

**Jeff G. Leid**

Associate Professor of Bacteriology and Infectious Disease &  
Associate Director, Center for Microbial Genetics and Genomics  
Department of Biological Sciences  
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[Jeff.Leid@nau.edu](mailto:Jeff.Leid@nau.edu)

**EDUCATION**

**University of Puget Sound**, Tacoma, WA

Chemistry, B.S (1995), Varsity Letterman, All-American, National Champion, Swimming, 4 years

**Montana State University**, Bozeman, MT

Immunology, Ph.D. (2000), advisor, Dr. Mark Jutila

**Turner Enterprises, Inc.**, Bozeman, MT

Veterinary Infectious Disease, Postdoctoral Fellow (2000-2001)

**Center for Biofilm Engineering**, Montana State University, Bozeman, MT

Biofilm Immunology and Infectious Disease, Postdoctoral Fellow (2001-2002)

**PROFESSIONAL EXPERIENCE**

Colorado State University, Fort Collins, CO  
Visiting Assoc. Professor, Sabbatical

2008-2009

Northern Arizona University, Flagstaff, AZ  
Associate Professor of Biology with tenure

2007-Present

Northern Arizona University, Flagstaff, AZ  
Associate Director, Center for Microbial Genetics and Genomics

2005-Present

Northern Arizona University, Flagstaff, AZ  
Assistant Professor of Biology

2002-2007

Montana State University, Bozeman, MT  
Assistant Research Professor, Department of Cell Biology & Neuroscience

2001-2002

Montana State University, Bozeman, MT  
Director of Projects, Immunology, Center for Biofilm Engineering

2001-2002

## **RESEARCH FUNDING**

**Total career research funding received is in excess of \$7M. Research grants and awards received and/or pending since 2003 are listed below:**

### **Current**

- 2008-2009 Biofilm-specific, genetically regulated host immunoavoidance. Science Foundation Arizona, **\$216,000**, PI
- 2008-2012 Mathematical modeling of silver compound activity against infectious disease microorganisms. National Science Foundation/National Institutes of Health, **\$195,104** (NAU subcontract), Co-PI. 1R01 GM086895
- 2009-2011 Bacterial metabolic disruption: A high-throughput *in vitro* assay for identification of novel broad spectrum antibiotics. DTRA JSTO-CBD, Los Alamos National Laboratories, **\$3,100,000**, co-PI.

### **Pending**

#### **Principle Investigator**

- 2009-2011 Biofilm-specific, genetically regulated host immunoavoidance. Cystic Fibrosis Foundation, **\$150,000**, PI.
- 2009-2010 Development of a real-time PCR assay for detection of bacterial pathogens involved in chronic rhinosinusitis, Medtronic, INC, **\$50,000**, PI
- 2009-2014 Defining microbial pathogenesis of biofilms in chronic rhinosinusitis. National Institutes of Health, **\$4,201,200**, PI
- 2009-2011 Genetically mediated biofilm immunoavoidance in *Pseudomonas aeruginosa*. NIH R15, **\$150,000**, PI
- #### **Co-Principle Investigator**
- 2008-2013 Functional analysis of *Staphylococcus aureus* and *Candida albicans* polymicrobial biofilms. National Institutes of Health, NIDCR, R01. **\$1,250,000**. Co-PI
- 2009-2014 *Staphylococcus aureus* biofilms: *in vitro* and *in vivo* studies. National Institutes of Health, NIAID, R01. **\$1,250,000**, Co-PI.
- 2009-2011 Prevention of oxidative stress decreases persistence of drug tolerant *M. tuberculosis*. National Institutes of Health R21, **\$275,000**, co-PI.
- 2009-2014 Resolving the role of Mycobacterial communities in persistent tuberculosis. National Institutes of Health R01, **\$1,500,000**, co-PI.

### **Past 7 years at Northern Arizona University**

- 2005-2010 Real-Time PCR Assays for the Direct Detection of Sepsis and CAP Pathogens, National Institutes of Health – UO1 – AI066581, **\$7,600,000**. Award is through TGen and NAU is a subcontract on the grant, I was the NAU PI before I left on sabbatical to Colorado State University (2008-2009) (**\$500,000**)
- 2006-2007 Development of nanoparticle biofilm diagnostics, Northern Arizona University TRIF Development Grant, **\$50,000**, PI
- 2004-2005 Determining the role of quorum sensing in polymicrobial biofilms. Northern Arizona University Proposition 301 mini-grant, **\$50,000**, PI

