

ANTHONY S. BREITBACH, PH.D.
Assistant Professor of Chemistry, Clarke University
Curriculum Vitae

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EDUCATION

- 2007-2013 University of Wisconsin-Madison, Madison, WI
Ph.D., Chemistry
Mentor: Prof. Helen E. Blackwell
GPA 3.688/4.000
- 2004-2007 Clarke University (formerly Clarke College), Dubuque, IA
B.S., Chemistry; Minors in Biology and Mathematics
GPA 4.000/4.000, Valedictorian, summa cum laude
- 2003-2004 Simpson College, Indianola, IA
GPA 3.922/4.000

TEACHING EXPERIENCE *(in addition to instructing the courses below, I have served as a guest lecturer on many occasions)*

- 2015 (spring) Advisor for Senior Capstone (Chem499); Clarke University
Topic (Analytical Chemistry): Incorporating Chiral HPLC Stationary Phases into Educational Laboratory Experiments
- *Done in collaboration with Prof. Armstrong at The University of Texas at Arlington.*
 - *Also, mentored two other students with their Capstone projects that utilized GC-MS.*
- 2015 (spring) Adjunct for General, Organic & Biochemistry Lab (Chem107L-1 & -2); Clarke University
- *Instructed two lab sections (each 2 hours-long, once a week) of ~14 students each.*
 - *Mean scores from student evaluations were 3.25/ and 3.21/4.00, respectively.*
- 2015 (spring) Tutor for High School Chemistry Student
- *Held 1 hour-long, individual tutoring sessions twice a week.*
- 2014 (fall) Adjunct for Organic Chemistry I and Lab (Chem221 & L); Clarke University
- *Adjunct to cover lecture (1 hour-long, three times a week) of 14 students for Prof. Karen K. Glover on sabbatical.*
 - *Utilized student-centered POGIL method of teaching via guided inquiry activities.*
 - *Adjunct to cover lab (4 hours-long, once a week) of 14 students once Prof. Qian Wang took ill and resigned.*
 - *Mean scores from student evaluations were 2.79/ and 3.04/4.00, respectively.*
- 2014 (fall) Adjunct for General, Organic & Biochemistry Lab (Chem107L-1 & -2); Clarke University
- *Instructed two lab sections (each 2 hours-long, once a week) of ~18 students each.*
 - *Mean scores from student evaluations were 3.09/ and 3.08/4.00, respectively.*
- 2014 (summer) Mentor of Analytical, Undergraduate Researcher; The University of Texas at Arlington
- *Mentoring included training in experimental techniques, teaching how to design experiments and keep a laboratory notebook, and guiding their research.*
- 2014 (spring) Adjunct for General, Organic & Biochemistry (Chem107-1); Clarke University
- *Instructed one lecture section (1 hour-long, three times a week) of 21 students.*
 - *Utilized an interactive lecture method of teaching via MS powerpoint and web-based learning via Sapling Learning.*
 - *Mean score from student evaluations was 2.94/4.00.*

