

# SHELLEY E. HAYDEL

## CURRICULUM VITAE

**NAME:**

Shelley E. Haydel

**POSITION:**

Associate Professor

**ADDRESS:**

School of Life Sciences  
The Biodesign Institute  
Center for Infectious Diseases & Vaccinology  
Arizona State University  
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**LABORATORY WEBPAGE:**

<http://www.public.asu.edu/~shaydel/>

**EDUCATION**

INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
Louisiana Tech University, Ruston, LA	B.S.	1993	Microbiology
University of Alabama at Birmingham (UAB) Birmingham, AL	Ph.D.	2000	Microbiology
Washington University in St. Louis St. Louis, MO	Post-doc	2000 – 2005	Microbiology

**PROFESSIONAL EXPERIENCE**

1994	Laboratory Scientist, Louisiana Department of Public Health, Division of Laboratory Services Central Laboratory, Tuberculosis Laboratory, New Orleans, LA
2000 – 2005	Postdoctoral Research Associate, Department of Biology, Washington University, St. Louis, MO
2001 – 2004	Instructor, University College, College of Arts and Sciences, Washington University, St. Louis, MO
2005 – 2011	Assistant Professor, School of Life Sciences, The Biodesign Institute, Center for Infectious Diseases and Vaccinology, Arizona State University, Tempe, AZ
2011 – present	Associate Professor, School of Life Sciences, The Biodesign Institute, Center for Infectious Diseases and Vaccinology, Arizona State University, Tempe, AZ

**HONORS, AWARDS, AND FELLOWSHIPS**EXTERNAL

- 1997 ASM Sustaining Member Student Travel Grant, ASM General Meeting, Miami Beach, FL
- 1997 Leo Pine Student Travel Scholarship, Southeastern Branch ASM Meeting, Helen, GA
- 1999 Leo Pine Student Travel Scholarship, Southeastern Branch ASM Meeting, Jekyll Island, GA
- 1999 President's Award for graduate research and presentation, Southeastern Branch ASM, Jekyll Island, GA
- 2000 – 2002 Heiser Postdoctoral Research Fellowship, Heiser Program for Research in Leprosy and Tuberculosis, New York, NY
- 2002 Arnold Ravin-Muriel Rogers Travel Fellowship, Wind River Conference on Prokaryotic Biology, Estes Park, CO
- 2008 – 2009 National Academies Education Fellow, National Academies – Howard Hughes Medical Institute Summer Institute on Undergraduate Education in Biology, University of Wisconsin – Madison, Madison, WI

#### INTERNAL

- 1996 David E. Wells Memorial Scholarship, UAB, Department of Microbiology
- 1999 First place award recipient, Sigma Xi / UAB Graduate Student Research Day Competition, Birmingham, AL
- 2000 Samuel B. Barker Award for Excellence presented to the university's outstanding Ph.D. graduate, UAB Graduate School, Birmingham, AL
- 2002 – 2003 Postdoctoral Research Trainee, Washington University School of Medicine, NIH Infectious Diseases Training Grant, St. Louis, MO
- 2006 ASU Selected Applicant for grant submission to the Searle Scholars Program, Tempe, AZ
- 2006 Travel Award, ASU College of Liberal Arts and Sciences, Tempe, AZ
- 2008 Selected Applicant, National Academies – Howard Hughes Medical Institute Summer Institute on Undergraduate Education in Biology, ASU, Tempe, AZ
- 2011 Nominee, ASU College of Liberal Arts and Sciences, Zebulon Pearce Distinguished Teaching Award, Tempe, AZ
- 2012 Employee of the Month, ASU Biodesign Institute, Tempe, AZ, May 2012
- 2013 Teaching Excellence and Innovation Award, ASU School of Life Sciences, Tempe, AZ, May 2013

## **PUBLICATIONS**

### PEER-REVIEWED ARTICLES, PUBLISHED

- **Haydel, S. E.**, N. E. Dunlap, W. H. Benjamin, Jr. 1999. *In vitro* evidence of two-component system phosphorylation between the *Mycobacterium tuberculosis* TrcR/TrcS proteins. *Microbial Pathogenesis* 26:195-206. PMID: 10089160.
- **Haydel, S. E.**, W. H. Benjamin, Jr., N. E. Dunlap, and J. E. Clark-Curtiss. 2002. Expression, autoregulation, and DNA binding properties of the *Mycobacterium tuberculosis* TrcR response regulator. *Journal of Bacteriology* 184:2192-2203. PMCID: PMC134962.

