CURRICULUM VITAE

RONALD MARK WOOTEN, Ph.D.
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University of Toledo College of Medicine, Health Science Campus
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I. PERSONAL INFORMATION

Name: Ronald Mark Wooten, Ph.D.
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Phone: (419) 944-9445

EDUCATION AND TRAINING

B. A. Zoology/Chemistry, College of Arts and Sciences, University of Arkansas, Fayetteville, AR. August 1980-May 1985

M. A. Microbiology, College of Graduate Studies, University of Arkansas, Fayetteville, AR. August 1985-August 1990

Ph.D. Microbiology/Immunology, Department of Microbiology (Immunology), University of Mississippi Medical Center, Jackson, MS. August 1989-March 1995

Postdoctoral Fellow, Department of Pathology, Division of Cellular Biology and Immunology, University of Utah School of Medicine. April 1995-April 2001

EMPLOYMENT

University of Arkansas, Fayetteville, AR; Department of Biological Sciences (Dr. Dwight Talburt, Chairman); Teaching Assistantship; Graduate Student; fulltime, and salaried. January 1987- July 1989

University of Mississippi Medical Center, Jackson, MS; Department of Microbiology (Dr. William Clem, Chairman); Research Assistantship; Graduate Student; full time, and salaried. August 1989- March 1995

University of Utah School of Medicine, Salt Lake City, UT; Department of Pathology (Dr. Janis Weis, Mentor), Division of Cell Biology and Immunology; Postdoctoral Fellowship. April 1995- April 2001

University of Toledo College of Medicine, Health Science Campus, Toledo, OH; Department of Medical Microbiology and Immunology (Dr. Akira Takashima, Chairman); Assistant Professor. May 2001- June 2008

University of Toledo College of Medicine, Health Science Campus, Toledo, OH; Department of Medical Microbiology and Immunology (Dr. Akira Takashima, Chairman); Associate Professor with tenure. July 2008-December 2015

University of Toledo College of Medicine, Health Science Campus, Toledo, OH; Department of Medical Microbiology and Immunology (Dr. Akira Takashima, Chairman); Professor with tenure. January 2016- Current

DEPARTMENTAL/GRADUATE PROGRAM (UT COLLEGE OF MEDICINE)

Molecular Basis of Disease (Graduate Program) 2001-2007

Molecular and Cellular Biology (Graduate Program) 2002-2007

Center for Diabetes and Endocrine Research (CEDER) 2006-present

Infection, Immunity, and Transplantation (Graduate Program) 2007-2017

Cardiovascular and Metabolic Diseases (Graduate Program) 2007-present

Medical Microbiology and Immunology (Graduate Program) 2017-present

APPOINTMENTS

Institutional Animal Care and Usage Committee, University of Toledo (all campuses), July 2003- January 2006

Member, Executive Curriculum Committee, University of Toledo College of Medicine, Health Science Campus, Toledo, OH. July 2006-2010

Medical School Course Director, Infection and Immunity course, University of Toledo College of Medicine, January 2008-January 2012

Director, BSL-3 Core Laboratory and Animal Facilities, University of Toledo College of Medicine, Health Science Campus, Toledo, OH; Department of Medical Microbiology and Immunology. December 2006-March 2013

Ohio Center for Innovative Immunosuppressive Therapeutics (OCIIT), participating faculty. January 2008-2014

Co-Director, BSL-3 Core Laboratory and Animal Facilities, University of Toledo College of Medicine, Health Science Campus, Toledo, OH; Department of Medical Microbiology and Immunology. March 2013- July 2024

Chairman, Institutional Biosafety Committee (IBC), University of Toledo (all campuses), Toledo, OH. June 2015-current

Curriculum Task Force, Thread 1 Co-director, University of Toledo College of Medicine, March 2016-March 2023

Medical School Course Director, Infectious Disease course, University of Toledo College of Medicine, September 2016-February 2024

Foundational Science Curriculum Committee, University of Toledo College of Medicine, Health Science Campus, Toledo, OH. August 2017-current

Member, Executive Curriculum Committee, University of Toledo College of Medicine, Health Science Campus, Toledo, OH. July 2018-2021

Co-Chairman, Human Gene Trials Institutional Biosafety Committee, University of Toledo (all campuses), Toledo, OH. November 2018-present

COVID-19 Research Steering Committee, University of Toledo (all campuses), April 2020-April 2022

Budget Committee, College of Medicine and Life Sciences Council Executive Committee, October 2023-present

Co-Chairman, University of Toledo College of Medicine Strategic Planning Committee, November 2023-present

Director, BSL-3 Core Laboratory and Animal Facilities, University of Toledo College of Medicine, Health Science Campus, Toledo, OH; Department of Medical Microbiology and Immunology. August 2024-current

AWARDS AND COMMENDATIONS

Academic Scholarship, University of Arkansas, Fayetteville, AR, 1980-1981

VWR Scientific Award for Best Student Presentation, Division of Microbiology and Immunology, Mississippi Academy of Sciences, 1991

McClesky Award for Best Student Presentation by a Ph.D. Candidate, Joint Meeting of The South Central Branch of the American Society for Microbiology and The Mid-South Biochemists, 1991 and 1992

Best Contributed Student Paper in Division of Comparative Immunology, Annual Meeting of American Society of Zoologists, 1991

Sigma Xi Graduate Student Research Award, 1993-1994

Elected to full membership in Sigma Xi, Scientific Research Society, 1994

Graduate Dean's Award for Mentoring, University of Toledo College of Medicine, Health Science Campus, 2007

President's Award for Excellence in Grantsmanship, University of Toledo, March 2017

President's Award for Excellence in Grantsmanship, University of Toledo, May 2019

President's Award for Excellence in Grantsmanship, University of Toledo, May 2021

II. Service

COMMITTEES, THE UNIVERSITY OF TOLEDO COLLEGE OF MEDICINE

Institutional:

2002-present	Radiation Safety & Radioisotope Committee, member
2002-2010	Distinguished Lecturers Committee, member
2004-2008	Chairman, Distinguished Lecturers Committee, Chairman
2002-2013	Hazardous Materials (HAZMAT) Emergency Response Team, member

2002-2022	Medical School applicant interviewer (3-10 per year)
2002-2007	Graduate School applicant interviewer (3-10 per year)
2003-2005	Institutional Animal Care and Use Committee (IACUC), member
2003-2005	Conduct Semi-Annual Audits of MCO/UT Facilities, member
2003-2005	Graduate School Executive Committee, member
2003-present	Committee for CDC Recertification of BSL3 Lab
	2006 Co-chair
	2008 Chairman
	2011 Chairman
	2013 Co-chair
	2014 Co-chair
	2017 Co-chair
	2020 Co-chair
	2021 Co-chair
	2022 Co-chair
2006-2012	Core Curriculum Committee (Graduate School), member
2006-2010	Executive Curriculum Committee (Medical School), member
2007-2011	Pre-Clinical Curriculum Committee (Medical School), member
2005-2013	Director, Biosafety Level 3 Animal Facility (ABSL3)
2013-present	Co-director, ABSL3
2006-2013	Director, Biosafety Level 3 (BSL3) Core Laboratory Facility
2013-present	Co-director, BSL3 Core Facility
2009-2013	College of Medicine Council, member
2009-2013	Academic Affairs Committee, member
2015-present	Chairman, Institutional Biosafety Committee
2015-present	Institutional Review Entity Committee for Dual Use Research (DURC)
2016-present	Curriculum Task Force
2016-present	Thread Director for the Foundational Sciences (Medical School Curriculum)
2017-current	Foundational Science Curriculum Committee
2018-present	Co-Chair, Human Gene Trials Institutional Biosafety Committee
2018-2021	Executive Curriculum Committee (Medical School), member
2018-present	Co-Chairman, Human Gene Trials Institutional Biosafety Committee
2019-present	M.D./Ph.D. Student Advisory Committee
2024-present	Director, Biosafety Level 3 (BSL3) Core Laboratory Facility

Departmental:

2002-2003	Microbiology & Immunology Seminar Series, Coordinator
	Faculty Search Committee, Chairman
2002-2003	Immunology search; June 2002-February 2003 (Kevin Pan hire)
2004	Immunity to infectious agents; January-May (no hire)
2004-2005	Immunology/Bacteriology search; October 2004-November 2005 (no hire)
2005-2006	Immunology search; January 2005-January 2006 (Randall Worth hire)

2007-2008	Bacteriology search; November 2007- October 2008 (no hire)
2008-2009	Immunology/Virology/Bacteriology; October 2008-June 2009 (Viviana Ferreira hire)
2009-2010	Bacteriology search; June 2009-February 2010 (Jason Huntley hire)
2024	2 Faculty search; July 2024-present

Faculty Search Committee, member

2010-2012	Virology/Immunology search; March 2010-February 2012 (Travis Taylor hire)
2017-2018	Chief, Infectious Disease; October 2017-December 2018
2019-2020	Immunology faculty search, Department of Biological Sciences, University of Toledo
2021	Bacteriology search; 2020-2021 (Laura Mike hire)

Other

2004-2006	Capital Improvements Committee Chairman Submitted for and secured Capital Improvements money for remodeling costs to build a Tissue Culture Core and BSL2+ Culture Core Facility, as well as purchase essential equipment. Served as coordinator for the five companies involved in the renovation.
2006-2012	Director, Tissue Culture Core Facility
2006-present	Director, BSL2+ Core Lab
2012-present	Director, Confocal Imaging Center

Other Institutional Service:

2002-2012	Conduct the Spring Tours for undergraduate students interested in science careers
2002-2012	Participate in the Open House for Educational Opportunities
2002-2017	Summer Undergraduate Research Fellowship (SURF) program
2002-present	Serve as judge at Graduate Research Forum
2002-2007	Participate in Molecular Basis of Disease Graduate Program Research Retreat
2002-2007	Participate in Molecular and Cellular Biology Graduate Program Research Retreat
2003-2009	Host groups of medical students in our home for dinner during orientation
2003-2007	Participate in Faculty/Student softball game during orientation week

NATIONAL AND INTERNATIONAL PROFESSIONAL SOCIETIES AND ACTIVITIES

American Society for Microbiology (ASM)	1986-present
American Association of Immunologists (AAI)	2001-present
American Heart Association (AHA)	2004-2007
International Complement Society (ICS)	2018-present

CONSULTATIVE ACTIVITIES

Reviewed the development plan and subsequent full program proposal for a new Ph.D. program in Immunobiology at the University of Cincinnati (College of Medicine) 2003-2006

Media Events:

2008-02	Article in UT News – "UT scientist seeks to learn more about Lyme disease"
2008-03	Article in Toledo Blade – "UT expands research of Lyme disease"
2008-12	Article in UT News – "UT, Georgia, Canadian scientists working to develop vaccine for two bacterial diseases"
2010-01	Article in Toledo Blade – "Researchers at UT are part of experiment with lab space"
2012-01	Article in Toledo Blade – "Number of deer ticks surging across Ohio; Insect is only carrier of Lyme disease"
2015-02	"Germs on Board": WTOL 11 investigates what could be living in your minivan
2015-05	Channel 13 (ABC; television) – "UT Health Expert Dr. Mark Wooten on Lyme Disease"
2015-07	Article in UT News – "UT Microbiologist Seeks Better Treatments for Lyme Disease with Immune Response Research"
2016-07	Press Release – "KAPTUR APPLAUDS $1,948,415 FEDERAL AWARD FOR LYME DISEASE RESEARCH AT UT"
2016-07	Article in Toledo Blade – "Grant to Help Study of Lyme Disease"
2016-08	Article in UT News – "UT researcher receives nearly $2 million grant for Lyme disease study"
2017-03	Interview for Dana Foundation web site – "Almost invisible to the immune response" – http://www.dana.org/Briefing_Papers/Almost_Invisible_to_the_Immune_Response/
2017-06	Article in Toledo Blade – "UT researchers aim to outsmart Lyme disease"
2017-07	Channel 13 (ABC; television) – "What's Going Around: tick bites and Lyme disease"
2017-08	Interview on iHeart/Clear Channel Radio – Ticks and Disease in Ohio
2019-05	Men's Health magazine – "2019 Tick Season is Here: How to Spot Signs of the Critters"
2019-05	ABC Channel 13 – "Tick season in full swing" – May 31, 2019 article and news video
2019-06	Healthline.com – "How close are we to getting a Lyme disease vaccine?" – June 6, 2019 online article

Community Service:

1980-present	Blood Donor (regular, double red cell, and platelets) – American Red Cross
2002-present	Volunteer work for Maumee Valley Historical Society/Wolcott House Museum Complex
2005-2006	Coach Flag Football – YMCA South Branch

2005-2006 Coach T-ball – Harvard Elementary School League

III. EDUCATIONAL ACTIVITIES

TEACHING

University of Arkansas, Fayetteville, AR (1987-1989)

- Laboratory Studies in General Biology I 1987-1989
  1 semester/ year; ~35 students; 6 h/ week
- Laboratory Studies in General Biology II 1987-1989
  1 semester/ year; ~35 students; 6 h/ week
- Laboratory Studies in General Microbiology 1988-1989
  1 semester/ year; ~40 students; 6 h/week
- Laboratory Studies in Pathogenic Microbiology 1988-1989
  1 semester/ year; ~45 students; 6 h/week
- Laboratory Studies in Immunology 1988-1989
  1 semester/ year; ~45 students; 6 h/ week

