

**Bianca R. Sculimbrene**

College of the Holy Cross  
Department of Chemistry  
1 College St  
Worcester, MA 01610

Phone: (508) 793-3425  
Fax: (508) 793-3530  
Email: [bsculimb@holycross.edu](mailto:bsculimb@holycross.edu)

**Current Position:** Associate Professor of Chemistry, College of the Holy Cross

**Education:**

1999-2004 Ph.D. Chemistry, Boston College  
1995-1999 B.S., Magna Cum Laude, Chemistry, Xavier University

**Research Experience:**

2006-present Independent Research (College of the Holy Cross)  
*Utilizing Organic Synthesis for the Development of Chemical Tools*

2004-2006 Postdoctoral Research (Massachusetts Institute of Technology)  
*Lanthanide Binding Tags as Fluorescent Probes for Studying Protein-Protein Interactions* (Advisor: Barbara Imperiali)

1999-2004 Doctoral Research (Boston College)  
*Catalytic Asymmetric Phosphorylation: Total Syntheses of Inositol Phosphates* (Advisor: Scott J. Miller)

1997-1999 Undergraduate Research (Xavier University)  
*Silatrane-Nucleosides as Transition State Analogues: Synthesis and Characterization* (Advisor: Edward E. Fenlon)

**Teaching Experience:****Faculty Member**

2006 - present Organic Chemistry I (Lecture and Laboratory)  
Organic Chemistry II (Lecture and Laboratory)  
Mechanistic Organic Chemistry  
Biochemistry I  
Undergraduate Research Tutorials

**Teaching Assistant**

2006 Teaching Assistant (at MIT): *Tools for Assessing Biological Function*  
2003 Teaching Assistant (at Boston College): *Mechanistic Organic Chemistry*  
2000-2001 Teaching Assistant (at Boston College): *Organic Chemistry*  
2000 Teaching Assistant (at Boston College): *General Chemistry*

**Grants:**

- 2014 Research and Publication Award  
 “*Synthesis of the C-terminal Fragment of Peptide Isoesters*” \$3,000
- 2013 Research and Publication Award  
 “*Selective Phosphorylation of Diols*” \$3,000
- 2009 Charles & Rosanna Batchelor Ford Faculty Fellowship  
 “*Synthesis of Peptide-Isoesters to Study Drug Interactions*” \$3,800
- 2008 Jean Dreyfus Boissevain Undergraduate Scholarship (awarded to O.S. Fenton)  
 “*Development of a Catalytic Reaction for the Phosphorylation of Alcohols*” \$5,500
- 2007 Charles & Rosanna Batchelor Ford Faculty Fellowship  
 “*The Development of Chemical Tools in Organic Synthesis*” \$3,500
- 2006 The Camille and Henry Dreyfus New Faculty Start-Up  
 “*Utilizing organic synthesis for development of chemical tools: new methods for phosphorylation, facile amino acid synthesis and vancomycin probes*” \$30,000

**Awards and Honors:**

- 2012 Honorary Member of Alpha Sigma Nu
- 2004-2006 NIH Postdoctoral Fellowship
- 2004 Outstanding Graduate Student Award (Boston College)
- 2002-2003 ACS Division of Organic Chemistry Graduate Fellowship
- 2002 Kenneth J. Hancock Memorial Student Award in Green Chemistry
- 2002 Donald J. White Teaching Excellence Award
- 1999-2000 GAANN Fellowship
- 1999 Fr. Frederick Miller Award in Chemistry (Xavier University)
- 1998 Council on Undergraduate Research Summer Fellowship