- Clark-Curtiss, J. E. and **S. E. Haydel**. 2003. Molecular genetics of *Mycobacterium tuberculosis* pathogenesis. Annual Review of Microbiology 57:517-549. PMID: 14527290.
- **Haydel, S. E.** and J. E. Clark-Curtiss. 2004. Global expression analysis of two-component system regulators during *Mycobacterium tuberculosis* growth in human macrophages. FEMS Microbiology Letters 236:341-347. PMID: 15251217.
- **Haydel, S. E.** and J. E. Clark-Curtiss. 2006. The *Mycobacterium tuberculosis* TrcR response regulator represses transcription of the intracellularly-expressed Rv1057 gene, encoding a seven-bladed  $\beta$ -propeller. Journal of Bacteriology 188:150-159. PMCID: PMC1317589.
- **Haydel, S. E.**, C. M. Remenih, and L. B. Williams. 2008. Broad-spectrum in vitro antibacterial activities of clay minerals against antibiotic-susceptible and antibiotic-resistant bacterial pathogens. Journal of Antimicrobial Chemotherapy 61:353-361. PMCID: PMC2413170.
- Williams, L. B., **S. E. Haydel**, R. F. Giese, Jr., and D. D. Eberl. 2008. Chemical and mineralogical characteristics of French green clays used for healing. Clays and Clay Minerals. 56:437-452. PMCID: PMC2600539.
- Williams, L. B., **S. E. Haydel**, R. E. Ferrell. 2009. Bentonite, bandaids, and borborygmi. Elements 5:99-104. PMCID: PMC2895274.
- Cunningham, T. M., J. L. Koehl, J. S. Summers, and **S. E. Haydel**. 2010. pH-dependent metal ion toxicity influences the antibacterial activity of two natural mineral mixtures. PLoS ONE 5(3):e9456 (9 pages). PMCID: PMC2830476.
- Williams, L. B. and **S. E. Haydel**. 2010. Evaluation of the medicinal use of clay minerals as antibacterial agents. International Geology Review 52:745-770. PMCID: PMC2904249.
- **Haydel, S. E.** 2010. Extensively drug-resistant tuberculosis: a sign of the times and an impetus for antimicrobial discovery. Pharmaceuticals. 3:2268-2290. PMCID: PMC3002907.
- Otto, C. C., T. M. Cunningham, M. R. Hansen, and **S. E. Haydel**. 2010. Effects of antibacterial mineral leachates on the cellular ultrastructure, morphology, and membrane integrity of *Escherichia coli* and methicillin-resistant *Staphylococcus aureus*. Annals of Clinical Microbiology and Antimicrobials. 9:26 (13 pages). PMCID: PMC2949790. Highly accessed article designation.
- Treuer, R. and **S. E. Haydel**. 2011. Acid-fast staining and Petroff-Hausser chamber counting of mycobacterial cells in liquid suspension. Current Protocols in Microbiology. 20:10A.6.1-10A.6.6. DOI: 10.1002/9780471729259.mc10a06s20. PMCID: PMC3071241.
- Otto, C. C. and **S. E. Haydel**. 2011. Morphology of mature *Mycobacterium ulcerans* colonies. ASM MicrobeLibrary 2.0. <http://www.microbelibrary.org/index.php/library/resources/3359-mycobacterium-ulcerans-morphology>. April 28, 2011.
- Pang, X., G. Cao, P. F. Neuenschwander, **S. E. Haydel**, G. Hou, and S. T. Howard. 2011. The  $\beta$ -propeller gene Rv1057 of *Mycobacterium tuberculosis* has a complex promoter directly regulated by both the MprAB and TrcRS two-component systems. Tuberculosis (Edinb). 91:S142-S149. PMCID: PMC3248964.
- **Haydel, S. E.**, V. Malhotra, G. L. Cornelison, and J. E. Clark-Curtiss. 2012. The *prxAB* two-component system is essential for *Mycobacterium tuberculosis* viability and is induced during nitrogen-limiting conditions. Journal of Bacteriology. 194:354-361. PMCID: PMC3256671.
- Solanky, D. and **S. E. Haydel**. 2012. Adaptation of the neutral bacterial comet assay to assess antimicrobial-mediated DNA double-strand breaks in *Escherichia coli*. Journal of Microbiological Methods. 91:257-261. PMCID: PMC3486642.

