

QUALIFICATIONS

- Completed dissertation solving two pressing microbiological questions with bioinformatic approaches
- Currently in post-doctoral position using network analysis and bioinformatics to counteract contaminant transport in an urban river system
- Proven history in pharmaceutical industry design drug formulations and stability
- Proven history of team leadership and interaction with clients
- Educational experience underscores ability to communicate and inform others

EDUCATION

Doctor of Philosophy - *Environmental Engineering*

Focus in bioinformatics, environmental microbiology, antibiotic resistance, nanotoxicology

University of Texas at Austin

No. 3rd Environmental Engineering Program in world by Academic Rankings of World Universities (Shanghai)

No. 4th Environmental Engineering Program in US by US News

No. 20th Engineering program in world by Times Higher Ed.

May
2018

* note: A 6-7-year graduation timeline in engineering curricula is common at major USA universities. Students are required to design at least 3 projects on their own and find funding to conduct this research

Master of Engineering - *Environmental Engineering*

Focus in nanotoxicology, nanoparticle fate & transport, environmental microbiology, drinking water

University of Texas at Austin

No. 3rd Environmental Engineering Program in world by Academic Rankings of World Universities (Shanghai)

No. 4th Environmental Engineering Program in US by US News

No. 20th Engineering program in world by Times Higher Ed.

December
2013

Bachelor of Science - *Biochemistry*

Focus in antibiotic design, natural product isolation, gene pathway characterization

University of Texas at Austin

No. 23 in Biochemistry Program in world by Academic Rankings of World Universities (Shanghai)

May
2007

PROFESSIONAL EXPERIENCE

Post-Doctoral Research Assistant – *University of Texas at Austin*

- *Built contaminant transport through urban watershed model using informatics approach capable of identifying sources of microbial pollution input into water system.*
- *Led 1-year 7 person field research campaign sampling 10 sites for 14 parameters to identify sources of contamination*
- *Designed molecular source tracking methods to isolate bacterial contamination sources*
- *Tracked antibiotic resistance in bacteria resulting from metal exposure using whole genome sequencing and bioinformatics*

May
2018-
present

Graduate Research Assistant – *University of Texas at Austin*

- *Identified new source and model of antibiotic resistance using bioinformatics and microbiological approach*
- *Created comprehensive model of Silver nanoparticle-bacteria interaction based on bioinformatic model*
- *Characterized fate and transport of eight nanoparticles based on core and coating*
- *Build biofilm-nanoparticle interaction model describing inclusion of metals in sanitation waterlines*
- *Responsible for lab operations while mentoring 7 undergraduate students; 3 of whom are now in graduate school*
- *Led metagenomics consulting group, analyzing data for more than 15 clients over 4 years*

January
2011-
2018

Teaching Assistant – University of Texas at Austin	January 2011-2018
<ul style="list-style-type: none"> • Taught more than 100 course hours from fields as diverse as molecular biology and cell biology to hydraulic engineering and chemistry • Built five new learning labs for three courses in biotechnology, molecular biology, and • Developed small “choose your own adventure” problem-based learning program for large student classes resulting in a “small classroom teaching environment” for large class sizes 	
SIAD Mentor and Lab Head – University of Texas at Austin	August 2016-2018
<ul style="list-style-type: none"> • Mentored more than 100 independent first-year student projects on topics ranging from artificial intelligence and organic chemistry, to psychology and social science • Responsible for a research lab including a lab manager, 15 peer mentors, and 100 students • Developed course model that led to successful publication pipeline for undergrad researchers • Wrote new course materials teaching grant application process and professional presentation • Efforts in this position led to 96% retention (improved from 54%) of at-risk students in natural sciences 	
Engineers without Borders Professional Mentor – Austin, Texas	August 2010-2015
<ul style="list-style-type: none"> • Led team of 26 students on projects in Panama and Peru • Designed water filtration system with 10-year lifespan costing \$50 for use in communities • Directed 10-person travel team in Panama for on-site building and community negotiations • Designed irrigation system near Lima, Peru helping two high mountain communities gain access to water 	
Clubes De Ciencias Instructor – University of Guanajuato, Mexico	January 2015
<ul style="list-style-type: none"> • Developed biotechnology and societal technology course for at risk students in Mexico • Developed lab in community and wrote 4 new lab courses in Spanish • Designed bacterial fuel cells with 10% improvement on reported operational output • Mentored 30 students, 4 of which are now in graduate schools including Harvard and UCLA 	
Outreach Coordinator – OffRoad Sciences/UT Student Outreach	August 2012-2016
<ul style="list-style-type: none"> • Wrote more than 40 hands-on research demonstrations accessible to kids in kindergarten through high school illustrating lecture series topics • Created 4-year college research plan preparing high school students for courses in college • Built a comprehensive biology-physics-chemistry-economics-societal final research project illustrating how all facets of education are fused in real world scenarios • Co-chaired team of 10 graduate students in efforts and led communication with lecture organizers 	
Research Chemist II and Drug Design Researcher I – Pharmaform L.L.C	June 2007-2009
<ul style="list-style-type: none"> • Led organic and chemical research group analyzing stability and formulation effectivity of new active drug ingredients through analytical and physical chemistry • Conducted patent and legal analysis, preparing data and approaches for expert witnesses • Developed 3 U.S. pharmacopeia analytical testing methods for drug release and stability analysis • Pioneered new review process to establish project success and drug safety for company 	

