

Matthew A. Hostetler

Marshall University • 1 John Marshall Drive, Huntington, WV 25755

Phone: (260) 418-5997 • Email: matthew.a.hostetler@gmail.com

ACADEMIC APPOINTMENT

Assistant Professor, Organic Chemistry

Aug 2020 (start date)

Marshall University, Huntington, WV

Research Focus: *The discovery of greener technologies for the synthesis of peptides including: resin recycling, Fmoc-free synthesis, and chromatography-free cyclic peptide synthesis*

EDUCATION

Ph.D. in Chemistry

Aug 2018

Purdue University, West Lafayette, IN

Advisor: Professor Mark A. Lipton

Dissertation Title: *Part I. The Rational Design, Synthesis, and Evaluation of Second Generation Class II HMG-CoA Reductase Inhibitors Part II. Studies Directed Toward the On-Resin Preparation of C-terminal Modified and Cyclic Peptides*

Cumulative GPA: 3.69/4.0

B.S. in Chemistry (*Summa cum laude*)

May 2012

Marian University, Indianapolis, IN

Bioorganic Chemistry Concentration

Advisor: Professor Carl S. Lecher

Cumulative GPA: 3.95/4.0

RESEARCH EXPERIENCE

Postdoctoral Research Associate

Nov 2018 – July 2020

Purdue University, West Lafayette, IN

Prof. Elizabeth I. Parkinson

Structure prediction and synthesis of novel cyclic peptides inspired by bacterial genome mining

- Predicted bacterial cyclic peptide natural products using the bioinformatics program AntiSMASH
- Developed a robust method to synthesize cyclic peptides by a solution-phase cyclization approach
- Assisted Prof. Parkinson in setting up laboratory and establishing active research program (developed chemical inventory, purchased and installed major equipment, helped recruit a diverse group of undergraduate and graduate students)

Doctoral Research

Aug 2012 - Aug 2018

Purdue University, West Lafayette, IN

Prof. Mark A. Lipton

Rational drug design and synthesis

- Structure-based drug design was implemented to develop a novel class of antimicrobials targeting Gram-positive bacteria through inhibition of Class II HMG-CoA Reductase
- Developed an efficient route to synthesize a library of compounds for biological testing

Studies directed toward the on-resin preparation of C-terminal modified and cyclic peptides

- Developed an improved one-step preparation of 1,1-dimethylallyl (DMA)-protected amino acids and explored their ability to reduce diketopiperazine formation during backbone amide linker (BAL)-based solid-phase peptide synthesis
- Developed a concise and robust synthesis of Hcna – a photolabile BAL that possesses an aldehyde handle for facile incorporation of first amino acid via reductive amination
- Used Hcna in the synthesis of peptides both in solution and on a solid support

Synthesis of organic nitrates – Collaborative project with Prof. Paul B. Shepson

- Synthesized a series of organic nitrates whose hydrolysis rates were studied to ascertain their atmospheric impact

Undergraduate Research**Aug 2010 - May 2012**

Marian University, Indianapolis, IN

Prof. Carl S. Lecher

Incorporation of green chemistry into the Marian University organic laboratory curriculum

- Examined the reuse of a phase-transfer catalyst in the environmentally benign synthesis of adipic acid
- Explored green oxidations of aldehydes to carboxylic acids in aqueous media

PEER REVIEWED PUBLICATIONS

5. Foreman, D. J.; Lawler, J. T.; Niedrauer, M. L.; **Hostetler, M. A.**; McLuckey, S. A. Gold(I) Cationization Promotes Ring Opening in Lysine-Containing Cyclic Peptides. *J. Am. Soc. Mass Spectrom.* **2019**, *30* (10), 1914-1922. DOI: 10.1007/s13361-019-02247-x.
4. **Hostetler, M. A.**; Lipton, M. A. An Optimized Preparation of 1,1-Dimethylallyl Esters and Their Application to Solid-Phase Peptide Synthesis. *J. Org. Chem.* **2018**, *83* (15), 7762-7770. DOI: 10.1021/acs.joc.8b00658.
3. Younis, W.; Mohammad, H.; **Hostetler, M.**; Lopez-Perez, D.; Steussy, C.; Lipton, M. et al. Class II HMG-CoA Reductase Inhibitors targeting Methicillin-Resistant Staphylococcus pseudintermedius. *J. Adv. Veterinary Res.* **2017**, *7* (1), 1-6. ISSN: 2090-6277/2090-6269.
2. Rindelaub, J. D.; Borca, C. H.; **Hostetler, M. A.**; Slade, J. H.; Lipton, M. A.; Slipchenko, L. V.; Shepson, P. B. The Acid-Catalyzed Hydrolysis of an α -pinene-derived Organic Nitrates: kinetics, products, reaction mechanisms, and atmospheric impact. *Atmospheric Chem. Phys.* **2016**, *16* (23), 15425-15432. DOI: 10.5194/acp-16-15425-2016.
1. Xiong, F.; McAvey, K. M.; Pratt, K. A.; Groff, C. J.; **Hostetler, M. A.**; Lipton, M. A. et al. Observation of isoprene hydroxynitrates in the southeastern United States and Implications for the Fate of NO_x. *Atmospheric Chem. Phys.* **2015**, *15* (19), 11257-11272. DOI: 10.5194/acp-15-11257-2015.

