 Abbott Park Road, Dept. R4R8. AP31-1, Abbott Park, IL 60064-6201 708-937-4263. Email: steven.chamberlin@abbott.com.
- 22) Richard Hsung, B. S., Calvin College, 1988-1994. Postdoctoral 94-96, Lawrence Sita, University of Chicago. Postdoctoral 96-97, Gilbert Stork, Columbia University. First Position: Professor, Department of Chemistry, University of Minnesota, 139 Smith Hall, 207 Pleasant St. SE, Minneapolis, MN 55455, 612-625-3045. Present position: Professor of Pharmaceutical Sciences and Chemistry, The School of Pharmacy, and Department of Chemistry, 7111 Rennebohm Hall at 777 Highland Avenue, University of Wisconsin at Madison, Madison, WI 53705-2222, phone 608-890-1063, Email: rphsung@pharmacy.wisc.edu
- 23) Yan Shi B. S., University of Peking, 1990-1995. Postdoctoral 1995-1997, Yoshito Kishi, Harvard University. Present Position: Sr. Research Investigator, Discovery Chemistry, Pharmaceutical Research institute, Bristol-Myers Squibb Company, P. O. Box 5400, Princeton, NJ, 08543-5400, phone 609-818-4124., email: yan.shi@bms.com
- 24) Annette Rahm, Dip. Chem.; University of Zurich, 1990 -1995. First Position, Biosynth Company, St. Gallen, Switzerland. Second Address: Obere Heslibachstr. 39, 8700 Kusunacht, Switzerland, 01/910 41 06. Present position: Prosecur, Kugelgasse 20, 8708 Mannedorf, Switzerland, 044/9200021, email: annette.rahm@prosecur.ch
- 25) Jing Su, B. S.; Fudan University, 1990-1995. Postdoctoral 1995-1997, Koji Nakanishi, Columbia University. Second Position: Ontogen Corp., 2325 Camino Vida Roble Road, Carlsbad, CA 92009. 760-930-0100 ext 3132. Schering-Plough Research Institute, K-15-2545, 2015 Galloping Hill Road, Kenilworth, NJ 07033, 908-740-7489: email: jing.su@spcorp.com.
- 26) Doug Heller, B. S., Kansas, 1990-1996. First position: ARCH, University of Chicago. Second position: Ivax Corporation, 4400 Biscayne Blvd., Miami, FL 33137, 305-575-6005. Email: douglasheller@ivax.com. Present position: Lecturer, Department of Chemistry, University of Miami, 1301 Memorial Drive, Coral Gables, Florida 33146-0431, phone 305-284-2174, email: dheller@miami.edu
- 27) Weiqin Jiang B. S., Fudan University, 1991-1996. Postdoctoral with Dale Boger, Scripps Institute, 1996-1998. First position: R. W. Johnson Research Institute, 1000 Route 202, P. O. Box 300, Raritan, New Jersey, 08869. 908-704-4351: email: wjjsnh1@prius.jnj.com. Present position: Review Chemist, Food and Drug Administration, Division of Chemistry III, OGD, MPN II, Rm E108, 7500 Standish Place, MPN II, Rockville, MD 20855, phone 240-276-8474, email: Weiqin.Jiang@fda.hhs.gov
- 28) John Quinn, B.S., Williams College, 1991-1997. Present Position: Albany Molecular Research, 21 Corporate Circle, Albany, NY 12203, 518-464-0279, ext 2406. Email: johnq@albmolecular.com.

- 29) Marcey L. Waters, B. S., San Diego, 1992-1997. Postdoctoral with Ronald Breslow, Columbia University. Present position since 1999: Professor, Department of Chemistry, University of North Carolina, CB#3290 Venable Hall, Chapel Hill, NC 27599, 919-843-6522. Email: mlwaters@email.unc.edu.
- 30) Siu Man Yeung B. S., Univ. of Hong Kong, 1992-1997. Postdoctoral with Ben Liu, University of Minnesota, 1997-2000. Present position: Genzyme Glycobiology Research Institute, 800 Research Parkway, Suite 200 Oklahoma City, OK 73104, 405-271-8144. Email: Eliza.Yeung@genzyme.com
- 31) Mark Parisi, B. S., Harvard University, 1993-1999. Present Position: ZS Associates, 1800 Sherman Ave., Evanston, IL 60201, 847-492-3189.
- 32) Huan Wang B. S., Fudan, 1995-2000. Postdoctoral with E. J. Corey, Harvard, 2000-2003. Present position: GlaxoSmithKline, 709 Swedeland Road, UW 2810, PO Box 1539, King of Prussia, PA 19406, 610-270-5362 or 800-877-7074 upper merion extension 5362, email, Huan.2.Wang@gsk.com.
- 33) Jon Antilla, B. S. N. Mich Univ, 1995-2000. Postdoctoral with Steven Buchwald, MIT, 2000-2003. Present position: Assistant Professor, The University of Mississippi, Department of Chemistry and Biochemistry, Coulter Hall, University of Mississippi, University, MS 38677, 662-915-5332, email jantilla@olemiss.edu. Present position: Assistant Professor, Department of Chemistry, University of South Florida, 4202 E. Fowler Avenue, CHE 205A, Tampa, FL 33620-5250; 813-974-7438, email: jantilla@cas.usf.edu.
- 34) Vincent Liptak, B. S. Loyola, 1995-2000. Postdoctoral with Dennis Dougherty, Cal. Tech. 2000-2001. Present position: Applied Biosystems, 850 Lincoln Centere, M/S 432-2, Foster City, CA, 94404, 650-638-6895. Email: Vincent.P.Liptak@appliedbiosystems.com.
- 35) Louis Fogel, M. S. Wisconsin, Madison, 1997-2000. First position: Law School, The University of Chicago. Present position: Sidley Austin Brown & Wood LLP, Bank One Plaza, 10 South Dearborn Street, Chicago, Illinois 60603, phone 312-853-0423, email: LFogel@Sidley.com
- 36) Michael Fuertes, B. S., Mich State, 1996-2002. Postdoctoral with A. Smith, Univ of Pennsylvania, 2002-2005. Present position: 2005– Assistant Professor, Department of Chemistry and Biochemistry, Texas Tech University, Memorial Circle & Boston, Lubbock, TX 79409-1061, 806-742-0888; email: Michael.Fuertes@ttu.edu.
- 37) Xiao Wu Jiang, B. S., USTC, 1996-2002. Present Position: Postdoctoral with M. Miller, Notre Dame University; email: xjiang@nd.edu. Present position: Discovery R&D, Chemistry, Albany Molecular Research, Inc., 21 Corporate Circle, P. O. Box 15098, Albany, NY 12212-5098, 518-464-0279 x2136; email: may.jiang@albmolecular.com.
- 38) Andrei Vorogushin, B. S. Moscow State, 1998-2003. Present position: postdoctoral with S. Buchwald at MIT. 617-253-1852, email avvorogu@mit.edu. Present Position: Head of Department, Sibur LCC, Moscow, Russia, 8 (918) 590-7837 cell; email: VorogushinAV@sibur.ru.
- 39) Victor Prutyaynov, B. S. Ukraine, 1998-

