

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

July 2009-present **Associate Professor of Chemistry**, Department of Chemistry, Barnard College, Columbia University, New York, NY

August 2001-June 2009 **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.

Academic and Professional Honors

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 Memberships

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

Courses Taught

<i>Fall 2001</i>	CHEM BC 3231 Organic Chemistry II Guided research student: Aidan Flaherty
<i>Spring 2002</i>	CHEM BC 3368 Physical Chemistry II Laboratory Guided research students: Aidan Flaherty, Ekaterina Zelenova
<i>Fall 2002</i>	CHEM BC 3231 Organic Chemistry II Senior thesis student: Ekaterina Zelenova
<i>Spring 2003</i>	CHEM BC 3230 Organic Chemistry I Senior thesis student: Ekaterina Zelenova Guided research student: Annice Ormiston
<i>Fall 2003</i>	CHEM BC 3231 Organic Chemistry II Guided research students: Diana Huang, Marina Khrapunovich, Lillian Seu
<i>Spring 2004</i>	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
<i>Fall 2004- Spring 2005</i>	On Special Assistant Professor Leave
<i>Fall 2005</i>	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
- Fall 2008* CHEM BC 3333/3335 Modern Techniques of Organic Chemistry Laboratory
Senior thesis students: Xiao Yu Mo, Jennifer Schloss
Guided research students: Linda Suen, Stephanie Zaleski
- Spring 2009* CHEM BC 3230 Organic Chemistry I
Senior thesis students: Xiao Yu Mo, Jennifer Schloss
Guided research students: Stephanie Zaleski
- Fall 2009* CHEM BC 3231 Organic Chemistry II
Senior thesis students: Linda Suen, Julia Tolentino
Guided research students: XXXX
- Spring 2010* CHEM BC 3230 Organic Chemistry I
Senior thesis students: Linda Suen, Julia Tolentino
Guided research students: XXXX

Publications and Creative Work (undergraduate co-workers underlined)

Journal Articles

- (10) Mo, X. Y.; Bernard, S. E.; Khrapunovich, M.; Merrer, D. C. A Computational Study of Chlorocarbene Additions to Cyclooctyne, *J. Org. Chem.* **2008**, *73*, 8537-8544.
- (9) 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.
- (8) Merrer, D. C.; Rablen, P. R. Dichlorocarbene Addition to Cyclopropenes: A Computational Study, *J. Org. Chem.* **2005**, *70*, 1630-1635.
- (7) Merrer, D. C.; Ozcetinkaya, S.; Shinnar, A. E. Experimental and Theoretical Ultraviolet Spectra of Haloindoles, *Tetrahedron Lett.* **2004**, *45*, 4899-4902.
- (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 to Amidines by Garigipati's Reaction, *Tetrahedron Lett.* **1995**, 8761-8764.

Book Chapter

Merrer, D. C.; Moss, R. A. Kinetics of Intramolecular Carbene Reactions, in *Advances in Carbene Chemistry*; Brinker, U. H., ed.; JAI Press: Greenwich, CT, 2001, Vol. 3, pp 53-113.

Conference Presentations

- (15) Mo, X. Y.; Schloss, J.; Suen, L.; Zaleski, S.; Sheridan, M.; Tolentino, J.; Weena, U.; Merrer, D. C. Who's in Charge? Halocarbene Additions to Strained C-C Bonds, International Symposium on Reactive Intermediates and Unusual Molecules, Prague, Czech Republic, July 2009.
- (14) Mo, X. Y.; Schloss, J.; Suen, L.; Zaleski, S.; Merrer, D. C. Dynamical Control of Intermolecular Carbene Reactions, 237th National Meeting of the American Chemical Society, Division of Organic Chemistry, Salt Lake City, UT, March 2009.
- (13) Mo, X. Y.; Bernard, S. E.; Napolitano, D.; Suski, K.; Khrapunovich, M.; Merrer, D. C. Mechanistic Investigation of Halocarbene Additions to Cyclooctyne, Reaction Mechanisms Conference, Chapel Hill, NC, June 2008.
- (12) Napolitano, D.; Ortiz, S.; Suski, K.; Khrapunovich, M.; Guide, M.; Merrer, D. C. Halocarbene Additions to Strained Cyclic C-C π and σ Bonds, 235th National Meeting of the American Chemical Society, Division of Organic Chemistry, New Orleans, LA, April 2008.
- (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, Division of Organic Chemistry, 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 $:CX_2$ 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 $:CX_2$ 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