University of Mississippi Medical Center, Jackson, MS

- Dental Microbiology 1990-1995
  Spring term; 20-25 students; 3 lectures

University of Utah School of Medicine, Salt Lake City, UT

- Current Topics in Microbial Pathogenesis 1997-2001
  Spring semester; 5-7 students; 8 discussion sessions

University of Toledo College of Medicine, Health Sciences Campus, Toledo, OH (2001-current)

Medical Education:

Infection and Immunity (INDI 783)

Block 4; August-November; ~180 students

- **Course Director** 2008-2010
- **Course co-Director** 2010-2011
- Lecturer 2001-current

Lectures:

- Anaerobes (1 h) 2011-2017
- Bacillus (1 h) 2004-2017
- B cell Development I (1 h) 2003-2007
- B cell Development II (1 h) 2003-2007
- Bioterrorism (1 h) 2010-2012
- Borrelia & Leptospira (1 h) 2001-2017

- Chlamydia (1 h) 2005-2017
- Clostridium (1 h) 2004-2017
- Complement (1 h) 2002-2009
- Corynebacterium & Actinomycetes (1 h) 2010-2017
- Innate Immunity (1 h) 2002-2009
- Neisseria (1 h) 2007-2017
- Rickettsia & Coxiella (1 h) 2005-2017
- T cell Development (1 h) 2004-2007
- Zoonotic Infections (1 h) 2007-2017
- Francisella & Brucella (1 h) 2007-2009

POPS:

- Bee Careful (2 h) 2001-2013
- Tetanus (2 h) 2001-2017
- Influenza (2 h) 2002-2003
- Jaundiced Baby (2 h) 2003-2008

Bacteriology Wet Labs:

- Part I (instructor; 1.5 – 4 h) 2001-2017
- Part II (instructor; 1.5 – 4 h) 2001-2017
- Part III (instructor; 1.5 – 4 h) 2001-2012

Virology Wet Lab:

- Single lab (instructor; 1.5-2 h) 2001-2010

Bacteriology cases:

- ~25 cases/ year) 2001-2017

Immunology cases:

- ~6 cases/year 2002-2009

Independent Studies

- Bioterrorism (1 h) 2013-2017
- Food Safety (1 h) 2010-2017

Infectious Disease (INFD 780)

October-December; ~180 students

- **Course Director** 2016-current
- Lecturer 2017-current

Lectures:

- Course Introduction 2017-current
- Anaerobes (1 h) 2017-current
- Bacillus (1 h) 2017-current
- Borrelia & Leptospira (1 h) 2017-current
- Chlamydia (1 h) 2017-current
- Clostridium (1 h) 2017-current
- Corynebacterium & Actinomycetes (1 h) 2017-current

- Neisseria (1 h) 2017-current
- Rickettsia & Coxiella (1 h) 2017-current
- Zoonotic Infections (1 h) 2017-current
- Clinical Microbiology Methods and Diagnosis (4 h) 2021-current
- Streptococci (1h) 2024-present
- Staphylococci (1h) 2024-current
- Francisella, Brucella, & Acinitobacter (1 h) 2024-current

Team-Based Learning/POPS:

- Bee Careful (2 h) 2017-2019
- Tetanus (2 h) 2017-2019

Experiential Learning/Bacteriology Wet Labs:

- Part I (instructor; 1.5 – 4 h) 2017-2019
- Part II (instructor; 1.5 – 4 h) 2017-2019
- Part III (instructor; 1.5 – 4 h) 2017-2019

Student-Directing Learning/Bacteriology cases:

- ~25 cases/ year) 2017-current

Hematology/Oncology (INFD 780)
September-October ~180 students

- Lecturer 2022-current

Lectures:

- Immune Cell Origins and Lifestyles (1h) 2022-current
- Immune Cell Tissues and Trafficking (1h) 2022-current

Integrated Pathophysiology I (INDI 778) 2001-2006
Problem Based Learning or Clinical Decision Making I
Fall term; 7-10 students; 17 weeks; 2 h/ week

Integrated Pathophysiology II (INDI 784) 2003-2004
Problem Based Learning or Clinical Decision Making II
Winter term; 7-10 students; 17 weeks; 2 h/ week

Graduate Education:

Survey of Immunobiology (MICB 640/840) 2003-2005
Fall term; 5-9 students; 17 weeks; (17 total lectures) 1 hr./week

- **Director and instructor**

Journal Review in Molecular Basis of Disease (MBDP 660/860) 2002-2007
August-May; 45-56 students; (31-56 total lectures) 1 hr. lectures/discussions

- **Co-director and primary instructor**

Molecular Basis of Disease (MBDP 603/803) 2001-2007
Winter term; 11-15 students; (2-3 total lectures) 1 hr. lectures

Molecular Cell Biology (INDI 684/884) 2002-2007
Fall term; 11-15 students; 2 hr. lecture

Receptors and Signal Transduction (PHRM 607/807) 2002-2007
Winter term; 11-15 students; 2 hr. lecture

Cellular & Molecular Biology of Pathogenic Bacteria (MBDP 604/804)
Summer term; 2-4 students; (6 total lectures) 1 hr. lecture 2001-2002

Independent Study in Microbiology (MICB 889) 2003-2005
Winter term; 2-3 students; (24 total lectures) 1 hr. lectures/discussions

Molecular Basis of Disease Independent Study (MBDP 899) 2005-2007
Winter term; 1-3 students; (12 total lectures) 1hr. lectures/discussions

Current Problems & Research Approach in Cell Biology & Signaling (BMSP 635/835)
Winter term; 15-25 students; (2 total lectures) 2 hr. lectures 2008-present

Advanced Immunology (IIT 602/802) 2007-present
Fall term; 3-7 students; (1-3 total lectures) 2 hr. lectures
- **Course Director (2008-2009)**

Systems Pathophysiology I (Current Concepts in IIT; IIT 603/803) 2008-2011
Winter term; 15-18 students; (2 total lectures) 2 hr. lectures

Systems Pathophysiology II (Bacterial Pathogenesis; BMSP 632/832) 2011-currrent
Spring Term; 3-6 students; (3 total lectures) 1 hr. lecture

Grant Writing Workshop (BMSP 625/825) 2008-2020
Spring Term; 5-20 students; (2 total discussions) 2 hr. discussions

Grant Writing Workshop (BMSP 8250) 2022-present
Spring Term; 5-20 students; (1 total discussion) 3 hr. discussions

Current Topics in IIT (IITP 6030/80) 2008-current
Fall, Winter, & Spring; 9-18 students; (3-5 total discussions) 1 hr. each

Advanced Microbiology (IITP 6040/8040) 2016-current
Spring Term; 3-6 students; (2 total discussions) 2 hr. discussions

Faculty Education:

June 2011
October 2011
June 2012
October 2012

Faculty Development for Basic Science Faculty
My presentations were within the category of
"Overview of Curriculum and Organizing your Content", including:
- "Strategies for organizing and presenting course content" (1 hr.)
- "How to make your presentation clinically relevant" (1 hr.)

Commitment to Excellence in Medical Education Seminar August 19, 2016
"Using a Flipped Classroom Approach in Teaching Medical Students" (1 hr.)

ADVISING/MENTORING

Major Advisor (past)

John Lazarus, MD., Ph.D.
M.D./Ph.D. program; Molecular and Cellular Biology Track
Department of Medical Microbiology and Immunology
August 2002 - May 2007, (Ph. D. degree obtained)
Title: A Role for Interleukin-10 in the Murine Model of Lyme Disease
Current Position: Chief Cardiology Fellow, University of Michigan, Ann Arbor, MI.
Awards:

- NIH Graduate Student Travel Scholarship, 10th Annual Midwest Microbial Pathogenesis Meeting, Iowa City, IA; October 2003
- Invited speaker, Gordon Conference on Biology of the Spirochetes, Ventura, CA; January 2004.
- 2nd Place Poster Presentation, Graduate Student Research Forum, University of Toledo College of Medicine, March 2004.
- 1st Place Poster Presentation, Graduate Student Research Forum, University of Toledo College of Medicine, April 2005.
- Ohio Retirees Scholarship for Academic Excellence, 2006.
- Outstanding Student Leader Award, Graduate Program, University of Toledo College of Medicine, 2006
- Invited speaker, Gordon Conference on Biology of the Spirochetes, Il Ciocco, Barga, Italy; April 2006
- International Student Scholarship, Travel award to attend Days in Molecular Medicine Conference in Stockholm, Sweden; May 2006.
- M.D./Ph.D. Scholarship for Academic Excellence, University of Toledo College of Medicine, 2007.

Kylie Roach, M.S.B.S.
Ph. D. program; Molecular & Cellular Biology/Infection, Immunity, & Transplantation Track
Department of Medical Microbiology and Immunology
Aug. 2003- August 2007 (MSBS Degree obtained)
Title: The role of *iglC* in the growth and persistence of *Francisella tularensis* in macrophages
Current Position: Accupuncturist, Serenity Health & Wellness Center, Maumee, OH.

Vipul Shukla, M.S.B.S.
M.S.B.S. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2007- August 2009 (MSBS Degree obtained)
Title: Intravital Imaging of *Borrelia burgdorferi* in Murine Skin Tissue
Current Position: Research Associate, University of Wisconsin.

Daniel Wells, M.S.B.S.
M.S.B.S. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
Aug. 2007- September 2009 (MSBS Degree obtained)
Title: Delineation of signaling events required for efficient uptake and killing of *Borrelia burgdorferi* by macrophages.
Current Position: Emergency Medicine MD, Henry Ford/Beaumont Hospital, Royal Oak, MI.

William Grose, Ph.D.
Ph. D. program; Infection, Immunity, and Transplantation Track
*Completed part of dissertation work with Dr. Eric Lafontaine at the University of Georgia, College of Veterinary Medicine, Department of Infectious Diseases
Department of Medical Microbiology and Immunology
August 2005 – March 2011 (Ph.D. degree obtained)
Title: Characterization of a genetic locus in *Burkholderia pseudomallei* encoding a putative biofilm-associated protein
Current Position: Manager, Be The Match, National Marrow Donor Program, Minneapolis, MN
Awards:
- Best Poster Presentation, Infectious Disease Departmental Retreat, University of Georgia College of Veterinary Medicine; March 2007

Yutein (Andy) Chung, Ph.D.
Ph. D. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2006 – June 2011 (Ph.D. degree obtained)
Title: Identification of Signaling Pathways Important for *Borrelia burgdorferi*-elicited Interleukin-10 Production by Macrophages and their Effects on Suppressing Antigen Presenting Cell Immune Responses
Current Position: Research Associate, University of Michigan, Ann Arbor, MI.
Awards:
- N. Paul Hudson Award for Research Excellence (Best Overall Poster), American Society of Microbiology, Ohio Branch Meeting; April 2009
- 3rd Place Poster Presentation, Graduate Student Research Forum, University of Toledo College of Medicine, April 2009.
- Finalist, Poster Presentation, Graduate Student Research Forum, University of Toledo College of Medicine, March 2010.
- 3rd Place Poster Presentation, Graduate Student Research Forum, University of Toledo College of Medicine, April 2011.

John-Paul Lavik, M.D., Ph.D.
M.D./Ph. D. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2006 – June 2012 (Ph.D. degree obtained)
Title: Intravital Microscopy of *Borrelia burgdorferi*: Delineation of Dissemination Kinetics and Persistence within Murine Skin

Current Position: Assistant Professor, Pathology and Laboratory Medicine, Assistant Professor, Pathology and Laboratory Medicine; Program Director, Pathology Residency Program; Associate Medical Director – Division of Clinical Microbiology, Indiana University Health, Indianapolis, IN

Awards:

- MD/PhD Full-tuition Scholarship Award; University of Toledo College of Medicine, 2006-present; 2006-2013.
- Travel Award, 11th International Conference on Lyme Borreliosis and Other Tick-Borne Diseases, University of California-Irvine, Irvine, CA; October 2008.
- Invited Speaker, Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; January 2010.
- Finalist, Best Oral Presentation, Midwest Graduate Research Symposium, University of Toledo; March 2010.
- Awarded University of Toledo Retirees Scholarship (Academic Excellence); May 2010.
- Oral Presentation Award, 2nd Annual Ohio Center for Innovative Immunosuppressive Therapeutics Research symposium, Columbus, OH; November 2010.
- M.D./Ph.D. Student Travel Award, ASCI/AAP/APSA Joint Meeting, Chicago, IL; April 2011.
- Richard and Mary Finkelstein Student Travel Award, General Meeting of the American Society for Microbiology, New Orleans, LA; May 2011.
- Invited speaker, General Meeting of the American Society for Microbiology, New Orleans, LA; May 2011.
- Graduate Student Award to attend 61st Lindau Meeting of Nobel Laureates in Physiology and/or Medicine, Lindau, Germany; June/July 2011.
- Awarded University of Toledo Satellites Scholarship (Academic Excellence); May 2012.
- Invited speaker (including Travel Grant), 13th International Conference on Lyme Borreliosis and Other Tick-Borne Diseases, Boston, MA; August 2013
- Outstanding M.D./Ph.D Student Award, University of Toledo College of Medicine; May 2013.

Minal Mulye, Ph.D.