- 40) Jie Huang; b. 1974, B. S. Wuhan, 1995, M. S., Chinese Academy of Sciences, 1998. 1999-2005. Present position, Postdoctoral with Alison Frontier, University of Rochester, 2005-
- 41) Glenn Walton Phillips; b. 1976, B. S. . 1999-2006. Present position: Assistant Professor, Department of Chemistry, Oakwood University, Rm 214 Chemistry, Cooper Complex, 7000 Adventist blvd., Huntsville, AL 35896, phone 517-726-7115, email: gphillips@oakwood.edu
- 42) Manish Rawat; b. 1976, B. S., Univ of Delhi, 1996, M. S. IIT Bombay, 1999. 1999-2004. Postdoctoral with Linda Hsieh-Wilson at Cal Tech 2004-2008. Currently at a small company in India but will soon move to Dupont in Hyderabad?
- 43) Vijayagopal Gopalsamuthiram, b. 1974, B. S., St. Joseph's College, Trichy, India, 1992; M. S. IIT Mumbai, 1995; M. S. Missouri-Columbia, 2000. Sept 2000 –2005. Postdoctoral with Steve Burke at the University of Wisconsin. Present position: Dupont, Hyderabad, India email: Vijayagopal.Gopalsamuthiram@ind.dupont.com
- 44) Yiqian Lian , b. 1971, B. S. Tianjin University, 1993; M. A. South Dakota, 2000. Sept 2000 – 2006. Present position: Postdoctoral with Yoshito Kishi at Harvard University, email: lian@fas.harvard.edu
- 45) Yu Zhang, b. 11/26/73, B. S. East China University of Science and Technology, Shanghai, 1996. 2000 -2006. Postdoctoral with Michael Doyle, University of Maryland, 2006-2007. Present position: Postdoctoral with Richard Hsung at the University of Wisconsin, email: yuzhang73@gmail.com
- 46) Zhensheng, Ding, b. 9/13/76. B. S. and M.S. Peking University 1998 and 2001. Fall 2001 - 2009.
- 47) Gang Hu,; b. 11/12/72, B.S. and M.S., Tsinghua University, Beijing, 1995 and 1998. Tsinghua Co., Ltd. 1998-2001. Fall 2001 – 2008. Present position: Postdoctoral with Dalibor Sames at Columbia University, email: gh2244@columbia.edu
- 48) Keith A. Korthals, b. 8/16/73, B. S. Central Michigan University, 1995. Adtech Plastic Systems 95-96. Laur Silicone Rubber, 1996-2001. Fall 2001 - 2007. Present position: Postdoctoral with Barry Sharpless at Scripps Research Institute, email: korthals@scripps.com
- 49) Cory Newman, b. 1/18/79. B.S. Butler University 2001. Fall 2001 - 2007. Present position: Assistant Professor, Department of Chemistry, Montgomery College Takoma Park/Silver Spring, Science North 308, Silver Spring, MD (240)-567-1413, email: Cory.Newman@montgomerycollege.edu.
- 50) Chunrui Wu, b 1979. B. S. Beijing University 2001. Fall 2001 - 2007. Present position: Postdoctoral position with Marvin Miller at Notre Dame University, email: chunruiwu@nd.edu
- 51) Konstantinos Rampalagos, B. S. University of Crete. Fall 2002 – 2007. Present position: Postdoctoral with Benjamin List at Max-Planck Institute in Muelheim, email: rampala@mpi-muelheim.mpg.de
- 52) Zhenjie, Lu, b. 5/14/73, B. S. East China University 1996. Fall 2002 – present.
- 53) Alexander V. Predeus, 9/30/81. B. S. Moscow State University, M. S., Moscow State University, 2003. Fall I 2003 – present.

- 54) Aman Desai, B. T., University Institute of Chemical Technology 2005. Fall 2005-present.
- 55) Dmytro Olegovich Berbasov, B. S. National Technical University of Ukraine in Kiev, 2002; M. S. University of Oklahoma, 2005. Fall 2006 – present.
- 56) Yong Guan, B. S. Wuhan University, 2004; MS, Wuhan University, 2006. Fall 2006 – present.
- 57) Anil Kumar Gupta, B.S.Chhatrapeti Shahu Ji Maharaj University, Kanpur 2001; Indian Institute Technology Roorkee, Roorkee, 2004. Fall 2006 – present.
- 58) Li Huang, B.S. Fudan University, Shanghai, 2002, M.S. Fudan University, Shanghai, 2005. Fall 2006 – present.
- 59) Nilanjana Majumdar, B.S. and M.S. Indian Institute Technology Kharagp, Kharagpu, 2003 and 2005. Fall 2006 – present.
- 60) Munmun Mukherjee, B.S. Presidency College, Calcutta 700073, 2003; M.S. Indian Institute Technology Madras, Madras, 2005. Fall 2006 – present.
- 61) Hong Ren, B. S. Shandong Normal University 2004, M. S. Shandong University 2007. Fall 2007-present.
- 62) Wynter Gilson, B. S. Middle Tennessee State University, 2007. Fall 2007-present.
- 63) Wenjun Zhao, B. S. Sun Yat-sen University, 2009. 2009-present.
- 64) Xin Zhang, B. S. Nanjing University, 2009. 2009-present.
- 65) Xiaopeng Yin, 2011-present.
- 66) Yubai Zhou, 2001-present

Patents:

- 1) Synthesis of Vapoc Ligands, Wulff, W. D.; Antilla, J.; Yu, S., Patent Application, Docket No. 104116, March 19, **1999**.
- 2) Process for Producing Optically Active β -Amino Esters, Wulff, W. D.; Xue, S., Patent Application, Docket No. 104034, March 19, **1999**.
- 3) Process for Producing Optically Active β -Amino Esters Using Metal-Chiral Ligand Catalytic Compounds, Wulff, W. D., Antilla, J.; Yu, S., Patent Application, Docket No. 104147, March 19, **1999**.
- 4) Catalytic Asymmetric Synthesis of Chiral Aziridines, Wulff, W. D.; Antilla, J., Patent Application, Docket No. 7814-32,, March 19, **1999**.

Publications:

1. "On the role of trimethylsilylmethylsilylene in the gas-phase reactions of tetramethyldisilene", Wulff, W. D.; Goure, W. F.; T.J. Barton, T. J.; *J. Amer Chem. Soc.*, **1978**, *100*, 6236.
2. "Silene generation from a silyl-1,3-migration", Barton, T. J.; Wulff, W. D.; *J. Organomet. Chem.*, **1979**, *168*, 23.
3. "Silicon-carbon double-bond formation via 1,5-sigmatropic migration of trimethylsilyl from silicon to carbon", Barton, T. J.; Wulff, W. D.; Arnold, E. V.; Clardy, J.; *J. Am. Chem. Soc.*, **1979**, *101*, 2733.
4. "Serendipitous synthesis of a sila- α -pyran - convenient, penultimate precursor to dimethylsilanone", Barton, T. J.; Wulff, W. D.; *J. Am. Chem. Soc.*, **1979**, *101*, 2735.
5. "Addition of carbon nucleophiles to arene-chromium complexes", Semmelhack, M. F.; Clark, G. R.; Garcia, J. L.; Harrison, J. J.; Thebtaronth, Y.; Wulff, W. D.; Yamashita, A.; *Tetrahedron*, **1981**, *37*, 3957.
6. "Regiochemistry of the reaction of chromium carbene complexes with acetylenes", Wulff, W. D.; Tang, P. C.; McCallum, J. S.; *J. Am Chem. Soc.*, **1981**, *103*, 7677.
7. "Silylene to silene thermal rearrangement. Generation and rearrangement of cyclopropylsilylene and vinylsilylene", Barton, T. J.; Burns, G. T.; Goure, W. F.; Wulff, W. D.; *J. Am. Chem. Soc.*, **1982**, *104*, 1149.
8. "Long-range corner participation by cyclopropane. 2. Synthesis and study of 1-substituted tricyclo[3.2.2.0^{2,4}]nonanes", Chenier, P. J.; Jenson, T. M.; Wulff, W. D.; *J. Org. Chem.*, **1982**, *47*, 770.
9. "Observations and comments of the thermal behavior of 7-silanorbornadienes", Barton, T. J.; Goure, W. F.; Witiak, J. L.; Wulff, W. D.; *J. Organometal. Chem.*, **1982**, *225*, 87-106.
10. "Synthesis of nanaomycin A and deoxyfrenolicin by alkyne cycloaddition to chromium-carbene complexes", Semmelhack, M. F.; Bozell, J. J.; Sato, T.; Wulff, W. D.; Spiess, E.; Zask, A.; *J. Am. Chem. Soc.*, **1982**, *104*, 5850.

