

DINA C. MERRER

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Education

- May 1999* Ph.D., Organic Chemistry, Rutgers University, New Brunswick, NJ
Absolute Kinetics of Selected Singlet Carbenes: Rearrangement in Excited States, Quantum Mechanical Tunneling, and Bystander Effects
- May 1994* B.A., Chemistry (*magna cum laude*, Phi Beta Kappa), Smith College, Northampton, MA
Modifications of Tin Oxide Semiconductor Electrodes with Functionalized Porphyrins

Academic and Research Experience

- August 2001-present* **Assistant Professor of Chemistry**, Department of Chemistry, Barnard College, Columbia University, New York, NY
- July 1999-July 2001* **OSU Postdoctoral Fellow**, Department of Chemistry, The Ohio State University, Columbus, OH
Advisor: Professor Matthew S. Platz
Measured the fast kinetics of novel triplet carbenes by nanosecond laser flash photolysis and time-resolved infrared spectroscopies, cryogenic matrix techniques, and ab initio computational methods; synthesized bifunctional molecules for use as covalent links between polymeric layers in organic light-emitting diodes.
- Sept. 1994-May 1999* **Graduate Research Fellow**, Department of Chemistry, Rutgers University, New Brunswick, NJ
Advisor: Professor Robert A. Moss
Synthesized benzyl and alkylhalodiazirines and acetoxydiazirines; photochemically generated carbenes and studied their fast kinetics by laser flash photolysis; determined absolute rates and Arrhenius parameters for intramolecular and intermolecular carbenic reactions by laser flash photolysis.
- May 1993-May 1994* **Undergraduate Research Assistant**, Department of Chemistry, Smith College, Northampton, MA
Advisor: Professor Sharon M. Palmer
Synthesized and studied electrochemistry of functionalized porphyrins; derivatized semiconductor electrodes with porphyrins by organic coupling techniques.

Fellowships and Awards

2006	Gladys Brooks Teaching Award, Barnard College
1999-2000	Ohio State University Postdoctoral Fellowship
1997-1998	Department of Education GAANN Graduate Fellowship
1996	William Rieman Teaching Prize, Rutgers University
1994-1996	Excellence Graduate Fellowship, Rutgers University
1995	J.R.L. Morgan Scholarship, Rutgers University
1995	U.S. Department of Defense Graduate Fellowship, Honorable Mention
1994	Phi Beta Kappa
1994	Sigma Xi Scientific Research Honor Society

Professional Affiliations

American Chemical Society
Council on Undergraduate Research
Phi Beta Kappa
Sigma Xi

Research Grants

Sept. 2005- August 2008	National Science Foundation, CHE-0517876, \$201,000 Mechanisms of Electrophilic Carbene Additions to Strained Cyclic C-C Bonds
March 2003- March 2006	National Science Foundation, CHE-0234660, \$90,049 A High Resolution GC/MS/FID for Undergraduate Research in Chemistry
June 2002- June 2004	Cottrell College Science Award, Research Corporation, CC5551, \$35,000 Relative and Absolute Kinetic Studies of Stable Nucleophilic Carbenes
May 2002- August 2004	Petroleum Research Fund, American Chemical Society, 37969-GB4, \$35,000 Mechanisms of Intramolecular Ring Expansions: Additions of Carbenes to Strained Cyclic Systems
May 2002- May 2003	National Center for Supercomputing Applications, 10,000 cpu hours Mechanisms of Carbene Additions to Strained Cyclic Systems
June 2002- August 2002	New York Science Education Program Summer Undergraduate Fellowship to Alexis N. Sabo (BC '03), \$4,000 The Mechanism of Electrophilic Carbene Addition to Benzocyclopropene: Concerted or Stepwise?

Publications (undergraduate co-workers underlined)

- (11) Bernard, S. E.; Mo, X. Y.; Khrapunovich, M.; Merrer, D. C. Mechanisms of Halocarbene Additions to Cyclooctyne: A Computational Investigation, under revision.
- (10) Khrapunovich, M.; Zelenova, E.; Seu, L.; Sabo, A. N.; Flaherty A.; Merrer, D. C. Regioselectivity and Mechanism of Dihalocarbene Addition to Benzocyclopropene, *J. Org. Chem.* **2007**, 72, 7574-7580.