Curriculum vitae for Jeff G. Leid

- 2003-2004 Searching Biofilm Mutations for Potential Therapeutic Targets. Northern Arizona University, PROP 301 mini-grant. **\$25,000**, PI
- 2003-2004 Determining the role of biofilm development in the human leukocyte response against infection. Northern Arizona University Intramural Grant Program, **\$10,600**, PI.
- 2003-2004 Systemic Thread Based Adaption of an Electrical Engineering Curriculum. National Science Foundation. **\$99,986**, Co-PI
- 2002-2003 Detection and Analysis of Johne's Disease in American Bison Herds. Turner Enterprises INC., **\$45,000**, PI.
- 2002-2003 Genomic and Proteomic Evaluation of *Staphylococcus epidermidis* Biofilms. Genome Therapeutics, **\$40,000**, Co-PI.
- 2002-2003 Identification of Vaccine Candidates for the Prevention of Biofilm-mediated *Staphylococcus aureus* Infections. Culpepper Foundation. **\$25,000**, Co-PI.
- 2002-2003 Investigations of human leukocyte killing of bacterial biofilms. Center for Biofilm Engineering, **\$11,000**, PI.
- 2002-2003 Analysis of *Staphylococcus aureus* biofilms through DNA microarrays and 2D gel electrophoresis. Montana Network for Biomedical Research Opportunities, **\$25,000**, Co-PI.

**Research at Northern Arizona University has been 35% of my academic appointment**

**PATENTS** – 8 applications within the last 3 years

Methods for stimulating human leukocytes to kill bacteria, yeast and fungi in biofilms that have formed in/on prosthetic devices, catheters, tissues and organs *in vivo*. Samuel C. Silverstein, Yongmei Li, J. W. Costerton, Mark E. Shirtliff and **Jeff G. Leid**. PENDING 2006.

Protein Preservation Solution, Mark E. Shirtliff, **Jeff G. Leid**. PENDING 2007.

Genetic detection of the community acquired pathogen *Streptococcus pneumoniae* and the sepsis-associated pathogen *Staphylococcus aureus*. Paul S. Keim, Elizabeth Dreibe, and **Jeff G. Leid**, PENDING, 2007.

Methods and devices for the detection of biofilm. **Jeff G. Leid**, Timothy L. Vail, Jennifer M. Kofonow, Mark E. Shirtliff and Rebecca A. Brady. PENDING 2007.

Methods and devices for the detection of *Staphylococcus aureus* biofilms. **Jeff G. Leid**, Timothy L. Vail, Jennifer M. Kofonow, Mark E. Shirtliff and Rebecca A. Brady. PENDING 2007

Functionalized paramagnetic nanoparticles for *in vitro* biofilm detection. **Jeff G. Leid**, Timothy L. Vail and Mark E. Shirtliff. PENDING 2007

Functionalized paramagnetic nanoparticles for *in vivo* biofilm treatment. **Jeff G. Leid**, Timothy L. Vail and Mark E. Shirtliff. PENDING 2007.

Protective vaccine against *Staphylococcus aureus* biofilms comprising cell wall-associated immunogens. Mark E. Shirtliff, Rebecca A. Brady and **Jeff G. Leid**. PENDING, 2008

These projects share the common theme of intellectual property that has been generated either directly out of my laboratory, or in collaboration with other lab groups, for research focused on bacterial causes of disease. Most are directly related to biofilm communities which are resistant to antimicrobial agents and the host's immune system. They begin with a patent for a novel *in vivo* killing approach to medically relevant biofilms, which is currently being reviewed by the United States Patent Office (USPO). The patents related to the development of the first ever biofilm-specific diagnostic tools have also been submitted for full patent protection and are currently being reviewed by the USPO. We are in discussion with Inverness Medical Innovations on the potential for their company to license this product. The last patent application has just been submitted to the UPSO for full patent review and stems from our creation of the first ever vaccine that is effective against Methicillin-resistant *Staphylococcus aureus* biofilms. We are currently in discussions with Mecrk & CO for licensing and development of this vaccine in the United States and Variation Biotechnologies, INC for a similar arrangement in Canada. My laboratory's projects represent a mix of general and applied studies, with the common core focus of resistance in biofilm communities, and we have been successful translating our findings into valuable intellectual property.

#### **HONORS & AWARDS**

- 1994-1995 Murdock Undergraduate Research Fellowship, University of Puget Sound, Tacoma, WA
- 2000 Sigma Xi Graduate Research Award, Montana State University, Bozeman, MT
- 2002-Pres. Invited Member, Flinn Foundation Bioengineering Technology Platform Committee, State of Arizona
- 2003 Co-founder of the Strategic Alliance for Integrative Biotechnology Research and Education (SABRE), Northern Arizona University
- 2004 Invited guest of the National Institute of Dental and Craniofacial Research panel to establish the Oral Biofilm Infrastructure Network (OBIN) at the National Institutes of Health
- 2005 Fred Funk Service Award Recipient, Department of Biological Sciences, Northern Arizona University
- 2005 Who's Who Among America's Teachers, 2005. Nominated by a past student
- 2005 NAU Tri Beta Outstanding Professor of the Year
- 2005 Who's Who Among International Business Leaders
- 2006 Leading Scientists of the World, International Biographical Center, Cambridge, England
- 2006 Co-Chair, Flinn Foundation/Battelle Biosciences Symposium – Bioengineering Platform, Phoenix, AZ, June 2006
- 2007 Most Influential Faculty Member, NAU Golden Axe Society
- 2007 Chair, Center for Microbial Genetics and Genomics symposium on Burkholderia, October, 2007
- 2007 Development of first biofilm-specific diagnostic tool coverage in Medical Device & Diagnostic Industry journal, R&D Digest, October 2007