11. "New substitution reactions on indole promoted by the Cr(CO)₃ unit", Semmelhack, M. F.; Wulff, W. D.; Garcia, J. L.; *J. Organometal. Chem.*, **1982**, *240*, C5.
12. "Quinone synthesis with organometallic reagents", Semmelhack, M. F.; Sato, T.; Bozell, J.; Keller, L.; Wulff, W. D.; Zask, A.; Spiess, E.; *Current Trends in Organic Synthesis*, H. Nozaki, Ed., Pergamon Press, **1982**, p. 303.
13. "Direct thermal and photochemical generation of silanones", Hussman, G.; Wulff, W. D.; Barton, T. J.; *J. Am. Chem. Soc.*, **1983**, *105*, 1263.
14. "1,5-Silyl migrations as a route to acyclic 1-sila-1,3-butadienes", Barton, T. J.; Wulff, W. D.; and Burns, S. A.; *Organometallics*, **1983**, *2*, 4.
15. "Diels-Alder reactions of Fischer carbene complexes", Wulff, W. D.; Yang, D. C.; *J. Am. Chem. Soc.*, **1983**, *105*, 6726.
16. "Anthracylene synthesis with Fischer carbene complexes", Wulff, W. D.; Tang, P. C.; *J. Am. Chem. Soc.*, **1984**, *106*, 434.
17. "Cyclohexadienone annulation *via* α,β -unsaturated Fischer carbene complexes", Tang, P. C.; and Wulff, W. D.; *J. Am. Chem. Soc.*, **1984**, *106*, 1132.
18. "Benzannulations of α,β -unsaturated Fischer carbene complexes with acetylenes", Wulff, W. D.; Chan, K. S.; Tang, P. C.; *J. Org. Chem.*, **1984**, *49*, 2293.
19. "Tandem and concurrent cycloaddition/annulation reactions of chromium alkynyl carbene complexes", Wulff, W. D.; Yang, D. C.; *J. Am. Chem. Soc.*, **1984**, *106*, 7565.
20. "In organic synthesis, the keyword is selectivity", *Ind. Chem. News.*, **1984**, *5*, 22-24.
21. "Cycloadditions and annulations of transition metal carbene complexes", Wulff, W. D.; Tang, P. C.; Chan, K. S.; McCallum, J. S.; Yang, D. C.; Gilbertson, S. R.; *Tetrahedron*, **1985**, *41*, 5813.
22. "Aldol reactions of Fischer carbene complexes", Wulff, W. D.; Gilbertson, S. R.; *J. Am. Chem. Soc.*, **1985**, *107*, 503.
23. "Cyclobutanone formation *via* in situ generated vinyl ketene complexes of chromium", Wulff, W. D.; and Kaesler, R. W.; *Organometallics*, **1985**, *4*, 1461.
24. "Two-alkyne annulations of transition metal carbene complexes *via* in situ generated vinyl carbene complexes", Wulff, W. D.; Kaesler, R. W.; Peterson, G. A.; Tang, P. C.; *J. Am. Chem. Soc.*, **1985**, *107*, 1060.
25. "Synthesis of naphthoquinone antibiotics by intramolecular alkyne cycloaddition to chromium-carbene complexes", Semmelhack, M. F.; Bozell, J. J.; Keller, L.; Sato, T.; Spiess, E. J.; Wulff, W. D.; Zask, A.; *Tetrahedron*, **1985**, *41*, 5803.
26. "Conjugate addition of acylate-nickel complexes to quinone monoketals: synthesis of the naphthoquinone antibiotics nanamycin A and deoxyfrenolicin", Semmelhack, M. F.; Keller, L.; Sato, T.; Spiess, E. J.; Wulff, W. D.; *J. Org. Chem.*, **1985**, *50*, 5566.

27. "Transition Metal Carbene Complexes", K.H. Doetz, et. al.: reviewed by W.D. Wulff, *J. Am. Chem. Soc.*, **1985**, *107*, 4606.
28. "Delayed phototoxic effects of 8-methoxypsoralen, khellin and sphondin in aedes aegypti", Kagan, J.; Szczepanski, P.; Bindokas, V.; Wulff, W. D.; McCallum, J. S.; *J. Chem. Ecol.*, **1986**, *12*, 899.
29. "A regioselective entry to vinyl lithiums from unsymmetrical ketones via enol triflates", Wulff, W. D.; Peterson, G. A.; Bauta, W. E.; Chan, K. S.; Faron, K. L.; Gilbertson, S. R.; Kaesler, R. W.; Murray, C. K.; Yang, D. C.; *J. Org. Chem.*, **1986**, *51*, 277.
30. "Reactions of cobalt carbene complexes with alkynes - η^4 -vinyl ketene complexed intermediates and a short synthesis of bovalide", Wulff, W. D.; Gilbertson, S. R.; Springer, J.; *J. Am. Chem. Soc.*, **1986**, *108*, 520.
31. "1,3-Dipolar cycloaddition reactions of transition metal carbene complexes and the formal [3+2+1] pyridinannulation of the cycloadducts", Chan, K. S.; Wulff, W. D.; *J. Am. Chem. Soc.*, **1986**, *108*, 5229.
32. "Palladium catalyzed reduction of aryl triflates - Utilization in the synthesis of angelicin, olivin and chromomycinone from phenols produced in the benzannulation reaction of chromium carbene complexes", Peterson, G. A.; Kunng, F. A.; McCallum, J. S.; Wulff, W. D.; *Tetrahedron Lett.*, **1987**, *28*, 1381.
33. "Alkylations of tetracarbonyl(phosphine) and pentacarbonyl chromium carbene complexes and their reactions with selected acetylenes", Xu, Y. C.; Wulff, W. D.; *J. Org. Chem.*, **1987**, *52*, 3263.
34. "Solvent, chelation, and concentration effects on the benzannulation reaction of chromium carbene complexes and acetylenes", Chan, K. S.; Peterson, G. A.; Brandvold, T. A.; Faron, K. L.; Challener, C. A.; Hyldahl, C.; and Wulff, W. D.; *J. Organometal. Chem.*, **1987**, *334*, 9.
35. "Regio- and stereoselectivity via transition metal carbene complexes", Wulff, W. D.; McCallum, J. S.; Yang, D. C.; Kunng, F. A.; Chan, K. S.; Faron, K. L.; Murray, C. K.; Kim, O. K.; *Chemica Scripta*, **1987**, *27*, 517.
36. "Cyclopropanations and cycloadditions of transition metal carbene complexes", Wulff, W. D.; Yang, D. C.; Murray, C. K.; *Pure and App. Chem.*, **1988**, *60*, 137.
37. "[2 + 1] versus [4 + 2] cycloadditions of Fischer carbene complexes with 1,3-Dienes; Evidence for a zwitterionic intermediate in a cyclopropanation reaction", Wulff, W. D.; Yang, D. C.; Murray, C. K.; *J. Am. Chem. Soc.*, **1988**, *110*, 2653.
38. "Insertion Reactions of Chromium Carbene Complexes with Organic Nitriles and a Diastereoselective Alkylation of a Resulting Imino Carbene Complex", Yang, D. C.; Dragisich, V.; Wulff, W. D.; Huffman, J. C.; *J. Am. Chem. Soc.*, **1988**, *110*, 307.
39. "The in-situ generation of non-stabilized carbene complexes via intramolecular acetylene insertion: A new two-alkyne annulation and a new preparation of γ -keto esters", Wulff, W. D.; Xu, Y. C.; *Tetrahedron Lett.*, **1988**, *29*, 415.
40. "An Organochromium Mediated Synthesis of 11-Deoxydaunomycinone Via A Tandem Benzannulation/Friedel-Crafts Double-Cyclization", Wulff, W. D.; Xu, Y. C.; *J. Am. Chem. Soc.*, **1988**, *110*, 2312.

