

Sarah M. Boutom

MD/PhD Candidate – University of Wisconsin-Madison
boutom@wisc.edu | 201.280.0577

EDUCATION

University of Wisconsin – Madison PhD Biomedical Engineering Advisors: Profs. Sean P. Palecek, PhD and Eric V. Shusta, PhD	April 2020 – Present Madison, WI
University of Wisconsin School of Medicine and Public Health MD Program, Medical Scientist Training Program	July 2017 – Present Madison, WI
Foundation for Advanced Education in the Sciences (FAES) Graduate School Post-Baccalaureate non-degree student at NIH	Jan – May 2016 Bethesda, MD
University of Michigan BS with Distinction, High Honors in Biophysics, December 2015 (GPA: 3.76/4) Advisor: Prof. Mark M. Banaszak Holl, PhD Honors Thesis: Folate Binding Protein (FBP) as a Vehicle for Targeted Delivery of Antifolates: Investigation of FBP Nano-particle Formation with Atomic Force Microscopy	Sept 2012 – Dec 2015 Ann Arbor, MI

RESEARCH EXPERIENCE

PhD Student University of Wisconsin Department of Biomedical Engineering Advisors: Profs. Sean P. Palecek, PhD and Eric V. Shusta, PhD <ul style="list-style-type: none">Using hPSC-derived models of the blood-brain barrier (BBB) to investigate the effects of hypoxia on BBB development and hPSC-derived model quality	April 2020 - present Madison, WI
Post-baccalaureate IRTA Fellow National Institutes of Health, NIDDK Laboratory of Chemical Physics, Biophysical Chemistry Section Advisor: William A. Eaton, MD, PhD <ul style="list-style-type: none">Investigated effectiveness of potential novel therapeutics for sickle cell disease using an <i>in-vitro</i> sickling model and patient blood samples, focusing on inhibition of HbS polymerization	Jan 2016 – May 2017 Bethesda, MD
Undergraduate Researcher and Summer Fellowship Recipient University of Michigan Departments of Chemistry and Biophysics Advisor: Prof. Mark M Banaszak Holl, PhD <ul style="list-style-type: none">Used atomic force microscopy to investigate the aggregation behavior of FBP complexed with folic acid and antifolate drugs as a proof-of-concept for a natural drug-delivery system	Sept 2013-Dec 2015 Ann Arbor, MI
Summer Research Intern (Summer 2013 & 2014) National Institutes of Health, NICHD Program in Physical Biology, Section on Cell Biophysics Advisors: Ralph Nossal, PhD and Dan Sackett, PhD <ul style="list-style-type: none">Investigated effects of microtubule-targeting drugs on clathrin-mediated endocytosis and applied biophysical techniques to study diffusion of clathrin in viscous medium mimicking cytosol	May 2013 – July 2014 Bethesda, MD
Undergraduate Research Assistant University of Michigan Departments of Biophysics and Biological Chemistry Advisor: Prof. Mark Saper, PhD <ul style="list-style-type: none">Investigated the structure and function of membrane proteins responsible for producing capsule in enteropathogenic <i>E. coli</i>	Aug 2012 – April 2013 Ann Arbor, MI

Summer Research Intern

National Institutes of Health, NCBI/NLM
Computational Biology Branch, Structure Group
Advisor: Aron Marchler-Bauer, PhD

June – Aug 2011
Bethesda, MD

- Sequence alignment and annotation for phylogenetically related bacterial transcription factors for Conserved Domain Database (CDD)

PUBLICATIONS

1. Li Q, Henry ER, Hofrichter J, Smith JF, Cellmer T, Dunkelberger EB, Metaferia BB, Jones-Straehle S, **Boutom S**, Christoph GW, Wakefield TH, Link ME, Staton D, Vass ER, Miller JL, Hsieh MM, Tisdale JF, and WA Eaton. Kinetic assay shows that increasing red cell volume could be a treatment for sickle cell disease. *Proc Natl Acad Sci USA*, **2017**, 114(5), E689-E696. <http://doi.org/10.1073/pnas.1619054114>
2. Merzel RL, **Boutom SM**, Chen J, Frey C, Shedden K, Marsh ENG, and MM Banaszak Holl. Folate Binding Protein: Therapeutic natural nanotechnology for folic acid, methotrexate, and leucovorin. *Nanoscale*, **2017**, 9, 2603-2615. <http://doi.org/10.1039/C6NR09060E>

TEACHING EXPERIENCE

Study group facilitator in University of Michigan Science Learning Center (SLC)

Jan 2014 – Dec 2015
Ann Arbor, MI

- CHEM 210 (Structure and Reactivity I)
- CHEM 215HH (Structure and Reactivity II Double Honors)
- BIOPHYS 290 (Physics of the Body and Mind)

Tutor at University of Wisconsin School of Medicine and Public Health

Oct – Dec 2020
Madison, WI

- Worked with two first-year medical students on topics in hematology, cardiology, pulmonology, and nephrology