## Curriculum vitae for Jeff G. Leid

- 2007 NPR Science Friday, Coverage of the biofilm-diagnostic invention
- 2007 Eagleson Memorial Award Lecture, American Biological Safety Associate, Nashville, TN
- 2008 Co-Chair, ASM General Meeting, "Host-Pathogen interactions in biofilms", Boston, MA
- 2008 Invited Co-editor, "The Role of Biofilms in Device-Related Infections", Springer Series on Biofilms
- 2009 Invited expert panel member, Rhinology World 2009, Philadelphia, PA

## GRADUATE STUDENT MENTORSHIP

### Master's Thesis Defenses/Committees:

#### **Northern Arizona University**

- Eric G. Thompson – Dr. Fernando Monroy, Chair – graduated 2003
- Yvette E. Espinosa – Dr. Fernando Monroy, Chair – graduated 2003
- Keehoon Lee – **Dr. Jeff G. Leid**, Chair – graduated 2006
- Jennifer Kofonow – **Dr. Jeff G. Leid**, Chair – graduated 2007
- Lars Neeling – **Dr. Jeff G. Leid**, co-Chair – graduated 2008
- Arne Gmerek – **Dr. Jeff G. Leid**, co-Chair – graduated 2008
- Stacy Parmenter – **Dr. Jeff G. Leid**, Chair – starts in Fall 2009

#### **Colorado State University**

- Jackie Scapa – Dr. Randall Basaraba, Chair

### Doctoral Thesis Defenses/Committees:

#### **Northern Arizona University**

- Jason Farlow – Dr. Paul Keim, Chair – graduated 2004
- Leo Kenefic – Dr. Paul Keim, Chair, graduated in 2008
- Jessica Collins – Dr. Egbert Schwartz, Chair, graduated in 2008
- Emily Cope – **Dr. Jeff G. Leid**, Chair, started in Fall 2008
- Bre Espen – Dr. Maribeth Watwood, Chair
- Jodi Beaudry – Dr. Paul Keim, Chair

#### **University of Maryland - Baltimore**

- Rebecca Brady – Dr. Mark Shirliff, Chair, graduated in 2007
- Ranj Prabhakara – Dr. Mark Shirliff, Chair
- Brian Peters – Dr. Mark Shirliff, Chair

## UNDERGRADUATE STUDENT MENTORSHIP

### Undergraduate Students (current status listed if known):

- 1999 Rebecca McCoy - Montana State University
- 2001 Michael Bonnema - Montana State University – graduated Medical School
- Kimberly White - University of Missouri and Montana State University REU – earned a MS degree from Colorado State University

Curriculum vitae for Jeff G. Leid

2002	Jeremy Mitchell - Magan Bledsoe -	Montana State University – graduated DO School Northern Arizona University – running a business in Patagonia, Argentina
	Carey Willson - Alyssa Jeffers - LaTosha Lott - Adam Block -	Northern Arizona University – <b>MARC Scholar</b> - fireman Northern Arizona University – registered nurse Northern Arizona University – medical student Northern Arizona University – dentist
2003	Crystal Borham - Keehoon Lee -	Northern Arizona University – dentist Northern Arizona University – earned BS and MS at NAU in <b>Leid Lab</b> , currently serving in South Korean Army as biomedical researcher
2004	John Naylor - Ashley Piersall - Mathias Kerr -	Northern Arizona University – graduate student at UNM Northern Arizona University – pharmaceutical representative Northern Arizona University – <b>MARC Scholar</b> – High School Science teacher in Chicago, IL
	Katie Toan - Shalamar Georgia - Jessica Bass -	Northern Arizona University – attorney Northern Arizona University – graduate student at NAU Northern Arizona University
2005	Melanie Torres -  Chelsa Johnson - Kara Levinson -	Northern Arizona University – <b>MARC Scholar</b> – registered nurse  Northern Arizona University Northern Arizona University – <b>Golden Axe Awardee</b> – graduate school at University of Michigan
	Breanna Berry - Ashley Teeling - Candice Selgado - Bethany Riggins -	Northern Arizona University – medical school Northern Arizona University – medical school Northern Arizona University – <b>MARC Scholar</b> Northern Arizona University – <b>REU Scholar</b> , medical school
	Alexandra Iannone - Gabriel Moreno -	Northern Arizona University – <b>Hooper Undergraduate Research Scholar/Golden Axe Awardee</b> , DO student Northern Arizona University – <b>MARC Scholar</b> – graduate student, University of California
	Crystal Wandrey - Joe Fox - Hertha Woody - Emily Cope -	Northern Arizona University – dental hygienist Northern Arizona University Northern Arizona University – <b>MARC Scholar</b> Northern Arizona University – <b>MARC Scholar/Science Foundation Arizona Doctoral Fellow – Leid Lab, NAU</b>
2006	Jon Sanchez - Matt Cornelison - Connor Fitzgerald - Chris Jenner - Aran Groves -	Northern Arizona University – Yuma – <b>REU Scholar</b> Coconino High School – University of Arizona Northern Arizona University – medical school Northern Arizona University – tech job in Phoenix valley Northern Arizona University – <b>MARC Scholar</b> , MD/Ph.D program, University of San Diego
	Blessing Okon - Katie Foley - Candice Bair -	Northern Arizona University – <b>UMEB Scholar</b> Northern Arizona University – DO school Northern Arizona University – NAU research technician