- Otto, C. C. and **S. E. Haydel**. 2013. Exchangeable ions are responsible for the in vitro antibacterial properties of natural clay mixtures. PLoS ONE 8(5): e64068 (9 pages).

#### PEER-REVIEWED ABSTRACTS, PUBLISHED

- **Haydel, S. E.** and V. Stout. 2010. Improving student understanding of polymerase chain reaction by incorporating a kinesthetic learning activity. Journal of Microbiology & Biology Education. 11:81-82.

### **PEER-REVIEWED AND SPONSORED RESEARCH SUPPORT**

#### ACTIVE

- 5 R01 AT004690-05      Role: PI      04/01/09 – 03/31/14  
HHS-NIH-NCCAM      Total direct costs - \$1,125,000      Total costs - \$1,662,733  
“Antibacterial activities of natural minerals and alternative treatment for infections”  
Host Institution: Arizona State University
- SoLS Postdoctoral Interdisciplinary Research in the Life Sciences (PIRLS) Grant  
Role: Sponsor      05/01/12 – 04/30/13  
Total direct costs - \$7,500      Total costs - \$8,138  
“Nanoparticle delivery of the *Mycobacterium ulcerans* mycolactone macrolide cytotoxin as a cancer-specific therapeutic”  
Host Institution: Arizona State University  
Co-PIs: Sarojini Adusumilli (postdoctoral fellow in my lab) and Thrimoorthy Potta (postdoctoral fellow in the lab my collaborator, Kaushal Rege, ASU Chemical Engineering)

#### PENDING

- Grant 11279295      Role: Co-PI      07/01/13 – 06/30/18  
USDA-NIFA      Total direct costs - \$559,756      Total costs - \$799,934  
“Drug-free poultry production and vaccination against *E. coli* and *Salmonella* to prevent infections and mitigate multidrug resistance”  
Host Institution: Arizona State University

#### COMPLETED

- 1 R21 AT003618      Role: Co-PI      09/01/06 – 08/31/08  
HHS-NIH-NCCAM      Total direct costs - \$275,000      Total costs - \$438,970  
“Assess structure and microbial interactions of clay mineral antibacterial agent”  
Host Institution: Arizona State University
- 5 T32 AI007172      Role: Postdoctoral Research Fellow      11/01/02 – 10/31/03  
HHS-NIH-NIAID  
NRSA Institutional Infectious Diseases/Basic Microbial Pathogenic Mechanisms Training Grant  
Host institution: Washington University in St. Louis School of Medicine
- Postdoctoral Research Fellowship      Role: PI      07/01/00 – 06/30/02

Heiser Program for Research in Leprosy and Tuberculosis

“Identification and characterization of *Mycobacterium tuberculosis* genes regulated by the TrcR response regulator”