41. "Mechanistic studies on the reaction of chromium carbene complexes with acetylenes: Furan formation and the dependence of the Product Distribution on the Stereochemistry of Reaction Intermediates", McCallum, J. S.; Kunng, F. A.; Gilbertson, S. R.; Wulff, W. D.; *Organometallics*, **1988**, *7*, 2346.
42. Two Regiocomplementary Approaches to Angular Furanocoumarins with Chromium Carbene Complexes: Synthesis of Sphondin, Thiosphondin, Hearatomin and Angelicin, Wulff, W. D.; McCallum, J. S.; Kunng, F. A.; *J. Am. Chem. Soc.*, **1988**, *110*, 7419.
43. An Examination of the Coupling of Vinyl and Aryl Triflates with Stannyl Cuprates for the Purpose of Providing Regioselective Access to Vinyl Lithiums, Gilbertson, S. R.; Challener, C. A.; Bos, M. E.; Wulff, W. D., *Tetrahedron Lett.*, **1988**, *29*, 4795.
44. The Chromium and Tungsten Pentacarbonyl Groups as Reactivity Auxiliaries in [2 + 2] Cycloadditions, Faron, K. L.; Wulff, W. D., *J. Am. Chem. Soc.*, **1988**, *110*, 8727.
45. Wulff, W. D., in "Advances in Metal-Organic Chemistry", Liebeskind, L.S.; Ed., JAI Press Inc.; Greenwich, Connecticut, **1989**, Vol. 1, pp 209-393.
46. Cyclohexadienone Annulations of Aryl Carbene Complexes of Chromium - New strategies for the Synthesis of Indole Alkaloids, Bauta, W. E.; Wulff, W. D.; Pavkovic, S. F.; Saluzec, E. J., *J. Org. Chem.*, **1989**, *54*, 3249.
47. High Diastereofacial Selectivity in the Additions of the Enolates of Amino Carbene Complexes to Chiral Aldehydes without the Assistance of a Lewis Acid, Anderson, B. A.; Toole, A. J., Wulff, W. D. *J. Am. Chem. Soc.*, **1989**, *111*, 5485.
48. The Generation of 2-Vinylcyclopenten-1,3-diones *via* a Five Component Coupling in the Coordination Sphere of Chromium, Xu, Y. C.; Challener, C. A.; Dragisich, V.; Brandvold, T. A.; Peterson, G. A.; Wulff, W. D.; Williard, P. G., *J. Am. Chem. Soc.*, **1989**, *111*, 7269-7271.
49. The Preparation, Structure, and Chemistry of O-Acyl- and O-Alkylimidate Pentacarbonyl Carbene Complexes of Chromium, Wulff, W. D.; Dragisich, V.; Huffman, J. C.; Kaesler, R. W.; Yang, D. C., *Organometallics*, **1989**, *8*, 2196.
50. Alkylations of "Enolates" Generated From Amino Carbene Complexes of Chromium, Wulff, W. D.; Anderson, B. A.; Isaacs, L. D., *Tetrahedron Lett.*, **1989**, *30*, 4061.
51. Evaluation of the Cyclohexadienone Annulation of Chromium Carbene Complexes for the Synthesis of Taxodione, Gilbertson, S. R.; Wulff, W. D., *Synlett*, **1989**, *1*, 47.
52. The chromium and tungsten pentacarbonyl groups as reactivity auxiliaries in the Diels-Alder reactions of alkenyl carbene complexes with 1,3-dienes, Wulff, W. D.; Bauta, W. E.; Kaesler, R. W.; Lankford, P. J.; Miller, R. A.; Murray, C. K.; Yang, D. C., *J. Am. Chem. Soc.*, **1990**, *112*, 3642-3659.
53. An Efficient Entry to Bicyclic Lactones via van Halban-White Cyclizations, Brandvold, T. A.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1990**, *112*, 1645.
54. Heteroannulation of Chromium Carbene Complexes - A Novel and Efficient Pyrrole Synthesis, Dragisich, V.; Murray, C. K.; Warner, B. P.; Wulff, W. D.; Yang, D. C., *J. Am. Chem. Soc.*, **1990**, *112*, 1251 .

55. Inverse-Electron Demand Diels-Alder Reactions of Fischer Carbene Complexes - A New and Efficient Dihydrobenzene Synthesis via a Retro-Cycloaddition of Chromium Hexacarbonyl, Wang, S. L. B.; Wulff, W. D., *J. Am. Chem. Soc.*, **1990**, 112, 4550.
56. Ene versus [2 + 2] Cycloaddition Reactions of Fischer Carbene Complexes: An Unusual Effect of Silicon on the Product Partition and the Stereospecificity, Faron, K. L.; Wulff, W. D., *J. Am. Chem. Soc.*, **1990**, 112, 6419-6420.
57. Cyclopropanation with Acyloxy Chromium Carbene Complexes - A Synthesis of (\pm) Prostaglandin PGE₂ Methyl Ester, Murray, C. K.; Yang, D. C.; Wulff, W. D., *J. Am. Chem. Soc.*, **1990**, 112, 5660.
58. Characterization of the First η^4 -Vinyl Ketene Metal Complex From the Reaction of a Group 6 Fischer Carbene Complex and an Alkyne, Anderson, B. A.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1990**, 112, 8615-8617.
59. Imino Carbene Complexes of Tungsten and Chromium as Synthons for Nitrile Ylides in Reactions with Alkynes, Alkenes, Nitriles and Aldehydes, Dragisich, V.; Wulff, W. D.; Hoogsteen, K., *Organometallics*, **1990**, 9, 2867.
60. Thermal Reactions of Acyloxy and Alkoxy Carbene Complexes with Imines - Methathesis, Acetate Rearrangements, and a New Route to Imine Carbene Complexes via Peterson Type Eliminations, Murray, C. K.; Warner, B. P.; Dragisich, V.; Wulff, W. D.; Rogers, R. D., *Organometallics*, **1990**, 9, 3142.
61. Metal-Carbene Cycloadditions, W. D. Wulff, in "Comprehensive Organic Synthesis", B. M. Trost and I. Fleming, Eds., Pergamon Press, **1991**, Vol. 5, pp 1065-1113.
62. Chromium Mediated Cyclizations of Cross-Conjugated Ketoketenes in 8 and 10 e⁻ Processes, Brandvold, T. A.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1991**, 113, 5459.
63. Substrate Regulation of Product Distribution in the Reactions of Aryl Chromium Carbene Complexes with Alkynes, Bos, M. E.; Wulff, W. D.; Miller, R. A.; Brandvold, T. A.; Chamberlin, S., *J. Am. Chem. Soc.*, **1991**, 113, 9293-9319.
64. Tandem Diels-Alder / Double-Intramolecular Two-alkyne Annulations of Fischer Carbene Complexes - A One-pot Construction of all Four Rings of the Steroid Ring System, Bao, J.; Dragisich, V.; Wenglowksy, S.; Wulff, W. D., *J. Am. Chem. Soc.*, **1991**, 113, 9873-9875.
65. Pressure Acceleration of [2 + 2] Cycloaddition Reactions on the Coordinated Ligands of Chromium and Tungsten Pentacarbonyl Carbene Complexes, Pipoh, R.; van Eldik, R.; Wulff, W. D.; Wang, S. L. B., *Organometallics*, **1992**, 11, 490-492.
66. Exo Selective Diels-Alder Reactions of Amino Carbene Complexes, Anderson, B. A.; Wulff, W. D.; Powers, T. A.; Tribbitt, S.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1992**, 114, 10784-10798.
67. Sequential Benzannulation / Nucleophilic Aromatic Substitution Mediated by Chromium (0), Chamberlin, S.; Wulff, W. D., *J. Am. Chem. Soc.*, **1992**, 114, 10667-10669.
68. C-H Insertions in the Reactions of Fischer Carbene Complexes with Ketene Acetals, Wang, S. L. B.; Su, J.; Wulff, W. D.; Hoogsteen, K., *J. Am. Chem. Soc.*, **1992**, 114, 10665-10666.

69. Cyclopentenone Formation via Hydrogen Activation in the Reactions of Chromium Carbene Complexes with Alkynes., Challener, C. A.; Wulff, W. D.; Anderson, B. A.; Chamberlin, S.; Faron, K. L.; Kim, O. K.; Murray, C. K.; Xu, Y. C.; Yang, D. C.; Darling, S. D., *J. Am. Chem. Soc.*, **1993**, *115*, 1359-76.
70. Stereochemical Control in Intramolecular Diels-Alder Reactions with Carbene Complexes as Ester Synthons, Wulff, W. D.; Powers, T. S., *J. Org. Chem.*, **1993**, *58*, 2381-93.
71. Asymmetric Michael Reactions of Amino Carbene Complex Anions, Anderson, B. A.; Wulff, W. D.; Rahm, A., *J. Am. Chem. Soc.*, **1993**, *115*, 4602-4611.
72. Preparation, Characterization and Reactions of the First Parent Acetylene Fischer Carbene Complexes, Rahm, A.; Wulff, W. D., *Organometallics*, **1993**, *12*, 597-599.
73. Vaulted Biaryls as Chiral Ligands for Asymmetric Catalytic Diels-Alder Reactions, Bao, J.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1993**, *115*, 3814-3815.
74. Intramolecular Reactions of Fischer Carbene Complexes with Alkynes and a Mechanistic Study of the Interception of Reactive Intermediates with added Acetylenes, Anderson, B. A.; Bao, J.; Brandvold, T. A.; Challener, C. A.; Wulff, W. D.; Xu, Y. C.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1993**, *115*, 10671-10687.
75. Stereoselection in the Chromium Mediated Intramolecular [2 + 2] Cycloadditions of Vinyl Ketenes and Alkenes, Kim, O. K.; Wulff, W. D.; Jiang, W.; Ball, R. G., *J. Org. Chem.*, **1993**, *58*, 5571-5573.
76. Direct Preparation of Differentially Protected Hydroquinone Chromium Tricarbonyl Complexes from the Benzannulation Reaction, Chamberlin, S.; Wulff, W. D.; Bax, B., *Tetrahedron*, **1993**, *49*, 5531-5547.
77. Synthons for the Parent Vinyl Carbene Complex in the Benzannulation Reaction, Chamberlin, S.; Wulff, W. D., *J. Org. Chem.*, **1994**, *59*, 3047-3054.
78. Reactions of Group 6 Fischer Carbene Complexes with Alkynes - The Effect of the Metal on the Product Distribution and the Isolation of a Non-Tautomerized Cyclohexadienone Complex, Wulff, W. D.; Bax, B. M.; Brandvold, T. A.; Chan, K. S.; Gilbert, A. M.; Hsung, R. P.; Mitchell, J.; Clardy, J., *Organometallics*, **1994**, *13*, 102-126.
79. Contrasteric Regiochemical Incorporation of Stannylacetylenes in the Benzannulation Reaction, Chamberlin, S.; Wulff, W. D.; Waters, M.L., *J. Am. Chem. Soc.*, **1994**, *116*, 3113.
80. Stereoselective Aldol Addition Reactions of Fischer Carbene Complexes via Electronic Tuning of the Metal Center for Enolate Reactivity, Wulff, W. D.; Anderson, B. A.; Toole, A. J.; Xu, Y. C., *Inorganica Chimica Acta*, **1994**, *220*, 215-231.
81. Metal-catalyzed Cyclopropene Rearrangements for Benzannulation; Evaluation of an Anthraquinone Synthesis Pathway and Re-evaluation of the Parallel Approach via Carbene-Chromium Complexes, Semmelhack, M. F.; Ho, S.; Cohen, D.; Steigerwald, M.; Lee, M. C.; Lee, G.; Gilbert, A. M.; Wulff, W. D.; Ball, R. G., *J. Am. Chem. Soc.*, **1994**, *116*, 7108-7122.