## Curriculum vitae for Jeff G. Leid

2007	Andrea Tanner -	Northern Arizona University – starting graduate school 2009
	Tyler Hagaman -	Northern Arizona University – undergraduate in Leid Lab
	Connor Rickett -	Northern Arizona University – graduate school 2009, NAU
	Nick Hernandez –	Northern Arizona University – undergraduate in Leid Lab
	Andrea Belovich -	Arizona State University – <b>Beckman Scholar</b>
	Stacy Parmenter -	Northern Arizona University – undergraduate in Leid Lab, starting graduate school 2009, <b>Leid Lab</b> , NAU
	Erika Keim -	Flagstaff High School – University of Arizona
	Devon Hudak -	Northern Arizona University – undergraduate in Leid Lab
	Mike Mattia -	Northern Arizona University – undergraduate in Leid Lab
	Jen Petro -	Northern Arizona University – Abroad in Australia, 2009
2008	Amber Jones -	Northern Arizona University – undergraduate in Leid Lab
2009	Colleen Lanza -	Colorado State University – undergraduate in Basaraba Lab

### **Highlights of STUDENT MENTORSHIP**

Number of undergraduate/high school students mentored (total) – 50

Number of graduate committees served on (total) – 17

Number of graduate students matriculated in my lab – 4 MS students

Number of undergraduates currently in the lab - 8

Number of graduate students currently in the lab – 2, 1 doctoral/1 masters

Number of postdoctoral scholars currently in the lab – 1

All of the students listed above spent at least a year working in the laboratory. Most students spent between 2-3 years. Many of these students were undergraduate research scholars in minority programs (NIH U\*STAR MARC), national research programs (NSF REU), or NAU scholars (Hooper, Beckman and Golden Axe). Most of these students have gone onto advanced degrees and strong careers. In the beginning of my mentorship, most students were entering, and completing, advanced professional degrees. Recently, more students have elected to enter graduate school. The most recent achievement from a student is the Science Foundation Arizona Graduate Research Fellowship awarded to Ms. Emily Cope who is pursuing a doctoral degree in my laboratory, characterizing the microbial communities in Chronic Rhinosinusitis for the first time.

### **PROFESSIONAL ACTIVITIES**

#### Invited Lectures

2000	Invited Guest Lecturer, Leiden University Medical Center, Leiden, THE NETHERLANDS
2000	Invited lecture, College of Agriculture and College of Veterinary Medicine, University of Tennessee, Knoxville, TN
2002	Invited lecture, Thompson Hall Science and Math Seminar, University of Puget Sound, Tacoma, WA
2002	Invited lecture, Complex Biological Systems Seminar, Montana State University, Bozeman, MT
2002	Invited Participant, April 2 <sup>nd</sup> -6 <sup>th</sup> , NSF sponsored biofilm workshop, Copenhagen, DENMARK

