

STANDARDIZED CURRICULUM VITAE

University of Alabama at Birmingham School of Medicine Faculty

DATE: April 10, 2022

PERSONAL INFORMATION

Name: Michael Jeffrey Gray
Citizenship: United States of America
Foreign Language(s): None
Home Address:
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Birmingham, AL 35212
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RANK / TITLE:

Assistant Professor (tenure-earning)
Department: Microbiology
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656 Bevell Biomedical Research Building
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HOSPITAL AND OTHER (NON-ACADEMIC) APPOINTMENTS

None.

PROFESSIONAL CONSULTANTSHIPS

None.

EDUCATION

Year	Degree	Institution
1999	B.S. in Food Science	Cornell University
2001	M.S. in Food Science <i>Thesis: "The NarX histidine kinase of <i>Escherichia coli</i>; the central domain and ligand-responsive autophosphorylation."</i> <i>Advisor: Dr. Valley Stewart</i>	University of California - Davis
2010	Ph.D. in Microbiology <i>Thesis: "Synthesis, remodeling, and salvaging of the lower ligand of coenzyme B₁₂."</i> <i>Advisor: Dr. Jorge Escalante-Semerena</i>	University of Wisconsin – Madison

MILITARY SERVICE

None.

LICENSURE

None.

BOARD CERTIFICATION

None.

POSTDOCTORAL TRAINING

Years	Title	Institution
2010-2015	Postdoctoral Research Fellow	University of Michigan

In the lab of Dr. Ursula Jakob, Department of Molecular, Cellular, and Developmental Biology, conducted research on bacterial responses to proteotoxic reactive chlorine stress, using biochemical, genetic, transcriptomic, physiological, and biophysical methods. Also supervised undergraduate researchers and assisted with grant preparation.

ACADEMIC APPOINTMENTS

Years	Title	Institution
2016-present	Assistant Professor (tenure track)	University of Alabama at Birmingham

Head of lab researching molecular mechanisms of stress response in bacteria. Duties include conducting and directing research, mentoring graduate and undergraduate students, writing grants and scientific papers, teaching microbiology and scientific communication to graduate and medical students, and service on departmental and university committees.

PROFESSIONAL EXPERIENCE

Research Laboratory Specialist Intermediate, Department of Molecular, Cellular, and Developmental Biology, University of Michigan (Jan. 2015 – Dec. 2015). Conducted research on bacterial responses to oxidative stress, using biochemical, genetic, transcriptomic, physiological, and biophysical methods. Also supervised undergraduate researchers and assisted with grant and manuscript preparation.

Lab Technician III, Cornell University Food Safety Laboratory (Jan. 2002 – Jul. 2004). Conducted research on food-borne pathogens *Listeria monocytogenes* and *Vibrio parahaemolyticus*. Experiments involved use of mammalian tissue culture techniques and the construction and use of promoter fusion constructs. Also assisted in general lab maintenance and support of other researchers.

Research Assistant, Cornell University Food Safety Laboratory (Jun. 1997 – Aug. 1999). Assisted with research on food spoilage bacteria and pathogens including *L. monocytogenes* and *V. parahaemolyticus*. Experiments involved both phenotypic and molecular techniques.

AWARDS / HONORS

General Mills Food Science Award, Spring 1997: Award for incoming freshman or existing undergraduates with a 3.00 GPA in Food Science.

Charles H. Roberts Scholarship, Cornell University, Fall 1997: Awarded in recognition of academic achievement by an undergraduate student.

Institute of Food Technologists Junior/Senior Scholarship, Fall 1997: Awarded in recognition of outstanding academic achievement in food-related studies.

National Dairy Promotion Board Scholarship, Spring 1998: This undergraduate scholarship is awarded based on academic achievement, an interest in a career in a dairy-related discipline, plus demonstrated leadership, initiative and integrity. I received this award while studying Food Science at Cornell University.

Wine Spectator California Fellowship, Winter 2000: This fellowship is awarded to outstanding graduate students in viticulture and enology, reflecting my studies in the Food Science department at UC-Davis.

Herman H. and Gwendolyn H. Shapiro Medical Scholarship, 2004-2005: This award is given to exceptional second-year students in biomedical sciences at UW-Madison.

Jerome J. Stefaniak Predoctoral Fellowship, 2008: This award recognizes research excellence by a doctoral student in the UW-Madison Bacteriology department.

Louis and Elsa Thomsen Wisconsin Distinguished Graduate Fellowship, 2008-2009: This award is designated to support graduate students in the College of Agricultural and Life Sciences at the University of Wisconsin - Madison who have established an outstanding research record.

Herman A. Smythe Award, 2009: This award recognizes research excellence by a doctoral student in the UW-Madison Bacteriology department.

PROFESSIONAL SOCIETIES

American Society for Microbiology (1998 - present)

American Association for the Advancement of Science (2016 – present)

Union of Concerned Scientists (2016 – present)

American Society for Biochemistry and Molecular Biology (2018 – present)

MEMBERSHIPS

UAB Center for Free Radical Biology

UAB Microbiome Center

UAB Program in Immunology

COUNCILS AND COMMITTEES

Jan. 4, 2016 – present: member of UAB Microbiology Department Seminar Series and Special Lecture Committee (co-chair Aug. 19, 2019 – present), co-moderator of remote seminar series (starting Apr. 14, 2020, due to COVID-19 restrictions)

May 29, 2017 – Sep. 15, 2021: member of UAB Microbiology Department Bacteriology Faculty Search Committee

Nov. 13, 2018 – present: member of UAB Graduate Biomedical Sciences Microbiology Theme Admissions Committee

Apr. 22 & May 7, 2020: *ad hoc* member of UAB Microbiology Department Education Committee (participating in curriculum update discussions)

Aug. 19, 2021 – present: member of UAB Division of Gastroenterology Faculty Search Committee

UNIVERSITY ACTIVITIES

Jul., 2017: Department of Microbiology new website content group (with UAB School of Medicine Communication team)

Dec., 2018 – Jan., 2019: faculty coordinator for the UAB Microbiology Department's contribution to the UAB School of Medicine Diversity Fair (Jan. 25, 2019), for which the department shared first prize

Aug. 20 & Sept. 19, 2019: *ad hoc* member of UAB Center for Clinical and Translational Science Nascent Project Panel (for Dr. Angela Carter, UAB Department of Surgery)

Sep. 15, 2021 – present: UAB Microbiology Department Diversity Champion, including a formal role as departmental Equity Advisor, responsible for ensuring good DEI practices by departmental faculty hiring committees

Mar. 22, 2022: *ad hoc* member of UAB Center for Clinical and Translational Science Nascent Project Panel (for Melissa Jennings, UAB Medical Scientist Training Program)

EDITORIAL BOARD MEMBERSHIPS

None.