- 2014 (spring) Adjunct for General, Organic & Biochemistry Timesaver (Chem107-6 & L); Clarke Univ.
- *Instructed a double-paced (i.e., semester condensed to 8 weeks), hybrid (i.e., lecture, lab, and web components) introductory chemistry course for 16 students.*
 - *The class met once a week for 4 hours, the first 2 hours were used for introducing and testing course content and the second 2 hours were used for labs.*
 - *Utilized an interactive lecture method of teaching via MS powerpoint and web-based learning via Sapling Learning.*
 - **Mean scores from student evaluations were 2.83/ and 2.82/4.00, respectively.**
- 2013 (fall) Adjunct for General, Organic & Biochemistry Lab (Chem107L-1 & -2); Clarke University
- *Instructed two lab sections (each 2 hours-long, once a week) of ~18 students each.*
 - **Mean scores from student evaluations were 3.25/ and 3.37/4.00, respectively.**
- 2013 (spring) Adjunct for General Chemistry II Lab (Chem111L); Clarke University
- *Instructed one lab section (3 hours-long, once a week) of 5 students.*
 - **Mean score from student evaluations was 3.57/4.00.**
- 2013 (spring) Adjunct for General, Organic & Biochemistry Timesaver (Chem107-6 & L); Clarke Univ.
- *Same as above. I was responsible for 5 students.*
 - **Mean score from student evaluations was 2.70/4.00.**
- 2012 (fall) Teaching Assistant for Introductory Organic Chemistry (Chem343-342, 344, 345, & 348); University of Wisconsin-Madison
Instructor: Prof. Samuel H. Gellman
- *Teaching assistant for four discussion sections (~30 students per section) of Chem343, which demanded attending lecture three times a week and leading a 1 hour-long discussion once a week per section.*
 - *Discussions included a blend of self-developed lecture, problem solving, and quizzes.*
 - **Mean scores from student evaluations were 3.93/, 4.39/, 4.73/, and 4.72/5.00.**
- 2012 (summer) Adjunct for General, Organic & Biochemistry Timesaver (Chem107-6 & L); Clarke Univ.
- *Same as above. I was responsible for 17 students.*
- 2010-2011 Mentor of Graduate Researcher; University of Wisconsin-Madison
- *Same as above.*
- 2009 (summer) Mentor of Undergraduate Researcher; University of Wisconsin-Madison
- *Same as above.*
- 2008 (spring) Teaching Assistant for General Chemistry and Qualitative Analysis (Chem104-771); University of Wisconsin-Madison
Instructor: Prof. Bassam Z. Shakhshiri
- *Teaching assistant for one section (21 students) of Chem 104, which demanded attending lecture three times a week, leading a 1 hour-long discussion twice a week, and directing a 3 hour-long laboratory once a week.*
 - *Discussions included a blend of self-developed lecture, problem solving, and quizzes.*
 - **Mean score from student evaluations was 4.64/5.00.**
- 2007 (fall) Teaching Assistant for General Chemistry and Qualitative Analysis (Chem104-701, 702); University of Wisconsin-Madison
Instructor: Prof. Howard W. Whitlock
- *Teaching assistant for two sections (~20 students per section) of Chem 104 which demanded attending lecture twice a week, leading a 1 hour-long discussion twice a week per section, and directing a 3 hour-long laboratory once a week per section.*
 - *Discussions included a blend of self-developed lecture, problem solving, and quizzes.*
 - **Mean scores from student evaluations were 4.74/ and 4.68/5.00, respectively.**
- 2004 (spring) Tutor for Principles of Biology II (Biol111); Simpson College
- *Held 1-2 hour-long, individual tutoring sessions twice a week and additional pre-exam study sessions.*

RESEARCH EXPERIENCE

- 2015 (Summer) Analytical Chemistry Research Internship; The University of Texas at Arlington
Mentors: Prof. Daniel W. Armstrong & Dr. Zachary S. Breitbach
- *Evaluated a library of novel resin-based stationary phases for their ability to separate mixtures of diastereomers via HPLC in the normal phase mode.*
 - ***Gained considerable experience with HPLC and in analytical, instrumental, and separations chemistry.***
- 2014 (Summer) Analytical Chemistry Research Internship; The University of Texas at Arlington
Mentors: Prof. Daniel W. Armstrong & Dr. Zachary S. Breitbach
- *Worked on the synthesis, packing, and testing of new chiral stationary phases for LC.*
 - *Performed a separations study on a library of novel chiral α -aryl ketones, which included optimizing normal phase HPLC and SFC separations, developing structure-separation relationships, using dynamic HPLC to study enantiomerization, and showing the utility of stationary phases composed of superficially porous particles.*
 - ***Gained considerable experience in analytical, instrumental, and separations chemistry and skill with small- and large-scale solution-phase synthesis, LC stationary phase packing, HPLC, and SFC.***
- 2007-2012 Graduate Research Assistant; University of Wisconsin-Madison
Mentor: Prof. Helen E. Blackwell
- *Developed quantitative and qualitative analytical methods to evaluate biological processes, small-molecule interactions, and drug kinetics.*
 - *Developed novel chemical approaches for the control of bacterial biofilms including strategies targeting cell adhesion, cell viability, and biofilm formation and dispersion.*
 - ***Gained considerable experience in microbiology, bioassay optimization, compound library screening, polymer-mediated drug delivery, kinetic studies of drug release and decomposition (via HPLC and UV/Vis), microscopy, and protein science.***
- 2008 (July) Attendee of a two-day workshop on Biofilm Research; Montana State University
Instructors: Prof. Zbigniew Lewandowski and Prof. Haluk Beyenal
- 2006 (summer) NNIN REU Researcher; University of Michigan
Mentors: Prof. Udo Becker and Prof. Devon J. Renock
- *Characterized the chemical and physical processes that occur in the deposition of gold on the surfaces of pyrite and arsenopyrite.*
 - ***Gained considerable experience in surface microscopy and spectroscopy techniques (e.g., AFM, SEM/EDS, and XPS).***
- 2006 (spring) Undergraduate Researcher; Clarke College
Advisor: Prof. Sunil Malapati
- *Performed a semester-long, independent research project, which compared three protocols to extract, isolate and purify lactate dehydrogenase protein from cow heart.*
 - ***Gained significant experience in protein science.***
- 2005 (fall) Undergraduate Researcher; Clarke College
Advisor: Prof. Diana Malone
- *Completed a 2 week-long, independent research project, where I optimized HPLC protocols to separate mixtures of keratolytic agents.*
 - ***Experience with HPLC and in analytical, instrumental, and separations chemistry.***
- 2005 (spring) Undergraduate Researcher; Clarke College
Advisor: Prof. Karen K. Glover
- *Took part in a 3 week-long, collaborative research project, where we synthesized the small molecules dianthrone and dixanthylene, studied their thermochromic properties by UV-Vis spectroscopy, and used molecular modeling to develop a hypothesis for their thermochromic property.*
 - ***Gained experience in synthesis, spectroscopy, and modeling.***