## Curriculum vitae for Jeff G. Leid

- 2002 Invited lecture, W. L. Gore and Associates, Technical Advisory Meeting, October 2002
- 2003 Invited lecture, Arizona State University, Department of Microbiology, April 2003
- 2003 Invited lecture, Biofilms 2003, Victoria, CANADA
- 2004 Invited lecture, The University of Arizona College of Medicine, Department of Microbiology and Immunology, Tucson, AZ, Feb. 2004
- 2004 Invited lecture, Department of Microbiology, Montana State Univ., Oct, 2004
- 2004 Invited lecture, Center for Biofilm Engineering, Montana State University, 2004
- 2005 Invited participant, McGraw-Hill Symposium on Microbiology, Hunt. Beach, CA
- 2005 Invited lecture for the Colorado State University Colloquium in the Life Sciences, October 2005. **The invitation was extended from the graduate students in the life sciences at Colorado State University.**
- 2005 Invited participant/lecturer in the University of Southern California School of Dentistry's Big Biofilm Bash, October 2005
- 2005 Invited participant, Center for Microbial Genetics and Genomics, Genotyping Symposium, Northern Arizona University, Flagstaff, AZ
- 2005-Pres. Invited Participant, Mountain Campus Science Day, Flagstaff, AZ
- 2006 Invited lecture, San Diego Naval Medical Center, January, 2006
- 2006 Invited lecture, American Association of Immunologists, Boston, MA, May 2006
- 2006 Invited Scientist, Pacific Southwest Regional Center of Excellence for Biodefense and Emerging Infectious Diseases, Burkholderia Symposium, Colorado State University, Fort Collins, CO, June 2006
- 2006 Invited Participant, Western & Pacific/Southwest joint Regional Center for Excellence in Biodefense and Emerging Infectious Disease meeting, New York, February, 2006
- 2007 Invited lecture, Biofilms 2007, Quebec City, Quebec, CANADA
- 2007 Invited lecture, Translational Genomics (TGen), monthly science symposium, Flagstaff, AZ, 2007
- 2007 Invited lecture, ASM Biodefense Meeting, Washington, DC, February 2007
- 2007 Invited lecture, Los Alamos National Laboratory, Los Alamos, NM, Nov. 2007
- 2008 NAU Tri-Beta invited lecture, February, 2008
- 2008 Invited lecture, ASM General Meeting, Boston MA, May, 2007
- 2008 Invited Grand Rounds lecture, University of Pennsylvania Medical School, Philadelphia, PA, April 2007
- 2008 Invited lecture, Mycobacterial Research Laboratory lecture series, Colorado State University, Fort Collins, CO, November, 2008
- 2009 Invited faculty, Rhinology World, Philadelphia, PA, April 2009
- 2009 Invited lecture, University of Akron, Program in Integrated Bioscience and the Center for Silver Therapeutics Research, Akron, OH, April 2009
- 2009 Invited lecture, University of Washington School of Medicine, Department of Microbiology, June, 2009
- 2009 Invited participant, Biofilms 2009, Cancun, MEXICO

## Reviewer Journals

## Curriculum vitae for Jeff G. Leid

- 2001-Pres. Adjunct Reviewer, Journal of Laboratory and Clinical Medicine
- 2001-Pres. Adjunct Reviewer, Blood
- 2002-Pres. Reviewer, Journal of Immunology
- 2003-Pres. Adjunct Reviewer, FEMS Immunology
- 2005-Pres. Adjunct Reviewer, FEMS Immunology and Medical Microbiology
- 2007-Pres. Reviewer, Journal of Medical Microbiology
- 2007-Pres. Adjunct Reviewer, Immunobiology
- 2008-Pres. Adjunct Reviewer, International Journal of Medical Microbiology
- 2008-Pres. Reviewer, BMC Microbiology

### **Grants**

- 2001-2006 Review Committee, American Society for Microbiology Undergraduate Research Fellowship Program
- 2006-Pres. National review panel for the USDA's National Research Initiative "Animal Protection", Washington, DC
- 2009 Defense Threat Reduction Agency (DTRA) – Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD) outside reviewer on grants related to novel antimicrobial agents and bacterial resistance
- 2009 Rocky Mountain Region Center for Excellence in Biodefense and Emerging Infectious Disease

### **SERVICE**

#### **Departmental**

- 2002-2006 Undergraduate Program Committee, Northern Arizona University. This committee is charged with directing curriculum for the department and each member is responsible for 2hrs a week of student advising (>1000 undergraduate students in department).
- 2005 **Chair**, Department of Biological Sciences Faculty Search Committee
- 2006-Pres. Departmental Graduate Committee, Biological Sciences, Northern Arizona Univ.

#### **College**

- 2005 Member, Department of Computer Science Faculty Search Committee
- 2006 Member, Department of Electrical Engineering Faculty Search Committee
- 2006 STEP UP 2006, Group Leader for Bioengineering for a summer program for high school females interested in science, Northern Arizona University, July 2006

#### **University**

- 1997-2002 Institutional Review Board, Human Subjects, Montana State University, Bozeman, MT
- 2003-2004 Institutional Review Board, Biohazard Materials, Northern Arizona University
- 2003-Pres. Institutional Review Board on Technology and Commercialization, Northern Arizona University
- 2003 Judge, Minority Access to Research Careers Symposium, Northern Arizona University
- 2004 Hooper Undergraduate Research Awards Committee, Northern Arizona University

## Curriculum vitae for Jeff G. Leid

- 2004-Pres. Institutional Review Board, Human Subjects, Northern Arizona University
- 2006-08 **Chair**, Northern Arizona University Institutional Review Board, Human Subjects
- 2007-Pres. Assistant Responsible Officer for Biosafety, Northern Arizona University
- 2007-Pres Executive Board Member, SABRE, NAU
- 2007 NAU Faculty Senate