PROFESSIONAL SKILLS

Bioinformatics: metagenomic analysis, transcriptomics (differential/relative), proteomics, mutational analysis, microarray analysis, weighted network analysis, random forest, various clustering analysis, PCA, tsne, motif analysis, correlational tree analysis

Bioinformatic Software Familiarity: Bioconductor, DESeq2, BowTie, DiffCuff, InParinoid, MeMeSuite, Qiime, MATLab bioinformatics toolkit, some Qiime2

Molecular Biology: DNA, RNA, Protein extractions, PCR, qPCR, RT-qPCR, ELISA, northern/western/southern blot,

cloning, HIS-tag-preparations

Programing Languages: R, MATLAB, Fortran, some Python

Microbiology: culturing, transformations, biofilm culturing, chemostat culturing, motility assays, enumeration, flow cytometry, growth assays, antibiotic resistance assays, EPS-characterization, enzymatic activity assays, various staining, sporulation assays, familiar with novel plate reader based high sensitivity growth analysis, BSL-2 and 3 trained

Microscopy: SEM, eSEM, TEM, confocal, phase contrast, brightfield, AFM

Nano: DLS, SLS, goniometry, fractal analysis, nano-sight, reductive synthesis and capping modification, SPR, fractional analysis, see microscopy

Analytical Chemistry: HPLC, UHPLC, GC, NFIR/IR, Flame AA, ICP-OES/AAS, MS, stripping voltammetry

Languages: English – Native, Spanish – conversational (EU B-1/2), Danish – intermediate (EU A-1/2)

PUBLICATIONS

* Denotes undergraduate mentee

IN PREPARATION

Chambers, B. A., Hofmann, H., Kirisits, M. J., Silver and silver nanoparticles cause and select for antibiotic resistance in *Pseudomonas aeruginosa*. *Manuscript in preparation for Proceedings of the National Academy of Science*

Chambers, B. A., D'Alton, S., *Smith, S. K., Kirisits, M. J., A molecular biological model for the surface attachment action of silver nanoparticles. *Manuscript in preparation for American Chemical Society Nano*

Chambers, B. A., Sabaraya, I. V., Saleh, N.B., Kirisits, M. J. Cohort adoption: The effect of a four-year pre-college STEM outreach program. *Manuscript in preparation for the Journal of Science Education and Technology*

PUBLISHED

Chambers, B. A. A molecular biological model describing silver nanoparticle mechanisms of toxicity and associated antibiotic resistance. *Dissertation Published by The University of Texas at Austin. 2018*

Saleh, N. B., **Chambers, B. A.,** Aich N., Kirisits, M. J. Mechanistic lessons learned from studies of planktonic bacteria with metallic nanomaterials: implications for interactions between nanomaterials and biofilm bacteria, *Frontiers in Microbiology. 2015*

Chambers, B. A., Afrooz A. R. M. N., Bae S., Aich N., Katz, L. E., Saleh N. B., Kirisits, M. J. Effects of Chloride and Ionic Strength on Physical Morphology, Dissolution, and Bacterial Toxicity of Silver Nanoparticles. *Environmental Science and Technology. 2014* 48 (1) 761-769. DOI: 10.1021/es403969x.

