

# JOSHUA E. BEAVER, Ph.D.

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## Education

### **Ph.D. Organic Chemistry | University of North Carolina at Chapel Hill | Chapel Hill, NC 27599 | 2014**

- NSF Graduate Research Fellowship

### **B.S. Chemistry | Juniata College | Huntingdon, PA 16652 | 2009**

- Overall GPA: 3.81; Chemistry GPA: 3.97
- *magna cum laude*, Distinction in Chemistry

## Dissertation

### **University of North Carolina at Chapel Hill | Chapel Hill, NC 27599 | 2009 - 2014**

- Advisor: Professor Marcey Waters, Organic Chemistry
- Ph.D. Dissertation Title: The Development of Receptors for Posttranslationally Modified Peptides in Water.
- Description: Investigated the physical organic driving forces that drive binding events in water using a dynamic combinatorial library methodology to synthesize receptors for posttranslational modifications of proteins. pp 1-283

## Relevant Teaching Experience & Training

### **Visiting Chemistry Lecturer | University of North Carolina at Chapel Hill | 2016 - 2017**

- Teaching Mentor: Dr. Thomas Freeman
- Course: General Chemistry (CHEM 101; four sections, 99 - 341 students per class)
- Description: Guide student learning of fundamental concepts in chemistry, such as atomic and molecular structure, stoichiometry, and conservation of mass and energy, through active-learning and flipped classroom techniques. Evaluate student understanding in real time using in-class surveys and critical thinking questions to guide the pace of class activities. Lead group problem-solving sessions to further students' grasp of the material. Provide short (5-10 minute) video resources as additional learning tools for students.
- Curriculum Development: Working directly with a team of teaching and research faculty to implement a new common General Chemistry curriculum that emphasizes the development of critical thinking skills and an understanding of core concepts in chemistry.

### **Graduate Research Consultant | University of North Carolina at Chapel Hill | 2011 - 2013**

- Teaching mentor: Prof. Paul Kropp
- Course: Honors Intermediate Organic Chemistry (CHEM 460H, three semesters, 5 students each)
- Description: Co-taught the Honors section for 3 semesters, devised lesson plans, led classes, and individually mentored students in literature research and presentation content as well as public speaking strategies. Employed Bloom's Cognitive Taxonomy, reflective questioning, and critical thinking exercises to encourage students to think scrutinize and evaluate research topics and generate their own ideas about the subjects discussed in class.
- Curriculum Development: Developed an innovative curriculum for the honors section that strengthened students' public speaking abilities, garnered interest in chemistry and emphasized hot topics in organic chemistry research.

### **Training & Certification | University of North Carolina at Chapel Hill | 2012**

- Course: UNC Training Initiatives in Biomedical & Biological Sciences (TIBBS): Summer Series Teaching Certification
- Description: Participated in a 6-week seminar series to learn how to apply current teaching pedagogy to undergraduate science education. Specifically learned to apply Bloom's Cognitive Taxonomy to course design, and to encourage critical thinking and active learning in large classrooms.

### **Teaching Assistant | University of North Carolina at Chapel Hill | 2009 - 2010**

- Courses: General Chemistry Lab I & II (CHEM 101L & 102L, two semesters, 20-25 students)
- Description: Prepared lesson plans and taught the lab for CHEM 101 & 102 and held office hours and problem solving sessions. Engaged students by asking questions that encouraged critical thinking and problem solving. Helped students develop translatable writing and group work skills by critiquing lab reports and encouraging teamwork-building activities.

### **Private Tutor | University of North Carolina at Chapel Hill | 2009 – 2014**

- Courses: General Chemistry (101 & 102); Organic Chemistry (CHEM 261 & 262)
- Description: Tutored and mentored over 30 different students for 1-3 hours per week in problem solving sessions.

### **Group Tutor | Juniata College | 2006 – 2009**

- Teaching Mentor: Dr. Dave Reingold
- Courses: Organic Chemistry Concepts I & II
- Six semesters: Tutored groups of 10-18 students in organic chemistry by facilitating semiweekly peer-led problem solving sessions.

### **Teaching Assistant | Juniata College | 2007 – 2009**

- Courses: General Chemistry Lab, Organic Chemistry Lab, Biology Lab
- Six semesters: Prepared lab materials, troubleshoot student challenges, and helped guide students to help them solve challenging laboratory questions.