- (9) Merrer, D. C.; Rablen, P. R. Dichlorocarbene Addition to Cyclopropenes: A Computational Study, *J. Org. Chem.* **2005**, *70*, 1630-1635.
- (8) Merrer, D. C.; Ozcetinkaya, S.; Shinnar, A. E. Experimental and Theoretical Ultraviolet Spectra of Haloindoles, *Tetrahedron Lett.* **2004**, *45*, 4899-4902.
- (7) Merrer, D. C.; Moss, R. A. Kinetics of Intramolecular Carbene Rearrangements, in *Advances in Carbene Chemistry*; Brinker, U. H., ed.; JAI Press: Greenwich, CT, 2001, Vol. 3, pp 53-113.
- (6) Moss, R. A.; Johnson, L. A.; Merrer, D. C.; Lee, G. E. Jr. Carbenes as Substrates: Bimolecular Fragmentation of Alkoxychlorocarbenes, *J. Am. Chem. Soc.* **1999**, *121*, 5940-5944.
- (5) Moss, R. A.; Merrer, D. C. Structure-Reactivity Dependence in the Rearrangements of a Family of Alkylacetoxycarbenes, *Tetrahedron Lett.* **1998**, *39*, 8067-8070.
- (4) Merrer, D. C.; Moss, R. A.; Liu, M. T. H.; Banks, J. T.; Ingold, K. U. Benzylchlorocarbene: Origins of Arrhenius Curvature in the Kinetics of the 1,2-H Shift Rearrangement, *J. Org. Chem.* **1998**, *63*, 3010-3016.
- (3) Moss, R. A.; Maksimovic, L.; Merrer, D. C. Benzylfluorocarbene: Reactions and Kinetics, *Tetrahedron Lett.* **1997**, 7049-7052.
- (2) Moss, R. A.; Merrer, D. C. Absolute Kinetics of Mesitylmethylchlorocarbene Reactions, *J. Chem. Soc., Chem. Commun.* **1997**, 617-618.
- (1) Moss, R. A.; Ma, W.; Merrer, D. C.; Xue, S. Conversion of 'Obstinate' Nitriles by Garigipati's Reaction, *Tetrahedron Lett.* **1995**, 8761-8764.

Presentations (undergraduate co-workers underlined)

- (11) Bernard, S. E.; Napolitano, D. C.; Suski, K.; Khrapunovich, M.; Merrer, D. C. Mechanisms of Halocarbene Additions to Cyclooctyne: An Experimental and Theoretical Investigation, 233rd National Meeting of the American Chemical Society, Chicago, IL, March 2007.
- (10) Bernard, S. E.; Merrer, D. C. Computational Study of Chlorocarbene Addition to Cyclooctyne, Mercury Conference on Computational Chemistry, Clinton, NY, July 2006.
- (9) Khrapunovich, M.; Zelenova, E.; Flaherty, A.; Seu, L.; Sabo, A. N.; Merrer, D. C. Regioselectivity and Mechanism of :CX₂ Addition to Benzocyclopropene, Reaction Mechanisms Conference, College Park, MD, June 2006.
- (8) Nicolas, C. I.; Merrer, D. C.; Addition of Dihalocarbenes to Benzyl[1.1.1]propellane, 231st National Meeting of the American Chemical Society, Division of Organic Chemistry, Atlanta, GA, March 2006.
- (7) Merrer, D. C.; Doubleday, C. E., Jr. Dynamics of Carbene Addition to Cyclopropene, 2005 International Chemical Congress of Pacific Basin Societies (Pacifichem), Honolulu, HI, December 2005.
- (6) Khrapunovich, M.; Zelenova, E.; Flaherty, A.; Seu, L.; Sabo, A. N.; Merrer, D. C. Regioselectivity and Mechanism of :CX₂ Addition to Benzocyclopropene, 2005 Gordon Conference on Physical Organic Chemistry, Plymouth, NH, June 2005.
- (5) Merrer, D. C.; Zelenova, E.; Khrapunovich, M.; Huang, D.; Seu, L.; Sabo, A. N. Singlet Carbene Additions to Strained Benzannulated Rings, 227th National Meeting of the American Chemical Society, Division of Organic Chemistry, Anaheim, CA, March 2004.
- (4) Zelenova, E.; Merrer, D. C.; Addition of Singlet Carbenes to Benzocyclopropene, 225th National Meeting of the American Chemical Society, Division of Organic Chemistry, New Orleans, LA, March 2003.