HONORS AND AWARDS

April 2018	Honorable Mention, American College of Physicians Innovation Challenge (“Detecting Catheter-Associated Biofilms at the Bedside”)
April 2018	Best Early-Stage Prototype, Transcend Innovation Competition, University of Wisconsin - Madison
July 2017 – present	NIH Medical Scientist Training Program (T32 GM008692) Trainee
Jan 2016- May 2017	NIH Post-baccalaureate IRTA Fellowship
Mar 2016	Three-Term James B. Angell Scholar, University of Michigan
Dec 2015	College Honors, Distinction, University of Michigan College of Literature, Science and the Arts
Dec 2015	High Honors, University of Michigan Department of Biophysics
May – July 2015	LSA Honors Program Summer Fellowship, University of Michigan
Mar 2013 – Mar 2016	University Honors Designation, University of Michigan
April 2011	Honorable Mention, DuPont Challenge Science Essay Competition, Senior Division

PROFESSIONAL SOCIETIES AND MEMBERSHIPS

American Physician Scientists Association (2018 – present)
American Medical Association – Wisconsin Medical Student Section (2017 – present)
Wisconsin Medical Society (2017 – present)
American College of Physicians (2017 – present)

ADDITIONAL EXPERIENCE & VOLUNTEER WORK

Social Chair

June 2020-present
Madison, WI

UW MSTP Student Executive Board

- Organized social activities for the UW-Madison Medical Scientist Training Program.
- Helped with planning and organizing four virtual interview weekends and a revisit weekend for program applicants during the COVID-19 pandemic.
- Produced two customized Google Earth virtual tours distributed to program applicants during 2020-21 application cycle.

<p>Medical Student Volunteer MEDiC Student-Run Free Clinics</p> <ul style="list-style-type: none"> • Saw and examined uninsured and under-insured patients in an office setting under licensed physician supervision, dispensed common prescription medications, made specialist referrals • Experience with using medical interpreter services 	<p>June 2018 – present Madison, WI</p>
<p>Advocacy Chair UW SMPH American Medical Association – Medical Student Section</p> <ul style="list-style-type: none"> • Student executive board member in our UW AMA chapter; communicated with medical students regarding local advocacy opportunities, including organizing medical student attendance to the annual Wisconsin Doctor Day for advocacy at Wisconsin State Capitol 	<p>Jan – Dec 2018 Madison, WI</p>
<p>Multidisciplinary Group Member – Technology in Medicine Innovation Project UW-Madison TECH (Technology, Entrepreneurship Changing Healthcare) Bench-to-Bedside Interest Group</p> <ul style="list-style-type: none"> • Collaborated with a group of medical students and engineering undergraduates to design a prototype for a central venous catheter that would rapidly detect bacteria in blood or catheter lumen biofilms to prevent catheter-associated bloodstream infections (CLABSIs) • Won Best Prototype (Early Stage) in 2018 Transcend UW Innovation Competition • Won Second Place in 2018 TECH Bench to Bedside Competition (awarded \$1500) • Honorable Mention in 2018 American College of Physicians (ACP) Innovation Challenge, presented at 2018 ACP National Meeting in New Orleans 	<p>Sept 2017 – April 2018 Madison, WI</p>
<p>NIH Academy Participant Public Health and Health Disparities Certificate Program</p> <ul style="list-style-type: none"> • Participated in weekly discussions and courses as well as completing a final project 	<p>Sept 2016 – May 2017 Bethesda, MD</p>
<p>Volunteer Science Tutor College Bound “Science Lab”</p> <ul style="list-style-type: none"> • Provided after-school math and science tutoring to high school students 	<p>Jan 2016 - Mar 2017 Washington, DC</p>
<p>Executive Board Member for Biophysics Club at University of Michigan Various positions included Co-Vice President, Academic Chair, External Chair</p> <ul style="list-style-type: none"> • Helped organize club social events, lab tours and biophysics department outreach to prospective undergraduates and participated in community science outreach to local elementary and middle school students 	<p>Sept 2013 – Dec 2015 Ann Arbor, MI</p>
<p>Volunteer Activities Facilitator Ann Arbor Hands-On Museum</p> <ul style="list-style-type: none"> • Facilitated learning activities at a local children’s science museum; interacted with kids and parents 	<p>Jun – Dec 2015 Ann Arbor, MI</p>
<p>Undergraduate Hospital Volunteer University of Michigan University Hospital</p> <ul style="list-style-type: none"> • Volunteered in Emergency Department and Adult Acute Rehabilitation inpatient floor 	<p>Sept 2013 – April 2015 Ann Arbor, MI</p>
<p>Undergraduate Student Peer Mentor Honors Peer Mentors, LSA Honors Program, University of Michigan</p> <ul style="list-style-type: none"> • Provided guidance and advice to younger undergraduate students in Honors Program 	<p>Sept 2013 – Dec 2014 Ann Arbor, MI</p>