- (17) Expect the Unexpected: Carbene Additions to Strained Systems, University of Nevada, Reno, NV, September 2008.
- (16) Carbenes Behaving Badly: Violating Transition State Theory, NSF Workshop on Physical Organic Chemistry, Lake Tahoe, CA, September 2008.
- (15) Expect the Unexpected: Carbene Additions to Strained Systems, Columbia University, New York, NY, March 2008.
- (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 $:CX_2$ 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 Grants

Prior Grants

- | | |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <i>Sept. 2005-</i> | National Science Foundation, CHE-0517876, \$201,000 |
| <i>August 2009</i> | Mechanisms of Electrophilic Carbene Additions to Strained Cyclic C-C Bonds |
| <i>March 2003-</i> | National Science Foundation, CHE-0234660, \$90,049 |
| <i>March 2006</i> | A High Resolution GC/MS/FID for Undergraduate Research in Chemistry
Co-PI with Elizabeth Kujawinski |
| <i>June 2002-</i> | Cottrell College Science Award, Research Corporation, CC5551, \$35,000 |
| <i>June 2004</i> | Relative and Absolute Kinetic Studies of Stable Nucleophilic Carbenes |
| <i>May 2002-</i> | Petroleum Research Fund, American Chemical Society, 37969-GB4, \$35,000 |
| <i>August 2004</i> | Mechanisms of Intramolecular Ring Expansions: Additions of Carbenes to Strained Cyclic Systems |
| <i>May 2002-</i> | National Center for Supercomputing Applications, 10,000 cpu hours |
| <i>May 2003</i> | Mechanisms of Carbene Additions to Strained Cyclic Systems |
| <i>June 2002-</i> | New York Science Education Program Summer Undergraduate Fellowship to |
| <i>August 2002</i> | Alexis N. Sabo (BC '03), \$4,000
The Mechanism of Electrophilic Carbene Addition to Benzocyclopropene:
Concerted or Stepwise? |

Active Grants

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|-------------------|---------------------------------------------------------------------------------|
| <i>June 2009-</i> | National Science Foundation, CHE-0844034, \$283,626 |
| <i>May 2012</i> | Dynamic Control of Electrophilic Carbene Additions to Strained Cyclic C-C Bonds |

Service

Service to Barnard College

- | | |
|----------------------|----------------------------------------------------------|
| <i>2009-present</i> | Faculty Governance and Procedures Committee |
| <i>2008-present,</i> | Committee on Instruction |
| <i>2003-2004</i> | |
| <i>2008-2009</i> | Columbia University Athletics Advisory Committee |
| <i>2007-2008</i> | Tenure Process Review Committee |
| <i>2005-2008</i> | Board of Trustees Committee on Student Life |
| <i>2005-2007</i> | Student Life Committee |
| <i>2002-present</i> | Chemistry Department faculty search committees – 9 total |

2002-present	Pre-major and major adviser
2005-2007	Committee on Honors
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
April 2002	Panelist: "What is graduate school like?" for Barnard undergraduates

Service to Columbia University (CU)

2001-present	CU Chemistry Ph.D. thesis examination committees (11 students to-date)
2001-present	Run CU Organic Chemistry problem sessions – average 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

Service to the Profession

2005-present	Article reviewer: <i>Journal of the American Chemical Society</i> , <i>Journal of Organic Chemistry</i> , <i>Journal of Physical Organic Chemistry</i> , <i>Tetrahedron Letters</i>
2002-present	Grant proposal reviewer: NSF, PRF
June 2009	Participant in Mellon 23 Intellectual Life Conference, Amherst College, Amherst, MA
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 Symposium, Somerset, NJ
August 2003	Participant in an NSF-sponsored summit about research at predominantly undergraduate institutions, Bates College, Lewiston, ME

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, senior thesis/summer research/guided 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)
 Jennifer Schloss (Barnard '09, senior thesis/summer research)

Lillian Seu (Barnard '05, guided research)
Marlena Sheridan (Barnard '11, summer research)
Ida Suen (Barnard '08, guided research)
Linda Suen (Barnard '10, senior thesis/summer research/guided research)
Kaitlyn Suski (Barnard '08, senior thesis/summer research)
Julia Tolentino (Barnard '10, senior thesis/summer research)
Ilana Vinograd (Barnard '05, guided research)
Ul Weena (Barnard '12, summer research)
Stephanie Zaleski (Barnard '11, summer research/guided research)
Ekaterina Zelenova (Barnard '03, senior thesis/guided research)