

CURRICULUM VITAE

RONALD MARK WOOTEN, Ph.D.

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I. PERSONAL INFORMATION

Name: Ronald Mark Wooten, Ph.D.
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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

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- current

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

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-current

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

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

Member, Human Gene Trials Institutional Biosafety Committee, University of Toledo (all campuses), Toledo, OH. January 2018-present

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-present

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-present	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
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		Member, 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

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)
2022	Immunology search; June 2022-present

Faculty Search Committee, member

2010-2012	Virology/Immunology search; March 2010-February 2012 (Travis Taylor hire)
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2017-2018 Chief, Infectious Disease; October 2017-current
 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
 Wrote 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-present 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
<u>POPS:</u>	
• Bee Careful (2 h)	2001-2013
• Tetanus (2 h)	2001-2017
• Influenza (2 h)	2002-2003
• Jaundiced Baby (2 h)	2003-2008
<u>Bacteriology Wet Labs:</u>	
• 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
<u>Virology Wet Lab:</u>	
• Single lab (instructor; 1.5-2 h)	2001-2010
<u>Bacteriology cases:</u>	
• ~25 cases/ year)	2001-2017
<u>Immunology cases:</u>	
• ~6 cases/year	2002-2009
<u>Independent Studies</u>	
• 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
<u>Lectures:</u>	
• 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
<u>Team-Based Learning/POPS:</u>	
• Bee Careful (2 h)	2017-2019
• Tetanus (2 h)	2017-2019

<u>Pathology Book Club</u>	
<ul style="list-style-type: none"> Clinical Microbiology (4 h) 	2021-current
<u>Experiential Learning/Bacteriology Wet Labs:</u>	
<ul style="list-style-type: none"> Part I (instructor; 1.5 – 4 h) Part II (instructor; 1.5 – 4 h) Part III (instructor; 1.5 – 4 h) 	2017-2019 2017-2019 2017-2019
<u>Student-Directing Learning/Bacteriology cases:</u>	
<ul style="list-style-type: none"> ~25 cases/ year) 	2017-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	
<i>Graduate Education:</i>	
Survey of Immunobiology (MICB 640/840)	2003-2005
Fall term; 5-9 students; 17 weeks; (17 total lectures) 1 hr./week	
<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> 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-current

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: Graduate student Psychology Program at University of Toledo College of Medicine.

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: Immunogenetics Specialist, Be The Match, Forest Lake, 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, 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: Assistant 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, Gaithersburg, 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: M3 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: Process Characterisation Scientist, FUJIFILM Diosynth Biotechnologies UK Ltd, Billingham, 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: Clinical Research Associate, Medpace Inc., Cincinnati, OH

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: M2 student at the University of Toledo College of Medicine

Ken Dejevongsa, (M.S.B.S. pending)

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. pending)

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: M1 student at the University of Toledo College of Medicine

Major Advisor (current)

Irum Syed, B.S. (Ph.D. pending)

Ph.D. program; Medical Microbiology and Immunology Track

Department of Medical Microbiology and Immunology

August 2016 – current

Title: Identification and Characterization of *Burkholderia pseudomallei* Receptors for the Human Complement Regulatory Proteins Factor H (fH) and Complement Component 4-Binding Protein (C4bp)

Awards:

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

Kelly Morgan, (M.S.B.S. pending)

Medical Microbiology & Immunology Track

August 2020-current

Title: Assessing FH-Fc Fusion Proteins for Controlling *Burkholderia pseudomallei* Infection

Awards:

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

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: Takeda Oncology, 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 Saggi, 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

(57 students)

Thesis/Dissertation Committee membership (current)**Paniz Rahmani (Ph.D. candidate)**

Department of Biochemistry and Chemistry

Major advisor: Dr. Donald Ronning

August 2014-present

Rachel Marie Golanka (Ph.D. candidate)

Department of Physiology and Pharmacology (Molecular Medicine Track))

Major advisor: Dr. Dr. Vijay-Kumar's

May 2018-present

Iluja Gautam (Ph.D. candidate)

Department of Medical Microbiology and Immunology

Major advisor: Dr. Rande Worth

August 2019-present

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

Kelli Devanna (M.S. candidate)
Department of Medical Microbiology and Immunology
Major advisor: Dr. Jyl Matson
August 2020-present

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: Research Scientist, 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: Postdoctoral Fellowship at the National Institute of Health, Bethesda, 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.

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 (SURE) 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 Saggi (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)

Caoqinglong 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)

(66 students through 2021-22 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

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, iScience, 2022-present

ADVISORY COMMITTEES – NATIONAL

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

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

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

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
- 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
- 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

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

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

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 LD₅₀ ≤ 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. Understand how *B. pseudomallei* and *B. mallei* can evade killing and persist within macrophages and neutrophils

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 (Δ CPS) *Burkholderia* strains, we determined that these Δ CPS strains possess more complement-deposition and display increased uptake and killing by neutrophils, but not by macrophages; only addition of IFN γ 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 known 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)

CURRENT RESEARCH SUPPORT

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

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 - 08/31/2024

Direct costs: \$200,000/annual

Role: **Wooten (PI)** 10% 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

ARTICLES PUBLISHED IN SCIENTIFIC JOURNALS

1. **Wooten, R. M.**, L. W. Clem, and J. E. Bly. 1993. The effects of temperature and oleic acid on murine memory and virgin T cell activation: interleukin-2 secretion and interleukin-2 receptor expression. *Cell. Immunol.* 152:35-48. PMID: 8242770.
2. Causey, A. L., **R. M. Wooten**, L. W. Clem, and J. E. Bly. 1994. A defined serum-free medium for human primary T cell culture. *J. Immunol. Methods* 175:115-121. PMID: 7930634.
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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.
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