BIOGRAPHICAL SKETCH

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NAME: Ring, Brooke

eRA COMMONS USER NAME (credential, e.g., agency login): BRING3

POSITION TITLE: Graduate Student Research Assistant

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
University of Akron	BS	08/2015	05/2019	Biochemistry
University of Toledo	MPH	08/2019	05/2021	Public Health Epidemiology
University of Toledo	PhD	08/2021	05/2026 (Expected)	Medical Microbiology and Immunology

A. Personal Statement

Throughout my academic career, I have sought a comprehensive understanding of the science spectrum, from bench to translating basic research toward improving public health. My deep interest in the three fields of microbiology, immunology, and epidemiology has remained a constant thread through my undergraduate and graduate studies. My degree programs have provided me with the opportunity to explore and cultivate my curiosity about various diseases and relevant preventive strategies. This curiosity has since evolved into a strong motivation to pursue a career in medical microbiology and immunology. Based on my undergraduate classes and my over 300 hours hour internship with the Toledo-Lucas County Health Department during the SARS-CoV-2 pandemic, I developed an interest in aligning the three fields into a strong research career plan.

My long-term goal is to become an independent researcher focusing on bacterial metabolism and its response to the host environment in the context of pathogenesis. At this point, I am actively exploring various career options that will enable me to achieve my long-term goal, whether it be in academia, industry, or a government lab. Under the mentorship of Dr. Laura Mike, I am studying the pathogenesis of *Klebsiella pneumoniae*, one of the high-impact ESKAPE pathogens. I am identifying exogenous signals and metabolic genes that regulate *K. pneumoniae* mucoidy, with the goal of publishing a first-author article defining arginine-dependent regulation of mucoidy. Along with my research, my proposed training plan includes public speaking at conferences, attending workshops for career development, advanced coursework in microbiology and immunology, bioinformatics certificate, and regular meetings with Dr. Mike, Dr. Ronald Mark Wooten, and my thesis committee to ensure my growth and development as a researcher. In conclusion, I am confident that executing the research proposal and training plan included in this F31 application will assist in me achieving my long-term goal of becoming a high-impact researcher in the fields of medical microbiology, immunology, and epidemiology.

1. Khadka, S. *, **Ring, B.E**. *, Walker, R. S., Krzeminski, L. R., Pariseau, D. A., Hathaway, M., Mobley, H. L. T., & Mike, L. A. Urine-mediated suppression of *Klebsiella pneumoniae* mucoidy is counteracted by spontaneous Wzc variants altering capsule chain length. *mSphere in press* (2023). PMC Journal – In Process. [**Co-first author*]
2. **Ring, B. E**., Khadka, S., Pariseau, D. A., & Mike, L. A. (2023). Genetic manipulation of Klebsiella pneumoniae. Current Protocols, 3(10), e912.

B. Positions, Scientific Appointments, and Honors

Position

2021-current Graduate Student Research Assistant
2020-2021 Lucas County Public Health Epidemiology Intern

Society Membership

2023-current American Society for Microbiology
2022-current Urinary Tract Infection Global Alliance

Honors

2024 Graduate Research Forum, Poster Presentation 1st place
2024 MMI Research Scholar Award, University of Toledo
2018 The Emanuel and Rose Gurin Scholarship, University of Akron
2017-2018 The Julius Muehlstein Scholarship, University of Akron
2017 Exxon Chemical Scholarship, University of Akron
2015-2019 Honors Scholarship, University of Akron
2015-2019 Scholarship of Excellence, University of Akron

C. Contributions to Science

1. **Public Health Internship:** During my time as part of a team of epidemiology intern leaders, I invested over 300 hours in the development of a comprehensive county-wide contact tracing program for the Lucas County Health Department, as well as the coordination of efforts with a member of the Centers for Disease Control and Prevention (CDC) research team on SARS-CoV-2 policies. Under the supervision of Dr. Joseph Dake, I was involved in the development of COVID-19 tracking database and protocols for Lucas County contact tracing. The pandemic presented an exciting (if sobering) opportunity for me to apply scientific research directly to public health initiatives. My background in epidemiology and my internship experience provided me with a unique perspective on my current graduate research, enabling me to have a greater impact on human health from the bench side, while always considering the direct translation of my research into public health.

2. **Graduate Research**: My current research focuses on the pathogenesis of *Klebsiella pneumoniae*, aiming to uncover novel insights into the regulation of mucoidy and its significance during *K. pneumoniae* infections. Through this investigation, I seek to identify targets that would combat highly virulent infections and advance human health. My research project involves identifying the exogenous signals and metabolic genes responsible for mucoidy regulation in *K. pneumoniae*, and I plan to publish a first-author article on this topic by the end of my third year in the program (spring 2024).