**Publications: (\* denotes undergraduate co-authors)****Research Articles**

- (16) “Synthesis of  $\alpha$ -chiral- $\beta,\gamma$ -unsaturated carboxylic acid derivatives using chiral auxiliaries” K.E. Poremba\*, V.A. Lee\*, **B.R. Sculimbrene** *Tetrahedron*, **2014**, 70, 5463-5467.
- (15) “Selective Phosphorylation of Diols with a Lewis Acid Catalyst” K.A. Coppola\*, J.W. Testa\*, E.E. Allen\*, **B.R. Sculimbrene** *Tetrahedron Lett.* **2014**, 55, 4203-4206.
- (14) “Catalytic Lewis Acid Phosphorylation with Pyrophosphates” O.S. Fenton\*, E.E. Allen\*, K.P. Pedretty\*, S.D. Till\*, J.E. Todaro\*, **B.R. Sculimbrene** *Tetrahedron*, **2012**, 68, 9023-9028.
- (13) “A Wet lab Approach to Stereochemistry Using 31P NMR Spectroscopy” O.S. Fenton\*, **B.R. Sculimbrene** *J. Chem. Ed.* **2011**, 88, 662-664.

- (12) "Synthesis of a D-Ala-D-Ala Peptide Isostere via Olefin Cross-metathesis and Evaluation of Vancomycin Binding" R.K. Quinn\*, A.L. Cianci\*, J.A. Beaudoin\* and **B.R. Sculimbrene** *Bioorg. Med. Chem. Lett.* **2010**, *20*, 4382-4385.
- (11) "Efficient Catalyst Turnover in the Phosphitylation of Alcohols with Phosphoramidites" P.B. Brady\*, E.M. Morris\*, O.S. Fenton\*, and **B.R. Sculimbrene** *Tetrahedron Lett.* **2009**, *50*, 975-978.
- (10) "Lanthanide-Binding Tags with Unnatural Amino Acids: Sensitizing Tb<sup>+3</sup> and Eu<sup>+3</sup> Luminescence at Longer Wavelengths." A. M. Reynolds, **B.R. Sculimbrene**, B. Imperiali *Bioconjugate Chem.* **2008**, *19*, 588-591.
- (9) "Lanthanide-Binding Tags as Luminescent Probes for Studying Proteins." **B. R. Sculimbrene**, B. Imperiali *J. Am. Chem. Soc.* **2006**, *128*, 7346-7352.
- (8) "Streamlined Synthesis of Phosphatidylinositol (PI), PI3P, PI3,5P<sub>2</sub>, and Deoxygenated Analogues as Potential Biological Probes." Y.J. Xu, **B.R. Sculimbrene**, S.J. Miller *J. Org. Chem.* **2006**, *71*, 4919-4928.
- (7) "Rapid Combinatorial Screening of Peptide Libraries for the Selection of Lanthanide-Binding Tags (LBTs)." L. J. Martin, **B.R. Sculimbrene**, M. Nitz, B. Imperiali *QCS Comb. Sci.* **2005**, *24*, 1149-1157.
- (6) "Desymmetrization of Glycerol Derivatives with Peptide-based Acylation Catalysts." C.A. Lewis, **B.R. Sculimbrene**, Y. Xu, S.J. Miller *Org. Lett.*, **2005**, *7*, 3021-3023.
- (5) "Asymmetric Synthesis of Phosphatidylinositol-3-Phosphates with Saturated and Unsaturated Side Chains through Catalytic Asymmetric Phosphorylation." **B.R. Sculimbrene**, Y. Xu, S.J. Miller *J. Am. Chem. Soc.*, **2004**, *126*, 13182-13183.
- (4) "Nonenzymatic Peptide-Based Catalytic Asymmetric Phosphorylation of Inositol Derivatives." **B.R. Sculimbrene**, A.J. Morgan, and S.J. Miller *Chem. Commun.*, **2003**, *15*, 1781-1785.
- (3) "Enantiodivergence in Small-Molecule Catalysis of Asymmetric Phosphorylation: Concise Total Syntheses of the Enantiomeric D-*myo*-Inositol-1-phosphate and D-*myo*-Inositol-3-phosphate." **B.R. Sculimbrene**, A.J. Morgan, and S.J. Miller *J. Am. Chem. Soc.*, **2002**, *124*, 11653-11656.
- (2) "Discovery of a Catalytic Asymmetric Phosphorylation through Selection of a Minimal Kinase Mimic: A Concise Total Synthesis of D-*myo*-Inositol-1-Phosphate." **B.R. Sculimbrene** and S.J. Miller *J. Am. Chem. Soc.*, **2001**, *123*, 10125-10126.
- (1) "Silatranyl-Nucleosides: Transition State Analogues for Phosphoryl Transfer Reactions." **B.R. Sculimbrene**, R.E. Decanio, B.W. Peterson, E.E. Muntel, and E.E. Fenlon *Tetrahedron Lett.*, **2001**, *30*, 4979-4982.