MAJOR RESEARCH INTERESTS

My primary research interest is in understanding the molecular mechanisms by which host-associated bacteria sense and respond to changes in their environments. This includes a long-standing interest in how bacteria respond to antimicrobial oxidants produced by the innate immune system during inflammation as well as in the regulation of production of the evolutionarily ancient stress response factor inorganic polyphosphate. Recently, in collaboration with Dr. Casey Weaver (UAB Department of Pathology), I have become interested in understanding the role of the microbiome and probiotics in the development and prevention of late-onset neonatal sepsis.

TEACHING EXPERIENCE

Courses taught:

Spring 2005: Teaching Assistant responsible for grading, holding office hours, and delivering one lecture in a graduate-level survey course in prokaryotic molecular biology (U. of California-Davis)

Fall 2006: Teaching Assistant responsible for preparing and delivering lectures, teaching microbiology techniques, and grading for twice-weekly sections in introductory-level undergraduate microbiology laboratory course (U. of Wisconsin-Madison)

Fall 2006 and Spring 2007: Participated, along with a group of faculty, post-docs, and graduate students, in the design of a new introductory-level microbiology course, emphasizing the implementation of active learning techniques (U. of Wisconsin-Madison)

Fall 2007: Teaching Assistant responsible for leading weekly discussion sections and grading exams in introductory-level undergraduate microbiology lecture course (U. of Wisconsin-Madison)

Summer 2009: Co-designed and taught a four-day introduction to fundamental microbiology lab techniques with one other graduate student (U. of Wisconsin-Madison Research Experience for Undergraduates)

Winter 2012: Co-designed and taught Microbiology 295, Introduction to Research in the Microbial World (1 credit), along with 3 other postdoctoral research fellows (U. of Michigan Microbiology Department)

Fall 2016 - present: Co-course director for UAB Bacterial Pathogenesis and Physiology journal club (GBSC 720) – meets weekly during the semester

Nov. 2, 2016: Discussion leader for UAB Center for Free Radical Biology Journal Club

Jan. 3 – 27, 2017: Co-course director for graduate-level UAB Prokaryotic Genetics and Molecular Biology course (GBS 760) – designed and taught 5 lectures, helped coordinate the rest of the module (with Dr. Michael Niederweis, UAB Department of Microbiology)

May 1 – 26, 2017: Co-instructor for graduate-level UAB Scientific Communication course (GBS 768) – designed and taught one lecture, participated in assessing student writing throughout module

Nov. 1 & 6, 2017: Co-instructor for graduate level UAB Advanced Topics in Bacterial Pathogenesis course (GBS 748) – designed and taught one lecture and coordinated one 2-hour student presentation session on the same topic

Dec. 1, 2017: Led two 2-hour bacterial pathogenesis case discussion sections for UAB School of Medicine medical students - developed one of the cases used

Jan. 8 – Feb. 2, 2018: Course director for graduate-level UAB Prokaryotic Genetics and Molecular Biology course (GBS 760) – designed and taught 7 lectures, coordinated the rest of the module

Apr. 30 – May 24, 2018: Co-instructor for graduate-level UAB Scientific Communication course (GBS 768) – designed and taught 3 lectures, participated in assessing student writing throughout module

Nov. 30, 2018: Led two 2-hour bacterial pathogenesis case discussion sections for UAB School of Medicine medical students - developed one of the cases used

Jan. 7 – Feb. 1, 2019: Course director for graduate-level UAB Prokaryotic Genetics and Molecular Biology course (GBS 760) – designed and taught 6 lectures, coordinated the rest of the module

May 9 – 31, 2019: Co-instructor for graduate-level UAB Scientific Communication course (GBS 768) – designed and taught 3 lectures, participated in assessing student writing throughout module

- Oct. 23 & 28, 2019: Co-instructor for graduate level UAB Advanced Topics in Bacterial Pathogenesis course (GBS 748) – designed and taught one lecture on beneficial microbes and coordinated one 2-hour student presentation session on the same topic
- Dec. 18, 2019: Co-facilitator for 2-hour team-based learning exercise for UAB School of Medicine medical students
- Jan. 13 – Feb. 7, 2020: Co-course director for graduate-level UAB Prokaryotic Genetics and Pathogenesis course (GBSC 716) – designed and taught 9 lectures, helped coordinate the rest of the module (with Dr. David Briles, UAB Department of Microbiology)
- Apr. 6 – May 1, 2020: Co-instructor for graduate-level UAB Scientific Communication course (GBS 768) – designed and taught 8 lectures, participated in assessing student writing throughout module; taught remotely due to COVID-19
- Jan. 11 – Feb. 5, 2021: Course director and instructor for graduate-level UAB Prokaryotic Genetics and Physiology course (GBS 760) – designed and taught 19 lectures; taught remotely due to COVID-19 (38 contact hours)
- Mar. 10, 2021: Co-instructor for graduate level UAB Model Organisms course (GBS 723) – designed and taught one lecture on bacteria as model organisms; taught remotely due to COVID-19 (2 contact hours)
- Sep. 23, 2021: Co-instructor for UAB Graduate Biomedical Sciences core course (GBS 708) – designed and taught one discussion section on regulatory RNAs for first-year Microbiology Theme students (2 contact hours)
- Sep. 29 & Oct. 4, 2021: Co-instructor for graduate level UAB Advanced Topics in Bacterial Pathogenesis course (GBS 748) – designed and taught one lecture on post-transcriptional regulation in bacteria and coordinated one 2-hour student presentation session on the same topic (3 contact hours)
- Dec. 3, 2021: Co-facilitator for 2-hour team-based learning exercise for UAB School of Medicine medical students (2 contact hours)
- Jan. 10 – Feb. 4, 2022: Course director and instructor for graduate-level UAB Prokaryotic Genetics and Physiology course (GBS 760) – designed and taught 19 lectures; taught remotely due to COVID-19 (38 contact hours)
- Mar. 24, 2022: Co-instructor for graduate level UAB Model Organisms course (GBS 723) – designed and taught one lecture on bacteria as model organisms (2 contact hours)