- (3) Merrer, D. C. Dichlorocarbene Addition to Cyclopropenes: A Computational Study, 225th National Meeting of the American Chemical Society, Division of Organic Chemistry, New Orleans, LA, March 2003.
- (2) Merrer, D. C.; Flaherty, A. Theoretical Study of Dichlorocarbene Addition to Cyclopropenes, Reaction Mechanisms Conference, Columbus, OH, July 2002.
- (1) Merrer, D. C.; Moss, R. A. Bystander Effects in Related Acetoxycarbenes, 216th National Meeting of the American Chemical Society, Division of Organic Chemistry, Boston, MA, August 1998.

Invited Lectures

- (14) Expect the Unexpected: Carbene Additions to Strained Rings, Gordon Research Conference on Physical Organic Chemistry, Holderness, NH, June 2007.
- (13) Mechanisms of Carbene Addition to Cyclopropenes: Dynamics and Strain, Brooklyn College, Brooklyn, NY, May 2007.
- (12) Mechanisms of Carbene Addition to Cyclopropenes: Dynamics and Strain, Rutgers University, New Brunswick, NJ, May 2007.
- (11) Dynamics in the Mechanisms of Carbene Additions to Strained C-C Bonds, 233rd National Meeting of the American Chemical Society, Chicago, IL, March 2007.
- (10) Carbenes Behaving Dynamically: Additions to Cyclopropenes, Colby College, Waterford, ME, February 2007.
- (9) Mechanisms of Carbene Addition to Cyclopropenes: Dynamics and Strain, University of Maryland, College Park, MD, October 2006.
- (8) Mechanisms of Carbene Addition to Cyclopropenes: Dynamics and Strain, Johns Hopkins University, Baltimore, MD, October 2006.
- (7) Regioselectivity and Mechanism of :CX₂ Addition to Benzocyclopropene, Reaction Mechanisms Conference, College Park, MD, June 2006.
- (6) Chemistry + Carbenes = Career, General Electric Fellowship Program for minority students in the sciences, Barnard College, New York, NY, April 2006.
- (5) Mechanisms of Carbene Additions to Cyclopropenes: Dynamics and Strain, Columbia University, New York, NY, March 2006.
- (4) Carbene Addition to Cyclopropenes: Mechanistic Reconsiderations, Long Island University, Brooklyn, NY, October 2005.
- (3) Carbenes Behaving Dynamically: Addition to Cyclopropene, Smith College, Northampton, MA, April 2005.
- (2) Carbenes Behaving Dynamically, Organic Chemistry Celebration, Barnard College, New York, NY, February 2005.
- (1) A Mechanistic Mystery: Carbene Addition to Cyclopropenes, Western Connecticut State University, Danbury, CT, April 2003.

Research Students

Sarah Bernard (Barnard '07, senior thesis/summer research)
Aidan Flaherty (Barnard '04, independent study)
Rebecca Goldstein (Barnard '07, guided research)
Michele Guide (Barnard '09, summer research)
Diana Huang (Barnard '05, summer research/guided research)
Karen Justiniano (Barnard '08, guided research)

Marina Khrapunovich (Barnard '06, senior thesis/summer research/guided research)
Xiao Yu Mo (Barnard '09, summer research)
Denise Napolitano (Barnard '08, senior thesis/summer research/guided research)
Chantel Nicolas (Barnard '07, summer research/guided research)
Annice Ormiston (Barnard '05, guided research)
Sonia Ortiz (Barnard '08, senior thesis/summer research)
Alexis Sabo (Barnard '03, summer research)
Lillian Seu (Barnard '05, guided research)
Ida Suen (Barnard '08, guided research)
Kaitlyn Suski (Barnard '08, senior thesis/summer research)
Ilana Vinograd (Barnard '05, guided research)
Ekaterina Zelenova (Barnard '03, senior thesis/guided research)