82. The First Stereoselective Synthesis of Arene Chromium Tricarbonyl Complexes via the Benzannulation Reaction, Hsung, R. P.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1994**, *116*, 6449-6550.
83. Three Component Intramolecular Two-Alkyne Annulations of Fischer Carbene Complexes - New Strategies for Steroid Synthesis, Bao, J.; Wulff, W. D.; Dragisich, V.; Wenglowky, S.; Ball, R. G., *J. Am. Chem. Soc.*, **1994**, *116*, 7616-7630.
84. Asymmetric Aldol Reactions of Chiral Imidazolidinone Fischer Carbene Complexes, Powers, T. S.; Shi, Y.; Wilson, K. J.; Wulff, W. D.; Rheingold, A. L., *J. Org. Chem.*, **1994**, *59*, 6882-6884.
85. The Palladium-Catalyzed Cross-Coupling of Arene Chromium Tricarbonyl Triflate Complexes, Gilbert, A. M.; Wulff, W. D., *J. Am. Chem. Soc.*, **1994**, *116*, 7449-7450.
86. Acyclic Stereoselection in the Michael Addition of Ketone Enolates to Metalloenoates, Shi, Y.; Wulff, W. D., *J. Org. Chem.*, **1994**, *59*, 5122-5124.
87. Phenol Formation from the Reactions of Amino-Stabilized Alkenyl Fischer Carbene Complexes, Wulff, W. D.; Gilbert, A. M.; Hsung, R. P.; Rahm, A., *J. Org. Chem.*, **1995**, *60*, 4566-4575.
88. A Comparison of Diels-Alder Catalysts Generated from Linear and Vaulted Biaryls and Bromoborane-Dimethylsulfide Complex, Bao, J.; Wulff, W., D., *Tetrahedron Lett.*, **1995**, *36*, 3321-3324.
89. Transition Metal Carbene Complexes: Alkyne and Vinyl Ketene Chemistry, Wulff, W. D. in "Comprehensive Organometallic Chemistry II", Abel, E. W.; Stone, R. G. A.; Wilkinson, G., Eds., Pergamon Press, **1995**, Vol. 12, pp 469-547.
90. The Effects of Phosphine Ligands on the Benzannulation Reaction of Molybdenum Carbene Complexes with Alkynes, Hsung, R. P.; Xu, Y.-C.; Wulff, W. D., *Tetrahedron Lett.*, **1995**, *36*, 8159-8162.
91. Azabicyclo[3.3.0]octanes and 6-Hydroxytetrahydroquinolines from Intramolecular Reactions of Alkenyl(amino)carbene Complexes with Alkynes, Rahm, A.; Wulff, W. D., *Tetrahedron Lett.*, **1995**, *36*, 8753-8756.
92. Moore-Type Cyclization Leading to Arene Chromium Tricarbonyl 1,4-Diradical Intermediates and the Isolation of Indolines, Rahm, A.; Wulff, W. D. *J. Am. Chem. Soc.*, **1996**, *118*, 1807-1808.
93. The Reaction of Fischer Carbene Complexes with 1,3-Butadiynes; A New Strategem for Biaryl Synthesis with the Construction of the Biaryl Bond Preceding the Synthesis of the Arenes, Bao, J.; Wulff, W. D.; Fumo, M. J.; Grant, E. B.; Heller, D. P.; Whitcomb, M. C.; Yeung, S.-M., *J. Am. Chem. Soc.*, **1996**, *118*, 2166-2181.
94. The Synthesis, Resolution and Determination of Absolute Configuration of a Vaulted 2,2'-Binaphthol and a Vaulted 3,3'-Biphenanthrol (VAPOL), Bao, J.; Wulff, W. D.; Dominy, J. B.; Fumo, M. J.; Grant, E. B.; Rob, A. C.; Whitcomb, M. C.; Yeung, S.-M.; Ostrander, R. L.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1996**, *118*, 3392-3405.
95. Stereoselective Benzannulations and Cyclohexadienone Annulations of Fischer Carbene Complexes in the Synthesis of Decala-2,4-dien-1-ones and in the Synthesis of Tetralin Chromium Tricarbonyl Complexes, Hsung, R. P.; Wulff, W. D.; Challener, C. A., *Synthesis*, **1996**, 773-789.

96. A New Approach to Hydrindenones by Tautomer-Arrested Annulations of Fischer Carbene Complexes, Bos, M. E.; Wulff, W. D.; Wilson, K. J., *J. Chem. Soc., Chem. Commun.*, **1996**, 1863-1864.
97. Asymmetric Synthesis of δ -Ketoesters via Michael Additions of Chiral Carbene Complexes, Shi, Y.; Wulff, W. D.; Yap, G. P. A.; Rheingold, A. L., *J. Chem. Soc., Chem. Commun.*, **1996**, 2601-2602.
98. 1,4-Asymmetric Induction in the Formation of Cyclohexadienones by Chirality Transfer from a Transiently installed Chromium - stereospecific electrocyclic ring closure of a metal complexed vinyl ketene, Hsung, R. P.; Quinn, J. F.; Weisenberg, B. A.; Wulff, W. D.; Yap, G. P. A.; Rheingold, A. L., *J. Chem. Soc., Chem. Commun.*, **1997**, 615-616.
99. Asymmetric Exo-Selective Diels-Alder Reactions by Steric Attenuation of Secondary Orbital Interactions, Powers, T. S.; Jiang, W.; Su, J.; Wulff, W. D.; Waltermire, B. E.; Rheingold, A. L., *J. Am. Chem. Soc.*, **1997**, *119*, 6438-6439.
100. A Synthesis of Quinoline-5,8-quinones via the Benzannulation of 1,4-Dihydro-2-pyridyl Carbene Complexes, Peterson, G. A.; Wulff, W. D., *Tetrahedron Lett.*, **1997**, *38*, 5587-5590.
101. Asymmetric Construction of 4H-Carbazol-4-one Intermediates via the Cyclohexadienone Annulation of Chiral Carbene Complexes, Quinn, J. F.; Powers, T. S.; Wulff, W. D.; Yap, G. P. A.; Rheingold, A. L., *Organometallics*, **1997**, *16*, 4945-4947.
102. Positive Cooperativity of Product Mimics in the Asymmetric Autoinduction of Diels-Alder Reactions Catalyzed by a VAPOL-Aluminum catalyst, Heller, D. P.; Goldberg, D. R.; Wulff, W. D., *J. Am. Chem. Soc.*, **1997**, *119*, 10551-10552.
103. Physical Organic Chemistry of Transition Metal Carbene Complexes. 12. Thermodynamic Acidity Measurements of Fischer Carbene Complexes in Acetonitrile, Bernasconi, C. F.; Leyes, A. E.; Wulff, W. D.; Wang, H.; Shi, Y., *J. Am. Chem. Soc.*, **1998**, *120*, 8632-8639.
104. Stereoelectronic Effects on Product Formation from the E- and Z-isomers of η^1, η^3 -Vinyl Carbene Complexed Intermediates in the Reactions of Fischer Carbene Complexes with Alkynes, Waters, M. L.; Brandvold, T. A.; Isaacs, L.; Wulff, W. D.; Rheingold, A. L., *Organometallics*, **1998**, *17*, 4298-4308.
105. Preparation of Alkenyl Fischer Carbene Complexes via Aldol Condensations with Enolizable Aldehydes, Wang, H.; Hsung, R. P.; Wulff, W. D., *Tetrahedron Lett.*, **1998**, *39*, 1849-1852.
106. Asymmetric Synthesis with Fischer Carbene Complexes - The Development of Imidazolidinone and Oxazolidinone Complexes, Wulff, W. D., *Organometallics*, **1998**, *17*, 3116-3134.
107. Asymmetric Synthesis of Stannanes and Silanes via Reaction of Chiral Imidazolidinone Carbene Complexes with Group 14 Hydrides, Parisi, M.; Solo, A.; Wulff, W. D.; Guzei, I.; Rheingold, A. L., *Organometallics*, **1998**, *17*, 3696-3700.
108. Macrocyclization of Fischer Carbene Complexes as an Approach to Cyclophanes, Wang, H.; Wulff, W. D., *J. Am. Chem. Soc.*, **1998**, *120*, 10573-10574.
109. Synthesis of the Tetracyclic Carbon Core of Menogaril Utilizing the Benzannulation Reaction of a Fischer Carbene Complex and an Alkyne, Su, J.; Wulff, W. D.; Ball, R. G., *J. Org. Chem.*, **1998**, *63*, 8440-8447.

