FERNANDA MARQUES BURKE

476 Hubbard Drive ~ Lancaster, South Carolina 29720

803-313-7463 **burkefm@mailbox.sc.edu**

EDUCATION

University of Michigan **Ann Arbor, MI**

Ph.D. Medicinal Chemistry, July 2007

- Project title: "Synthesis and characterization of novel unnatural peptide inhibitors of thrombin activation of platelet aggregation"
- Advisor: Professor Henry I. Mosberg
- GPA: 3.71/4.00

University of Florida **Gainesville, FL**

B.S. Microbiology and Cell Science, Honors, May 2002

- GPA: 3.81/4.00

Newberry College **Newberry, SC**

Concentration in Biology and Chemistry, August 1998-May 2000

- GPA: 3.90/4.00

RESEARCH EXPERIENCE

University of Michigan (2002-2007)

- Doctoral Candidate under Professor Henry I. Mosberg.
- Designed and synthesized peptide analogues of kininogen, a naturally occurring ligand known to inhibit the interaction of thrombin and PAR (protease-activated receptors) necessary for the initiation of thrombosis, the condition responsible for acute myocardial syndromes such as myocardial infarction (heart attack).
- Measured the activity of the synthetic analogues on biochemical processes related to thrombosis and clotting such as platelet aggregation, calcium mobilization, and clotting determinants (i.e. thrombin clotting time).
- Assessed the kinetic profile of the analogues in reference to thrombin and several clotting factors to determine the selectivity of each analogue.
- Currently synthesizing unusual analogues of phenylalanine and arginine for future series of compounds with increased lypophilicity as a means of improving the absorption of our lead compound through the intestinal wall.

University of Michigan (Fall 2002)

- Rotation Student under Professor Shaomeng Wang.
- Synthesized small molecule inhibitors of MDM2, a main component of the apoptosis pathway, as a potential treatment for cancer.

University of Florida (2000-2002)
- Medicinal Chemistry Department Intern under Professor Carrie Haskell-Luevano.
- Synthesized tetrapeptide agonists of the melanocortin family of receptors for the treatment of appetite disorders and obesity.
- Observed the effect of N-terminus capping on the potency of tetrapeptide His-D-Phe-Arg-Trp-NH_2.

WORK EXPERIENCE

University of South Carolina Lancaster **Lancaster, SC**
Assistant Professor of Biology and Chemistry, August 2008-Present
Instructor of Biology and Chemistry, August 2007-July 2008
- Teaching biology and chemistry courses for majors and non-majors.
- Mentoring students and supervising student assistants for laboratory courses.
- Co-sponsor of the USCL Chemistry Club
- Service on "Honors Day Committee" as MSN Division Representative.
- Research geared towards discovering novel drug targets for the treatment of metabolic disorders through the study of the chemical and pharmacokinetic characteristics of peptides involved in obesity and diabetes.

Pfizer Global Research and Development **Ann Arbor, MI**
Chemistry Associate, May 2002-August 2002
- Synthesized organic compounds with modified oxindole rings as potential inhibitors of receptors responsible for Alzheimer's disease development.
- Employed HPLC, NMR, and infrared spectrometry to analyze the chemical characteristics of the synthetic compounds.

TEACHING AND MENTORING

Assistant Professor of Biology and Chemistry (Fall 2008-Present)
- Fall 2011: CHEM L102 (Lecture and Lab), CHEM L333 (Lecture), CHEM L331L (Lab), BIOL L250L (Lab)
- Summer I 2011: BIOL L250/L250L (Lecture and Lab)
- Spring 2011: CHEM L102 (Lecture and Lab), CHEM 334 (Lecture), CHEM L332L (Lab).
- Fall 2010: CHEM L102 (Lecture and Lab), CHEM L333 (Lecture), CHEM L331L (Lab)
- Summer I 2010: BIOL L250/L250L (Lecture and Lab)
- Spring 2010: CHEM L102 (Lecture and Lab), CHEM 334 (Organic Chemistry II Lecture), CHEM L332L (Lab).
- Fall 2009: CHEM L102 (Lecture and Lab), CHEM L105 (Lecture), CHEM L333 (Organic Chemistry I Lecture), CHEM L331L (Lab)
- Summer I 2009: BIOL L250/L250L (Microbiology Lecture and Lab for non-majors).
- Spring 2009: CHEM L102 (Lecture and Lab), CHEM L332 L (Organic Chemistry II Lab for non-majors), BIOL L120 (Human Biology Lecture).

- Fall 2008: CHEM L102 (Fundamentals of Chemistry II Lecture and Lab), CHEM L111L (General Chemistry I Lab), CHEM L331L (Organic Chemistry I Lab for non-majors), CHEM L333L (Comprehensive Organic Chemistry Lab I).

Instructor of Biology and Chemistry (Fall 2007-Summer II 2008)
- Summer II 2008: CHEM L102 (Lecture and Lab).
- Summer I 2008: CHEM L105 (Chemistry and Modern Society I Lecture and Lab).
- Spring 2008: CHEM L102, CHEM L111L, CHEM L112L (General Chemistry II & Qualitative Analysis Lab), CHEM L332L (Organic Chemistry II Lab for non-majors).
- Fall 2007: CHEM L102 (Lecture and Lab), CHEM L111L.