### **Community**

- 2001-2002 Vice President, Sweet Pea Festival of the Arts and Board of Directors, Bozeman, MT. Member, Board of Directors, 1997-2002
- 2004-Pres. National Board Member, Center for High Altitude Training, Flagstaff, AZ
- 2006 DeMiguel Elementary School Science Fair Judge, Flagstaff, AZ

### **SOCIETY MEMBERSHIPS**

- American Society for Microbiology
- American Association of Immunologists

### **TEACHING ACTIVITIES**

#### Montana State University

- 1999 Laboratory Instructor for:
  - VTMB 411, Hybridomas,
  - VTMB 412, Flow Cytometry,
  - VTMB 413, Advanced Immunology,
  - VTMB 414, Advanced Microscopy (also 2000)
- 1999 Guest Lecturer, Microbiology 401, Immunology, Cell Trafficking and Adhesion, Montana State University
- 2000 Guest Lecturer, General Studies 102, Ethical Implications of Stem Cell Research, Montana State University
- 2002 Guest Lecturer, Chemical Engineering 338, Medical Bacteriology and Immunology, Montana State University
- 2001 Guest Lecturer, Chemical Engineering 338, Cell and Tissue Engineering, and Bioprocess Engineering, Montana State University

#### University of Puget Sound

- 2002 Guest Lecturer, Biology 112 and 311, Medical Biofilms, University of Puget Sound, Tacoma, WA

#### Northern Arizona University

- 2002-Pres. BIO 205, Introduction to Microbiology, Northern Arizona University
- 2003-Pres. BIO 488, Medical Microbiology, capstone course for senior Microbiology Majors, Northern Arizona University
- 2004 BIO/EE 141, Introduction to Biological Engineering, an introductory course for Electrical Engineering students interested in Biological Engineering, Northern Arizona University
- 2004-Pres Guest lecture, BIO471, Microbial Ecology, senior capstone

- 2004-Pres. BIO 502, Virology, a graduate course, Northern Arizona University, responsible for ½ of the class
- 2005-Pres. BIO 375/575, Ecology of Infectious Disease, a co-convened undergraduate/graduate class, Northern Arizona University
- 2006 BIO 346/546, Advanced Microbiology, an undergraduate/graduate co-convened class on advanced topics in microbiology, responsible for ¼ of the class
- 2007 BIO 401, Immunobiology, a senior capstone course for majors with an emphasis in cellular and molecular biology

At Northern Arizona University, I have developed new classes (Biological Engineering and Ecology of Infectious Disease) and new programs (Human Biology) that have enhanced the academic experience of students. The Human Biology program is a new undergraduate degree program with a focus on human genetics and genomics, with the purpose of preparing students equally well for graduate school or medical school. This is the first year of the program and maximum enrollment has already been achieved.

***Teaching at Northern Arizona University has been 55% of my academic appointment.***

## **PUBLICATIONS**

1. **Leid, JG**, Kerr, M, Selgado, C, Johnson, C, Moreno, G, Shirliff, ME, O'Toole, GA and Cope, E. Flagellar-mediated biofilm defense mechanisms of *Pseudomonas aeruginosa* against host derived lactoferrin. *Infection and Immunity*. 2009 submitted.
2. Lo Presti, SM, **Leid, JG**, Monetti, MS, Grondona, E, Bigliani, MC and Ponce, AA. 2009. Alterations in electrocardiographs parameters induced by acute infection with *Pseudomonas aeruginosa* wild-type and mucoid strains in mice, *In press*.
3. Panzer, MJ, Deeraksa, A, Smith, A, Wright, BD, Hindi, KM, Kascatan-Nebioglu, A, Torres, AG, Judy, BM, Hovis, CE, Hilliard, JK, Mallett, RJ, Cope, E, Estes, DM, Cannon, CL, **Leid, JG** and Youngs, WJ. 2009. Synthesis and in vitro efficacy studies of silver carbene complexes on biosafety level 3 bacteria. *Eur J Inorg Chem*. *In press*.
4. Aviles, HO, Stiles, JOP, Orshal, J, **Leid, J**, Sonnenfeld, G and Monroy, FP. 2009. Kinetics of systemic cytokine and brain chemokine expression in murine *Toxoplasma* infection. *J. Parasitol*. 95:84-92.
5. Brady, RA, **Leid, JG**, Calhoun, JH, Costerton, JW and Shirliff, ME. 2008. Osteomyelitis and the role of biofilms in chronic infection. *FEMS Immunol Med Microbiol*. 52:13-22.
6. Healy, DY, **Leid, JG**, Sanderson, AR and Hunsaker, DH. 2008. Biofilms with fungi in chronic rhinosinusitis. *Otolaryngol Head and Neck Surg.*, 138:641-647. *This publication included the cover of this volumn of the journal.*
7. **Leid, JG** and Nymeyer, MA. 2008. Innate immune responses to important, opportunistic bacterial biofilms. *Arch Immunol Ther Exp.*, *In press*.
8. **Leid, Jeff G**, Shirliff, ME, Cope, EK and Moreno, GO. 2008. Biofilms and Biosafety. *Applied Biosafety*, *In press*.
9. Muench A, Jacobsen SM, Fux C, **Leid JG**, Camper AK, Costerton JW, and Shirliff ME. 2008. *Staphylococcus aureus* genes unique to clinical strains are more often up-regulated in biofilms compared to the genes of laboratory strains. *J. Bacteriol.*, *In press*.