#### Patents

- (1) "Peptide as Kinase Mimic Catalysts for Asymmetric Phosphorylation in Synthesis of Phosphorylated Inositols and Cyclo-alkanols" **B.R. Sculimbrene**, S.J. Miller, A.J. Morgan *PCT Int. Appl.* WO 2003004141 A3, 2003.

#### Doctoral Dissertation

- (1) **B.R. Sculimbrene**, "Catalytic Asymmetric Phosphorylation: Concise Total Syntheses of Inositol Phosphates" 2004

Conference Abstracts (first author presenter)

- (25) "Catalytic asymmetric monophosphorylation of diols" M.G.Lougee\*, **B.R. Sculimbrene**, *From Abstracts of Papers, 249th ACS National Meeting*, Boulder, CO (2015).
- (24) "Caged phosphates in organic molecules" A.K. Dame\*, **B.R. Sculimbrene**, *From Abstracts of Papers, 249th ACS National Meeting*, Boulder, CO (2015).
- (23) "Lewis acid phosphorylation utilizing pyrophosphates" **B.R. Sculimbrene**, K.A. Coppola, K.P. Pedretty, J.W. Testa *From Abstracts of Papers, 247th ACS National Meeting*, Dallas, TX (2014).
- (22) "Catalytic phosphorylation of diols" K.A. Coppola, J.W. Testa, **B.R. Sculimbrene** *From Abstracts of Papers, 247th ACS National Meeting*, Dallas, TX (2014).
- (21) "Development of an efficient method for the synthesis of the c-terminal fragment of peptide isosteres" K.E. Poremba, V.A. Lee, **B.R. Sculimbrene** *From Abstracts of Papers, 247th ACS National Meeting*, Dallas, TX (2014).
- (20) "Phosphorylation of functionalized alcohols using a Lewis acid catalyst" K.P. Pedretty, **B.R. Sculimbrene** *From Abstracts of Papers, 245th ACS National Meeting*, New Orleans, LA (2013).
- (19) "Development of an efficient method for the synthesis of the c-terminal fragment of peptide isosteres" K.E. Poremba, **B.R. Sculimbrene** *From Abstracts of Papers, 245th ACS National Meeting*, New Orleans, LA (2013).
- (18) "Wet-lab approach to stereochemistry using  $^{31}\text{P}$  and  $^1\text{H}$  NMR spectroscopy" **B.R. Sculimbrene**, O.S. Fenton *From Abstracts of Papers 244<sup>th</sup> ACS National Meeting*, Philadelphia, PA (2012).
- (17) "Synthesis of "caged" phosphates" J.E. Todaro\*, **B.R. Sculimbrene** *From Abstracts of Papers, 243rd ACS National Meeting*, San Diego, CA (2012).
- (16) "Catalytic P(V) phosphorylation with orthogonal protecting groups" E.M. Allen\*; **B.R. Sculimbrene** *From Abstracts of Papers, 243rd ACS National Meeting*, San Diego, CA (2012).
- (15) "Synthetic phosphorylation using pyrophosphates" S.D. Till\*; **B.R. Sculimbrene** *From Abstracts of Papers, 243rd ACS National Meeting*, San Diego, CA (2012).
- (14) "Development of catalytic phosphorylation reactions" O.S. Fenton\*, **B.R. Sculimbrene**, *From Abstracts of Papers, 239th ACS National Meeting*, San Francisco, CA, (2010).
- (13) "Exploring olefin cross metathesis for the synthesis of peptide isosteres" G.M. Faxon\*, **B.R. Sculimbrene** *From Abstracts of Papers, 239th ACS National Meeting*, San Francisco, CA (2010).
- (12) "Using peptide isosteres to investigate antibiotic resistance" R.K. Quinn\*, **B.R. Sculimbrene**, *From Abstracts of Papers, 239th ACS National Meeting*, San Francisco, CA (2010).
- (11) "Exploring stereochemistry in a teaching laboratory using  $^{31}\text{P}$  NMR spectroscopy" O.S. Fenton\*, **B.R. Sculimbrene** *From Abstracts of Papers, 239th ACS National Meeting*, San Francisco, CA (2010).
- (10) "Phosphorylation of alcohols: New methods and reagents" **B.R. Sculimbrene**, P.B. Brady\*, E.M. Morris\*, O.S. Fenton\*, *From Abstracts of Papers, 237th ACS National Meeting*, Salt Lake City, UT (2009).
- (9) "Efficient synthesis of phosphates from alcohols using phosphoramidites" E.M. Morris\*, O.S. Fenton\*, **B.R. Sculimbrene** *From Abstracts of Papers, 237th ACS National Meeting*, Salt Lake City, UT (2009).
- (8) "Formation of peptide isosteres via olefin cross metathesis" J.A. Beaudoin\*, **B.R.**