Ph. D. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2008 – November 2013 (Ph.D. degree obtained)
Title: Delineating the Immune Mechanisms Required by Murine Neutrophils and Macrophages for Clearance of *Burkholderia pseudomallei*, the Causative Agent of Melioidosis
Current Position: Associate Professor of Microbiology and Immunology, Philadelphia College of Osteopathic Medicine, Philadelphia, PA.

Awards:

- Scholarly Excellence Award, Dean Katherine Easley Wemmer Trust, American Association of University Women; April 2011

- 1st Place Poster Presentation, Graduate Research Forum, University of Toledo College of Medicine; April 2011
- Student Travel Award, 19th Annual Midwest Microbial Pathogenesis Meeting, Milwaukee, WI; September 2012
- 1st Place Poster Presentation, Graduate Research Forum, University of Toledo College of Medicine; April 2013

Michael Bechill, Ph.D.
Ph. D. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
*shared mentorship with Dr. Kevin Pan
August 2008 – May 2014 (Ph.D. degree obtained)
Title: The MAP kinase phosphatase-1 (MKP-1), DUSP1, is a critical negative regulator of *Staphylococcus aureus*-induced inflammatory cytokine gene expression in macrophages.
Current Position: Assistant Professor of Biology, University of Saint Francis, Ft. Wayne, IN.
Awards:

- Invited Speaker, National Association of Graduate-Professional Students (AGPS) Midwest Regional Conference, Columbus, OH; April 2012

Nan Zhang, Ph.D.
Ph. D. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2009 – July 2014 (Ph.D. degree obtained)
Title: Identification of Receptors and Signaling Pathways Involved in *Borrelia burgdorferi*-Elicited Interleukin-10 and Potential Therapies for Lyme Disease.
Current Position: Clinical Projects Manager, Shijiazhuang Yiling Pharmaceutical, Co. Ltd. Hebei, China, and Columbus, OH.

Shannon Rossio, M.S.B.S.
M.S.B.S program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2013 – July 2014 (M.S.B.S. degree obtained)
Title: Mechanisms of Complement Resistance by *Burkholderia pseudomallei.*
Current Position: Family Medicine Resident, University of Montana, Missoula, MT

Padmapriya Sekar, Ph.D.
Ph. D. program; Infection, Immunity, and Transplantation Track
Department of Medical Microbiology and Immunology
August 2010 – May 2015 (Ph.D. degree obtained)
Title: The effects of key motility (*motB*) and chemotaxis (*cheY3*) genes on *Borrelia burgdorferi* dissemination and evasion of immune clearance in murine tissues.
Current Position: Research Scientist, Teraimmune, Gaitherburg, MD
Awards:

- Finalist, Best Oral Presentation, Graduate Research Forum, University of Toledo College of Medicine; April 2013

- Invited Speaker, Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; January 2014
- Finalist, Best Oral Presentation, Graduate Research Forum, University of Toledo College of Medicine; April 2014
- Pre-Doctoral Fellowship, American Heart Association; July 2014-June 2016. "Role of *Borrelia burgdorferi* motility and chemotaxis genes in evading immune clearance within murine skin tissues"
- UT Health Science Retirees Award (Academic Achievement); August 2014
- 2015 University of Toledo College of Medicine & Life Sciences, Doctor of Philosophy in Biomedical Sciences Program Outstanding Student; May 2015

Erin Sheehan, M.S.B.S.
M.S.B.S program; Biomedical Sciences Track
Department of Medical Microbiology and Immunology
August 2016 – August 2017 (M.S.B.S. degree obtained)
Title: Relative Importance of B and T Cell Immune Response for *Borrelia burgdorferi* Clearance from Murine Tissues.
Current Position: M4 student at the University of Toledo College of Medicine

Caroline Lambert, M.S.B.S.
Bioinformatics, Proteomics, & Genomics program
Medical Microbiology & Immunology Track
August 2016-August 2018
Title: The Identification and Description of *Burkholderia pseudomallei* Proteins That Bind to Host Complement-Regulatory proteins Via *In Silico* and *In Vitro* Analyses.
Current Position: INNOVIA Films, Wigton, United Kingdom

Awards:

- Nominated for and participated in the University of Toledo Advanced Leadership Academy, Spring 2018
- University of Toledo Track Newcomer of the Year award, 2016/2017 season
- University of Toledo Track Athlete of the Year award, 2016/2017 season
- NCAA Women's Track qualifying time in 10,000 meters
- University of Toledo Health Science Campus Scholarship-in-need award

Muhammed Saad Moledina, B.S., Ph.D.
Ph.D. program; Medical Microbiology and Immunology Track
Department of Medical Microbiology and Immunology
August 2014 – July 2019
Title: Role of *Borrelia burgdorferi*-elicited IL – 10 in Suppression of Innate Immune Response within Murine Skin
Current Position: Senior Clinical Research Associate, ICON plc, Vancouver, BC, Canada

Awards:

- 1st Place Poster Presentation, Graduate Research Forum, University of Toledo College of Medicine; April 2017

- NIH Fellowship Award for Best Poster presentation, 23rd Annual Midwest Microbial Pathogenesis Meeting, South Bend, IN; August 2017
- Invited Speaker, Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; January 2018
- Student Travel award, Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; January 2018
- 2nd Place Oral Presentation, Graduate Research Forum, University of Toledo College of Medicine; April 2018
- Invited Speaker, 15th International Conference on Lyme Borreliosis and other Tick-Borne Diseases, Atlanta, Georgia.; September 2018

Walter (Drew) A. Gryczewski, Jr., M.S.B.S.
M.S.B.S program; Biomedical Sciences Track
Department of Medical Microbiology and Immunology
August 2019 – August 2020
Title: The Role of CheY2 in Evasion of Innate Immune Responses by *Borrelia burgdorferi*.
Current position: M3 student at the University of Toledo College of Medicine

Ken Dejvongsa, M.S.B.S
M.S.B.S program; Biomedical Sciences Track
Department of Medical Microbiology and Immunology
August 2020 – August 2021
Title: The Role of CheY2 in Evasion of Neutrophil Responses by *Borrelia burgdorferi*.
Current position: Clinical Research Associate, Northwestern University, Chicago, IL

Matt Leverich, M.S.B.S.
M.S.B.S program; Biomedical Sciences Track
Department of Medical Microbiology and Immunology
August 2020 – August 2021
Title: Role of CheY2 in Evasion of Macrophage Responses by *Borrelia burgdorferi*.
Current position: M2 student at the University of Toledo College of Medicine

Irum Syed, Ph.D.
Ph.D. program; Medical Microbiology and Immunology Track
Department of Medical Microbiology and Immunology
August 2016 – May 2022
Title: Identification and Characterization of *Burkholderia pseudomallei* Receptors for the Human Complement Regulatory Proteins Factor H
Current position: Scientific Writer, DRT Strategies (contracted to the US Food and Drug Administration)
Awards:

- 4th Place Poster Presentation, Graduate Research Forum, University of Toledo College of Medicine; March 2019

Kelly Morgan, M.S.B.S.
Medical Microbiology & Immunology Track

August 2020-December 2022
Title: Assessing FH-Fc Fusion Proteins for Controlling *Burkholderia pseudomallei* Infection
Current position: Starting Medical School at the University of Toledo in Fall 2023
Awards:

- 1st Place Poster Presentation, Graduate Research Forum, University of Toledo College of Medicine; March 2022

Major Advisor (current)

John Presloid, M.S. (Ph.D. pending)
Ph.D. program; Medical Microbiology and Immunology Track
Department of Medical Microbiology and Immunology
August 2021-present
Title: Characterization of an attenuated *Borrelia burgdorferi* mutant as a vaccine against Lyme disease

Hugo Sigona Gonzalez, B.S. (M.S. pending)
MSBS program; Medical Microbiology and Immunology Track
Department of Medical Microbiology and Immunology
August 2022-present
Title: Characterizing Different FH-Fc Fusion Proteins for Mediating *Burkholderia pseudomallei* killing

(22 students)

Thesis/Dissertation Committee membership (past)

Amanda Melillo, M.S.B.S.
Department of Medical Microbiology and Immunology
Major advisor: Darren Sledjeski
August 2002- April 2005
Current Position: Program Specialist, NIH, Bethesda, MD

Roger Herr, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Gerry Cole
August 2001- May 2006
Current Position: Senior Scientist, Washington University, St. Louis, MO

Eric Tarcha, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Gerry Cole
August 2001- May 2006
Current Position: Senior Director, Translational Development, Kineta Inc., Seattle, WA

Jennifer Timpe, Ph.D.
Department of Medical Microbiology and Immunology

Major advisor: Dr. Eric Lafontaine, then switch to Dr. Stan Sawicki
August 2001- July 2006
Current Position: Research Fellow, University of Texas-Galveston.

Brad Rabquer, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Julie Westerink
August 2001- August 2006
Current Position: Associate Professor, Biology Department, Albion College, Albion, MI.

Anne Shriner (Grace), Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Julie Westerink
August 2001- August 2006
Current Position: Senior Contract and Grant Officer, Northwestern Univ., Chicago, IL.

Laura Smith, M.S.B.S.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Kevin Pan
August 2003- August 2006
Current Position: Research Assistant III, Case Western Reserve University.

Christine Akimana, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Eric Lafontaine (I became her mentor when Dr. Lafontaine left in 2006)
August 2002- July 2007
Current Position: Research Scientist, University of Louisville School of Medicine.

Brian Bullard, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Eric Lafontaine (I became his mentor when Dr. Lafontaine left in 2006)
August 2003- July 2007
Current Position: Staff Scientist, Crystal Diagnostics, Cleveland, OH.

Robert Lintner, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Robert Blumenthal
August 2002- August 2007
Current Position: Research Scientist, Broad Institute of Massachusetts Institute of Technology and Harvard University

Linda Goding (Brock), Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Michael Rees
August 2002- December 2007
Current Position: Principal Scientist, Pfizer Vaccines, New York, NY.

Meenakshi Kaw, Ph.D
Department of Medical Microbiology and Immunology
Major advisor: Dr. Darren Sledjeski and Dr. Robert Blumenthal
August 2002- December 2007
Current Position: Assistant Professor, Department of Physiology and Pharmacology, University of Toledo College of Medicine.

Rachel Balder, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Eric Lafontaine
August 2003- December 2007
Current Position: Research Scientist, Cargill Animal Nutrition, Elk River, MN.

Haiying Li, Ph.D.
Department of Biological Sciences
Major advisor: Dr. Doug Leaman
August 2003- December 2007
Current Position: Research Scientist, Univ. of Texas Southwestern Medical Center, Dallas, TX.

Benjamin Kloesal, M.S.B.S.
Department of Surgery
Major advisor: Dr. Keith Crist
August 2005- June 2007
Current Position: Assistant Professor, Department of Anesthesiology, Brigham & Women's Hospital, Boston, MA

Sumanta Mukherjee, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Kevin Pan
August 2003- March 2008
Current Position: Research Investigator II, Bristol-Myers Squibb, Hopewell, NJ.

Jonathan Collins, M.S.
Department of Chemistry
Major advisor: Dr. Don Ronning
August 2005- May 2008
Current Position: Senior Scientist, Downstream Process Development, Novartis Pharma AG, Basel, Switzerland.

Pablo Serrano (Ayber), M.S.B.S.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Kevin Pan
August 2005- June 2008
Current Position: Assistant Professor of Surgery, McMaster University, Hamilton, Ontario, Canada.

Sarah S. Smith, M.S.B.S.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Isabel Novella
August 2005- August 2008
Current Position: PhD candidate, Technical University of Dresden, Dresden, Germany.

Joyce Bevington, Ph.D.
Department of Biochemistry and Cancer Biology
Major Advisor: Dr. James Trempe
August 2004 - January 2009
Current Position: Assistant Professor of Pediatrics, U. of Toledo Medical Center

Archana Bhat, Ph.D.
Department of Biomedical Engineering
Major Advisor: Dr. A. Champa Jayasuriya
August 2006 - October 2009
Current Position: Senior Project Engineer, Globus Medical, Norristown, PA

Thomas Bowman, Ph.D.
Department of Physiology and Pharmacology, Cardiovascular and Metabolic Disease Track
Major Advisor: Dr. Sonia Najjar
August 2005 - August 2010
Current Position: Senior Scientist, Jarrow Formulas, Los Angeles, CA

Joshua Vieth, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Randall Worth
August 2005- April 2010
Current Position: Managing Director, Immune Monitoring, at Rutgers Cancer Institute of New Jersey, New Brunswick, NJ

Benjamin Hart, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Robert Blumenthal
August 2005- July 2010
Current Position: Medical Fellow, Gastroenterology, University of Toledo College of Medicine, Toledo, OH.

Elizabeth Biel, M.S.B.S., M.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Randall Worth
August 2006- January 2012
Current Position: Pediatrician, Geisinger Health System.

Mithun Khattar, Ph.D.
Department of Medical Microbiology and Immunology

Major advisor: Dr. Stanislaw Stepkowski
August 2007- February 2012
Current Position: Director, Immuno-Oncology Research, Amgen, Boston, MA.

Rebecca Thompson, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Julie Westerink
August 2007- March 2012
Current Position: Senior Director of Quality, Cell Culture Company, Minneapolis, MN

Kuladeep Sudini, Ph.D.
Department of Biological Sciences
Major advisor: Dr. Doug Leaman
August 2007- July 2012
Current Position: Research Fellow, Johns Hopkins Medical Center.