10. Lee, K, Costerton, JW, Ravel, J, Auerbach, RJ, Wagner, DM, Keim, P and **Leid, JG** 2007. Phenotypic and functional characterization of *Bacillus anthracis* biofilms. *Microbiology*. 153:1693-1701.
11. Brady RA, **Leid JG**, Kofonow J, Costerton JW, and Shirliff ME. 2007. Immunoglobulins to surface-associated biofilm immunogens provide a novel means of visualization of methicillin-resistant *Staphylococcus aureus* biofilms. *Appl Env Micro*. 73:6612-6619.
12. Vadasz, P, Vadasz, AS, **Leid, JG**, Dobbs, E, Andrade, A, Pouldel, R. 2007. Monotonic Growth of Motile Microorganisms. Published in, *Proceedings of the 2nd International Conference on Porous Media and its Applications in Science Engineering and Industry*, Kauai, Hawaii, USA.
13. Brady, RA, **Leid, JG**, Camper, AK, Costerton, JW and Shirliff, ME. 2006. Identification of *Staphylococcus aureus* proteins recognized by the antibody-mediated immune response to a biofilm infection. *Infect. Immun*. 74: 3415-3426.
14. Sanderson, AR, **Leid, JG**, Hunsaker, D. Bacterial biofilms on the sinus mucosa of human subjects with chronic rhinosinusitis. 2006. *Laryngoscope* 116:1121-1126.
15. Vadasz, AS., Vadasz, P, **Leid, JG**, Andrade, A, Cope, E, Dobbs, E, Yong, CK and Zavodnyik, S. 2006. Monotonic Growth of Motile Microorganisms, Published in the *Proceedings of IMECE2006*.
16. Marion-Ferey, K, **Leid, J**, Bouvier, G, Pasmore, M, Husson, G and Vilagines, R. 2005. Endotoxin level measurement in hemodialysis biofilm using 'the Whole Blood Assay'. *Artificial Organs*. 29:475-481.
17. Flikkema, PG and **Leid, JG**. 2005. Bacterial Communities: A Microbiological Model for Swarm Intelligence. Published in the *Proceedings of the Institute of Electrical and Electronic Engineers Swarm Intelligence Symposium*.
18. **Leid, JG**, Wilson, CJ, Shirliff, ME, Hassett, DJ, Parsek, MR and Jeffers, AK. 2005. The Exopolysaccharide Alginate Protects *Pseudomonas aeruginosa* Biofilm Bacteria from IFN- $\gamma$ -mediated Macrophage Killing. *J. Immunol*. 171:5886-5894.
19. **Leid, JG** and Jutila, MA. 2004. Impact of polyunsaturated fatty acids on cytoskeletal linkage of L-selectin. *Cell. Immunol*. 228:91-98.
20. **Leid, JG**, Shirliff, ME, Costerton, JW and Stoodley, P. 2002. Human leukocytes adhere to, penetrate, and respond to *Staphylococcus aureus* biofilms. *Infection and Immunity* 70(11):6339-6345.
21. **Leid, JG**, Hunter, D and Speer, CA. 2002. Early diagnosis of Johne's disease in the American Bison by monoclonal antibodies directed against antigen 85. *Annals of the New York Academy of Science*, 969:66-72.
22. **Leid, JG**, Speer, CA and Jutila, MA. 2002. Ultrastructural examination of cytoskeletal linkage of L-selectin and comparison of L-selectin cytoskeletal association to that of other human and bovine lymphocyte surface antigens. *Cellular Immunology* 215(2): 219-230.
23. **Leid, JG**, Steeber, DA, Tedder, TF, and Jutila, MA. 2001. Antibody binding to a conformation-dependent epitope induces L-selectin linkage to the cytoskeleton. *Journal of Immunology*, 166, 4899-4907.
24. **Leid, JG**, Speer, CA, and Jutila, MA. 1998. Comparative ultrastructure and expression of L-selectin on bovine  $\alpha\beta$  and  $\gamma\delta$ T cells. *J. Leukocyte Biology*, 64, 104-107.