Graduate Student Instructor (Fall 2006)
- Medicinal Chemistry 409—Drug Assay Laboratory
- Introductory lab course for first year pharmacy students including instrumentation and techniques employed in drug analysis such as HPLC, GC-MS, UV spectrophotometer and Fluorescence spectrophotometer.

High School Student Mentor (Summer 2006)
- Washtenaw County Alliance for Gifted Education
- Served as guide, advisor, and teacher to students interested in attending graduate school in such areas as chemistry, biochemistry and pharmacology.
- Familiarized gifted students with the concepts and techniques for advanced study in Medicinal Chemistry.

TECHNICAL SKILLS

Organic Chemistry
- Solid-phase peptide synthesis
- Terminus modification of peptide sequence
- Cyclization techniques including oxidation and alkylation reactions
- Organic synthesis of unusual amino acid residues such as arginine and phenylalanine analogues
- Purification through crystallization techniques and semi-preparative HPLC

Molecular Analysis
- Analytical reverse phase chromatography (RP-HPLC)
- Mass spectrometry (LCMS-ESI and GC-MS)
- NMR
- Infrared spectrometry (IR)

Biochemistry
- Dual-channel aggregometer for platelet aggregation analysis
- Coulter counter for plasma preparation
- Coagulation analyzer used to assess clinical markers of coagulation disorders
- Microplate reader for basic kinetic analysis and binding assay development

Protein Chemistry

- Recombinant protein expression in bacteria
- Protein isolation and purification
- Protein characterization including UV spectroscopy and electrophoresis

PUBLICATIONS AND PRESENTATIONS

Publications

- "Quantitative Analysis of Bisphenol A Leached from Plastic Bottles using SPME-GC-MS" Bettie Obi Johnson, Fernanda M. Burke, Rebecca Harrison, and Samantha Burdette. Manuscript in preparation for submission to *The Journal of Chemical Education* on June 20th, 2011.
- "Determination of Ethylene Glycol in Engine Coolant using Refractive Index" B. Obi Johnson, F.M. Burke, and S. Burdette. *Chem. Educator*. **16**, 116-117 (2011).
- "Thrombostatin FM compounds: direct thrombin inhibitors: mechanism of action in vitro and in vivo" M.T. Nieman, F.M. Burke, M. Warnock, Y. Zhou, J. Sweigert, A. Chen, D. Ricketts, B.R. Lucchesi, Z. Chen, E. Di Cera, J. Hilfinger, H.I. Mosberg and A.H. Schmaier. *J Thromb Haemost.* **6(5)**, 837-45 (2008).
- "Synthesis of novel peptide inhibitors of thrombin-induced platelet activation" F.M. Burke, M. Warnock, A.H. Schmaier and H.I. Mosberg. *Chemical Biology and Drug Design*, **68**, 235-238 (2006)
- "Characterization of aliphatic, cyclic, and aromatic N-terminally capped His-D-Phe-Arg-Trp-NH_2 tetrapeptides at the melanocortin receptors" J.R. Holder, F.F. Marques, Z. Xiang, R.M. Bauzo and C. Haskell-Luevano. *Eur J Pharmacol*. **462**, 41-52 (2003)

Patents

- "Synthetic peptide inhibitors of thrombin and thrombin activation of protease activated receptors 1 and 4" A.H. Schmaier, H.I. Mosberg, F.F. Marques and J. Hilfinger. U.S. Patent No. US 7,879,792 B2 (February 1st, 2011).

Presentations

- "Modernizing the Chemistry Lab Experience Using Hi-Tech Instrumentation" B.O. Johnson and F.M. Burke at the *190th Conference of the Two-Year College Chemistry Consortium*, Wake Technical Community College, Raleigh, NC November 12-13th, 2010
- "Improving the Pharmacokinetic Profile of CART Peptides" B.D Stogner Jr., J. Stover, W. Cofield, and F.M. Burke. *South Carolina Academy of Science Annual Meeting*, College of Charleston, SC (2010)
- "Improving the Pharmacokinetic Profile of CART Peptides" F.M. Burke. Oral presentation at *Faculty Colloquium*, USC Lancaster (2010)
- "Improving the Pharmacokinetics of Peptides Involved in Obesity and Diabetes" F.M. Burke. Oral presentation at *Regional Campuses Science Meeting*, USC Sumter (2009)