## **Mentoring Experience**

### **Postdoctoral Mentor | Duke University | 2014 – 2016**

- Ph.D. Students: Simone Costa, Imran Ozer
- Description: Mentored and trained two graduate students in organic chemistry and project development.

### **Mentor for NC Project SEED | University of North Carolina at Chapel Hill | 2011, 2012**

- High School Student: Mariah Reese
- Description: During two 8-week programs, mentored a NC URM high school student by guiding her through two research projects to teach her fundamental laboratory concepts, foster excitement for science, chemistry and research, and build presentation and public speaking skills.

### **Graduate Research Mentor | University of North Carolina at Chapel Hill | 2009 – 2014**

- Ph.D. Students: Nick Pinkin, Brendan Peacor
- Description: Mentored first year graduate students as they learned good laboratory practices and organic synthesis, and guided them through the early stages of research project development.
- Undergraduate Students: Julianne Bain, Tyler Jones
- Description: Developed and guided individual projects, trained in organic chemistry.

## **Refereed Publications**

- **Beaver, Joshua E.**, Waters, Marcey, L. "Molecular Recognition of Lys and Arg Methylation." *ACS Chem. Biol.* **2016**, *11*, 643-653. (Co-contributing author)
- **Beaver, Joshua E.**,\* Peacor, Brendan, C.,\* Bain, Julianne V., Waters, Marcey L. "Contributions of Pocket Depth and Electrostatic Interactions to Affinity and Selectivity of Receptors for Methylated Lysine in Water." *Org. Biomol. Chem.* **2015**, *13*, 3220-3226.
- James, Lindsey I.,\* **Beaver, Joshua E.**,\* Rice, Natalie W., Waters, Marcey L. "A Synthetic Receptor for Asymmetric Dimethyl Arginine." *J. Am. Chem. Soc.* **2013**, *135*, 6450-6455.

\* - Denotes equal contribution

## **Notable Honors & Awards**

### **University of North Carolina at Chapel Hill**

- NSF Graduate Research Fellowship (2010-2013)
- Graduate Travel Award (2013)
- Venable Summer Research Fellowship (2009)

### **Juniata College**

- Brumbaugh Award for Science (2009): Excellence in science courses and research
- Rockwell Chemistry Prize (2008): Excellence in chemistry coursework
- ACS Award in Organic Chemistry (2008): Top student in organic chemistry
- Pentz Premedical Scholarship (2008): Exemplary humanitarian attitude, scholarly excellence, and character
- Service and Peacemaking Scholarship (2005): Humanitarian service scholarship

## Relevant Research Experience

### **Duke University | Postdoctoral Research Associate | Durham, NC 27708 | 2014 – 2016**

- Advisor: Professor Ashutosh Chilkoti, Biomedical Engineering
- Research Description: Investigated the utility of single stranded DNA drug polymers as a backbone for novel nanoparticle architectures for drug delivery in cancer and inflammatory therapies.
- Regularly consulted with graduate students and research scientists as the resident expert in organic chemistry, polymer design, and molecular recognition and mentored students to help troubleshoot and design research projects in surface chemistry and peptide drug delivery.

### **Juniata College | Undergraduate Research Assistant | Huntingdon, PA 16652 | 2007 – 2009**

- Advisors: Professor Dave Reingold and Professor Paul Ewbank
- Description: Synthesized novel semiconducting polymers and oligomers for organic field-effect transistors.

### **Carnegie Mellon University | Summer Undergraduate Researcher | Pittsburgh, PA 15289 | Summer 2008**

- Advisor: Professor Richard McCullough
- Description: Synthesized, characterized and analyzed semiconducting organic polymer derivatives for organic solar cells and chemical sensing applications.

## Relevant Leadership & Service

- NSF Graduate Research Fellowship Reviewer and Panelist | National Science Foundation | 2016
- President | Association of Chemistry Graduate Students, UNC | 2012 – 2013
- Vice President | Association of Chemistry Graduate Students, UNC | 2010 – 2012
- Senator | Graduate and Professional Student Federation, UNC | 2010 – 2012
- Diabetes Mentor, faculty assistant mentor | Heels & Hearts UNC | 2010 – Present
- Mentor | NC Project SEED | 2011, 2012
- First-Year Representative | Association of Chemistry Graduate Students, UNC | 2009 – 2010
- Ombudsman to the Chemistry Department | Juniata College | 2008 – 2009