Graduate students mentored:

- Mar. 3, 2016 – Mar. 12, 2021: Rhea Derke (UAB Graduate Biomedical Sciences, Microbiology Theme), graduated with Ph.D.
- 2019 - 2020 UAB Dental Academic Research Training pre-doctoral fellowship (NIDCR T90 DE022736) recipient
- Oct. 16, 2017 – present: Marvin Bowlin (UAB Graduate Biomedical Sciences, Biochemistry & Structural Biology Theme), Ph.D. candidate
- Aug. 19, 2019 – present: Julia Meredith (*née* Williams) (UAB Graduate Biomedical Sciences, Microbiology Theme), Ph.D. student

Jun. 1, 2020 – present: Sierra Hansen (UAB Medical Scientist Training Program), M.D. / Ph.D. student (co-mentor, with Dr. Casey Weaver, UAB Department of Pathology)

Graduate rotation students mentored:

Aug. 15 – Oct. 14, 2016: Benjamin Hunt (UAB Graduate Biomedical Sciences)

Oct. 17 – Dec. 16, 2016: Ashleigh Riegler (UAB Graduate Biomedical Sciences)

Jan. 3 – Mar. 10, 2017: N'Toia Hawkins (UAB Graduate Biomedical Sciences)

Aug. 14 – Oct. 13, 2017: Rachel Muir (UAB Graduate Biomedical Sciences)

Aug. 13 – Oct. 12, 2018: Nicole Arroyo Diaz (UAB Graduate Biomedical Sciences)

Aug. 19 – Oct. 18, 2019: Gretchen Bollar (UAB Graduate Biomedical Sciences)

Oct. 21 – Dec. 20, 2019: Ari Ginsparg (UAB Graduate Biomedical Sciences)

Oct. 21 – Dec. 20, 2019: Caitlin Billiot (UAB Graduate Biomedical Sciences)

Oct. 19 – Dec. 18, 2020: Caitlin Costello (UAB Graduate Biomedical Sciences)

Oct. 19 – Dec. 18, 2020: Emily Hughes (UAB Graduate Biomedical Sciences)

Jan. 4 – Mar. 5, 2021: Joshua Huffines (UAB Graduate Biomedical Sciences)

Oct. 18 – Dec. 17, 2021: Caitlyn Sebastian (UAB Graduate Biomedical Sciences)

Jun. 6 – Aug. 5, 2022 (upcoming): Avery Lieber (UAB Graduate Biomedical Sciences)

Aug. 15 – Oct. 14, 2022 (upcoming): Jessie Fields (UAB Graduate Biomedical Sciences)

Service on graduate student thesis committees:

2016 - 2021: Rhea Derke (UAB Graduate Biomedical Sciences - mentor; graduated with Ph.D. Spring 2021)

2016 - 2021: James L. Kizziah (UAB Graduate Biomedical Sciences, T. Dokland lab, UAB Department of Microbiology; graduated with Ph.D. Spring 2021)

2017 - 2018: Jeffrey Singer (UAB NIH Medical Scientist Training Program, C. Weaver lab, UAB Department of Pathology; graduated with Ph.D. Summer 2018)

2017 – 2019: Saman M. Najmi (UAB Graduate Biomedical Sciences, D. Schneider lab, UAB Department of Biochemistry and Molecular Genetics; graduated with Ph.D. Fall 2019)

2017 – 2021: Ashleigh Riegler (UAB Graduate Biomedical Sciences, C. Orihuela lab, UAB Department of Microbiology – qualifying exam committee chair; graduated with Ph.D. Spring 2021)

2017 - present: Marvin Bowlin (Ph.D. candidate, UAB Graduate Biomedical Sciences - mentor)

2017 - present: N'Toia Hawkins (Ph.D. candidate, UAB Graduate Biomedical Sciences, T. Dokland lab, UAB Department of Microbiology)

2019: Charlene Farmer (M.S. student, UAB Multidisciplinary Biomedical Science Master's Program, R. Roberts lab, UAB Department of Psychiatry)

2019 - present: Julia Meredith (Ph.D. candidate, UAB Graduate Biomedical Sciences - mentor)

2019 – present: Rachel Andrews (Ph.D. student, UAB Graduate Biomedical Sciences, O. Kutsch lab, UAB Department of Medicine)

2020 - present: Sierra Hansen (M.D. / Ph.D. student, UAB Medical Scientist Training Program – co-mentor, with Dr. Casey Weaver, UAB Department of Pathology)

2020 – present: Jennifer Luck (Ph.D. student, UAB Graduate Biomedical Sciences, C. Orihuela lab, UAB Department of Microbiology – qualifying exam committee chair)

2020 – 2021: Samuel Dedert (Ph.D. student, UAB Graduate Biomedical Sciences, W. Swords lab, UAB Department of Medicine)

2021 – present: Joshua Huffines (Ph.D. student, UAB Graduate Biomedical Sciences, M. Kiedrowski lab, UAB Department of Medicine)

2021 – present: Catarina A. Mendes Felguiera (UAB Graduate Biomedical Sciences, D. Schneider lab, UAB Department of Biochemistry and Molecular Genetics)

Undergraduate students mentored:

Summer 2008: Becky Thorburn (U. of Wisconsin-Madison Research Experience for Undergraduates)

Summer 2009: Karla J. Esquilin (U. of Wisconsin-Madison Research Experience for Undergraduates)

Summer and Fall 2011: Erica M. Smith (U. of Michigan)

Summer 2012 – Fall 2015: Emily Schwessinger, Benjamin Parker, Nico Wagner, Adam Krieger, Nathaniel Hock, Siddhant Dogra, and Mehadi Muhith (U. of Michigan mBio and Undergraduate Research Opportunity Programs)

Spring 2016 – Spring 2018: Amanda Rudat (UAB Science and Technology Honors College)