MANUSCRIPTS IN PREPARATION

4. **Hostetler, M. A.**; Parkinson, E. I. Identification, Synthesis, and Biological Evaluation of Natural Product-Inspired Cyclic Peptides. *J. Am. Chem. Soc.* **2020**, *manuscript in preparation*.
3. **Hostetler, M. A.**; Niedrauer, M. N.; Kang, S.; Lipton, M. A. A Photolabile Backbone Amide Linker for the Solid-Phase Synthesis of Cyclic and C-terminally Modified Peptides. *J. Am. Chem. Soc.* **2020**, *manuscript in preparation*.
2. **Hostetler, M. A.**; Niedrauer, M. N.; Lipton, M. A. Second Generation Inhibitors of Class II HMG-CoA Reductase. *Bioorg. Med. Chem. Lett.* **2020**, *manuscript in preparation*.

1. **Hostetler, M. A.**; Lipton, M. A. Resensitization of Methicillin-Resistant *Staph aureus* to Beta-lactam Antibiotics by Inhibition of Class II HMG-CoA Reductase. *J. Med. Chem.* **2020**, *manuscript in preparation*.

TEACHING EXPERIENCE

Visiting Lecturer (Instructor of Record), Organic Chemistry I (CHM 255) Jun 2018 - Aug 2018

Purdue University, West Lafayette, IN

- Prepared and conducted lectures for 32 organic chemistry students with a focus on making the course content relevant and stimulating to the students
- Prepared exams, homework assignments, and grading rubrics that provided a fair assessment of student comprehension of course material
- Ensured accessibility to students through office hours, appointments, and help sessions
- Implemented a dynamic and active learning environment by pausing lectures, offering out of class review sessions, preparing practice exams and review sheets, and making course material relevant to students to interests
- Supervised teaching assistants in proctoring and grading exams to ensure a comfortable testing environment for the students

Visiting Instructor, Organic Chemistry II Laboratory (CHE 306) Jan 2018 - May 2018

Marian University, Indianapolis, IN

- Developed pre-lab lectures for two sections of second semester organic chemistry students
- Maintained a safe, instructive atmosphere by implementing safety rules and providing personalized student support
- Demonstrated and trained students in using necessary instrumentation (NMR, IR) and guided student interpretation of resulting data
- Proctored exams and graded assignments

Guest Lecturer, Organic Chemistry I & II (CHM 26505 & 26605) Aug 2015 - Present

Purdue University, West Lafayette, IN

Course instructor: Prof. Mark A. Lipton

- Conducted lectures discussing a range of topics within organic chemistry (stereochemistry, functional groups, general reactivity, spectroscopic methods and analysis)
- Developed own material to discuss the fundamental principles of ^1H NMR spectroscopy

Research Mentor Aug 2013 - Present

Purdue University, West Lafayette, IN

Lab PIs: Prof. Mark A. Lipton (Graduate Advisor) & Prof. Betsy I. Parkinson (Postdoc Advisor)

- Mentored 16 students:
 - 10 chemistry undergraduates (2 now in graduate school, 1 now in veterinary school)
 - 6 chemistry graduate students
- Taught students laboratory techniques including: organic synthesis, column chromatography, thin layer chromatography, spectroscopic analysis, reaction optimization, Schlenk technique, and solid-phase peptide synthesis

- Trained students on relevant equipment (HPLC, solvent purification system, NMR, peptide synthesizer)
- Helped develop projects appropriate for each student based on their interest, prior experience, and expected duration of research experience
- Successfully advised 4 graduate students through their research proposals as part of their preliminary examinations
- Fostered intellectual growth of students interested in organic chemistry by developing "Reaction Mechanism Boot-camp" – a daily group activity in which reaction mechanisms are attempted and discussed

Organic Chemistry Tutor**Aug 2013 - Present**

Purdue University, West Lafayette, IN

- Improved student performance and comprehension in organic chemistry through private instruction
- Developed a personalized approach to enhance student learning through creation of problem sets designed to draw connections between fundamental concepts
- Encouraged students from underrepresented communities to pursue careers in STEM

Supervisor, Organic Chemistry I & II Lectures (CHM 26505 & 26605)**Aug 2013 - May 2015**

Purdue University, West Lafayette, IN

Course Instructor: Prof. Mark A. Lipton

- Assisted instructor with lectures and maintained daily class notes
- Prepared lecture notes for instructor and handouts for students
- Supervised teaching assistants in proctoring and grading exams

Teaching Assistant, Organic Laboratory I & II (CHM 263 & 264)**Aug 2012 - May 2013**

Purdue University, West Lafayette, IN

- Prepared pre-lab lectures for two laboratory sections
- Implemented safety rules and performed troubleshooting during laboratory experiments
- Demonstrated and trained students in using necessary equipment (IR, GC)
- Proctored exams and graded assignments

Organic Chemistry Tutor**Aug 2010 - May 2012**

Marian University, Indianapolis, IN

- Improved student performance and comprehension in organic chemistry through private instruction

PRESENTATIONS

Oral Presentations

5. "Inhibitors of II-HMGR as Novel Gram-Positive Antimicrobial Agents" Schaap Chemistry Symposium, Hope College, Holland, MI, **July 20, 2017**.
4. "Inhibition of Thioester Reduction by Class II HMGR & The Synthesis of Peptide Thioesters" Purdue University, West Lafayette, IN, **April 4, 2017**.