Saleh, N. B., Aich, N., **Chambers, B. A.,** Afrooz, A. R. M., Kirisits, M. J. Influence of tin doping on environmental interactions of nano indium oxides in aqueous systems. *Abstracts of Papers of the American Chemical Society. 2014*

C.B. Mendez, S. Bae, **B. A. Chambers,** S. Fakhreddine, T. Gloyna, S. Keithley, L. Untung, M.E. Barrett, K. Kinney, and M. J. Kirisits, Effect of Roof Material on Water Quality for Rainwater Harvesting Systems Additional Physical, Chemical, and Microbiological Data. *Texas Water Development Board 2010*

PRESENTATIONS

Landsman M. R., **Chambers B.A.**, Kirisits M. J., Contaminant transport in an Austin Urban Watershed: approaches to isolate human influence. Waller Creek Consortium. Austin Texas, May 9th, 2019

Chambers B. A., Smith, S. K., Kirisits M. J., Silver nanoparticles induce antibiotic resistance in *Pseudomonas aeruginosa*. American Chemical Society National Meeting, New Orleans March 18-22, 2018

Chambers B. A., Smith S. K., Kirisits M. J., Resistance is not futile: Metals generate antibiotic resistance in engineered systems. Sustainability Conference. University of Texas, November 8-11, 2016

Chambers B. A., Kirisits M. J., Antibiotic resistance consequences of silver nanoparticle use. Gordon Microbial Stress Response. Mount Holyoke, July 17 -26, 2016

Chambers B. A., Kirisits, M, Chloride drive low fractal dimension silver nanoparticle formation, controlling toxicity and stress response. University of Texas, March 20, 2014

Chambers B. A., Katz L. E., Kirisits M. J., Chloride concentrations and ionic strength impact the toxicity and stability of silver nanoparticles in bacterial exposure media. 87th American Chemical Society Colloid and Surface Science Symposium. University of California Riverside, June 23-June 26, 2013

Chambers B., Nguyen H. Kirisits, M.J. Microarray Analysis of Nanosilver Tolerance Strategies in *Pseudomonas aeruginosa* and *Escherichia coli*. Environmental Nanotechnology Gordon Conference, 2011, Waterville Valley, NH. Poster Presentation.

TEACHING EXPERIENCE

Clubes De Ciencias, University Of Guanajuato, Mexico

From trash to treasure: Using bacteria to power the future
Self-written course

January 2015

The University of Texas At Austin

Scientific Inquiry Across the Disciplines
Stuart Reichler and Self-written

2016, 2017, 2018

Cell Biology

Arturo De Lozanne and Self-written

2017

Introduction to Environmental Engineering

Mary Jo Kirisits

2016

Hydraulic Engineering

John Burgin

2015

Microbiology

Pratibha Saxena

2015

Marvin Whiteley

2014

Mary Jo Kirisits

2011, 2013

Molecular Biology

Scott Stevens

2015

Ellen Gottlieb

2014

Mary Jo Kirisits

2011

General Engineering Chemistry

Self-written course

2010

Organic Chemistry and Biochemistry for Nursing Students

Fatima Fahkreddine

2006

General Chemistry
Sarah Sutcliffe

2005

Average rating: 4.62 out of 5

CERTIFICATIONS

Translating nano-experience to an academic career: Integrating social aspects in engineering education through active learning
Active Learning Certification Program

October
2016

Interdisciplinary Education Certificate
School of Undergraduate Education, University Of Texas At Austin

Fall
2016

AWARDS

Ben D. Geeslin Endowed Presidential Scholarship
Kolodzey Travel Grant
American Water Works Association Scholarship
University of Texas at Austin Legacy Fellowship
Earnest Gloyna Presidential Scholarship
Texas American Water Works Association Fellowship
Gus Fruh Memorial Fellowship

2013, 2017-2015,
2016, 2017
2016
2015
2014-2015
2014
2011-2012

PROFESSIONAL SOCIETIES

American Water Works Association
American Chemical Society

PERSONAL

bicycle touring, hiking/camping, language and history enthusiast, swing dancing, amateur geologist