

BRAE BIGGE

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EDUCATION

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| PhD | Dartmouth College, Biochemistry and Cell Biology
Advisor: Prachee Avasthi, PhD | June 2022 |
| BS | Wichita State University, Chemistry-Biochemistry
Magna Cum Laude, Honors Student | May 2017 |

RESEARCH EXPERIENCE

- Dissertation**, University of Kansas Medical Center and Dartmouth College 2022
Advisor: Prachee Avasthi, PhD
- Developed and led project to understand the biochemical and functional characteristics of the Arp2/3 complex in *Chlamydomonas reinhardtii*
 - Effectively displayed work with GraphPad Prism, R, and Adobe Illustrator and effectively presented work both verbally and in writing
 - Designed and readjusted cell biology assays for an unusual model organism, including immunofluorescence, immunoprecipitation, western blot, organelle isolation, protein labelling, and others
 - Imaged experiments using spinning disk confocal, airyscan confocal, laser scanning confocal, DIC/Phase contrast, widefield fluorescence, and TIRF microscopy
 - Analyzed image data with ImageJ/FIJI, Nikon Elements, and Zeiss Zen
 - Tagged proteins using molecular cloning, PCR, DNA and RNA isolation, and algal and bacterial transformation and expression
 - Performed sequence studies to further understanding of the *Chlamydomonas* genome and proteome using Geneious, BLAST, MEGA, and other software
- Undergraduate Research**, Wichita State University 2016 to 2017
Advisor: Moriah Beck, PhD
- Collaborated on project to understand myopalladin's role in cardiac muscle function and disease
 - Purified protein fragments using a bacterial expression system
 - Performed co-sedimentation assays to measure actin binding

PUBLICATIONS

Zhang, N.; Pazouki, L.; Nguyen, H.; Jacobshagen, S.; **Bigge, B.M.**; Xia, M.; Mattoon, E.M.; Klebanovych, A.; Sorkin, M.; Nusinow, D.A.; Avasthi, P.; Czymmek, K.J.; Zhang, R. "Comparative Phenotyping of Two Commonly Used *Chlamydomonas reinhardtii* Background Strains: CC-1690 (21gr) and CC-5325 (The CLiP Mutant Library Background)." *Plants* 2022, 11, 585. <https://doi.org/10.3390/plants11050585>.

Bigge, B.M., Rosenthal, N.E., Avasthi, P. "Initial ciliary assembly in *Chlamydomonas* requires Arp2/3-dependent recruitment from a ciliary protein reservoir in the plasma membrane." *BioRxiv*. 2021. doi.org/10.1101/2020.11.24.396002.

Craig, E.W., Mueller, D.M., **Bigge, B.M.**, Schaeffer, M., Engel, B. D., and Avasthi, P. "The elusive actin cytoskeleton of a green alga expressing both conventional and divergent actins." *MBoC*, vol. 30, no. 22, 2019. doi.org/10.1091/mbc.E19-03-014.

ORAL PRESENTATIONS

Bigge, B.M., Avasthi, P. "Arp2/3-dependent actin networks in ciliary protein delivery in *Chlamydomonas*." Dartmouth College Molecular and Cell Biology Research in Progress Seminar. April 2021. (Virtual)

Bigge, B.M. "Arp2/3-dependent actin networks in ciliary protein delivery in *Chlamydomonas*." BSCB GenSoc UK Cilia Network e-Symposium. January 2021. (Virtual)

Bigge, B.M., Sept, D., Schroeder, C., Avasthi, P. "Arp2/3 nucleates conventional and divergent actin networks in *Chlamydomonas Reinhardtii*" KUMC Student Research Forum (SRF). March 2020. Kansas City, KS. (Cancelled due to COVID-19)

Bigge, B.M., Avasthi, P. "Arp2/3-mediated branched actin networks play a role in ciliary assembly and maintenance in *Chlamydomonas*" American Society of Cell Biology (ASCB). December 2019. Washington D.C.

Bigge, B.M., Sept, D., Avasthi, P. "Arp2/3 can nucleate filaments of a divergent actin with few conserved Arp2/3 binding residues" KUMC Student Research Forum (SRF). March 2019. Kansas City, KS.

POSTERS

Dartmouth College Molecular and Cell Biology Recruitment 2022

Cell Bio 2021 (2 posters, Virtual)

Triangle Cytoskeleton Meeting 2021 (Virtual) Award for top poster

Dartmouth College Molecular and Cell Biology Annual Retreat 2021

Dartmouth College Molecular and Cell Biology Recruitment 2022 (Virtual)

Cell Bio 2020 (2 posters, Virtual)

Dartmouth College Molecular and Cell Biology Retreat 2020 (Virtual) Award for top 3 posters.