Ran Lu, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Akira Takashima
August 2008- December 2012
Current Position: Postdoctoral Fellow, University of West Virginia.

Joshua Waldman, Ph.D./MBA
Department of Medical Microbiology and Immunology
Major advisor: Dr. Michael Rees
August 2008- May 2013
Current Position: Entrepreneurial Lead, FI-EMF Technologies, Toledo, OH.

Venkatesh Chari, Ph.D.
Department of Biochemistry and Cancer Biology
Major advisor: Dr. Manohar Ratnam
August 2008- November 2013
Current Position: Staff Scientist, DiscoverRx, San Francisco, CA.

Jixiao (James) Liang, M.S.B.S.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Robert Blumenthal
August 2009- May 2013 (I was on his committee from 2009-2012)
Current Position: Ph.D. candidate, University of Toledo.

Yi Yao, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Akira Takashima
August 2009- January 2014
Current Position: Research Instructor, Henry Ford Health System, Detroit, MI.

Gurpanna Saggu, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Viviana Ferreira
August 2009- February 2014
Current Position: Senior Scientist, Translational Oncology at Takeda, Boston, MA.

David Leggat, Ph.D.
Department of Medical Microbiology and Immunology
Major advisor: Dr. Julie Westerink
August 2009- January 2014
Current Position: Research Scientist, Vaccine Research Center, National Institute of Health.

Skylar Rohrs, M.S.B.S.
Division of Occupational Health
Major advisor: Dr. Sheryl Milz
August 2010- March 2014
Current Position: Biological Safety Officer, University of Toledo Medical Center.

Robert Lee, Ph.D.
Department of Physiology and Pharmacology, Cardiovascular and Metabolic Disease Track
Major advisor: Dr. Guillermo Vazquez
August 2009- January 2014
Current Position: Research Assistant Professor, University of North Carolina.

Jennifer Ohtola, M.D./Ph.D.
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Julie Westerink
August 2012-June 2015
Current Position: Allergy & Clinical Immunology Fellow, Cleveland Clinic, Cleveland, OH

Anita Iyer, Ph.D.
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Julie Westerink
August 2012-July 2015
Current Position: Scientist at Takeda Farmacêutica Brasil, Sao Paulo, Brazil

Mohammad Adnan Siddiqui, Ph.D.
Department of Biological Sciences, University of Toledo
Major advisor: Dr. Doug Leaman
August 2009-July 2015
Current Position: Postdoctoral Fellow, Aaron Diamond AIDS Research Institute, Rockefeller University

Kari Lavik (Ph.D.)
Department of Biochemistry and Cancer Biology
Major advisor: Dr. Katherine Eisenmann

August 2010-January 2016
Current Position: Wildlife Specialist, Cleveland Museum of Natural History, Cleveland, OH

Adam Blatt (M.D./Ph.D.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Viviana Ferreira
August 2013-June 2016
Current Position: Medical Resident at Duke University School of Medicine, Pediatrics Program, Durham, NC

Xiaojun (Wilma) Wu (Ph.D.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Jason Huntley
August 2011-April 2016
Current Position: Research Associate, Department of Neurosciences and Neurologic Disorders, University of Toledo College of Medicine, Toledo, OH

Venkata Mantripragada (Ph.D.)
Department of Orthopedics and Biomedical Engineering
Major advisor: Dr. A. Champa Jayasuriya
August 2010-May 2016
Current Position: Postdoctoral Fellow, Department of Biochemical Engineering, Cleveland Clinic

Adaeze Izuogu (Ph.D.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Travis Taylor
August 2013-May 2017
Current Position: Postdoctoral Fellow, Vanderbilt University College of Medicine

Alison Brandel-Thees (B.S.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Jason Huntley
August 2015-April 2018
Current Position: Account Executive, Gateway Hospice, Broomfield, CO

Brian Youseff (M.D./Ph.D. candidate)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Travis Taylor
August 2013-May 2018
Current Position: Medical Resident, Cleveland Clinic, Cleveland, OH

Youjie Zhang (Ph.D.)
Department of Physiology and Pharmacology (CVMD Track)
Major advisor: Dr. Bina Joe
August 2014-May 2018
Current Position: Postdoctoral Fellow, University of Toledo School of Medicine

Jessica Saul (Ph.D.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Jyl Matson
August 2014-December 2018
Current Position: Postdoctoral Fellow, University of Texas San Antonio

Claire Meikle (M.D./Ph.D candidate)
Department of Medical Microbiology and Immunology (MMI Track)
Major advisor: Dr. Randall Worth
August 2016-March 2019
Current Position: 3rd Year Medical Student, University of Toledo School of Medicine and Life Sciences

Cara DeAngelis (Ph.D.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Jyl Matson
August 2014-April 2019
Current Position: Research Liaison, Global Lyme Alliance, Greenwich, CT

Briana Zellner (Ph.D.)
Department of Medical Microbiology and Immunology (IIT Track)
Major advisor: Dr. Jason Huntley
August 2015-December 2019
Current Position: Scientist, KBI Biopharm, Durham, NC

Hallie Dolan (M.D./Ph.D candidate)
Department of Medical Microbiology and Immunology (MMI Track)
Major advisor: Dr. Kevin Pan
August 2016-March 2020
Current Position: Medical Resident, Cleveland Clinic, Cleveland, OH

Brenden Tully (B.S.)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Jason Huntley
August 2019-December 2020
Current Position: Physician Assistant Student, Thiel College, Greenville, PA

Maxim Marino (B.S.)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Jyl Matson
August 2019-January 2021

Apurva Lad (Ph.D.)
Department of Medical Microbiology and Immunology
Major advisor: Dr. David Kennedy

May 2018-September 2021
Current Position: Postdoctoral Fellow, University of Toledo College of Medicine

Dinesha Thejani Agosthinghage Dona (Ph.D.)
Department of Bioengineering
Major advisor:
August 2019-November 2021

Kelli Devanna (M.S. candidate)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Jyl Matson
August 2020-August 2022
Current Position: Lab Manager, Pediatric Diabetes Research Group, Indiana Univ SOM

Rachel Marie Golanka (Ph.D. candidate)
Department of Physiology and Pharmacology (Molecular Medicine Track))
Major advisor: Dr. Dr. Vijay-Kumar's
August 2017-December 2022
Current position: Senior Research Scientist, UMass Chan Medical School

Iluja Gautam (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Rande Worth
August 2019-May 2024
Current position: Postdoctoral Fellow, Cleveland Clinic

(60 students)

Thesis/Dissertation Committee membership (current)

Ryan Harris (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Travis Taylor
August 2019-present

Mir Himayet Kabir (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Travis Taylor
August 2020-present

Jessica Jiron (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major Advisor: Tomo Ogino
August 2021-current

Brooke Ring (Ph.D. candidate)

Department of Medical Microbiology and Immunology
Major Advisor: Laura Mike
August 2021-current

Saroj Khadka (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major Advisor: Laura Mike
August 2021-current

Upasana Shrestha (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major Advisor: Jason Huntley

Emily Kinney (Ph.D. candidate)
Department of Medical Microbiology and Immunology
Major Advisor: Laura Mike
August 2022-current

Arturo Grano de Oro (Ph.D. candidate)
Department of Molecular Medicine
Major Advisor: Islam Osman
August 2023-current

(68 students through 2024)

Thesis/Dissertation Committee membership (outside Univ. of Toledo)

Susann Olsrud Hotvedt (Master's degree)
Department of Medical Biology, Arctic University of Norway, Tromsø, Norway
Major advisor: Tor Stuge
Title: Immune responses to platelet alloantigens in pregnancy: Development of a solid surface assay for assessment of T cell interaction with peptide-MHC
January 2014 - June 2015

Postdoctoral Fellow Training

Michael Woodman, Ph.D.
Trained in Wooten lab 2008-2013
Current Position: Director, Immunology Discovery, Eli Lilly and Co., Indianapolis, IN
Awards:

- Postdoctoral Fellowship, American Heart Association, July 2011 – June 30, 2013
  "The role of neutrophils and complement in preventing septic melioidosis"

Rudel Saunders, Ph.D.
Trained in Wooten lab 2009-2011
Current Position: Completing combined M.D./J.D. Doctorate Program, University of Toledo

Padmapriya Sekar, Ph.D.
Trained in Wooten lab 2015-2016
Current Position: Research Scientist, Teraimmune, Gaitherburg, MD.
Awards:

- Outstanding Research Presentation by a Postdoctoral Fellow, Midwest Microbial Pathogenesis Meeting, Indianapolis, IN, August 2015
  "Loss of chemotaxis gene *cheY3* in *Borrelia burgdorferi* leads to decreased persistence of the bacteria but still elicits a strong antibody response.

Irum Syed, Ph.D.
Trained in Wooten lab 2022-2023
Current Position: Scientific Writer, DRT Strategies (contracted to the US Food and Drug Administration)

Undergraduate Student Training

Jeanette Brown
University of Utah School of Medicine
Division of Cell Biology and Immunology
May 1997 – May 2001
Current Position: Clinical Assistant Professor, Pulmonary and Critical Care, University of Utah Medical School, Salt Lake City, UT
Awards:

- 1st Place Outstanding Research, National Institute of Health, Society for Advancement of Chicanos and Native Americans in Science (SACNAS), Denver, CO; May 1999.
- 1st Place Outstanding Research, National Institute of Health, Society for Advancement of Chicanos and Native Americans in Science (SACNAS), Denver, CO; May 2000.
- Received acceptance and full scholarship for M.D./Ph.D. Program at the University of Colorado School of Medicine, Denver, CO; March 2001
- Received MD/Ph.D from the University of Colorado School of Medicine, Denver, CO (Immunology track); June 2009

High School Student Training

Jessie Griffith (Senior)
Maumee Valley Day School, Toledo, OH
January 2015
Research Project Title: "Assessing the growth and infectivity of a *Borrelia burgdorferi flaA* mutant"

Stephanie Ravas (Senior)
Notre Dame Academy, Toledo, OH
June-July 2016
Research Project Title: "Assessing the efficacy of a *cheY3*-deletion *Borrelia burgdorferi* strain as an attenuated vaccine for Lyme disease"

Mackenzie Perry (Sophomore)
Southview High School (Sylvania, OH)
September 2019-April 2020
Research Project Title: Development of an *in vivo* intravital microscopy technique to assess chemotaxis of *Borrelia burgdorferi* in murine skin tissue

Summer Undergraduate Research Fellowship (SURF) students

Christopher Snell
Milsaps University, Jackson, MS
May-August 2003

Ava Feng
Duke University
May-August 2008

Emily Chang
Dartmouth College
June-September 2008

Mitchel Deboskey
Notre Dame University
June-August 2018

Medical Resident training

Hongliu (Daisy) Sun, M.D./Ph.D
Department of Pathology, University of Toledo College of Medicine
Research Project Title: Assessment of Interleukin-10 Effects on Cellular Immune Responses to *Borrelia burgdorferi* Infection in Skin
October 2013- May 2014

Physician Assistant (scholarly project)

Klark Kent, P.A.
Project Title: "Lyme Disease in the Southern United States"
January 2013-December 2014
Current position: Physician Assistant, Texarkana, TX

IMAGINE 2 Teacher Training Program (Howard Hughes Medical Institute)

Karen Flowers, B.S.
Jones Junior High School, Toledo, OH
May-August 2008

Caine Kolinski, B.S.
Clay High School, Oregon, OH

May-August 2010

Nate Keiper, B.S.
Notre Dame Academy, Toledo, OH
May-August 2011

Pharmaceutical Sciences Internships

Terlinzica Craig, B.S.
University of Toledo College of Pharmacy
May-August 2010

Visiting Students Research Programs

Marcus T. Roalsø, B.S.
Medical student (Year 2)
University of Tromsø, Tromsø, Norway
March 2011

Sigurd M. Hald, B.S.
Medical student (Year 2)
University of Tromsø, Tromsø, Norway
March 2011

Rotation Student Training (UTHSC Graduate Programs; 8-12 week rotation)

2001-2002
Hala Elnakat (Department of Biochemistry and Cancer Biology)
Eric Tarcha (Department of Medical Microbiology and Immunology)
Amanda Richmond (Department of Biochemistry and Cancer Biology)
Meenakshi Kaw (Department of Medical Microbiology and Immunology)

2002-2003
Robert Lintner (Department of Medical Microbiology and Immunology)
Linda Goding (Department of Medical Microbiology and Immunology)
John Lazarus (Department of Medical Microbiology and Immunology)
Joyce Bevington (Department of Biochemistry and Cancer Biology)
Christine Akimana (Department of Medical Microbiology and Immunology)
Mahdi Jahangir-Blourchian (Department of Physiology and Pharmacology)
Shadi Oweis (Department of Physiology and Pharmacology)

2003-2004
Kylie Roach (Department of Medical Microbiology and Immunology)
Sumanta Mukherjee (Department of Medical Microbiology and Immunology)

2004-2005
William Grose (Department of Medical Microbiology and Immunology)

Amanda Huber (Department of Physiology and Pharmacology)
Jacob Lindquist (Department of Biochemistry and Cancer Biology)
Brent Pennline (Department of Physiology and Pharmacology)