3. "Graduate Studies in Chemistry" Invited speaker. Gamma Eta chapter of the Sigma Zeta National Science and Mathematics Honor Society, Marian University, Indianapolis, IN, **September 29, 2016**.
2. "Stereo-controlled α -Methylation of α -Amino Acid Derivatives via Memory of Chirality" Invited Speaker. Advanced Organic Chemistry Course, Marian University, Indianapolis, IN, **October 7, 2013**.
1. "Reuse of a phase-transfer catalyst in the environmentally benign synthesis of adipic acid" 6th Annual Marian University Undergraduate Research Symposium, Marian University, Indianapolis, IN, **April 20, 2012**.

Poster Presentations

6. "The Design and Synthesis of Novel Peptide Macrocycles Inspired by Bacterial Genome Mining" 26th American Peptide Symposium, Monterey, CA, **June 24, 2019**.
5. "A Photolabile Backbone Amide Linker for the Solid-Phase Synthesis of Cyclic Peptides and Thioesters" 25th American Peptide Symposium, Whistler BC, Canada, **June 19, 2017**.
4. "A Photolabile Backbone Amide Linker for the Solid-Phase Synthesis of Cyclic Peptides and Peptide Thioesters" 34th Annual H. C. Brown Lectures, Purdue University, West Lafayette, IN, **April 14, 2017**.
3. "Design and Synthesis of Novel Antimicrobials Targeting Gram-Positive Bacterial Pathogens" 1st annual PI4D Symposium, Purdue University, West Lafayette, IN, **August 10, 2016**.
2. "Design and Synthesis of Novel Antimicrobials Targeting Gram-Positive Bacterial Pathogens" 32nd Annual H. C. Brown Lectures, Purdue University, West Lafayette, IN, **April 3, 2015**.
1. "Design and Synthesis of Novel Antimicrobials Targeting Gram-Positive Bacterial Pathogens" 31st Annual H. C. Brown Lectures, Purdue University, West Lafayette, IN, **April 19, 2014**.

HONORS & AWARDS

2019	H. C. Brown Organic Chemistry Travel Grant Awardee
2018	H. C. Brown Graduate Research Award Nominee, Purdue University, IN <i>Highest recognition from the organic chemistry faculty</i>
2017	Purdue Research Foundation Graduate Research Fellowship, Purdue University, IN
2017	American Peptide Society Travel Grant Awardee
2017	Purdue College of Science International Travel Grant Awardee
2017	H. C. Brown Organic Chemistry Seminar Award, Purdue University, IN
2017	34th Annual H. C. Brown Lectures Poster Award, Purdue University, IN
2016	1st Annual PI4D Symposium Poster Award, Purdue University, IN
2015	32nd Annual H. C. Brown Lectures Poster Award, Purdue University, IN
2012	American Institute of Chemists Award, Marian University, IN <i>Highest recognition from the chemistry faculty</i>
2012	Sr. Mary Rose Stockton Chemistry Scholarship, Marian University, IN
2011	Delta Epsilon Sigma Scholarship, Marian University, IN
2009 - 2011	Sr. Mary Rose Stockton Chemistry Scholarship, Marian University, IN

SERVICE & COMMUNITY OUTREACH

Purdue University Undergraduate Research Conference Judge**April 2020**

Purdue University, West Lafayette, IN

- Provided undergraduate researchers with constructive input on their scientific research

Students Taking Active and Reflective Roles (STARR)**Aug 2010 - May 2012**

Marian University, Indianapolis, IN

- Led groups of 10 to 15 Marian undergraduates pursuing volunteer work in the greater Indianapolis area
 - Inner-city after-school programs (engaged with grade-school students after school)
 - Work programs for adults with disabilities (assisted workers with related work duties)
 - Food pantries (stocked shelves and prepared lunches for communities in need)

College Mentors for Kids Volunteer Science Presentation**April 2012**

Marian University, Indianapolis, IN

- Performed demonstrations for grade-school students from Holy Angels Catholic School highlighting the different chemical properties of helium and hydrogen
- Welcomed students into the laboratory to foster excitement about STEM

PROFESSIONAL AFFILIATIONS

2014 - Present Phi Lambda Upsilon National Honorary Chemical Society *Member*2018 - Present American Peptide Society *Member*2019 - Present American Chemical Society *Member*
Technical Divisions: Organic, Medicinal, Chemical Education