110. Synthetic Studies Towards the Total Synthesis of Olivin: Synthesis of a Fully Functionalized Alkyne Appropriate for the Benzannulation Reaction, Gilbert, A. M.; Miller, R. A.; Wulff, W. D., *Tetrahedron*, **1999**, *55*, 1607-1630.
111. Synthetic Studies Towards the Total Synthesis of Olivin Using Fischer Carbene Complexes: Synthesis of the 1,6,8-Trioxxygenated Core via the Benzannulation Reaction, Miller, R. A.; Gilbert, A. M.; Song, X.; Wulff, W. D., *Synthesis*, **1999**, 80-84.
112. A Comprehensive Study of [2 + 2] Cycloadditions and Ene Reactions of Alkynyl Chromium and Tungsten Carbene Complexes with Enol Ethers and Ketene Acetals and of the Stereochemistry of the Electrocyclic Ring Opening of Cyclobutenyl Carbene Complexes, Wulff, W. D.; Faron, K. L.; Su, J.; Springer, J. P.; Rheingold, A. L., *J. Chem. Soc., Perkin I*, **1999**, 197-219.
113. Studies Toward the Synthesis of Menogaril: Synthesis of A-ring Precursors and their Evaluation in a Model Benzannulation Reaction, Wulff, W. D.; Su, J.; Tang, P.-C.; Xu, Y.-C., *Synthesis*, **1999**, 415-422.
114. Mechanistic Studies on the Reaction of Fischer Carbene Complexes with Alkynes. Does the Alkyne Insertion Intermediate form Irreversibly? Waters, M. L.; Bos, M. E.; Wulff, W. D., *J. Am. Chem. Soc.*, **1999**, *121*, 6403-6413.
115. Catalytic Asymmetric Aziridination with a Chiral VAPOL-Boron Lewis Acid, Antilla, J. C.; Wulff, W. D., *J. Am. Chem. Soc.*, **1999**, *121*, 5099 - 5100.
116. Novel [1,5] Sigmatropic Rearrangements of Cyclohexadienones Generated from Fischer Carbene Complexes. A New Strategy for Installing the C-20 Angular Ethyl Group in Aspidospermidine Alkaloids, Quinn, J. F.; Bos, M. E.; Wulff, W. D., *Organic Letters*, **1999**, *1*, 161 - 164.
117. Electronic tuning of Fischer Carbene Complexes in the Preparation of Bicyclo[3.1.1]heptanones as Taxane A-ring Synthons, Jiang, W.; Fuertes, M. J.; Wulff, W. D., *Tetrahedron*, **2000**, *56*, 2183-2194.
118. Chiral Aluminum Lewis acids in Organic Synthesis, Wulff, W. D.; Handbook of Lewis Acids, Yamamoto, H., Ed., **2000**, Vol 1, 283-354, Wiley-VCH.
119. Asymmetric Diels-Alder Reactions with Chiral Acetylenic Carbene Complexes as Dienophiles, Rahm, A.; Rheingold, A. L.; Wulff, W. D.; *Tetrahedron*, **2000**, *56*, 4951-4965.
120. The Preparation and Evaluation of Electron Deficient Benzyldiene Fischer Carbene Complexes: Studies Toward the Total Synthesis of (+)-Olivin, Liptak, V. P.; Wulff, W. D., *Tetrahedron*, **2000**, *56*, 10229-10247.
121. Unexpected Regiochemistry in the Benzannulation Reaction of Fischer Carbene Complexes in the Synthesis of Cyclophanes, Wang, H.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **2000**, *122*, 9862-9863.
122. Catalytic Asymmetric Aziridination with Aryl Borate Catalysts Derived from VAPOL and VANOL Ligands, Antilla, J.; Wulff, W. D., *Angew. Chem. Int. Ed. Engl.*, **2000**, *39*, 4518-4521.
123. Chiral Ancillaries in the Benzannulations of Alkoxy and Amino Carbene Complexes with Alkynes, Hsung, R. P.; Wulff, W. D.; Chamberlin, S.; Liu, Y.; Liu, R.-Y.; Wang, H.; Quinn, J. F.; Wang, S. L. B.; Rheingold, A. L., *Synthesis*, **2001**, 200-220.

124. Active Site Design in a Chemzyme: Development of a Highly Asymmetric and Remarkably Temperature Independent Catalyst for the Imino Aldol Reaction, Xue, S.; Yu, S.; Deng, Y.; Wulff, W. D., *Angew. Chem. Int. Ed. Engl.* **2001**, *40*, 2271-2274.
125. The Preparation of Imidazolidinone and Oxazolidinone Chelated Carbene Complexes, Powers, T. S.; Wulff, W. D.; Quinn, J.; Shi, Y.; Jiang, W.; Hsung, R.; Parisi, M.; Rahm, A., Jiang, X. W., *J. Organometal. Chem.*, **2001**, *617-618*, 182-208.
126. Simultaneous and Stereoselective Construction of Planar and Axial Centers of Chirality, Fogel, L.; Hsung, R. P.; Wulff, W. D.; Sommer, R. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **2001**, *123*, 5580-5581.
127. Convergent Synthesis of Fully Functionalized Ring C Alcolchicinoids. Benzannulation Approach. Vorogushin, A. V.; Wulff, W. D.; Hansen, H.-J., *Org. Lett.*, **2001**, *3*, 2641-2644.
128. An Efficient Synthesis of Chloramphenicol via Asymmetric Catalytic Aziridination: A Comparison of Catalysts Prepared from Triphenylborate and Various Linear and Vaulted Biaryls, Loncaric, C.; Wulff, W. D., *Org. Lett.*, **2001**, *3*, 3675-3678.
129. 2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol and 3,3'-diphenyl-[2,2'-binaphthalene]-1,1'-diol, Patwardhan, A. P.; Wulff, W. D., *Electronic Encyclopedia of Reagents for Organic Synthesis*, Online posting date: October 15, **2002**.
130. Stereoselectivity of the Benzannulation Reaction: Efficient Central to Axial Chirality Transfer, Vorogushin, A. V.; Wulff, W. D.; Hansen, H.-J., *J. Am. Chem. Soc.*, **2002**, *124*, 6512-6513.
131. Steric vs. Hydrogen Bonding Control of Atropisomerization: Preparation of Either Diastereomer of Configurationally Stable Alcolchicinoids, Vorogushin, A. V.; Wulff, W. D.; Hansen, H.-J., *J. Org. Chem.*, **2003**, *68*, 9618-9623.
132. Highly Enantioselective Deracemization of Linear and Vaulted Biaryl Ligands, Zhang, Y.; Yeung, S.-M.; Wu, H.; Heller, D. P.; Wu, C.; Wulff, W. D., *Org. Lett.*, **2003**, *5*, 1813-1816.
133. The First Examples of a Meta-Benzannulation from the Reaction of Fischer Carbene Complexes with Alkynes, Wang, H.; Huang, J.; Wulff, W. D.; Rheingold, A. L., *J. Am. Chem. Soc.*, **2003**, *125*, 8980-8981.
134. Diels-Alder Reaction – Aromatization Approach toward Functionalized Ring C Alcolchicinoids. Enantioselective Total Synthesis of (-)-7S-Alcolchicine, Vorogushin, A. V.; Predeus, A. V.; Wulff, W. D.; Hansen, H.-J., *J. Org. Chem.*, **2003**, *68*, 5826-5831.
135. Total Synthesis of Carbazochinocin C: Application of the *ortho*-Benzannulation of Fischer Carbene Complexes to Carbazole-3,4-quinone Alkaloids, Rawat, M.; Wulff, W. D., *Org. Lett.*, **2004**, *6*, 329-332.
136. Contingency and Serendipity in the Reactions of Fischer Carbene Complexes with Conjugated Triynes, Jiang, M. X.-W.; Rawat, M.; Wulff, W. D., *J. Am. Chem. Soc.*, **2004**, *126*, 5970-5971.
137. Vaulted Biaryls: Efficient Ligands for the Aluminum-Catalyzed Asymmetric Baeyer-Villiger Reaction, Bolm, C.; Frison, J.-C.; Zhang, Y.; Wulff, W. D., *SynLett.*, **2004**, 1619-1621.