2005-2006
Sara Campbell (Department of Medical Microbiology and Immunology)
Kelly Ledford (Department of Physiology and Pharmacology)
Benjamin Hart (Department of Medical Microbiology and Immunology)
Liqun Yang (Department of Biochemistry and Cancer Biology)

2006-2007
Yutein Chung (Department of Medical Microbiology and Immunology)
Jason Mosakowski (Department of Medical Microbiology and Immunology)
Elizabeth Philbrick (Department of Medical Microbiology and Immunology)

2007-2008
Ryan Hershey (Department of Biochemistry and Cancer Biology)
Sumit Bhattacharya (Department of Biochemistry and Cancer Biology)
John-Paul Lavik (Department of Medical Microbiology and Immunology)
Vipul Shukla (Department of Medical Microbiology and Immunology)

2008-2009
Michael Bechill (Department of Medical Microbiology and Immunology)
Minal Mulye (Department of Medical Microbiology and Immunology)
Joshua Waldman (Department of Medical Microbiology and Immunology)
Venkatesh Chari (Department of Biochemistry and Cancer Biology)
Moumita Bannerjee (Department of Physiology and Pharmacology)
Jessica Arden (Department of Biochemistry and Cancer Biology)

2009-2010
David Leggat (Department of Medical Microbiology and Immunology)
Gurpanna Saggu (Department of Medical Microbiology and Immunology)
Yi Yao (Department of Medical Microbiology and Immunology)
Nan Zhang (Department of Medical Microbiology and Immunology)

2010-2011
Padmapriya Sekar (Department of Medical Microbiology and Immunology)
Zhangxi Wei (Department of Biochemistry and Cancer Biology)
Kari Lavik (Department of Biochemistry and Cancer Biology)

2011-2012
Robert Lee (Department of Physiology and Pharmacology)
Xiaojun Wu (Department of Medical Microbiology and Immunology)
Anita Iyer (Department of Medical Microbiology and Immunology)
Archit Trivedi (Department of Biochemistry and Cancer Biology)

2012-2013
Adam Blatt (Department of Medical Microbiology and Immunology)
Brian Youssef (Department of Medical Microbiology and Immunology)

2013-2014
No rotations

2014-2015
Megan Bickford (Department of Medical Microbiology and Immunology)
Cara DeAngelis (Department of Medical Microbiology and Immunology)
Muhammed Saad Moledina (Department of Medical Microbiology and Immunology)

2015-2016
Briana Zellner (Department of Medical Microbiology and Immunology)

2016-2017
Kelsey Fout (Department of Molecular Medicine)
Caroline Lambert (Department of Medical Microbiology and Immunology)
Irum Syed (Department of Medical Microbiology and Immunology)
Chris Coakley (Department of Medical Microbiology and Immunology)
Chrysan Mohammed (Department of Molecular Medicine)

2018-2019
Maxim Marino (Department of Medical Microbiology and Immunology)
Hussein Odeh (Department of Medical Microbiology and Immunology)
Branden Tully (Department of Medical Microbiology and Immunology)
Caoquinglong Huang (Department of Biochemistry and Cancer Biology)

2019-2020
Iluja Gautam (Department of Medical Microbiology and Immunology)
Sachin Aryal (Bioinformatics and Proteomics/Genomics Track)
Ishan Manandhar (Bioinformatics and Proteomics/Genomics Track)

2020-2021
Kelly Morgan (Department of Medical Microbiology and Immunology)
Mir Himayet Kabir (Department of Medical Microbiology and Immunology)

2021-2022
Brooke Ring (Department of Medical Microbiology and Immunology)

2022-2023
Emily Kinney (Department of Medical Microbiology and Immunology)
Hugo Sigona Gonzalez (Department of Medical Microbiology and Immunology)
Olalekan Olatunji (Department of Medical Microbiology and Immunology)

2023-202

Sam Beckman (Department of Medical Microbiology and Immunology)
Timilehin Faboro (Department of Medical Microbiology and Immunology)
Tanisha Chaudhary (Department of Medical Microbiology and Immunology)
Bennett Allison (Department of Molecular Medicine)
Arturo Grano de Oro (Department of Molecular Medicine)

(74 students through 2022-23 in total)

IV. SCHOLARSHIP

EDITORIAL POSITIONS

Academic Editor, PLOS ONE, 2012-present
Review Editor, Frontiers in Cellular and Infection Microbiology Archive, 2012-present
Review Editor, Frontiers in Cellular and Infection Microbiology: Bacteria and Host, 2018-present
Review Editor, Frontiers in Cellular and Infection Microbiology: Microbes and Innate Immunity, 2018-present
Editorial Board, Infection and Immunity, 2019-present
Invited Editor, mBio, 2021-present
Editorial Board, Cellular Microbiology, 2021-present
Associate Editor, Frontiers in Microbiology, 2022-present
Associate Editor, Frontiers in Bacteriology, 2023-present

JOURNAL PEER REVIEW – NATIONAL

Ad hoc reviewer, Journal of Infectious Disease, 2000-present
Ad hoc reviewer, Journal of Microbiological Methods, 2004-present
Ad hoc reviewer, International Immunology, 2005-present
Ad hoc reviewer, Vaccine, 2005-present
Ad hoc reviewer, Journal of Immunology, 2005-present
Ad hoc reviewer, Cellular Microbiology, 2006-present
Ad hoc reviewer, American Journal of Tropical Medicine and Hygiene, 2006-present
Ad hoc reviewer, FEMS Immunology and Medical Microbiology, 2007-present
Ad hoc reviewer, PLOS Pathogen, 2008-present
Ad hoc reviewer, American Journal of Pathology, 2009-present
Ad hoc reviewer, PLOS Neglected Tropical Diseases, 2009-present
Ad hoc reviewer, Frontiers in Neurology, 2010-present
Ad hoc reviewer, PLOS One, 2010-present
Ad hoc reviewer, Future Neurology, 2010-present
Ad hoc reviewer, Infection and Immunity, 2011-present
Ad hoc reviewer, Zoonoses and Public Health, 2011-present
Ad hoc reviewer, Clinical and Vaccine Immunology, 2011-present
Ad hoc reviewer, Molecular Microbiology, 2012-present
Ad hoc reviewer, Equine Veterinary Journal, 2012-present
Ad hoc reviewer, Frontiers in Cellular and Infection Microbiology, 2012-present
Ad hoc reviewer, Mediators of Inflammation, 2013-present

Ad hoc reviewer, Physiological Genomics, 2013-present
Ad hoc reviewer, Journal of Visual Experiments (JOVE), 2014-present
Ad hoc reviewer, Ticks and Tick-Borne Diseases, 2014-present
Ad hoc reviewer, British Journal of Medicine and Medical Research, 2014-present
Ad hoc reviewer, BMC Veterinary Research, 2014-present
Ad hoc reviewer, Molecular Medicine, 2014-present
Ad hoc reviewer, Antimicrobial Agents and Chemotherapy, 2015-present
Ad hoc reviewer, Experimental Dermatology, 2015-present
Ad hoc reviewer, Virulence, 2015-present
Ad hoc reviewer, Scientific Reports, 2015-present
Ad hoc reviewer, BMC Nephrology, 2015-present
Ad hoc reviewer, BMC Infectious Diseases, 2016-present
Ad hoc reviewer, Arthritis and Rheumatology, 2016-present
Ad hoc reviewer, Microbial Pathogenesis, 2017-present
Ad hoc reviewer, mSphere, 2017-present
Ad hoc reviewer, Frontiers in Cellular and Infection Microbiology: Bacteria and Host, 2018-present
Ad hoc reviewer, Frontiers in Cellular and Infection Microbiology: Microbes and Innate Immunity, 2018-present
Ad hoc reviewer, BMC Medical Genomics, 2019-present
Ad hoc reviewer, Cells, 2020-present
Ad hoc reviewer, Microorganisms, 2020-present
Ad hoc reviewer, mBio, 2021-present
Ad hoc reviewer, Biology, 2021-present
Ad hoc reviewer, Transactions of the Royal Society of Tropical Medicine & Hygiene, 2021-present
Ad hoc reviewer, Journal of Leukocyte Biology, 2022-present
Ad hoc reviewer, Proceedings of the National Academy of Sciences, 2022-present
Ad hoc reviewer, iScience, 2022-present
Ad hoc reviewer, Frontiers in Microbiology, 2022-present
Ad hoc reviewer, Children, 2022-present
Ad hoc reviewer, Frontiers in Immunology, 2022-present
Ad hoc reviewer, Immunology Letters, 2023-present
Ad hoc reviewer, ImmunoHorizons, 2023-present
Ad hoc reviewer, Frontiers in Antibiotics, 2024-present
Ad hoc reviewer, Nature Communications, 2024-present

ADVISORY COMMITTEES – NATIONAL

Global Lyme Alliance – Scientific Advisory Board Committee member – 2018-present

NIH Board of Scientific Counselors (ad hoc) – NIAID Division of Intramural Research – Review of the Laboratory of Bacteriology (LB), Laboratory of Virology (LV) and Laboratory of Persistent Viral Diseases (LPVD), National Institutes of Health, Rocky Mountain Laboratories (RML), Hamilton, MT; June 2022

STUDY SECTIONS, REVIEW PANELS

National Academy of Sciences, National Research Council, panelist, 2002-2005

Howard Hughes Medical Institute Predoctoral Fellowship review panelist, Cell Biology and Immunology, Feb. 2003

NIH/CSR study section, Bacteriology and Mycology-1 (BM-1), ad hoc reviewer, Oct. 2003

NIH/CSR study section, Bacteriology and Mycology-1 (BM-1), ad hoc reviewer, June 2004

NIH/CSR study section, Host Interactions with Bacterial Pathogens (HIBP), ad hoc reviewer, February 2005

NIH/CSR study section, Innate Immunity and Inflammation (III), ad hoc reviewer, February 2006

American Heart Association study section (Region 1), Immunology and Microbiology 2, reviewer, April 2008

NIH/NIAID Review Committee, Regional Centers of Excellence in Biodefense and Emerging Infectious Diseases (RFA-AI-08-002), September 2008
Theme Leader - *F. tularensis* Host (Lung) Immune Responses, Genetics of Virulence

Review of joint funding program with the Defence Science and Technology Agency (DSTA) under the Ministry of Defence (MINDEF), Agency for Science, Technology and Research's (A*STAR) Biomedical Research Council (BMRC), Singapore, November 2008

American Heart Association study section (Region 1 and 2), Microbiology and Microbial Pathogenesis, reviewer, April 2009

American Heart Association study section (Region 1 and 2), Microbiology and Microbial Pathogenesis, reviewer, April 2010

American Heart Association study section (Region 1 and 2), Microbiology and Microbial Pathogenesis, reviewer, April 2011

American Heart Association study section (Region 1 and 2), Microbiology and Microbial Pathogenesis, reviewer, April 2012

NIH/NIAID study section, NIH Support for Conferences and Scientific Meetings (R13), ad hoc reviewer, July 2012

Yale University School of Medicine, Pilot Grant Program, ad hoc reviewer, January 2013

NIH/NIAID study section, Vaccines against Microbial Disease (VMD), ad hoc reviewer, February 2013

American Heart Association study section (National), Microbiology and Microbial Pathogenesis, reviewer, March 2013

Medical Research Council (UK), peer review of grant proposals, May 2014

American Heart Association study section (National), Microbiology and Microbial Pathogenesis, reviewer, October 2014

NIH/NIAID study section, Topics in Bacteriology and Pathogenesis (ZRG1 IDM-U), ad hoc reviewer, December 2014

American Heart Association study section (National), Microbiology and Microbial Pathogenesis, reviewer, April 2015

Kentucky Science & Engineering Foundation, peer review of grant proposals, May 2015

NIH/NIAID study section, Vaccines against Microbial Disease (VMD), ad hoc reviewer, October 2015

American Heart Association study section (National), Microbiology and Microbial Pathogenesis, reviewer, April 2016

NIH/NIAID study section, NIH Support for Conferences and Scientific Meetings (R13), ad hoc reviewer, April 2016

NIH/NIAID study section, Human Immunology Project Consortium (HIPC), ad hoc reviewer, July 18-20, 2016

Netherlands Organisation for Health Research and Development (ZonMw), ad hoc reviewer, October 2016

NIH/NIAID study section, Eukaryotic Parasites and Vectors, ad hoc reviewer, November 16-17, 2016

NIH/NIAID study section, Topics in Bacterial Pathogenesis (IDM-B), ad hoc reviewer, March 2017

American Heart Association study section (National), Microbiology and Microbial Pathogenesis, reviewer, April 2017

NIH/NIAID study section, NIH Support for Conferences and Scientific Meetings (R13), ad hoc reviewer, May 2017

NIH/NIAID study section, Eukaryotic Parasites and Vectors, ad hoc reviewer, July, 2017

NIH/NIAID study section, Parasite-Vectors and Fungi [ZRG1 IDM-M(02)], ad hoc reviewer, November 2017

NIH/NIAID study section, Topics in Mechanisms of Bacterial Virulence and Pathogenesis [ZRG1 IDM-V (02) M], November 2017

Chairperson, Department of Defense study section, 2017 Tick-Borne Disease Research Program, Diagnosis and Pathogenesis, December 2017

American Heart Association study section (National), Microbiology and Microbial Pathogenesis, reviewer, February 2018