### Invited Reviews

25. Cohen, M, Kofonow, J, Nayak, JV, Palmer, JN, Chiu, AG, **Leid, JG** and Cohen, NA. 2009. Biofilms in chronic rhinosinusitis: A review of clinical paradigms and future directions. *Am. J. Rhino.* 23:255-260.
26. **Leid, JG**. 2009. Bacterial biofilms resist key host defenses. *Microbe.* 4:66-70
27. Hunsaker, DH and **Leid, JG**. 2008. The relationship of biofilms in chronic rhinosinusitis. *Curr. Opin. Otolaryngology*, 16:237-241.
28. Shirliff M.E., **Leid JG**, Camper A.K. and Costerton, J.W. 2008. Antimicrobial agents and biofilm-mediated infections. *Curr Med Chem, In press.*
29. Brady, RA, **Leid, JG**, Costerton, JW and Shirliff, ME. 2006. Osteomyelitis: Clinical overview and mechanisms of infection persistence. *Clin. Micro. News.* 28:65-70.
30. **Leid, JG**, Costerton, JW, Shirliff, ME, Gilmore, M and Engelbert, M. 2002. Immunology of Staphylococcal biofilm infections in the eye: New tools to study biofilm endophthalmitis. *DNA and Cell Biology*, 21(5/6): 405-413.

### **Invited Books and Book Chapters**

31. **Leid, JG.**, Cope, E, Cohen, N and Palmer, J. 2009. Biofilms in Chronic Rhinosinusitis. In: Biofilm Infections: well characterized diseases, host response, and treatment options. Ed. Springer-Verlag Publishers, Heidelberg, Germany, *In press.*
32. **Leid JG**, Costerton, JW, Jeffers, AK, Monroy, FP and Shirliff ME. Recent advances in the diagnosis and treatment of acute septic arthritis. 2008. In: Progress in Arthritis Research. ed. Columbus F. Novel Science Publishers Inc. New York, NY, *In press.*
33. Selan, L, Kofonow, J, Vail, T, **Leid, JG** and Artini, M. 2008. Use of immunodiagnosics for the early detection of biofilm infections of native tissue or medical implants. In: Biofilms and Device Related Infections. Ed. Springer-Verlag Publishers, Heidelberg, Germany.
34. Nymeyer, M, Cope, E, Brady, R, Shirliff, ME and **Leid, JG**. 2008. Immune responses to indwelling medical devices. In: Biofilms and Device Related Infections. Ed. Springer-Verlag Publishers, Heidelberg, Germany, *In press.*
35. Brady, RA, **Leid, JG**, Calhoun, JH and Shirliff, ME. 2008. Infections of orthopaedic implants and devices. In. Biofilms and Device-Related Infections. Springer, New York, NY. ed. Shirliff ME and Leid JG., *In press.*
36. Shirliff, ME and **Leid, JG**, Editors. 2008. Biofilms and Device-Related Infections. Springer, New York, NY.
37. Shirliff, M.E., **Leid, JG.**, and Costerton, JW. 2003. Basic science of musculoskeletal infections. In: Musculoskeletal Infections. ed. Mader J.T. and Calhoun, J.H.. Marcel Dekker, Inc., New York, NY. 1-61.

### **Submitted**

38. Kofonow, J, Brady, RA, Vail, TL, Shirliff, ME and **Leid, JG**. Development of a lateral flow assay for the detection of biofilm-specific antibodies in rabbits with chronic osteomyelitis, 2009 *submitted.*
39. **Leid, JG**, Barker, D, Ulrich, R, Costerton, JW, Monroy, FP, Koppisch, A and Shirliff, ME. Insights into the Putative Role of Biofilm Pathogenesis in Chronic *Burkholderia pseudomallei* Infection: Proposing a New Model of Chronic Melioidosis. 2009, *submitted.*

40. **Leid, JG**, Parsek, M, Douglas N. Barker, Ricky Ulrich, Bethany Riggins, Matt Cornelison, and Moreno, G. Quorum-sensing and biofilm development in *Burkholderia pseudomallei* and *Burkholderia thailandensis*. 2009, submitted.
41. Brady RA, O'May GA, **Leid, JG**, Costerton JW, and Shirtliff ME. Resolution of *Staphylococcus aureus* biofilm infection using vaccination and antibiotic treatment. *Nature*. 2009, submitted.
42. Peters B, Jabra-Rizk MA., Scheper MA, **Leid, JG**, Costerton JW, and Shirtliff ME. Microbial and host cell interactions and differential protein expression in *Staphylococcus aureus* and *Candida albicans* dual species biofilms. *PNAS* 2009, submitted.
44. Cope, E, Kofonow, J, Shirtliff, ME, Dowd, S, Chiu, A, Palmer, J, Neeling, L, Gmerek, A, Smith, A, Cohen, N and **Leid, JG**. Resolving the etiology of chronic rhinosinusitis: Identification of novel bacterial pathogens responsible for CRS. *Nature* 2009, submitted.
45. Basaraba, RJ, Ackert, DF, Kirk, N, Lenaerts, A, Shanley, C, Park, Q, Nick, J, **Leid, JG** and Orme, I. Necrotic host cells enhance biofilm formation by *Mycobacterium tuberculosis*. *Nature* 2009 submitted.

**ABSTRACTS** - >50 presented at various local, state, national and international meetings.