Stowers Developmental Cell Biology Conference 2020 (Cancelled due to COVID-19)

Chicago Cytoskeleton Meeting 2020 (Cancelled due to COVID-19)

American Society of Cell Biology (ASCB) 2019 (3 posters)

American Society of Cell Biology (ASCB) 2018

Kansas Idea Network of Biomedical Research Excellence (K-INBRE) Symposium 2017

Undergraduate Research and Creative Activity Forum (URCAF) 2017

TEACHING AND MENTORING

Dartmouth College, Hanover, NH

Graduate Teaching Assistant, Cell Structure and Function

- Delivered lab lecture (virtual)
- Facilitated lab exercises and assisted students in lecture, small groups, and office hours (virtual)
- Graded lab assignments and course exams (virtual)

Dartmouth College, Hanover, NH

Graduate Student Mentor, Biochemistry and Cell Biology

- Rotation Students: Amy Conaway, Lia Michaels, Shrea Bural

University of Kansas Medical Center, Kansas City, KS

Graduate Student Mentor, Anatomy and Cell Biology

- Undergraduate Student: Abigail Salberg
- Rotation Students: Larissa Dougherty, Ananya Nidamangala

Wichita State University, Wichita, KS

Tutor, Disability Services

- Reviewed and translated biochemistry and medicinal chemistry lessons for a visually impaired student, aided with homework and studying for exams

Wichita State University, Wichita, KS

Research mentor, Cohen Honors College Summer Research Institute

- Worked with high school students from highly diverse Kansas counties to help them develop, carry out, and present original research
- Built relationships with students

HONORS AND AWARDS

Triangle Cytoskeleton Meeting Poster Award One of the top posters at the Triangle Cytoskeleton Meeting	2021
Dartmouth Molecular and Cell Biology Retreat Poster Award One of the top 3 posters at the Dartmouth MCB Retreat for PhD students	2020
Madison and Lila Self Graduate Fellowship Provides financial support and professional development opportunities for promising graduate student leaders at The University of Kansas	2018-2020
Kansas Idea Network of Biomedical Research Excellence Scholar Strengthens Kansas research by funding undergraduate research	2016-2017

PROFESSIONAL TRAINING

Communication Coaching

Robert C. Roland, Ph.D. and Amy J. Devitt, Ph.D., Lawrence, KS, 2018-2020

Description: Oral and written communication classes teaching presentation skills, writing skills, and how to better communicate science

Lean Six Sigma Yellow Belt Training

Donna Whittaker, Ph.D., Lawrence, KS, Jan, 2020

Description: Introduction to the Lean Six Sigma method of process problem solving

Public Policy Seminar

Self Graduate Fellowship, Washington, D.C., Sept 2019

Description: A comprehensive introduction to public policy for graduate students

Negotiation and Conflict Resolution

Michael Haselhuhn, Ph.D., Lawrence, KS, Aug 13-14, 2019

Description: Two-day seminar demonstrating proper negotiation techniques

Discover Your Strengths, Clifton Strength Finder Seminar

Kathleen Ames-Stratton, Lawrence, KS, Jan 15, 2019

Description: Seminar to identify and harness personal strengths for relationship building, thinking strategically, executing plans, and influencing others to accomplish goals

Adaptive Leadership Seminar

Jill Hufnagel, Ph.D., Lawrence, KS, Aug 7-8, 2018

Description: Seminar that teaches how to use adaptability to enhance leadership skills

PROFESSIONAL AFFILIATIONS

Dartmouth College Cancer Biology and Therapeutics/Cancer Signaling and Genomes

American Society of Cell Biology

American Society of Biochemistry and Molecular Biology

American Genetics Society

PROFESSIONAL AND COMMUNITY SERVICE

Grad Student Slack

Cofounder/administrator, 2018-Present

Sinochips Diagnostics

Data entry for COVID-19 testing, Kansas City, KS, April-May 2020

Letters to a Pre-Scientist

Scientist/Letter writer, 2018-Present

3 Minute Thesis Organization Committee

Student Research Forum, KUMC, 2018-2019

Big Brothers Big Sisters

Mentor, Wichita, KS, 2013-2017

Kansas DNA Day

Ambassador, Wichita, KS, 2016-2017

Expanding Your Horizons

Volunteer, Wichita, KS, 2016-2017