NIH/NIAID study section, Topics in Infectious Diseases (IDM-X), ad hoc reviewer, February 2018

NIH/NIAID study section, Eukaryotic Parasites and Vectors, ad hoc reviewer, March 2018

NIH/NIAID study section, Topics in Bacterial Pathogenesis (IDM-B), ad hoc reviewer, March 2018

NIH/NAIAD study section, Topics on Non-HIV Infectious Agent Diagnostics, Food Safety, Sterilization, and Disinfection (IDM-V12), ad hoc reviewer, June 2018

NIH/NAIAD study section, Eukaryotic Parasites and Vectors, ad hoc reviewer, July 2018

Global Lyme Alliance, review of grant applications, October 2018

NIH/NIAID study section, Topics in Bacterial Pathogenesis (IDM-B), ad hoc reviewer, November 2018

Department of Defense study section, 2018 Tick-Borne Disease Research Program, Diagnosis and Pathogenesis, December 2018

Chairperson, NIH/NIAID study section, FOA "B Cell Epitope Discovery and Mechanisms of Antibody Protection", February 2019

Global Lyme Alliance, ad hoc grant review (off cycle), March-April 2019

Review for the Pre-Applications for the Infectious Diseases-2 and Infectious Diseases-3 grant submissions, 2019 Peer Review Medical Research Program, Department of Defense (DOD) Congressionally Directed Medical Research Programs (CDMRP); April 2019

NIH/NIAID, Immunity and Host Defense (IHD), ad-hoc reviewer (October 2019)

Global Lyme Alliance, review of grant applications (December 2019)

NIH/NIAID, Eukaryotic Parasites & Vectors (IDM-M), ad hoc reviewer (March 2020)

NIH/NIAID, Topics in Bacterial Pathogenesis & Virulence (IDM-V), ad hoc reviewer (April 2020)

NIH/NIAID, Immunity and Host Defense (IHD), ad-hoc reviewer (June 2020)

NIH/NIAID, Eukaryotic Parasites & Vectors (IDM-M), ad hoc reviewer (July 2020)

NIH/NIAID, NIH Small Business Grant (ZRG1 AIDC-V), ad hoc reviewer (March 2021)

NIH/NIAID, Immunity and Host Defense (IHD), ad-hoc reviewer (June 2021)

NIH/NIAID, Human Immunology Project Consortium (HIPC), ad hoc reviewer (Oct 2021)

Dept. of Defense, Tick-Borne Disease Research Program (TBDRP), reviewer (Oct 2021)

NIH/NIAID, Host Interactions with Bacterial Pathogens (HIBP), Infectious Diseases and Immunology B Integrated, ad hoc reviewer, March 2022

JDRF (Juvenile Diabetes Research Foundation) FY22 RFA: Developing Combination Therapies In Type 1 Diabetes. Ad hoc reviewer, March 2022

Board of Scientific Counselors Review of the NIAID research program at the Rocky Mountain Laboratories, Hamilton, MT (June 2022)

NIH/NIAID, Bacteria-Host Interactions (BHI), ad-hoc reviewer (June 2023)

Dept. of Defense, Tick-Borne Disease Research Program (TBDRP), reviewer (Oct 2023)

Chairperson, NIH/NIAID study section, PHS 2024-1 Phase I and II: Adjuvant Development for Vaccines for Infectious and Immune-Mediated Diseases (Feb 2024)

INVITED LECTURES, SEMINARS, SYMPOSIA, PROFESSORSHIPS (Since 1998)

Research Seminar speaker – University/Institutional:

University of Tennessee Medical School, Department of Microbiology and Immunology, Memphis, TN; October 1998
Tulane Medical School, Department of Microbiology and Immunology, New Orleans, LA; March 1999
Texas Tech University, Department of Biological Sciences, Lubbock, TX; January 2000
Kansas State University School of Veterinary Medicine, Department of Microbiology and Immunology, Manhattan, KS; June 2000
University of Missouri Medical School, Department of Molecular Microbiology and Immunology, Columbia, MO; June 2000
East Carolina University School of Medicine, Department of Microbiology and Immunology, Greenville, NC; October 2000
Medical College of Ohio, Department of Microbiology and Immunology, Toledo, OH; October 2000
University of South Alabama Medical School, Department of Microbiology and Immunology, Mobile, AL; December 2000
University of Kentucky School of Medicine, Department of Microbiology and Immunology, Lexington, KY; January 2001
University of Mississippi Medical Center, Department of Microbiology and Immunology, Jackson, MS; May 2002
Rotary Club of Toledo, Toledo, OH; November 2002
University of Toledo, Department of Biological Sciences, Toledo, OH; April 2004
University of Mississippi Medical Center, Department of Microbiology and Immunology, Jackson, MS; June 2004
Wayne State University, Department of Microbiology and Immunology, Detroit, MI; April 2005
Bowling Green State University, Department of Biological Sciences, Bowling Green, OH; March 2006
West Virginia University, School of Medicine, Department of Microbiology, Immunology, and Cell Biology, Morgantown, WV; March 2006
"Chronic Autoimmune Lyme Disease: Fact or Fiction". West Virginia University, School of Medicine, Department of Microbiology, Immunology, and Cell Biology, Morgantown, WV; March 2006
Heidelberg College, Department of Biological Sciences, Tiffin, OH; November 2007
University of Texas at San Antonio, South Texas Center for Emerging Infectious Diseases, San Antonio, TX; November 2008
University of Kentucky Medical Center, Department of Microbiology, Immunology & Molecular Genetics, Lexington, KY; December 2008

University of Georgia, College of Veterinary Medicine, Department of Infectious Diseases, Athens, GA; December 2009
Miami University, College of Arts and Sciences, Department of Microbiology, Oxford, OH; January 2010
University of Toledo, College of Arts and Sciences, Department of Biological Sciences, Toledo, OH; February 2011
Wayne State University, Department of Microbiology and Immunology, Detroit, MI; November 2011
University of Kansas Medical Center, Department of Microbiology, Molecular Genetics, and Immunology, Kansas City, KS; November 2012
North Carolina State University, Joint for College of Veterinary Medicine/Department of Biological Sciences, Raleigh, NC; March 2014
"The Emergence of Lyme Borreliosis in North American and Eurasia." Lecture series in Molecular and clinical aspects of infection, inflammation and immunity (MBI-8001). Arctic University of Norway, Tromsø, Norway; June 1-12, 2015
"Using Intravital Microscopy to Identify Virulence Mechanisms of *Borrelia burgdorferi* within Skin Tissues." Lecture series in Molecular and clinical aspects of infection, inflammation and immunity (MBI-8001). Arctic University of Norway, Tromsø, Norway; June 1-12, 2015
University of Saint Francis, Department of Biology, Ft. Wayne, IN; November 2015
Indiana University School of Medicine, Department of Microbiology and Immunology, Indianapolis, IN; April 27, 2017
Arkansas College of Osteopathic Medicine, Department of Microbiology and Immunology, Ft. Smith, AR; March 5, 2018
University of Kentucky School of Medicine, Department of Microbiology, Immunology, and Molecular Genetics, Lexington, KY; March 18-19, 2019
East Carolina University, Brody School of Medicine, Department of Microbiology and Immunology, Greenville, NC; April 1-3, 2019
University of Toledo, College of Pharmacy, Department of Medicinal and Biological Chemistry, Toledo, OH; April 2019
Tick-Borne Diseases Working Group, Health and Human Services, Pathogenesis subcommittee, Washington DC; September 24, 2019
University of Nevada-Reno, Department of Microbiology and Immunology, Reno, NV; May 2022
University of Utah School of Medicine, Department of Pathology, Division of Microbiology and Immunology, Salt Lake City, UT; January 2023
University of Saint Francis, Department of Biology, Ft. Wayne, IN; September 2023

POSTER/ORAL PRESENTATIONS AT NATIONAL AND INTERNATIONAL MEETINGS

International Congress of Immunology, San Francisco, CA; July 1995

Gordon Conference on Biology of the Spirochetes
Ventura, CA; **January 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012, 2014, 2016, 2018**
IL Ciocco, Barga, Italy; April 2006, March-April 2020

Program on Microbial Pathogenesis and Host Response, Cold Spring Harbor, NY; September 1997

International Endotoxin Society Meeting, Santa Fe, NM; September 1998

Cell Biology Approach to Microbial Pathogenesis Conference (American Society for Microbiology), Portland, OR; April 1999

Federation of American Societies for Experimental Biology, Orlando, FL; March 2001

Midwest Microbial Pathogenesis Meeting
- Indiana University Medical Center, Indianapolis, IN; September 2002
- University of Iowa, Iowa City, IA; October 2003
- Michigan State University, East Lansing, MI; October 2004
- University of Cincinnati, Cincinnati, OH; October 2006
- Washington University, St. Louis, MO; September 2010
- University of Michigan, Ann Arbor, MI; October 2011
- The Ohio State University, Columbus, OH; August 2013
- University of Illinois-Chicago, Chicago, IL; September 2014
- Indiana University School of Medicine, Indianapolis, IN; August 2015
- University of Illinois, Champaign-Urbana, IL; September 2016
- University of Notre Dame, South Bend, IN; August 2017
- University of Iowa, Iowa City, IA; September 2018
- University of Toledo, Toledo, OH; September 2019
- Michigan State University, East Lansing, MI; September 2021
- University of Wisconsin, Madison, WI; September 2022
- Northwestern University, Chicago, IL; October 2023

American Society for Microbiology (National Meeting)
- Washington, DC; May 2003
- Philadelphia, PA; May 2009
- New Orleans, LA; May 2011
- San Francisco, CA; June 2012

American Society for Microbiology (Biodefense Meeting)
- Baltimore, MD; February 2009
- Washington, DC; February 2012

American Heart Association Research Symposium, Chicago, IL; November 2006.

International Congress on Lyme Borreliosis and Emerging Tick-Borne Diseases
- Irvine, CA; October 2008
- Boston, MA; August 2013
- Atlanta, GA; September 2018
- Amsterdam, Netherlands; September 2022

American Association of Immunologists (International Meeting)
- Baltimore, MD; May 2010
- New Orleans, LA; May 2015

World Melioidosis Congress (International Meeting)

Townsville, Australia; November 2010
Cebu City, Philippines; August 2016
Hanoi, Vietnam; October 2019

Meeting on Bacterial Locomotion and Signal Transduction (BLAST)
Meeting XIII, Tucson, AZ; January 2015
Meeting XIV, New Orleans, LA; January 2017

10th International Conference on Complement Therapeutics, Aegean Conferences, Heraklion, Crete, Greece; June 2017

International Symposium on Tick-Borne Pathogens and Disease (ITPD), Vienna, Austria; September 2017

11th International Complement Workshop, Santa Fe, NM; September 2018

INVITED SEMINARS AT NATIONAL AND INTERNATIONAL MEETINGS

International Congress on Lyme Borreliosis and Emerging Tick-Borne Diseases
San Francisco, CA; June 1996
Munich, Germany; June 1999

Arthritis Foundation Research Conference, Alexandria, VA; August 1999

International Northwest Conference on Diseases in Nature Communicable to Man
Logan, UT; August 1999

Gordon Conference on Biology of the Spirochetes, Ventura, CA; January 2002

Midwest Microbial Pathogenesis Meeting
Indiana University Medical Center, Indianapolis, IN; September 2002
Michigan State University, East Lansing, MI; September 2021

American Heart Association Research Symposium, Chicago, IL; November 2006

Disease Prevention Forum, Office of Research Collaboration, Toledo, OH; April 2008

IIT Fall Workshop, Univ. of Toledo Health Sciences, Toledo, OH; October 2009

American Society for Microbiology (National Meeting), San Francisco, CA; June 2012

Meeting on Bacterial Locomotion and Signal Transduction (BLAST)
Meeting XIII, Tucson, AZ; January 2015
Meeting XIV, New Orleans, LA; January 2017

Microbiology Society Annual Conference (National Meeting), Birmingham, England, United Kingdom; April 2018

Global Lyme Alliance, Tarrytown, NY; March 2020

Midwest Microbial Pathogenesis Meeting, Michigan State University, East Lansing, MI; September 2021

Ohio Regional Tick Symposium, Ohio State University, Columbus, OH; October 2021

Ohio Mosquito and Vector Control Association meeting, Crown Plaza, Columbus, OH; October 2023

Ticks and Tickborne Diseases Symposium, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; May 2024

MEETING ORGANIZER

Co-Chairman, Midwest Microbial Pathogenesis Meeting, University of Toledo College of Medicine, Toledo, OH; September 2019

Chair/Section Leader – Meeting:

11th International Congress on Lyme Borreliosis and Other Tick-Borne Diseases
Pathogenesis/Animal Models Section
Irvine, CA; October 2008

Program Committee – Meeting:

International Conference on Lyme Borreliosis and Other Tick-Borne Diseases
Boston, MA; August 2013
Vienna, Austria; September 2015
Atlanta, GA; August 2018

INFEST-igate LYME, Lyme Researchers Networking Conference
Tufts University, Boston, MA; June 2024

Invited Participation in Round Table Discussions:

NAIAD/ORD International Conference on *Burkholderia* Pathogenesis: Approaches and Opportunities for Research on Glanders and Melioidosis, Bethesda, MD, August 2004

Workshop on Current Topics in *Burkholderia* research, Regional Center of Excellence for Biodefense and Emerging Infectious Disease Research (RCE VIII), Colorado State University, Fort Collins, CO, June 2006

Unraveling Vascular Inflammation: From Immunology to Imaging Symposium; Bethesda, MD, October 2016

Educational Conferences:

Microbiology and Immunology Educational Strategies Workshop
Ocean Creek Conference Center, Myrtle Beach, SC, May 2008
Ocean Creek Conference Center, Myrtle Beach, SC, May 2010
Sheraton Sand Key Resort, Clearwater Beach, FL, May 2018
Snowbird Resort, Snowbird, UT, July 2024

International Conference on Biocontainment Facilities, Las Vegas, NV, March 2009

Team-Based Learning Collaborative Workshop
Hilton Portland Downtown, Portland, OR, March 2020

MAJOR RESEARCH INTERESTS

My laboratory is currently pursuing two major research projects, both directed towards better understanding the immune responses against two major groups of bacterial pathogens. The goal of both projects is to identify critical immune events for controlling these pathogens, in order to better target curative treatments.