- Sculimbrene**, *From Abstracts of Papers, 237th ACS National Meeting*, Salt Lake City, UT (2009).
- (7) “Development of a catalytic reaction for the phosphorylation of alcohols” O.S. Fenton\*, E.M. Morris\*, **B.R. Sculimbrene**, *From Abstracts of Papers, 237th ACS National Meeting*, Salt Lake City, UT (2009).
- (6) “Development of new methods for catalytic phosphorylation” P.B. Brady\*, **B.R. Sculimbrene** *From Abstracts of Papers, 235th ACS National Meeting*, New Orleans, LA (2008).
- (5) “Utilizing olefin cross metathesis for the synthesis of peptide isosteres” A.L. Cianci\*, **B.R. Sculimbrene**, *From Abstracts of Papers 235th ACS National Meeting*, New Orleans, LA (2008).
- (4) “Development of Lanthanide Binding Tags (LBTs) as probes for protein-protein interactions” **B.R. Sculimbrene**, B. Imperiali *From Abstracts of Papers, 230th ACS National Meeting*, Washington, DC (2005).
- (3) “Asymmetric Catalytic Phosphorylation: Synthesis of Inositol Phosphates” **B.R. Sculimbrene**, A.J. Morgan, S.J. Miller *From National Organic Symposium*, Bloomsberg, IN (2003).
- (2) “Biomimetic Synthesis, Biomimetic Catalysis: Concise Synthesis of D-*myo*-Inositol-1-Phosphate” **B.R. Sculimbrene**, S.J. Miller *From Green Chemistry and Engineering Conference*, Washington, DC (2001).
- (1) “Silatranyl-Nucleosides as Transition State Analogues” **B.R. Napolitano**, E.E. Fenlon *From CUR Posters on the Hill*, Washington, DC (1999).

#### Invited Lectures

- (3) Connecticut College, “Synthesis of Chemical Tools: Phosphorylation and Peptide Isosteres” (March 2012).
- (2) Wesleyan University, “Synthesis of Chemical Tools: Phosphorylation and Peptide Isosteres” (October 2011)
- (1) Trinity College “Synthesis of Chemical Tools: Phosphorylation and Peptide Isosteres” (March 2011)