    1. Khadka, S. *, **Ring, B.E**. *, Walker, R. S., Krzeminski, L. R., Pariseau, D. A., Hathaway, M., Mobley, H. L. T., & Mike, L. A. Urine-mediated suppression of *Klebsiella pneumoniae* mucoidy is counteracted by spontaneous Wzc variants altering capsule chain length. *mSphere in press* (2023). 10.1128/msphere.00288-23 [**Co-first author*]
    2. **Ring, B. E**., Khadka, S., Pariseau, D. A., & Mike, L. A. (2023). Genetic manipulation of Klebsiella pneumoniae. *Current Protocols*, 3(10), e912.
    3. Khadka, S., **Ring, B. E.**, Pariseau, D. A., & Mike, L. A. (2023). Characterization of Klebsiella pneumoniae extracellular polysaccharides. *Current Protocols*, 3(11), e937.
    4. Pariseau, D. A., **Ring, B. E.**, Khadka, S., & Mike, L. A. (2024). Cultivation and Genomic DNA Extraction of Klebsiella pneumoniae. *Current Protocols*, 4(1), e932.

D. Scholastic Performance

YEAR	COURSE TITLE	GRADE
	UNIVERSITY OF AKRON, GPA: 3.6	
2015	Principles of Chemistry I	A
2015	Principles of Chemistry I Lab	B+
2015	Precalculus Mathematics	B
2015	Humanities in the Wld sinc 1300	A
2015	Intermediate Spanish I	B+
2016	Principles of Biology II	A-
2016	Principles of Chemistry II	B
2016	Qualitative Analysis	A
2016	Analytic Geometry-Calculus I	B-

YEAR	COURSE TITLE	GRADE
2016	Intermediate Spanish II	B
2016	General Genetics	B
2016	Genetics Lab	A-
2016	Organic Chemistry Lecture I	B-
2016	Organic Chemistry Lab I	B+
2016	Analytic Geometry-Calculus II	C
2016	Physics for Life Sciences I	A-
2017	Cell & Molecular Biology	A
2017	Organic Chem Lecture II	B-
2017	Organic Chemistry Lab II	B+
2017	Physics for Life Sciences II	A
2017	Microbiology	A
2017	Phys Chemistry for Bio Science	A
2017	Biochemistry Lecture I	B-
2017	Bowling	A
2017	Honors Colloquium: Humanities	A
2017	Honors Colloquium: Social Science	A
2017	Badminton	A
2018	Renal Physiology	A
2018	Biochemistry Laboratory	A
2018	Biochemistry Lecture II	A
2018	Honors Colloquium: Natural Science	A
2018	Immunology	A-
2018	Molecular Biology	A
2018	Biochem of Gene Expression	A
2018	Advanced Chemistry Lab III	B+
2018	Dynamics of Personality	A-
2018	Psychological Disorders: Child	A
2018	History of Psychology	A
2019	Cell Physiology	A-
2019	Cell Physiology Laboratory	B+
2019	ST: Psychology Human Motivation	A
2019	Exploring Music: Bach to Rock	A
	UNIVERSITY OF TOLEDO, GPA: 4.0	
	Masters in Public Health	
2019	Biostatistics	A
2019	Public Health Epidemiology	A
2019	Social Determinants of Health	A
2019	Issues in Public Health	A
2020	Management and Leadership PBUH	A
2020	Concepts Issues Environ Health	A
2020	Advanced Biostatistics	A
2020	Clinical Epidemiology	A
2020	Advanced Epidemiology	A
2020	Public Health and Aging	A
2020	Chronic Disease Epidemiology	A
2020	Epidemiology Infectious Disease	A
2020	Internship in Public Health	S
2021	Reproductive Epidemiology	A

YEAR	COURSE TITLE	GRADE
2021	Public Health Research Design	A
2021	IPE in Public Health	A
2021	Integ Learning Experience	S
	UNIVERSITY OF TOLEDO, GPA: 3.807	
	Doctoral Degree in Biomedical Sciences	
2021	Current Problems & Research Applications: Proteins	A
2021	Current Problems & Research Applications: Genes/Genomes	A
2021	Current Problems & Research Applications: Membranes	B+
2021	Mentored Research	S
2022	Cell Biology & Signaling	A
2022	Mentored Research	S
2022	System Pathophysiology	A-
2022	Current Topics in MMI	A
2022	Statistical Methods I	A
2022	On Being a Scientist	S
2022	Research in MMI	S
2022	Research in MMI	S
2022	Advanced Immunology	A
2022	Current Topics in MMI	A
2023	Grant Writing Workshop	A
2023	Current Topics in MMI	A
2023	Advanced Microbiology	A
2023	Dissertation Research in MMI	S
2023	Fund Bioinformatics Proteomics	B
2023	Current Topics in MMI	A
2023	Dissertation Research in MMI	S

The University of Toledo has graded courses (A, B, C) and grades of S (Satisfactory) or U (Unsatisfactory) upon completion. A grade of S will be allowed for credit toward graduation but is not computed in the grade point average.