1. Immunity to *Borrelia burgdorferi:*

B. burgdorferi is a spirochetal bacterium that is the causative agent of Lyme disease. Although this extracellular pathogen elicits strong innate and adaptive immune responses, the organism is able to persist within immunocompetent hosts for extended periods of time and periodically re-emerge to cause inflammatory disease. Notably, the *B. burgdorferi*-specific antibodies and inflammatory responses that develop during the natural course of infection are unable to clear the bacteria, suggesting they can "host-adapt" such that innate and/or adaptive immune responses are no longer able to clear infection within 1-2 weeks post-infection. Our current studies are directed towards better understanding how *B. burgdorferi* evades early clearance by resident innate immune cells (within 1-2 weeks); these immune cells include macrophages, dendritic cells, neutrophils, and Langerhans cells.

A. Understanding how *B. burgdorferi* dysregulates the host innate immune responses

Our work has determined that earl

y recognition of *B. burgdorferi* (Bb) through Toll-like receptor 2 on innate immune cells appears to be crucial for bacterial clearance from host tissues. We also determined that Bb rapidly elicits high IL-10 levels from murine macrophages (MØs) and dendritic cells (DCs), and that the secreted levels of IL-10 can significantly inhibit subsequent activation of resident MØs, DCs, and neutrophils. Also, IL-10-deficient mice (IL-$10^{-/-}$) control Bb levels in host tissues significantly better than wild type (WT) mice, thus making IL-10 the only cytokine shown to significantly affect Bb clearance. We hypothesize that the IL-10 elaborated in response to Bb infection, suppresses host innate immune responses that are crucial for efficient Bb clearance from host tissues, and that MØ and DC functions are central to this dysregulated host response. We are currently identifying the cell types that initially detect Bb and/or subsequently produce IL-10 during the course of infection, as well as which immune cell types and mechanisms are adversely affected by Bb-elicited IL-10.

B. Intravital imaging of skin tissues in living mice to assess and understand the early immune events that are critical for controlling *B. burgdorferi* infection

While skin tissues represent a critical environment for *B. burgdorferi* interactions with immune cells and soluble immune mediators, these interactions cannot be accurately assessed using current *in vitro* techniques. This is largely because these bacteria are parasites that only exist naturally in living animals or ticks, and thus any "culture" conditions outside of an intact animal do not allow them to exhibit the mechanisms they use to escape immune clearance in the natural skin environment. Our collaborative group has recently developed novel experimental systems to visualize the dynamic behaviors of green-fluorescent immune cell populations and fluorescent *B. burgdorferi* strains directly within the intact skin of living mice and in real-time. Using these novel techniques together with more traditional models, we are determining the relative importance of different phagocyte

populations versus the activities of *B. burgdorferi*-specific antibodies in determining the initial reduction of bacterial numbers observed at ≥5 days post-infection. We are also performing imaging studies to determine the relative importance of *B. burgdorferi* motility and chemotaxis properties in evading immune clearance using fluorescent bacterial strains that have been mutated in selected motility and chemotaxis genes. Finally we are delineating the mechanisms that allow *B. burgdorferi* to evade the antibody response that appears about 1 week post-infection. We believe that our studies will allow for identification of both bacterial-related and host immune mechanism that can be targeted for preventative or curative therapies for Lyme disease.

2. Immunity to *Burkholderia pseudomallei* and *Burkholderia mallei:*

Burkholderia pseudomallei is a globally-distributed saprophytic Gram-negative bacterium, primarily associated with wet environments in tropical and subtropical regions. Infection of human and susceptible animal hosts via inhalation or wounds results in the febrile illness melioidosis. Acute disease can result in fulminant septicemia. Even with vigorous antibiotic and supportive therapy, mortality ranges from 50-90%. Infection can also lead to chronic disease, with recrudescence occurring months to years after the initial exposure. *Burkholderia mallei* is the causative agent of glanders, which is a highly contagious and often fatal zoonotic disease of solipeds including horses, mules and donkeys. It is characterized by ulcerating granulomatous lesions of the skin and mucus membranes. Disease progression and pathology in humans and horses are similar. After infection, the organism generally travels through lymph channels first to regional lymph nodes often causing irritation (lymphangitis, lymphadenitis) en route. If unchecked, these organisms may enter the bloodstream and be carried anywhere throughout the body. Without proper treatment, the course of disease may range from one that is acute and rapidly fatal (50-90%), to one that is very slow and protracted with alternating remissions and exacerbations. Although both these bacteria are primary pathogens, they are particularly notable in that aerosolized *B. pseudomallei* (Bp) and *B. mallei* (Bm) has an $LD_{50} \leq$ 30-500 organisms in mice, thus giving it considerable potential for misuse as a Tier 1 select agent regarding biological weapons. There is currently no vaccine.

A. <u>Understand how *B. pseudomallei* and *B. mallei* can evade killing and persist within macrophages and neutrophils</u>

Infection of macrophages appears to be central to the development of both melioidosis and glanders. Ingested Bp and Bm can escape the phagosome and replicate within the cytoplasm, enabling the bacteria to spread within the host. Although very little is known about the molecular mechanisms involved in Bp and Bm virulence, these bacteria appear to efficiently suppress macrophage responses, leading to an inability to both clear the infection or mount an effective adaptive immune response. A better understanding of the basic biology of macrophage subversion by these bacteria is an urgent priority in order to develop preventative and curative treatments of melioidosis.

Using wild-type and capsule-deficient (ΔCPS) Burkholderia strains, we determined that these ΔCPS strains possess more complement-deposition and display increased uptake and killing by neutrophils, but not by macrophages; only addition of IFNγ could promote killing by macrophages. Interestingly, antibody-binding did not promote killing, but did enhance complement deposition, suggesting they could be important for increasing

complement deposition to reach the critical threshold to elicit killing *in vivo*. Together, these findings indicate that capsule is important for preventing complement deposition on the surface, which would otherwise lead to efficient clearance of these bacteria by neutrophils. We will continue to delineate the mechanisms by which the *Burkholderia* capsule can prevent complement deposition, with the hope of developing therapies directed to neutralize these suppressive properties and allow efficient clearance by neutrophils.

B. Identification and assessment of virulence factors that can provide vaccine targets against *B. pseudomallei* and *B. mallei*

We and our collaborators have made significant progress in the last few years towards the identification of the virulence determinants of *B. mallei* and *B. pseudomallei*, which we hypothesize will be excellent candidates as components of conjugate vaccines. Of particular note are two polysaccharide structures present on the surface of both of these organisms which are critical for the virulence of both of these pathogens. These are an extracellular polysaccharide capsule (CPS) and lipopolysaccharide O-antigen (OPS). We previously conjugated the CPS and OPS polysaccharides to six different carrier proteins shown or predicted to play important roles in pathogenesis by *B. pseudomallei* and *B. mallei*, which allowed identification of one vaccine that significantly protected mice from challenge with fully virulent Bp (the needle protein for the T3SS).

Currently, we are focusing our search for vaccine candidates towards identification of mechanisms that *Burkholderia* use to evade complement deposition on their surface. Our preliminary studies have shown that both Bp and Bt can bind host Factor H (fH), which is known to prevent complement deposition. Notably, we also observed that Bp can strongly bind the host C4 binding protein (C4bp), which is also know to prevent complement deposition, whereas avirulent Burkholderia strains are unable to bind this regulatory protein. We are now directing our studies towards: 1) delineating the binding characteristics of host fH and C4bp with Bp and Bt, 2) identify the *Burkholderia* proteins or capsule components that are responsible for binding fH and C4bp, and 3) determining whether therapies that neutralize these *Burkholderia* receptors can serve as vaccines to prevent melioidosis.

PAST RESEARCH SUPPORT, TRAINING GRANTS

Title: The Role of CD14 in *Borrelia burgdorferi*-Induced Signaling Pathways Related to Lyme Arthritis
Agency: Arthritis Foundation Postdoctoral Fellowship Award, 1997-2000
Period of Support: 03/01/1997-02/28/2000.
Direct costs: $60,000 total
Principal Investigator: R. Mark Wooten, Ph.D.

Title: Adherence Mechanisms of *Moraxella catarrhalis*
Agency: National Institutes of Health, National Institutes of Allergy & Infectious Diseases
Period of Support: 12/01/2002-12/22/2006
Direct costs: $721,315
Principal Investigator: Eric R. Lafontaine, Ph. D.

Co-Investigator: R. Mark Wooten, Ph.D.

Title: Immunologic Control of *Borrelia burgdorferi* in Mammalian Tissues
Agency: American Heart Association, National Affiliate
Period of Support: 07/01/03-06/30/08
Direct costs: $236,364
Principal Investigator: R. Mark Wooten, Ph.D.

Title: Affymetrix Microarray Pilot Studies
Agency: Medical University of Ohio – Request for Application
Period of Support: 05/05 – 04/06
Direct costs: $4,200 in murine microarray chips and services
Principal Investigator: R. Mark Wooten, Ph.D.

Title: Identification of *B. pseudomallei* & *B. mallei* adhesins
Agency: National Institutes of Health (R21)
Period of Support: 08/05-07/07
Direct costs: $375,000 (increased for select agent work)
Principal Investigator: Eric Lafontaine, Ph.D.
Co-investigator: R. Mark Wooten, Ph.D.

Title: A new approach to regenerate bone using microparticles seeded with mesenchymal stem cells and macrophages
Agency: National Science Foundation (NSF)
Biomedical Engineering, Research to Aid Persons with Disabilities, and Biophotonics Programs
Period of Support: 08/01/07-07/31/2010
Direct costs: $224,000
Principal Investigator: A. Jayasuriya, Ph.D.
Co-investigator: R. Mark Wooten, Ph.D.

Title: Intravital Assessment of Interactions Between *Borrelia burgdorferi* and Immune Cells in Skin
Agency: National Research Fund for Tick-Borne Diseases
Period of Support: 01/01/08-12/31/10
Direct costs: $100,000
Principal Investigator: R. Mark Wooten, Ph.D.

Title: Early Interactions of *Borrelia burgdorferi* with Immune Cells Resident in Skin
Agency: The Dana Foundation Program in Brain and Immuno-Imaging
Period of Support: 07/01/08-06/30/12 (no cost extension)
Direct costs: $200,000
Principal Investigator: R. Mark Wooten, Ph.D.

Title: Glanders Vaccine Development
Agency: NIH – Cooperative Research Partnerships for Biodefense (U01)

Period of Support: 07/01/08-06/30/12 (no cost extension)
Direct costs: $1,284,191
Principal Investigator: Donald Woods, Ph.D.
Co-PI: R. Mark Wooten, Ph.D.

Title: Dysregulation of Innate Immune Responses by *Borrelia burgdorferi*: A Role for IL-10
Agency: National Institute of Allergy and Infectious Diseases (R01)
Period of Support: 06/01/08-05/31/12 (no cost extension)
Direct costs: $1,000,000
Principal Investigator: R. Mark Wooten, Ph.D.

Title: Biophysics of the morphology and motility of *Borrelia burgdorferi* in diverse environments
Agency: National Institute of General Medical Sciences (R01)
Period of Support: 09/01/10-08/31/13
Direct costs: $1,250,000
Principal Investigator: Charles Wolgemuth, Ph.D.
Co-Investigator: R. Mark Wooten, Ph.D.

Title: The role of neutrophils and complement in preventing septic melioidosis
Agency: American Heart Association, National Affiliate (Postdoctoral Fellowship)
Period of Support: 07/01/11-06/30/13
Direct costs: $86,000
Principal Investigator: Michael Woodman, Ph.D.
Mentoring Investigator: R. Mark Wooten, Ph.D.

Title: Role of *Borrelia burgdorferi* chemotaxis genes in evading immune clearance within murine skin tissues
Agency: American Heart Association, National Affiliate (Predoctoral Fellowship)
Period of Support: 07/01/14-06/30/16
Direct costs: $52,000
Principal Investigator: Padmapriya Sekar
Mentoring Investigator: R. Mark Wooten, Ph.D.