Summer 2016: Jennifer Chavez (UAB PARAdiGM undergraduate research program)

Fall 2016 – Spring 2019: Arya Pokhrel (UAB Science and Technology Honors College)

Summer 2017: Rachel Sutton (UAB SIBS undergraduate research program) – directly mentored by Researcher V Poulami Basu Thakur

Fall 2017 – Spring 2021: Leanna Crafford (UAB Science and Technology Honors College) – directly mentored by graduate student Rhea Derke

Fall 2018 – Spring 2021: Abigail Long (UAB Science and Technology Honors College)

Summer 2018: Benjamin Nelson (UAB SIBS undergraduate research program) – directly mentored by Researcher V Poulami Basu Thakur

Summer 2021: Ourania Smeltz (UAB SIBS undergraduate research program) – co-mentored with Dr. Craig Maynard (UAB Department of Pathology), directly mentored by graduate student Julia Meredith

Service on undergraduate student honors thesis committees:

2017: Alexandria Nichols (UAB Science and Technology Honors College) – R. Patel lab, UAB Department of Pathology

2018: Arya Pokhrel (UAB Science and Technology Honors College) – mentor

2021: Abigail Long (UAB Science and Technology Honors College) – mentor
2021: Leanna Crafford (UAB Science and Technology Honors College) – mentor

MAJOR LECTURES AND VISITING PROFESSORSHIPS

None.

GRANT SUPPORT

Current

NIH R35 GM124590 09/01/17 - 08/31/22

Title: Bacterial responses to reactive chlorine stress and their role in host-microbe interactions.

Role on project: PI

Annual direct costs: \$250,000

NIH R01 AI164712 08/01/21 - 07/31/26

Title: Targeting the Intestinal Mucosa and Microbiome to Prevent Neonatal Late-onset Sepsis

Role on project: co-PI (with Casey Weaver, UAB Department of Pathology)

Annual direct costs: \$480,104

Pending

NIH R35 GM124590 (renewal) (proposed) 04/01/22 - 03/31/27

Title: Molecular Mechanisms of Bacterial Stress Response Relevant to Host-Microbe Interactions.

Role on project: PI

Submitted 05/10/2021, study section met 10/14/2021

Council met Feb. 3, 2022 – recommended for funding

Past

NIH T32 AI07528 09/01/10 - 8/31/11

Title: Characterization of the hypochlorous acid stress response in bacteria and its role in bacterial colonization

Role on project: Appointee (postdoctoral fellow)

PI: Victor DiRita (Program Director)

NIH F32 GM096613 09/01/11 - 08/31/13

Title: Cellular stress response to the oxidizing effects of bleach

Role on project: PI (postdoctoral fellow)

UAB Faculty Development Grant Program 2016–2017 05/16/16 - 08/31/17

Title: Reactive chlorine sensing in the probiotic *Escherichia coli* Nissle 1917

Role on project: PI

Annual direct costs: \$10,000

UAB Center for Clinical and Translational Science 06/24/16 - 03/31/17

CCTS Research Vouchers Program, NIH UL1TR001417

Title: Bioinformatics support for studies of the effect of inflammatory stress on commensal *E. coli*

Role on project: PI

Funding: \$3,750

UAB Center for Redox Biology and Inflammation, Infection and Immunity (I3) Steering Committee
Joint Research Pilot Grant 08/15/19 – 08/15/20

Title: Defining the Molecular Mechanisms that Govern Dysbiosis in the Neonatal Intestine to
Prevent Late-onset Sepsis

Role on project: co-PI

Annual direct costs: \$60,000

Submitted but Not Funded

NIH K99 GM110112

Title: Hypochlorous acid-specific sensing and stress response in bacteria

Role on project: PI

Submitted 06/10/2013, revised and resubmitted 03/11/2014

Impact score: 28 (original submission), 17 (revision)

Young Investigator Grant for Probiotics Research (Global Probiotics Council)

Title: How does *Lactobacillus reuteri* respond to inflammatory oxidants?

Role on project: PI

Submitted 02/12/2016

Young Supporters Board of the UAB Comprehensive Cancer Center New Faculty Development
Award in Cancer Research

Title: The role of reactive chlorine response by the microbiome during gut inflammation

Role on project: PI

Submitted 05/27/2016

NIH R01 AI132428

Title: Recombinant myeloperoxidase as a novel therapeutic for antibiotic-resistant bacterial
infections.

Role on project: co-I (5% effort)

PI: Guangjie Cheng (UAB Department of Medicine)

Submitted 10/5/2016

Young Investigator Grant for Probiotics Research (Global Probiotics Council)

Title: Regulation of anti-inflammatory genes in *Lactobacillus reuteri*.

Role on project: PI

Submitted 02/13/2017

NIH R21 AI149496

Title: Human Brain Microbiome

Role on project: co-I (5% effort)

PI: Rosalinda Roberts (UAB Department of Psychology)

Submitted 02/16/2019

NIH K22 CA251350

Title: Bioengineering a Novel Class of Microbial-based Cancer Therapy

Role on project: co-I (5% effort)

PI: James Bibb (UAB Department of Surgery)

Submitted 04/10/2019, resubmitted 06/24/2020

OTHER

Grant Review:

- Dec. 2019 – Feb. 2020: stage I reviewer for the 2020 NIH DPI Pioneer Award Program (study section ZRGI BCMC-N (50))
- Dec. 2020 – Feb. 2021: stage I reviewer for the 2021 NIH DPI Pioneer Award Program (study section ZRGI BCMC-N (50))
- Jul. 2021 – Aug. 2021: *ad hoc* international research project reviewer for FWF Austrian Science Fund grant proposal
- Nov. 2021 – Jan. 2022: *ad hoc* reviewer for Army Research Office extramural single-investigator grant proposal (Broad Agency Announcement W911NF-17-S-0002)
- Dec. 2021 – Feb. 2022: stage I reviewer for the 2022 NIH DPI Pioneer Award Program (study section ZRGI BCMC-N (50))
- Mar. 2022: *ad hoc* reviewer for National Science Center Poland OPUS-22 grant proposal (Reg. No. 2021/43/B/NZ1/01360)

Service for Professional Societies:

- Jun. 2022 (upcoming): convener of a session on “Bacterial responses to neutrophil oxidants” at ASM Microbe 2022. Washington, DC.