- "Unnatural peptide inhibitors of thrombin activated platelet aggregation" F.M. Burke, M. Warnock, A.H. Schmaier, J. Hilfinger and H.I. Mosberg. Oral presentation at *233rd ACS National Meeting*, Chicago, IL (2007)
- "Characterization of novel peptide inhibitors of thrombin-induced platelet activation and aggregation" F.M. Burke, A.H. Schmaier and H.I. Mosberg, *AAPS Annual Meeting and Exposition*, San Antonio, TX (2006)
- "Synthesis and characterization of novel inhibitors of thrombin mediated platelet activation" F.F. Marques, A.H. Schmaier and H.I. Mosberg, *26th Annual Graduate Student Symposium in the Pharmacological Sciences and Biorelated Chemistry*, Ann Arbor, MI (2006)
- "Preparation of novel peptide inhibitors of thrombin activation of PARs" F.F. Marques, A.H. Schmaier and H.I. Mosberg, *19th American Peptide Symposium: Understanding Biology Using Peptides*, San Diego, CA (2005)
- "Protease-activated receptors: novel peptide inhibitors of platelet activation" F.F. Marques, A.H. Schmaier and H.I. Mosberg, *25th Annual Graduate Student Symposium in the Pharmacological Sciences and Biorelated Chemistry*, Ann Arbor, MI (2005)
- "Inhibition of Thrombin Activation of Platelet Aggregation" F.F. Marques and H.I. Mosberg, *24th Annual Graduate Student Symposium in the Pharmacological Sciences and Biorelated Chemistry*, Ann Arbor, MI (2004)
- "Role of N-terminal functional groups added to the melanocortin tetrapeptide His-D-Phe-Arg-Trp-NH_2" F.F. Marques, J.R. Holder, R.M. Bauzo, Z. Xiang and C. Haskell-Luevano, *223rd ACS National Meeting*, Orlando, FL (2002)

HONORS/GRANTS

- Duke Energy Foundation Grant for USCL Science Department, $7,500 (April 2011)
- Faculty Staff Research and Productive Scholarship Program, $12,868 (2011)
- National Science Foundation Science, Technology, Engineering, and Math (STEM), Student Internship Funding, $500 (Spring 2010)
- National Science Foundation Science, Technology, Engineering, and Math (STEM), Student Internship Funding, $4000 (Summer 2009, Summer 2010, Summer 2011)
- Faculty Staff Research and Productive Scholarship Program, $11,616 (2009)
- Fred W. Lyons Fellowship (2006-2007)
- CARAT Learning Sciences GSI Fellows Grant Recipient (2006)
- Sheila B. Cresswell Fellowship in Medicinal Chemistry (2005-2006)
- Pharmacological Sciences Training Program Fellowship (2003-2005)
- College of Pharmacy Annual Symposium, First Place Poster (2002)
- University Scholar Program (2000-2001)
- Florida Bright Future Scholarship Program (2000-2002)
- Clara Wertz Athletic Scholarship (1999)
- South Atlantic Conference Student-Athlete Honor (1998-2000)
- Founder's Scholarship (1998-2000)
- Americans for Financial Security Scholarship (1998)
- Freshman Chemistry Student of the Year (1998)

ACADEMIC AND COMMUNITY SERVICE

- USC Regional Campuses Faculty Senator (2011-2014)
- USCL Faculty Organization Secretary (2010-2012)
- Chemistry Session Judge for Undergraduate Poster Presentations, Discovery Day, USC Columbia (April 2011)
- Human Health Session Judge for Undergraduate Oral and Poster Presentations, South Carolina Academy of Science Annual Meeting, South Carolina State University, SC (April 2011)
- USCL Scientific Literacy Rubric Ad Hoc Committee (2010)
- Biomedical Engineering Judge for Undergraduate Poster Presentations, Discovery Day, USC Columbia (April 2010)
- USCL Research and Productive Scholarship Review Panel (2009-2010, 2011-2012)
- USCL Mole Day Celebration, Chemistry Magic Show, Buford and A.J. High Schools, (October 2009 and 2010)
- National Chemistry Week, "Chemistry—It's Elemental!", Indian Land High School, (October 2009)
- Regional Campus Science Meeting, Organizing Committee, USC Sumter (Fall 2009)
- Careers in Science Lecture Series, Co-sponsor (Fall 2009-Present)
- Pre-Pharmacy Advisor (2009-Present)
- National Science Foundation Science, Technology, Engineering, and Math (STEM), Mentor, (Summer 2009, Spring 2010, Summer 2010, Summer 2011)
- USCL High School Honor's Day, "Chemistry Magic Show" (2009-2011)
- National Chemistry Week, "Having a Ball with Chemistry," Buford High School, (October 2008)
- USCL Chemistry Club Faculty Advisor (2008-2011)
- USCL and Lancaster County School District Science Fair Judge, (2008-2011)
- USCL High School Honor's Day Committee (2007-2011)
- USCL High School Honor's Day, Master of Ceremony for Music Competition, February 2008

AFFILIATIONS

- American Chemical Society (2006-Present)
- South Carolina Academy of Science (2009-Present)
- Two-Year College Chemistry Consortium (2010)
- Student Affairs Committee, American Peptide Society (2006-2007)
- American Association for Pharmaceutical Scientists (2006-2009)
- American Peptide Society (2005-Present)
- Graduate Student Advisory Council, Medicinal Chemistry Representative (2005-2007)
- Organizing Committee Member, Mid-Atlantic Graduate Student Symposium in Medicinal Chemistry (2003)