PATENTS

1. Blackwell, H. E.; Frei, R.; **Breitbach, A. S.**; Lynn, David M.; Broderick, A. H. Inhibition and Dispersion of Bacterial Biofilms with 2-Aminobenzimidazole Derivatives. U.S. Patent 13/669,368, Nov. 5, 2012.

PUBLICATIONS (*co-first authors)

1. **Breitbach, A. S.**; Lim, Y.; Xu, Q.-L.; Kürti, L.; Armstrong, D. W.; Breitbach, Z. S. Enantiomeric separations of α -aryl ketones with cyclofructan chiral stationary phases via high pressure liquid chromatography and supercritical fluid chromatography. *J. Chromatogr. A* **2016**, *1427*, 45-54.
2. Broderick, A. H.*; **Breitbach, A. S.***; Frei, R.; Blackwell, H. E.; Lynn, D. M. Surface-Mediated Release of a Small-Molecule Modulator of Bacterial Biofilm Formation: A Non-Bactericidal Approach to Inhibiting Biofilm Formation in *Pseudomonas aeruginosa*. *Adv. Healthcare Mater.* **2013**, *2*, 993-1000.
3. Frei, R.*; **Breitbach, A. S.***; Blackwell, H. E. 2-Aminobenzimidazole Derivatives Strongly Inhibit and Disperse *Pseudomonas aeruginosa* Biofilms. *Angew. Chem. Int. Ed.* **2012**, *51*, 5226-9.
4. Frei, R.; **Breitbach, A. S.**; Blackwell, H. E. Expedient Construction and *ex situ* Biological Testing of Small-Molecule Macroarrays via Sequential Palladium- and Copper-Mediated Reactions. *Chem. Sci.* **2012**, *3*, 1555-61.
5. Praneenarat, T.; Beary, T. M. J.; **Breitbach, A. S.**; Blackwell, H. E. Synthesis and application of an N-acylated l-homoserine lactone derivatized affinity matrix for the isolation of quorum sensing signal receptors. *Bioorg. Med. Chem. Lett.* **2011**, *21*, 5054-7.
6. **Breitbach, A. S.***; Broderick, A. H.*; Jewell, C. M.; Gunasekaran, S.; Lin, Q.; Lynn, D. M.; Blackwell, H. E. Surface-mediated release of a synthetic small-molecule modulator of bacterial quorum sensing: Gradual release enhances activity. *Chem. Commun.* **2011**, *47*, 370-2.
7. Buck, M. E.; **Breitbach, A. S.**; Belgrade, S. K.; Blackwell, H. E.; Lynn, D. M. Chemical Modification of Reactive Multilayered Films Fabricated from Poly(2-alkenyl azlactone)s: Design of Surfaces that Prevent or Promote Mammalian Cell Adhesion and Bacterial Biofilm Growth. *Biomacromolecules* **2009**, *10*, 1564-74.

CONFERENCES (presentations/judging listed in parentheses)