Peer Reviewer (number of manuscripts reviewed):

- Publons Record: publons.com/a/1514968
 - American Society for Microbiology Press book chapter (1)
 - Antioxidants and Redox Signaling (1)
 - Applied and Environmental Microbiology (1)
 - Applied Microbiology and Biotechnology (1)
 - Archives of Microbiology (1)
 - Bioengineering (1)
 - BMC Microbiology (1)
 - Current Genetics (1)
 - EcoSal Plus (1)
 - F1000 Faculty Reviews (1)
 - Frontiers in Microbiology (4)
 - Journal of Applied Microbiology (2)
 - Journal of Bacteriology (1)
 - Journal of Biological Chemistry (2)
 - Journal of Clinical Gastroenterology and Treatment (1)
 - Journal of Proteomics (1)
 - Molecular Microbiology (3)
 - mBio (3)
 - mSystems (3)
 - Nature Chemical Biology (2)
 - PLOS Pathogens (1)
 - Proceedings of the National Academy of Sciences, USA (3)
 - Research in Microbiology (2)
 - Scientific Reports (1)
 - The Plant Cell (1)

Professional Development Activities:

2008: semester-long Mentor Training Seminar with Dr. Jo Handelsman (Wisconsin Program for Scientific Teaching)

2008 – 2009: Howard Hughes Medical Institute Teaching Fellow

Fall 2011: Postdoctoral Teaching Short Course (U. of Michigan Center for Research on Learning and Teaching)

Apr. 18-22, 2016: UAB Mentoring Academy (UAB Office of Postdoctoral Studies)

UAB Center for Teaching and Learning (CTL) Workshops:

- awarded CTL Gold Certificate (Level I) in 2020
 - Aug. 2, 2016: Faculty Foundations - New Faculty Teaching Orientation
 - Sept. 6, 2016: Faculty Foundations - Understanding the QEP
 - Oct. 4, 2016: Faculty Foundations - Disability Support Services
 - Dec. 6, 2016: Faculty Foundations - Understanding Research
 - Feb. 7, 2017: Faculty Foundations - Title IX
 - Mar. 7, 2017: Faculty Foundations - Guide to the IDEA Survey
 - Apr. 4, 2017: Faculty Foundations - Promoting Global Awareness in the Classroom
 - Apr. 2, 2019: High Impact Teaching to Motivate Students
 - Jun. 21, 2019: Teaching Effectiveness - Creating Your Syllabus
 - Jul. 17, 2019: Mental Health Matters – Foundations
 - Mar. 23, 2020: eLearning Workshop Teaching Remotely Series – Canvas Modules
 - Mar. 24, 2020: eLearning Workshop Teaching Remotely Series – Online Communication
 - Mar. 25, 2020: Teaching Foundations - Teaching by Full Application
 - Mar. 26, 2020: eLearning Workshop Teaching Remotely Series – Canvas Gradebook
 - Mar. 26, 2020: Teaching Effectiveness - Alternative Assessment
 - Mar. 27, 2020: eLearning Workshop Teaching Remotely Series – Zoom for Teaching
 - Apr. 2, 2020: eLearning Workshop Teaching Remotely Series – Student Accommodations with DSS and in Canvas
 - Jun. 8, 2020: eLearning Workshop Teaching Remotely Series – Zoom Advanced Features for Teaching
 - Jun. 11, 2020: Mental Health Matters – Supporting Student Mental Health During the COVID-19 Transitions
 - Jul. 20, 2021: COVID Keepers: The Student Perspective

Nov. 3, 2016: UAB Faculty Senate Faculty Development Promotion & Tenure roundtable discussion

Jan. 20, 2017: UAB School of Medicine Junior Faculty Career Workshop

Alabama Drug Discovery Alliance Lecture Series:

- Feb. 21, 2017: Introduction to Drug Discovery
- Mar. 14, 2017: Medicinal Chemistry - From Hit to Lead
- Mar. 21, 2017: High Throughput Screening
- Apr. 4, 2017: How to Submit an IND
- Apr. 18, 2017: Pharmacokinetics and ADME
- May 9, 2017: What is a Valid and Druggable Target?

UAB Center for Clinical and Translational Science Case Studies in Mentoring:

Aug. 7, 2017: Maintaining Effective Communication
Aug. 28, 2017: Addressing Equity and Inclusion
Sept. 18, 2017: Promoting Professional Development
Sept. 25, 2017: Cultivating Ethical Behavior
Oct. 2, 2017: Articulating Your Mentoring Philosophy and Plan
Oct. 18, 2017: Aligning Mentor/Mentee Expectations
Oct. 25, 2017: Assessing Mentee Understanding
Mar. 5, 2018: Cultivating Ethical Behaviors

May 14 – 17, 2018: Computational Genomics Advanced Level Immersion Course for Investigators at UAB (Heflin Center for Genomic Sciences, CCTS)

UAB Center for Clinical and Translational Science Workshops:

Apr. 7, 2020: Thriving in a Virtual World – Issues With Working Virtually
Apr. 9, 2020: Thriving in a Virtual World – Conducting Virtual Meetings
Apr. 14, 2020: Thriving in a Virtual World – Working With Virtual Teams

UAB Learning System Courses:

Aug. 24, 2021: Supporting Student Mental Health through Teaching
Aug. 25, 2021: UAB Mentoring Matters

Oct. 22, 2021: UAB Office of Faculty Affairs Promotion & Tenure roundtable discussion

Mar. 23, 2022: UAB Search Committee Implicit Bias training

NIH Office of Intramural Training & Education Workshops:

Mar. 29, 2022 (upcoming): Building an Inclusive Research Group
Apr. 26, 2022 (upcoming): Difficult Conversations, Conflict, and Feedback
May. 24, 2022 (upcoming): The Mental Health and Well-being of Your Trainees

Outreach:

Jun. 20, 2019: appeared on podcast Productivity Alchemy (www.productivityalchemy.com, Episode 102) to discuss organization and productivity techniques for success in academic science

Mar. 26, 2020: with other faculty of the UAB Microbiology Department, led by Dr. Sunnie Thompson (UAB Dept. of Microbiology), helped prepare an information sheet on COVID-19 for release to the public

Aug. 2, 2021: invited panel member for “Starting A Lab” mentoring session at the 2021 Molecular Genetics of Bacteria and Phage meeting; convened virtually due to COVID-19

Apr. 14, 2022 (upcoming): invited speaker (with Dr. Craig Maynard, UAB Department of Pathology) for virtual meeting of the Virginia Tech Microbiology Club

BIBLIOGRAPHY

ORCID iD = 0000-0002-7112-4188
h-index = 24 (Google Scholar, 3/17/22)

Published papers:

I. Douglas, S.A., **Gray, M.J.**, Crandall, A.D. and Boor, K.J. Characterization of chocolate milk spoilage patterns. *J Food Prot* 2000; 63(4): 516-21.