Title: Intravital assessment of *Borrelia burgdorferi*-immune cell interactions in skin
Agency: National Institute of Allergy and Infectious Diseases (R56)
Period of Support: 08/01/14-07/31/15
Direct costs: $254,000
Principal Investigator: R. Mark Wooten

Title: TRPC3 Protein in Molecular and Cellular Events during Atherogenesis
Agency: National Institute of Diabetes and Digestive and Kidney Diseases (R01)
Period of Support: 12/15/2011 - 11/30/2015
Direct Costs: $1,466,910
Principal Investigator: Guillermo Vazquez

Co-Investigator: R. Mark Wooten

Title: Delineation of *Borrelia burgdorferi* motility and chemotaxis in the development of Lyme disease
Agency: National Institute of Allergy and Infectious Diseases (R01)
Period of Support: 09/01/11 - 08/30/17
Direct costs: $1,590,000
Principal Investigator: Mohammed Motaleb
Co-Investigator: R. Mark Wooten (subcontract)

Title: *In vivo* role of platelets in bacterial blood infection
Agency: National Heart, Lung, and Blood Institute (R01)
Period of Support: 04/15/14 - 03/31/19
Direct costs: $1,250,000
Principal Investigator: Randall G. Worth
Co-Investigator: R. Mark Wooten

Title: R13 AI148687-01; Support for 26th Annual Midwest Microbial Pathogenesis Meeting
Agency: National Institutes of Health
Period of Support: 07/01/2019 – 06/01/2020
Direct costs: $14,020
Role: co-PI with Jason Huntley (University of Toledo)

Title: Intravital assessment of *Borrelia burgdorferi* immune clearance in skin
Agency: National Institute of Allergy and Infectious Diseases (R01)
Period of Support: 06/22/16-05/31/21
Direct costs: $1,300,495
Principal Investigator: R. Mark Wooten

CURRENT RESEARCH SUPPORT

W81XWH-21-TBDRP-IDA
GRANT13193455
Funding agency: USAMRAA (Department of Defense) Tick-Borne Disease Research Program
Title: Development of an Attenuated Vaccine for the Prevention of Lyme Disease
Period of support: 09/01/2021 - 08/31/2025
Direct costs: $200,000/annual
Role: **Wooten (PI)** 10% effort

Title: Development of Factor H-Fc Chimeras Against Pathogenic Burkholderia
Agency: National Institute of Allergy and Infectious Diseases (R41; STTR)
Period of Support: 08/10/2023 – 07/31/2025
Total Direct Costs: $300,000/annual
Role: **Wooten (co-PI with Planet Biotech)** 5% effort

PENDING RESEARCH SUPPORT

Title: Understanding How Tick Microbiomes Affect Pathogenic Bacterial Infections
Agency: Department of Defense, Tick-Borne Disease Research Program
Period of Support: July 2023 – June 2026
Total Direct Costs: $600,000
Role: **Wooten (co-Investigator)** 8.3% effort

PATENTS

2021 '*Methods, Assays and Kits for Detecting Exposure to Cyanotoxins*'; Provisional application filed June 28th, 2018; Application number 16/454,327; Inventor with Drs. David Kennedy and Steven Haller. MST docket: 59990-US-NP

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11. **Wooten, R. M.**, Y. Ma, R. A. Yoder, J. P. Brown, J. H. Weis, J. F. Zachary, C. J. Kirschning, and J. J. Weis. 2002. Toll-like receptor 2 plays a pivotal role in host defense and inflammatory response to *Borrelia burgdorferi*. Vector Borne Zoonotic Dis. 2(4):275-278. PMID: 12804169.
12. Yoder, A., X. Wang, Y. Ma, M. T. Philipp, M. Heilbrun, J. H. Weis, C. J. Kirschning, **R. M. Wooten**, and J. J. Weis. 2003. Tripalmitoyl-S-Glyceryl-Cysteine-Dependent OspA Vaccination of Toll-Like Receptor 2-Deficient Mice Results in Effective Protection from *Borrelia burgdorferi* Challenge. Infect. Immun. 71(7):3894-3900. PMID: 12819074.
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21. Woodman, M. E., A. E. Cooley, R. Avdiushko, A. Bowman, M. Botto, **R. M. Wooten,** N. van Rooijen, D. A. Cohen**,** and B. Stevenson. 2009. Roles for phagocytic cells and complement in controlling relapsing fever infection. J. Leukoc. Biol. 86:727-736. doi: 10.1189/jlb.0309169. PMID: 19458267.

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MATERIAL SUBMITTED OR IN PREPARATION FOR PUBLICATION

1. Zhang, N., Y. Chung, R. Saunders, and **R. M. Wooten**. Identification of receptors/signaling pathways involved in *Borrelia burgdorferi*-elicited IL-10 by murine macrophages.
2. Zhang, N., Y. Chung, R. Saunders, and **R. M. Wooten**. Role of p38 MAPK in early host immune clearance of *Borrelia burgdorferi*.
3. Lavik, J. P., P. Sekar, V. Shukla, A. L. Nestor-Kalinoski, and **R. M. Wooten**. Intravital imaging in murine skin reveals that *Borrelia burgdorferi* display rapid and constant motility in skin that promotes evasion of host inflammatory responses and persistent infection.

ABSTRACTS FROM NATIONAL/INTERNATIONAL MEETINGS (since joining MCO/UT in 2001)

R. M. Wooten, Y. Ma, R. A. Yoder, J. P. Brown, J. H. Weis, J. F. Zachary, C. J. Kirschning, and J. J. Weis. Toll-like Receptor 2 Involvement in the Host Control of *Borrelia burgdorferi*. Gordon Research Conference on Biology of the Spirochetes. Ventura, CA; Jan. 27-Feb. 1, 2002.

R. M. Wooten, Y. Ma, R. A. Yoder, J. P. Brown, J. H. Weis, J. F. Zachary, C. J. Kirschning, and J. J. Weis. Toll-Like Receptor 2 Is Required for Innate, But Not Acquired, Host Defense to *Borrelia burgdorferi*. 9th Annual Midwest Microbial Pathogenesis Meeting, Indianapolis, IN; Sept 20-22, 2002.

J. J. Lazarus, M. J. Meadows, M. A. Kay, and **R. M. Wooten**. Interleukin-10-Deficiency Promotes Increased Immune Clearance of *Borrelia burgdorferi* Irrespective of Changes in Adaptive Immune Responses. 10th Annual Midwest Microbial Pathogenesis Meeting, Iowa City, IA; Oct. 10-12, 2003.

J. J. Lazarus, M. J. Meadows, Robert Lintner, and **R. M. Wooten**. Increased Clearance of *Borrelia burgdorferi* in IL-10 Deficient Mice is Irrespective of Changes in Adaptive Immune Responses. Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; January 25-30, 2004

J. J. Lazarus and **R. M. Wooten**. Interleukin-10 Significantly Modulates *Borrelia burgdorferi* Persistence in Host Tissues. 11th Annual Midwest Microbial Pathogenesis Conference, Michigan State University, East Lansing, MI; Oct. 1-3, 2004.

J. J. Lazarus, M. A. Kay, and **R. M. Wooten.** Viable *Borrelia burgdorferi* Elicits Increased Interleukin-10 and Suppresses Subsequent Activation of Murine Macrophages. Gordon Research Conference on Biology of the Spirochetes, Il Ciocco, Barga, Italy; April 23-28, 2006.

J. J. Lazarus, M. J. Meadows, R. J. Lintner, and **R. M. Wooten**. Interleukin-10 Deficiency Promotes Increased *Borrelia burgdorferi* Clearance Predominantly through Enhanced Innate Immune Responses. Gordon Research Conference on Biology of the Spirochetes, Il Ciocco, Barga, Italy; April 23-28, 2006.

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Woodman M.E., A. E. Cooley, J.C. Miller, J.J. Lazarus, K. Tucker, T. Bykowski, M. Botto, J. Hellwage, **R. M. Wooten**, B. Stevenson. *Borrelia burgdorferi* binding of host complement regulator factor H is not required for efficient mammalian infection. Midwest Microbial Pathogenesis Conference, University of Cincinnati, Cincinnati, OH; Oct. 20-22, 2006.

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Lavik, J. P., V. Shukla, and **R. M. Wooten**. Intravital Imaging of *Borrelia burgdorferi* Interactions with Antigen-Presenting Cells in Murine Skin. Ohio Branch Meeting of the American Society for Microbiology, Columbus, OH; April 10-11, 2009.

Chung, Y., J. P. Waldman, and **R. M. Wooten**. *Borrelia burgdorferi* Elicit Dysregulated Phagocytosis and Inflammatory Responses from Murine Antigen Presenting Cells through Enhancement of Interleukin-10 Production. Ohio Branch Meeting of the American Society for Microbiology, Columbus, OH; April 10-11, 2009.

Shukla, V., J. P. Lavik, and **R. M. Wooten**. Intravital Imaging of *Borrelia burgdorferi* Interactions with Antigen-Presenting Cells in Murine Skin. 109th General Meeting of the American Society for Microbiology, Philadelphia, PA; May 17-21, 2009.

Chung, Y., J. P. Waldman, and **R. M. Wooten**. *Borrelia burgdorferi* Elicit Dysregulated Phagocytosis and Inflammatory Responses from Murine Antigen Presenting Cells through Enhancement of Interleukin-10 Production. 109th General Meeting of the American Society for Microbiology, Philadelphia, PA; May 17-21, 2009.

Lavik, J. P., V. Shukla, A. Nestor-Kalinoski, and **R. M. Wooten**. *In vivo* imaging of *Borrelia burgdorferi* and murine innate immune cells during early cutaneous infection. Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; Jan. 31-Feb. 5, 2010.

Chung, Y., D. J. Wells, J. P. Waldman, J. D. Arden and **R. M. Wooten**. *Borrelia burgdorferi* Elicits Dysregulated Production of IL-10 in Macrophages Via a TLR-2 Dependent, Yet Distinct

Signaling Pathway Than For Eliciting Pro-Inflammatory Responses. Gordon Research Conference on Biology of the Spirochetes, Ventura, CA; Jan. 31-Feb. 5, 2010.

Mulye, M., W. E. Grose, and **R. M. Wooten**. Role of serum opsonization in clearance of *Burkholderia* species by macrophages. Ohio Branch American Society for Microbiology Spring Meeting, Cincinnati, OH; April 2010.

Lavik, J. P., V. Shukla, and **R. M. Wooten**. *In vivo* imaging of *Borrelia burgdorferi* and murine innate immune cells during early cutaneous infection. Ohio Branch American Society for Microbiology Spring Meeting, Cincinnati, OH; April 2010.

Chung, Y, and **R. M. Wooten**. *Borrelia burgdorferi* elicit dysregulated phagocytosis and inflammatory responses from murine antigen presenting cells through enhancement of IL-10 production. Ohio Branch American Society for Microbiology Spring Meeting, Cincinnati, OH; April 2010.

Saunders, R, Y. Chung, D. J. Wells, J. P. Waldman, J. D. Arden and **R. M. Wooten**. *Borrelia burgdorferi* dysregulates IL-10 production in macrophages independent of phagocytosis and requires activation of PI3K/Akt. 97th Annual Meeting of the American Association of Immunologists, Baltimore, MD; May 7-11, 2010.

Chung, Y., D. J. Wells, J. P. Waldman, J. D. Arden and **R. M. Wooten**. *Borrelia burgdorferi* Elicits Dysregulated IL-10 Production by Macrophages via a TLR2-dependent, yet Distinct, Signaling Pathway than those Involved in Pro-inflammatory Responses. 97th Annual Meeting of the American Association of Immunologists, Baltimore, MD; May 7-11, 2010.

Lavik, J. P., V. Shukla, and **R. M. Wooten**. Intravital imaging of *Borrelia burgdorferi* and murine innate immune cells during early cutaneous infection. 97th Annual Meeting of the American Association of Immunologists, Baltimore, MD; May 7-11, 2010.

Saunders, R, Y. Chung, D. J. Wells, J. P. Waldman, J. D. Arden and **R. M. Wooten**. *Borrelia burgdorferi* dysregulates IL-10 production in macrophages independent of phagocytosis and requires activation of PI3K/Akt. 17th Annual Midwest Microbial Pathogenesis Conference, Washington University, St. Louis, MO; Sept. 10-12, 2010.

Woodman M. E. and **R. M. Wooten**. Serum opsonization is important for efficient uptake and killing of *Burkholderia pseudomallei* and *Burkholderia thailandensis* by human neutrophils. 17th Annual Midwest Microbial Pathogenesis Conference, Washington University, St. Louis, MO; Sept. 10-12, 2010.

Lavik, J. P., V. Shukla, and **R. M. Wooten**. *In vivo* imaging of *Borrelia burgdorferi* and murine innate immune cells during early cutaneous infection. 17th Annual Midwest Microbial Pathogenesis Conference, Washington University, St. Louis, MO; Sept. 10-12, 2010.

Antczak, A. J., J. A. Vieth*, A. H. Riaz, M. E. Woodman, **R. M. Wooten** and R. G. Worth. A leukocyte-like role for human platelets in host defense. 17th Annual Midwest Microbial Pathogenesis Conference, Washington University, St. Louis, MO; Sept. 10-12, 2010.

Chung, Y, and **R. M. Wooten**. *Borrelia burgdorferi* elicit dysregulated phagocytosis and inflammatory responses from murine antigen presenting cells through enhancement of IL-10 production. 17th Annual Midwest Microbial Pathogenesis Conference, Washington University, St. Louis, MO; Sept. 10-12, 2010.

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