2013-2016	Clarke University Research Conference
2016 (May)	Illinois-Iowa Section ACS Meeting, Guardian Glass, DeWitt, IA
2016	UW-Platteville 45 th Annual College of EMS Expo (<i>judge</i>)
2016 (Mar)	Illinois-Iowa Section ACS Meeting, Clarke University, Dubuque, IA
2016	CU Books, Bites, and Brilliance (<i>oral</i>)
2015	ACS Midwest Regional Meeting, Missouri Western State University, CHO workshop
2015	UW-Platteville 44 th Annual College of EMS Expo (<i>judge</i>)
2014 (Apr)	Illinois-Iowa Section ACS Meeting, Clarke University, Dubuque, IA
2012	UW-Madison Department of Chemistry Poster Session (<i>poster</i>)
2011	4 th ASM conference on Cell-Cell Communication in Bacteria, Miami, FL (<i>poster</i>)
2011	25 th Kenneth B. Raper Symposium, UW-Madison (<i>poster</i>)
2011	CBI Training Program Summer Symposium, UW-Madison (<i>poster</i>)
2010	24 th Kenneth B. Raper Symposium, UW-Madison
2010	Perlman Symposium on Antibiotic Discovery and Development, UW-Madison
2009	5 th ASM Conference on Biofilms, Cancun, MX (<i>poster</i>)
2005-2007	Clarke College Research Conference (<i>oral</i>)
2007	Illinois-Iowa Section ACS Meeting, Clinton, IA (<i>oral</i>)
2006	NNIN REU Convocation, Ithaca, NY (<i>oral and poster</i>)

PROFESSIONAL AFFILIATIONS

2007-2013	American Chemical Society
2011-2012	American Society for Microbiology
2009-2012	NIH CBI Graduate Training Program

ADDITIONAL EXPERIENCE

2015-2016	Volunteer for Dubuque Family STEM Festival
2015-2016	Card Dealer for CAB Casino Night, Clarke University
2015-2016	Judge at UW-Platteville EMS Expo
2014-2016	Judge for Clarke View, Clarke University
2013-2014, 2016	Leader for Human Body Bee, Clarke University
2013-2016	Chemistry Representative for Iowa Private College Week, Clarke University
2013-2016	Chemical Hygiene Officer, Clarke University
2012-2016	Laboratory Manager, Clarke University
2016	Search committee for Executive Director of Facilities & Security, Clarke University
2016	Search committee for VP of Enrollment Management, Clarke University
2016	Chaperone for CAB May Daze Dance, Clarke University
2014-2015	Sponsored projects for two Mary Frances Clarke Scholars, Clarke University
2013-2015	Leader for STEM day, Clarke University
2013-2014	Volunteer for Fall Visit Day, Clarke University
2014	Volunteer for Clarke's Pancake Dinner, Clarke University
2012-2013	Lead transition of Chemistry & Biology Departments to new science center, Clarke Univ.
2013	Volunteer for Clarke Soccer Anniversary Event, Clarke University
2005, 2007	AmeriCorps-Partners in Learning Service Leader, Dubuque, IA
2005-2007	Volunteer for Clarke College Youth Soccer Developmental Camp, Clarke College
2004-2007	Chemical Stock Room Assistant, Clarke College
2003-2006	Collegiate Soccer, Clarke College

HONORS AND AWARDS

2016	Clarke University honorary speaker at the CSI naming ceremony
2016	Clarke University Faculty Development Summer Grant
2014	Clarke University honorary brick (for leading transition to new science building)
2009-2012	NIH Chemistry-Biology Interface Graduate Traineeship
2012	UW-Madison Chi Omega Sorority Impactful Educator
2011	UW-Madison Vilas Conference Presentation Funding
2011	UW-Madison Department of Chemistry Travel Grant
2008	Montana State University Center for Biofilm Engineering Workshop Travel Award
2003-2007	Dean's List (8 consecutive semesters)
2007	Clarke College Graduating Class of 2007 Valedictorian
2007	Clarke College Senior Male Athlete of the Year
2007	Clarke College Sister Marguerite Neumann Chemistry Award
2007	NCAA Postgraduate Scholarship
2007	McElroy Fellowship Honorable Mention Selection
2007	Kappa Gamma Pi Honor Society
2005-2006	Clarke College Varsity Soccer Team Captain
2004-2006	Clarke College All-Academic Team
2006	ESPN the Magazine Second-team Academic All-American
2006	Clarke College Soccer Most Inspirational Teammate Award <i>and</i> Team Spirit Award
2004	Simpson College CRC Freshmen Chemist of the Year
2004	Alpha Lambda Delta Honor Society

REFERENCES

Work:

- Prof. Karen K. Glover, Clarke University karen.glover@clarke.edu 563.588.8139
- Prof. Daniel W. Armstrong, UT-Arlington sec4dwa@uta.edu 817.272.0632
- Prof. Helen E. Blackwell, UW-Madison blackwell@chem.wisc.edu 608.262.1503

Personal:

- Prof. Reto Frei, Bern University, CH reto.frei@bfh.ch +41.32.344.03.81
- Prof. Luke Lammer (class of '06), Loras College luke.lammer@loras.edu 563.588.7379
- Jaclyn Esqueda, UW-Platteville esqueda@uwplatt.edu 608.342.7158