138. A New Convergent Strategy for the Synthesis of Calixarenes via a Triple Annulation of Fischer Carbene Complexes, Gopalsamuthiram, V.; Wulff, W. D., *J. Am. Chem. Soc.*, **2004**, *126*, 13936.
139. A New Synthesis of Vaulted Biaryl Ligands via the Snieckus Phenol Synthesis, Yu, S.; Rabalakos, C.; Mitchell, W. D.; Wulff, W. D., *Org. Lett.*, **2005**, *7*, 367.
140. ESI-Mass Spectrometry Study of the Intimate Mechanism of a Gas-Phase Organometallic Reaction by Selective Deuterium Labelling, Wulff, W. D.; Korthals, K. A.; Martinez-Alvarez, R.; Gomez-Gallego, M.; Fernaneez, I.; Sierra, M. A., *J. Org. Chem.*, **2005**, *70*, 5269-5277.
141. Highly Diastereoselective Alkylation of Aziridine-2-carboxylate Esters. Enantioselective Synthesis of LFA-1 Antagonist BIRT-377, Patwardhan, A. P.; Pulgam, V. R.; Zhang, Y.; Wulff, W. D., *Angew. Chem., Int. Ed. Engl.*, **2005**, *44*, 6169-6172.
142. Novel Ozone-Mediated Cleavage of the Benzhydryl Protecting Group from Aziridiny Esters, Patwardhan, A. P.; Lu, Z.; Pulgam, V. R.; Wulff, W. D., *Org. Lett.*, **2005**, *7*, 2201-2204.
143. The First Synthesis of Cyclopropanone Acetals from the Reaction of Fischer Carbene Complexes with Ketene Acetals, Wang, S. L. B.; Goldberg, D. R.; Liu, X.; Su, J.; Zheng, Q.-H.; Liptak, V.; Wulff, W. D., *J. Organometal. Chem.* **2005**, *690*, 6101-6110.
144. Iron in the Service of Chromium – the *ortho*-Benzannulation of *trans,trans*-dienyl Fischer Carbene Complexes, Lian, Y.; Wulff, W. D., *J. Am. Chem. Soc.*, **2005**, *127*, 17162-17163.
145. Metal Carbenes in Organic Synthesis. Topics in Organometallic Chemistry, 13. Edited by K. H. Doetz (Rheinische Friedrich-Wilhelms-Universität). Springer-verlag: Berlin, Heidelberg. 2004 x + 378 pp. \$349.00 ISBN 3-540-21833-5. Reviewed by W. W. Wulff. *J. Am. Chem. Soc.*, **2005**, *127*, 15991-15992.
146. Chromene Chromium Carbene Complexes in the Syntheses of Naphthopyran and Naphthopyrandione Units in Photochromic Materials and Biologically Active Natural Products, Rawat, M.; Prutyay, V.; Wulff, W. D., *J. Am. Chem. Soc.*, **2006**, *128*, 11044-11053.
147. An Examination of VANOL, VAPOL and VAPOL Derivatives as Ligands for Asymmetric Catalytic Diels-Alder Reactions, Heller, D. P.; Goldberg, D. R.; Wu, H.; Wulff, W. D., *Can. J. Chem.*, **2006**, *84*, 1487-1503.
148. Studies on the Synthesis of Richardianidin-1 via the Tautomer-Arrested Annulation of Fischer Carbene Complexes, Bos, M. E.; Loncaric, C.; Wu, C.; Wulff, W. D., *Synthesis* **2006**, 3679-3705.
149. Reactions of Alkenyl Fischer Carbene Complexes with Ketene Acetals: Formation of Alkynes, Siu Ling B. Wang, Xuejun Liu, Miriam C. Ruiz, Vijay Gopalsamuthiram and William D. Wulff, *Eur. J. Org. Chem.* **2006**, 5219-5234.
150. Regulation of Orthogonal Functions in a Dual Catalyst System. Subservient Role of a Non-chiral Lewis Acid in an Asymmetric Catalytic Heteroatom Diels-Alder Reaction, Newman, C. A.; Antilla, J. C.; Chen, P.; Wulff, W. D., *J. Am. Chem. Soc.*, **2007**, *129*, 7216-7217.
151. Aziridiny Vinyl Ketones from the Asymmetric Catalytic Aziridination Reaction, Deng, Y.; Lee, Y. R.; Newman, C. A.; Wulff, W. D. *Eur. J. Org. Chem.* **2007**, 2068-2071.

152. Direct Access to N-H Aziridines from the Asymmetric Catalytic Aziridination with Borate Catalysts Derived from the VANOL and VAPOL Ligands, Lu, Z.; Zhang, Y.; Wulff, W. D. *J. Am. Chem. Soc.*, **2007**, *129*, 7185-7194.
153. Intramolecular Cyclohexadienone Annulations of Fischer Carbene Complexes: Model Studies for the Synthesis of Phomactins, Jie Huang, Huan Wang, Chunrui Wu and William D. Wulff, *Org. Lett.* **2007**, *9*, 2799-2802.
154. Total Synthesis of (±)-Phomactin B2 via an Intramolecular Cyclohexadienone Annulation of a Chromium Carbene Complex, Jie Huang, Chunrui Wu and William D. Wulff, *J. Am. Chem. Soc.* **2007**, *129*, 13366-13367.
155. The Synthesis of Phenols and Quinones via Fischer Carbene Complexes, Waters, M. L.; Wulff, W. D., *Organic Reactions*, **2008**, *70*, 121-623.
156. Central-to-Axial Chirality Transfer in the Benzannulation Reaction of Optically Pure Fischer Carbene Complexes in the Synthesis of Allocolchicinoids, Andrei V. Vorogushin, William D. Wulff and Hans-Jürgen Hansen, *Tetrahedron* **2008**, *64*, 949-968.
157. Asymmetric Catalytic Aziridination with Borate Catalysts Derived from the VANOL and VAPOL Ligands – Scope and Mechanistic Studies, Yu Zhang, Aman Desai, Zhenjie Lu, Gang Hu, Zhensheng Ding and William D. Wulff, *Chem. Eur. J.* **2008**, 3785-3803.
158. Traceless Stereoiduction in the One-Pot Assembly of all Three Rings of Hexahydrodibenzopyrans, Keith A. Korthals and William D. Wulff, *J. Am. Chem. Soc.* **2008**, *130*, 2898-2899.
159. A Novel Bis-Thiourea Organocatalyst for the Asymmetric Aza-Henry Reaction, Rampalagos, C.; Wulff, W. D. *Adv. Synth. Catal.* **2008**, 1785-1790.
160. Mapping the Active Site in a Chemzyme: Diversity in the N-Substituent in the Catalytic Asymmetric Aziridination of Imines, Yu Zhang, Zhenjie Lu, Aman Desai and William D. Wulff, *Org. Lett.* **2008**, *8*, 5429-5432.
161. Diastereoselective synthesis of syn 1,3-dinitro compounds by Michael addition of nitroalkanes to nitroalkenes with a thiourea catalyst, Constantinos Rabalakos and William D. Wulff, *SYNLETT* **2008**, 2826-2830.
162. Enantioselective Organocatalytic Direct Michael Addition of Nitroalkanes to Nitroalkenes Promoted by a Unique Bifunctional DMAP-Thiourea, Constantinos Rabalakos and William D. Wulff, *J. Am. Chem. Soc.* **2008**, *130*, 13524-13525.
163. Catalytic Asymmetric Aziridination with VAPOL and/or VANOL Derived Catalysts, Yu Zhang, Zhenjie Lu and William D. Wulff, *SynLett*, **2009**, 2715-2739.
164. Absolute Configuration of 3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol Revisited, Prasad L. Polavarapu, Ana G. Petrovic, Sarah E. Vick, William D. Wulff, Hong Ren, Zhensheng Ding, Richard J. Staples, *J. Org. Chem.*, **2009**, *74*, 5451-5457.
165. Optically Active (R)- and (S)-Linear and Vaulted Biaryl Ligands: Deracemization Versus Oxidative Dimerization, Gang Hu, Daniel Holmes, Brina F. Gendhar and William D. Wulff, *J. Am. Chem. Soc.* **2009**, *131*, 14355-14364.