2. Ferreira, A., **Gray, M.**, Wiedmann, M. and Boor, K.J. Comparative genomic analysis of the *sigB* operon in *Listeria monocytogenes* and in other Gram-positive bacteria. **Curr Microbiol** 2004; 48(1): 39-46.
3. Sasahara, K.C., **Gray, M.J.**, Shin, S.J., and Boor, K.J. Detection of viable *Mycobacterium avium* subsp. *paratuberculosis* using luciferase reporter systems. **Foodborne Pathog Dis** 2004; 1(4): 258-266.
4. **Gray, M.J.**, Zadoks, R.N., Fortes, E.D., Dogan, B., Cai, S., Chen, Y., Scott, V.N., Gombas, D.E., Boor, K.J. and Wiedmann, M. *Listeria monocytogenes* isolates from foods and humans form distinct but overlapping populations. **Appl Environ Microbiol** 2004; 70(10): 5833-41.
5. Chen, Y., Ross, W.H., **Gray, M.J.**, Wiedmann, M., Whiting, R.C., and Scott, V.N. Attributing risk to *Listeria monocytogenes* subgroups: dose response in relation to genetic lineages. **J Food Prot** 2006; 69(2): 335-344.
6. **Gray, M.J.**, Freitag, N.E. and Boor, K.J. How the bacterial pathogen *Listeria monocytogenes* mediates the switch from environmental Dr. Jekyll to pathogenic Mr. Hyde. **Infect Immun** 2006; 74(5): 2505-12.
7. **Gray, M.J.** and Escalante-Semerena, J.C. Single-enzyme conversion of FMNH₂ to 5,6-dimethylbenzimidazole, the lower ligand of B₁₂. **Proc Natl Acad Sci USA** 2007; 104(8): 2921-2926.
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15. **Gray, M.J.**, Wholey, W.-Y., and Jakob, U. Bacterial responses to reactive chlorine species. **Annu Rev Microbiol** 2013; 67: 141-60.
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26. Pokhrel, A., Lingo, J., Wolschendorf, F., and **Gray, M.J.** Assaying for Inorganic Polyphosphate in Bacteria. **J Visual Exp** 2019; 143: e58818.
27. **Gray, M.J.** Inorganic polyphosphate accumulation in *Escherichia coli* is regulated by DksA but not by (p)ppGpp. **J Bacteriol** 2019; 201(9): e00664-18. Featured article.
 - Commentary: Downey, M. A stringent analysis of polyphosphate dynamics in *E. coli*. **J Bacteriol** 2019; 201(9): e00070-19.
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28. Basu Thakur, P., Long, A.R., Nelson, B.J., Kumar, R., Rosenberg, A.F., and **Gray, M.J.** Complex Responses to Hydrogen Peroxide and Hypochlorous Acid by the Probiotic Bacterium *Lactobacillus reuteri*. **mSystems** 2019; 4(5): e00453-19.

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30. Sinha, R., LeVeque, R., Bowlin, M.Q., **Gray, M.J.**, and DiRita, V.J. Phosphate transporter PstSCAB of *Campylobacter jejuni* is a critical determinant of lactate-dependent growth and colonization in chickens. **J Bacteriol** 2020; 202(7): e00716-19.
31. **Gray, M.J.** Interactions between DksA and stress-responsive alternative sigma factors control inorganic polyphosphate accumulation in *Escherichia coli*. **J Bacteriol** 2020; 202(14): e00133-20.
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32. Derke, R.M., Barron, A.J., Billiot, C.E., Chaple, I.F., Lapi, S.E., Broderick, N.A., and **Gray, M.J.** The Cu(II) reductase RclA protects *Escherichia coli* against the combination of hypochlorous acid and intracellular copper. **mBio** 2020; 11(5): e01905-20.
33. Konigstorfer, A., Ashby, L.V., Bollar, G.E., Billiot, C.E., **Gray, M.J.**, Jakob, U., Hampton, M.B., and Winterbourn, C.C. Induction of the reactive chlorine-responsive transcription factor RclR in *Escherichia coli* following ingestion by neutrophils. **Pathogen Dis** 2021; 79(1): ftaa079.
34. Bowlin, M.Q. and **Gray, M.J.** Inorganic Polyphosphate in Host and Microbe Biology. **Trends Microbiol** 2021; 29(11): 1013-1023.

Manuscripts in press:

1. Bowlin, M.Q., Long, A.R., Huffines, J.T., and **Gray, M.J.** The role of nitrogen-responsive regulators in controlling inorganic polyphosphate synthesis in *Escherichia coli*. *In press at Microbiol. Preprint available at www.biorxiv.org/content/10.1101/2021.10.15.464621v1*

Manuscripts submitted but not yet accepted:

1. Meredith, J.D., Chapman, I., Ulrich, K., Sebastian, C., Stull, F., and **Gray, M.J.** *Escherichia coli* RclA is a highly-active hypochlorite reductase. *Revised manuscript under review for Proc Natl Acad Sci USA.*

Manuscripts in preparation:

None

Other publications:

1. Jan. 9, 2020: publicly released Bacterial Genetics Course Packet (2020 version) under a Creative Commons BY-NC-ND (Attribution – Non-Commercial – No Derivatives) 4.0 International License. (twitter.com/graymicrolab/status/1215303343557341184).
2. Jan. 5, 2021: publicly released Bacterial Genetics & Physiology Course Packet (2021 version) under a Creative Commons BY-NC-ND (Attribution – Non-Commercial – No Derivatives) 4.0 International License (github.com/graymicrolab/Bacterial_Genetics_Course_Packet).