Courses taught

Fall 2001 CHEM BC 3231 Organic Chemistry II
Guided research student: Aidan Flaherty

Spring 2002 CHEM BC 3368 Physical Chemistry II Laboratory
Guided research students: Aidan Flaherty, Ekaterina Zelenova

Fall 2002 CHEM BC 3231 Organic Chemistry II
Senior thesis student: Ekaterina Zelenova

Spring 2003 CHEM BC 3230 Organic Chemistry I
Senior thesis student: Ekaterina Zelenova
Guided research student: Annice Ormiston

Fall 2003 CHEM BC 3231 Organic Chemistry II
Guided research students: Diana Huang, Marina Khrapunovich, Lillian Seu

Spring 2004 CHEM BC 3230 Organic Chemistry I
CHEM BC 3280 Advanced Organic Chemistry (new course introduced with
Christian Rojas)
Guided research students: Diana Huang, Marina Khrapunovich, Lillian Seu,
Ilana Vinograd

*Fall 2004-
Spring 2005* On Special Assistant Professor Leave

Fall 2005 CHEM BC 3333/3335 Modern Techniques of Organic Chemistry Laboratory
Senior thesis student: Marina Khrapunovich
Guided research students: Rebecca Goldstein, Chantel Nicolas

Spring 2006 CHEM BC 3232 Intermediate General Chemistry
CHEM BC 3280 Advanced Organic Chemistry (with Christian Rojas)
Senior thesis student: Marina Khrapunovich
Guided research student: Chantel Nicolas

Fall 2006 CHEM BC 3333/3335 Modern Techniques of Organic Chemistry Laboratory

Senior thesis student: Sarah Bernard
 Guided research students: Karen Justiniano, Denise Napolitano, Chantel Nicolas

Spring 2007 Teaching release – 2 units
 Senior thesis student: Sarah Bernard
 Guided research student: Denise Napolitano

Fall 2007 CHEM BC 3231 Organic Chemistry II
 Senior thesis students: Denise Napolitano, Sonia Ortiz, Kaitlyn Suski
 Guided research student: Michele Guide

Spring 2008 CHEM BC 3230 Organic Chemistry I
 Senior thesis students: Denise Napolitano, Sonia Ortiz, Kaitlyn Suski
 Guided research students: Michele Guide, Xiao Yu Mo, Ida Suen

Service

Barnard College contributions

2007-present Tenure Process Review Committee
2005-present Board of Trustees Committee on Student Life
2005-present Student Life Committee
2002-present Chemistry Department faculty search committees – 8 total
2002-present Premajor and major adviser
2005-2007 Committee on Honors
2003-2004 Committee on Instruction
2002-2004 Committee on Programs and Academic Standing
May 2003 Faculty representative for Five Sisters admissions recruiting events in NYC and Chicago

Fall 2002, 2003 Participant in SGA town hall meetings: diversity on campus honor code

2001-2002 Faculty teller for faculty elections
November 2002 Arranged for and hosted departmental seminar speaker
April 2002 Panelist: “What is graduate school like?” for Barnard undergraduates

Columbia University contributions

2001-present Columbia Chemistry Ph.D. thesis examination committees 10 students to-date
2001-present Coordinate Columbia organic chemistry problem session – avg. 1-2 per year
2001-present Participant in weekly Columbia organic chemistry seminars and problem sessions
March 2006 Presented research seminar at Columbia organic chemistry problem session

Other professional contributions

2005-present Article reviewer: *Journal of Organic Chemistry*
2002-present Grant proposal reviewer: NSF, PRF
April 2006 Participant in Changing the Face of Science and Engineering Women in Science conference, Smith College, Northampton, MA
November 2005 Liberal arts college panelist for NSF-sponsored workshop for postdoctorals and graduate students on Academic Careers in Chemistry, Eastern Analytical

August 2003

Symposium, Somerset, NJ

Participant in an NSF-sponsored summit about research at predominantly undergraduate institutions, Bates College, Lewiston, ME