166. Evidence for a Boroxinate Based Brønsted Acid Derivative of VAPOL as the Active Catalyst in the Catalytic Asymmetric Aziridination Reaction, Gang Hu, Li Huang, Rui H. Huang and William D. Wulff, *J. Am. Chem. Soc.* **2009**, 131, 15615-15617.
167. Optically Active Calixarenes Conduced by Methylene Substitution, Vijay Gopalsamuthiram, Alexander V. Predeus, Rui H. Huang and William D. Wulff, *J. Am. Chem. Soc.* **2009**, 131, 18018-18019.
168. Alkyne Competition in the Benzannulation Reaction with Chromium Carbene Complexes, Chunrui Wu, Dmytro O. Berbasov, William D. Wulff, *J. Org. Chem.* **2010**, 75, 4441-4452.
169. Gram Scale Preparation of VAPOL Hydrogenphosphate, a Structurally Distinct Chiral Brønsted Acid, Aman A. Desai, Li Huang, William D. Wulff, Gerald B. Rowland and Jon C. Antilla, *Synthesis*, **2010**, 2106-2109.
170. Seeking Passe-Partout in the Catalytic Asymmetric Aziridination of Imines: Evolving Towards Substrate Generality for a Single Chemzyme, Munmun Mukherjee, Anil K. Gupta, Zhenjie Lu, Yu Zhang and William D. Wulff, *J. Org. Chem.* **2010**, 75, 5643-5660.
171. Controlled Diastereo- and Enantioselection in a Catalytic Asymmetric Aziridination, Aman A. Desai and William D. Wulff, *J. Am. Chem. Soc.* **2010**, 132, 13100-13103.
172. How the Binding of Substrates to a Chiral Polyborate Counterion Governs Diastereoselection in an Aziridination Reaction: H-Bonds in Equipose, Mathew J. Vetticatt, Aman A. Desai and William D. Wulff, *J. Am. Chem. Soc.* **2010**, 132, 13104-13107.
173. New Derivatives of VAPOL and VANOL: Structurally Distinct Vaulted Chiral Ligands and Brønsted Acid Catalysts, Aman A. Desai and William D. Wulff, *Synthesis*, **2010**, 3670-3680.
174. Origin of the Regioselectivity in an Intramolecular Nucleophilic Addition to Arene Chromium Tricarbonyl Complexes, Steven Chamberlin, Nilanjana Majumdar, William D. Wulff, John V. Muntean, Robert L. Ostrander and Arnold L. Rheingold, *Inorganic Chimica Acta*, **2010**, 364, 205-219.
175. Trimethylsilyldiazomethane as a Versatile Stitching Agent for the Introduction of Aziridines into Functionalized Organic Molecules, Hong Ren and William D. Wulff, *Org. Lett.* **2010**, 12, 4908-4911.
176. Substrate-Induced Covalent Assembly of a Chemzyme and Crystallographic Characterization of a Chemzyme-substrate Complex, Gang Hu, Anil K. Gupta, Rui H. Huang, Munmun Mukherjee and William D. Wulff, *J. Am. Chem. Soc.*, **2010**, 132, 14669-14675.
177. The Synthesis of Optically Active Calix[4]arenes with One or Three Substituents on the Methylene Bridges, Vijayagopal Gopalsamuthiram, Rui H. Huang and William D. Wulff, *Chem. Commun.* **2010**, 8213-8215.
178. Preparation of (2*R*,3*R*)-Ethyl 1-Benzhydryl-3-(4-bromophenyl)aziridine-2-carboxylate by Catalytic Asymmetric Aziridination, Aman A. Desai, Roberto Morán-Ramallal and William D. Wulff, *Organic Synthesis*, **2011**, 88, 224-237.
179. A Succinct Synthesis of the Vaulted Biaryl Ligand VANOL via a Dienone-Phenol Rearrangement, Zhensheng Ding, Song Xue and William D. Wulff, *Chemistry—An Asian Journal* **2011**, 6, 2130-2146.

180. One Pot Synthesis of 2-Imidazolines via the Ring Expansion of Imidoyl Chlorides with Aziridines, Kuszpit, M. R.; Wulff, W. D.; Tepe, J. J., *J. Org. Chem.* **2011**, *76*, 2913-2919.
181. Direct Catalytic Asymmetric Aminoallylation of Aldehydes – Synergism of Chiral- and Non-Chiral Brønsted Acids, Hong Ren and William D. Wulff, *J. Am. Chem. Soc.* **2011**, *133*, 5656-5659.
182. Multicomponent Catalytic Asymmetric Aziridination of Aldehydes, Gupta, A. K.; Mukherjee, M.; Wulff, W. D. *Org. Lett.* **2011**, *13*, 5866-5869.
183. Catalytic Asymmetric Synthesis of Tri-substituted Aziridines, Li Huang and William D. Wulff, *J. Am. Chem. Soc.* **2011**, *133*, 8892-8895.
184. Practical Gram Scale Asymmetric Catalysis with Boroxinate Brønsted Acids Derived from the VAPOL and VANOL Ligands, Desai, A. A.; Ren, H.; Mukherjee, M.; Wulff, W. D. *Org. Process. Res. & Dev.* **2011**, *15*, 1108-1115.
185. Scalable Syntheses of the Vaulted Biaryl Ligands VAPOL and VANOL via the Cycloaddition/Electrocyclization Cascade, Ding, Z.; Osminski, W. E. G.; Ren, H.; Wulff, W. D. *Org. Process. Res. & Dev.* **2011**, *15*, 1089-1107.
186. Simultaneous Synthesis of both Rings of Chromenes via a Benzannulation/o-Quinone Methide Formation/Electrocyclization Cascade, Majumdar, N.; Korthals, K. A.; Wulff, W. D. *J. Am. Chem. Soc.* **2012**, *134*, 1357-1362.
187. Double Stereodifferentiation in the Catalytic Asymmetric Aziridination of Imines Prepared from a-Chiral Amine, Huang, L.; Zhang, Y.; Staples, R. J.; Huang, R. H.; Wulff, W. D. *Chemistry – A European Journal*, **2012**, *18*, 5302-5313.
188. *BOROX Catalysis*: Self-assembled AMINO-BOROX and IMINO-BOROX Intermediates in a Singular Five Component Catalyst Assembly/Catalytic Asymmetric Aziridination, Gupta, A. K.; Mukherjee, M.; Hu, G.; Wulff, W. D. *Journal of Organic Chemistry* **2012**, submitted 5/23/12.
189. Multifaceted Interception of 2-Chloro-2-Oxoacetic Anhydrides: A Catalytic Asymmetric Synthesis of β -Lactams, Huang, L.; Zhao, W.; Staples, R. J.; Wulff, W. D. *Angew. Chem. Int. Ed.* **2012**, *51*, 0000.
190. Catalytic Asymmetric Synthesis of Alkynyl Aziridines: Both Enantiomers of *cis*-Aziridines from One Enantiomer of the Catalyst, Guan, Y.; Lopez-Alberca, M. P.; Lu, Z.; Xhang, Y.; Desai, A. A.; Patwardhan, A. P.; Wulff, W. D. *J. Am. Chem. Soc.* **2012**, submitted 6/19/12.
191. Isotope Effects and Mechanism of the Brønsted Acid Catalyzed Aziridination Reaction – A Stepwise Mechanism with Rate-Limiting Ring-Closure, Aman A. Desai, Mathew J. Veticatt and William D. Wulff, *J. Amer. Chem. Soc.* **2012**, *134*, 0000.
- 192.