3. Dec. 1, 2021: publicly released Bacterial Genetics & Physiology Course Packet (2022 version) under a Creative Commons BY-NC-ND (Attribution – Non-Commercial – No Derivatives) 4.0 International License (github.com/graymicrolab/Bacterial_Genetics_Course_Packet).

Book chapters:

1. **Gray, M.J.** and Boor, K.J. 2006. Genetics and physiology of pathogenicity in food-borne bacterial pathogens. In: **Food Biotechnology**, 2nd edition. (K. Shetty, G. Paliyath, A. Pometto, and R. E. Levin, eds.) pp. 1293-1327.

Published abstracts:

1. Bowlin, M. and **Gray, M.** Polyphosphate Kinase Terminal Modifications Alter Enzymatic Activity and Affect Stress Recovery in *E. coli*. **FASEB J** 2021 35(S1), doi: 10.1096/fasebj.2021.35.S1.02242.

POSTER EXHIBITS

1. **Gray, M.J.** & Escalante-Semerena, J.C. "Cobinamide salvaging in *Rhodobacter sphaeroides*." Wind River Conference on Prokaryotic Biology; 2006. Wind River, CO. (*Won poster award.*)
2. **Gray, M.J.** & Escalante-Semerena, J.C. "CbiZ is required for salvaging of pseudocobalamin in *Rhodobacter sphaeroides*." General Meeting of the American Society for Microbiology; 2009. Philadelphia, PA.
3. **Gray, M.J.** & Escalante-Semerena, J.C. "The cobinamide amidohydrolase (cobyrinic acid-forming) CbiZ enzyme: a critical activity of the cobamide remodeling system of *Rhodobacter sphaeroides*." Gordon Research Conference on Vitamin B₁₂ and Corphins; 2009. Oxford, UK.
4. **Gray, M.J.**, Wholey W.-Y., & Jakob, U. "Cellular responses to the oxidizing effects of bleach." Federation of American Societies for Experimental Biology Conference on Mechanisms and Regulation of Prokaryotic Transcription; 2011. Saxton's River, VT.
5. **Gray, M.J.**, Cremers, C.M., & Jakob, U. "Phosphate metabolism plays a critical role in cellular response to bleach." Gordon Research Conference on Microbial Stress Response; 2012. Mt. Holyoke, MA.
6. Parker, B.W., Schwessinger, E.A., Jakob, U., & **Gray, M.J.** "RclR is a reactive chlorine-specific transcriptional activator." Federation of American Societies for Experimental Biology Conference on Mechanisms and Regulation of Prokaryotic Transcription; 2013. Saxton's River, VT.
7. **Gray, M.J.**, Wholey W.-Y., Wagner, N.O., Cremers, C.M., Hock, N.T., Krieger, A.G., & Jakob, U. "Polyphosphate is a primordial chaperone." Gordon Research Conference on Stress Proteins in Growth, Development, and Disease; 2013. Mt. Snow Resort, West Dover, VT.
8. Cremers, C.M., Dahl, J.-U., Wagner, N.O., **Gray, M.J.**, & Jakob, U. "The inorganic chaperone polyphosphate accelerates biofilm formation." Gordon Research Conference on Microbial Stress Response; 2014. Mt. Holyoke, MA.
9. **Gray, M.J.**, Schroeder, J.W., Xie, L., & Jakob, U. "Hypochlorous acid stress response in the probiotic *Lactobacillus reuteri*." Molecular Genetics of Bacteria and Phages Meeting; 2015. Madison, WI.

10. Schroeder, J.W., Basu Thakur, P., Chavez, J., & **Gray, M.J.** "Understanding how the probiotic *Lactobacillus reuteri* responds to inflammatory oxidants." Gordon Research Conference on Microbial Stress Response; 2016. Mt. Holyoke, MA.
11. Rudat, A.K., Green, T.J., & **Gray, M.J.** "A novel selection strategy to identify regulatory residues in polyphosphate kinase." American Society for Microbiology Microbe; 2017. New Orleans, LA.
12. **Gray, M.J.** "Stringent alleles of RNA polymerase inhibit inorganic polyphosphate synthesis." Gordon Research Conference on Microbial Stress Response; 2018. Mt. Holyoke, MA.
13. **Gray, M.J.** "Stringent alleles of RNA polymerase inhibit inorganic polyphosphate synthesis." Molecular Genetics of Bacteria and Phages Meeting; 2018. Madison, WI.
14. **Gray, M.J.** "Inorganic polyphosphate accumulation in *Escherichia coli* is regulated by DksA and GreA." Molecular Genetics of Bacteria and Phages Meeting; 2019. Madison, WI.
15. Huffines, J.T. & **Gray, M.J.** "Deciphering the role of RpoN and the nitrogen limitation response in inorganic polyphosphate synthesis in *Escherichia coli*" Wind River Conference on Prokaryotic Biology; 2021. Delivered remotely due to COVID-19.

Poster exhibits by mentees:

1. Chavez, J., Basu Thakur, P., & **Gray, M.J.** "What Role Does NreB Play in the Stress Response to Hypochlorous Acid in *Lactobacillus reuteri*?" UAB Preparation for Graduate and Medical Education (PARAdiGM) Summer Program poster session; 2016. Birmingham, AL.
2. Derke, R.M. & **Gray, M.J.** "Hypochlorous acid response of commensal *Escherichia coli*." American Society for Microbiology Microbe; 2017. New Orleans, LA.
3. Basu Thakur, P. & **Gray, M.J.** "Transcriptomic and metabolomic analysis of the stress response of probiotic *Lactobacillus reuteri* to inflammatory oxidants." American Society for Microbiology Microbe; 2017. New Orleans, LA.
4. Crafford, L.M., Derke, R.M., & **Gray, M.J.** "*E. coli* Nissle 1917 viability and biofilm formation are affected by HOCl concentration." Molecular Genetics of Bacteria and Phages Meeting; 2019. Madison, WI.
5. Long, A.R., Basu Thakur, P., & **Gray, M.J.** "Understanding the role of the ECF sigma factor SigH in the probiotic *Lactobacillus reuteri*." Molecular Genetics of Bacteria and Phages Meeting; 2019. Madison, WI.
6. Derke, R.M., & **Gray, M.J.** "RclA is a thermostable copper (II) reductase required for reactive chlorine resistance in *Escherichia coli*." Molecular Genetics of Bacteria and Phages Meeting; 2019. Madison, WI.
7. Bowlin, M.Q., & **Gray, M.J.** "Proteolytic regulation of polyphosphate kinase in response to stress." Molecular Genetics of Bacteria and Phages Meeting; 2019. Madison, WI.
8. Bowlin, M.Q., Pokhrel, A., Rudat, A.R. & **Gray, M.J.** "Terminal additions to *Escherichia coli* polyphosphate kinase affect its enzymatic activity." Southeastern Branch American Society for Microbiology Meeting; 2020. Huntsville, AL.
9. Bowlin, M.Q., & **Gray, M.J.** "Tagging Polyphosphate Kinase Alters Enzymatic Activity and Affect Stress Recovery in *E. coli*" Experimental Biology 2022, Philadelphia, PA; Apr. 4, 2022 (upcoming).

10. Meredith, J.D., Chapman, I., Ulrich, K., Sebastian, C., Stull, F., & **Gray, M.J.** “*Escherichia coli* RclA is a highly active hypothiocyanite reductase.” ASM Microbe 2022 (upcoming), Washington D.C.

ORAL PRESENTATIONS

1. “The cobinamide amidohydrolase (cobyrinic acid-forming) CbiZ enzyme: a critical activity of the cobamide remodeling system of *Rhodobacter sphaeroides*.” Gordon Research Conference on Vitamin B₁₂ and Corphins; 2009. Oxford, UK.
2. “Polyphosphate is a Bleach-Induced Chaperone.” Midwest Stress Response and Molecular Chaperone Meeting; 2013. Evanston, IL.
3. “Polyphosphate is a Primordial Chaperone.” Gordon Research Conference on Stress Proteins in Growth, Development, and Disease; 2013. Mt. Snow Resort, West Dover, VT.
4. “Hypochlorous acid stress response in the probiotic *Lactobacillus reuteri*.” Molecular Genetics of Bacteria and Phages Meeting; 2015. Madison, WI.
5. “Bacterial responses to reactive chlorine stress.” University of Alabama at Birmingham / Society for Redox Biology and Medicine Regional Redox Symposium; Mar. 17, 2017. Birmingham, AL.
6. “Bacterial responses to reactive chlorine stress: the role and regulation of inorganic polyphosphate.” University of Alabama at Birmingham Biology Department Seminar Series; Apr. 19, 2017. Birmingham, AL.
7. “Stress regulation of inorganic polyphosphate, a ubiquitous primordial chaperone.” University of Maryland Baltimore County Department of Biological Sciences Seminar Series; Nov. 29, 2017. Baltimore, MD.
8. “Regulation of inorganic polyphosphate, a universal bacterial stress response factor.” University of Alabama at Birmingham Microbiology Department Seminar Series; May 29, 2018. Birmingham, AL.
9. “Stringent alleles of RNA polymerase inhibit inorganic polyphosphate accumulation in *Escherichia coli*.” Gordon Research Conference on Microbial Stress Response; Jul. 18, 2018. Mount Holyoke, MA.
10. Cornell Food Safety Symposium and FSL and MQIP Reunion Weekend; Jul. 27, 2019. Ithaca, NY.
11. “Gray Lab Update: Bleach, Bacteria, and Molecular Mechanisms of Stress Response.” University of Alabama at Birmingham Microbiology Department Seminar Series; May 5, 2020. Delivered remotely due to COVID-19.
12. “Regulation of inorganic polyphosphate: a primordial stress response”. ASM Microbe Online Summer of Science, “Diverse stress responses in the microbial world” Symposium; Jul. 20, 2020. Delivered remotely due to COVID-19.
13. “Solving the problem of polyphosphate genetics.” Polyphosphate Biology remote seminar series (organized by an informal international community of polyphosphate researchers, led by Dr. Patrick Seuss, U of Michigan); Aug. 19, 2020. Delivered remotely due to COVID-19.
14. “How *E. coli* senses and survives reactive chlorine stress.” Murray State University Biology Department Seminar Series; Sep. 11, 2020. Delivered remotely due to COVID-19.

15. "Disentangling inorganic polyphosphate from the general stress response of *Escherichia coli*." DFG GRK1708 "Bacterial Survival Strategies" Research Training Group symposium, Universität Tübingen, Tübingen, Germany; Oct. 7, 2020. Delivered remotely due to COVID-19.
16. "The Gray Lab: Bleach, Bacteria, and Molecular Mechanisms of Stress Response." University of Alabama at Birmingham Mucosal Biology group meeting; Jul. 27, 2021.
17. "How do bacteria survive on epithelial surfaces? The discovery of a highly-active bacterial hypothiocyanite reductase." University of Alabama at Birmingham Pathology Department Grand Rounds; Nov. 18, 2021. Delivered remotely due to COVID-19.

Oral presentations by mentees at national and regional meetings:

1. Bowlin, M.Q., & **Gray, M.J.** "Polyphosphate Kinase Terminal Modifications Alter Enzymatic Activity and Affect Stress Recovery in *E. coli*." American Society for Biochemistry and Molecular Biology Annual Meeting; Apr. 30, 2021. Delivered remotely due to COVID-19.
2. Bowlin, M.Q., & **Gray, M.J.** "Discovering Regulatory Elements of *E. coli* Polyphosphate Kinase." Inaugural PolyP Day online symposium; Oct. 1, 2021.
3. Meredith, J.D., Chapman, I., Ulrich, K., Sebastian, C., Stull, F., & **Gray, M.J.** "*Escherichia coli* RclA is a highly active hypothiocyanite reductase." ASM Microbe 2022 (upcoming), Washington D.C.

MISCELLANEOUS

2017-present: developed, distributed, and maintained syllabus and course materials for graduate-level bacterial genetics and physiology course (see Teaching Experience and Other Publications sections above)

Apr. 24, 2020: publicly released BLAS_Ter.py protein sequence analysis software under a GNU GPLv3 license (github.com/graymicrolab/BLAS_Ter).