Host Institution: Washington University in St. Louis

## PRESENTATIONS

### INVITED AND/OR ORAL PRESENTATIONS

1. **Haydel, S. E.** Characterization of the *Mycobacterium tuberculosis* TrcR/TrcS two-component regulatory system. Washington University, Department of Biology, St. Louis, MO. November 8, 1999.
2. **Haydel, S. E.** Autoregulation and DNA binding characteristics of the *Mycobacterium tuberculosis* TrcR response regulator. Washington University Molecular Microbiology and Microbial Pathogenesis Departmental Retreat, Potosi, MO. November 4, 2000.
3. **Haydel, S. E.** Molecular and biochemical characterization of the *Mycobacterium tuberculosis* TrcR response regulator. Washington University School of Medicine, Infectious Diseases/Basic Microbiological Mechanisms Research Conference, St. Louis, MO. March 15, 2001.
4. **Haydel, S. E.** *Mycobacterium tuberculosis* two-component regulatory systems: focusing on the TrcR/TrcS system. Washington University, Department of Biology, Bioforum Seminar Series, St. Louis, MO. March 23, 2001.
5. **Haydel, S. E.** Global expression analysis of the *Mycobacterium tuberculosis* two-component regulators. Washington University School of Medicine, Infectious Diseases/Basic Microbiological Mechanisms Research Conference, St. Louis, MO. March 7, 2002.
6. **Haydel, S. E.** Mutagenesis of *Mycobacterium tuberculosis* two-component systems. Washington University School of Medicine, Infectious Diseases/Basic Microbiological Mechanisms Research Conference, St. Louis, MO. April 24, 2003.
7. **Haydel, S. E.** Molecular analysis of the *Mycobacterium tuberculosis* two-component system regulators. Washington University, Department of Biology, Bioforum Seminar Series, St. Louis, MO. October 1, 2004.
8. **Haydel, S. E.** Mycobacterial regulatory systems and pathogenesis. Arizona State University, School of Life Sciences Seminar, Tempe, AZ. September 16, 2005.
9. **Haydel, S. E.** Mycobacterial regulation and pathogenesis. Arizona State University, Biodesign Institute External Advisory Board meeting, Tempe, AZ. November 1, 2006.
10. **Haydel, S. E.** Broad-spectrum in vitro antibacterial activities of clay minerals against antibiotic-susceptible and antibiotic-resistant bacterial pathogens. Geological Society of America, Annual Meeting, Denver, CO. October 29, 2007.
11. **Haydel, S. E.** Broad-spectrum antibacterial activities of clay minerals. American Chemical Society-Clay Minerals Society, National Meeting, New Orleans, LA. April 6, 2008.
12. **Haydel, S. E.** Antibiotic resistance: What happens when the drugs can't kill the bugs? Arizona Science Center, Phoenix, AZ. May 7, 2010.
13. **Haydel, S. E.** and V. Stout. Using your own hands, Bendaroos<sup>®</sup>, and supercoiled yarn to model PCR. Microbrew Session: Mixing Ideas for Successful Teaching Strategies in Microbiology. 17th Annual American Society for Microbiology Conference for Undergraduate Educators, San Diego, CA, May 20, 2010.

14. **Haydel, S. E.** Alternative and complementary antibacterials. Humanist Society of Greater Phoenix. Phoenix, AZ, August 28, 2011.
15. **Haydel, S. E.** Complementary and alternative medicine approach for treating topical bacterial infections. IV International Conference on Environmental, Industrial and Applied Microbiology (BioMicroWorld 2011), Torremolinos, Málaga, Spain, September 14 – 16, 2011.
16. **Haydel, S. E.** Validating natural therapies: Do they work? Spirit of the Senses Organization, Biodesign Institute, Tempe, AZ, August 6, 2012.
17. **Haydel, S. E.** Characterizing and creating antibacterial clay minerals. Arizona Nanotechnology Cluster Seminar, Tempe, AZ, August 23, 2012.

#### POSTER PRESENTATIONS

1. Harris, R. H., **S. E. Haydel**, W. H. Benjamin, Jr., and N. E. Dunlap. Identification of response regulator genes in *Mycobacterium tuberculosis*. American Society for Microbiology (ASM) General Meeting, Washington, DC. 1995.
2. **Haydel, S. E.**, R. H. Harris, W. H. Benjamin, Jr., and N. E. Dunlap. Identification of sensor gene fragments in *Mycobacterium tuberculosis*. IBC Mycobacterial Infection Conference, Washington, DC. 1996.
3. Harris, R. H., Y. Huang, **S. E. Haydel**, W. H. Benjamin, Jr., and N. E. Dunlap. Construction of a *Mycobacterium tuberculosis* library and cloning of response regulator genes. IBC Mycobacterial Infection Conference, Washington, DC. 1996.
4. **Haydel, S. E.**, R. H. Harris, W. H. Benjamin, Jr., and N. E. Dunlap. Identification of a two-component regulatory system in *Mycobacterium tuberculosis*. ASM General Meeting, Miami Beach, FL. 1997.
5. **Haydel, S. E.**, C. J. Greeson, W. H. Benjamin, Jr., and N. E. Dunlap. Characterization of the *Mycobacterium tuberculosis* TrcS sensor/histidine kinase. Southeastern Branch ASM Meeting, Helen, GA. 1997.
6. **Haydel, S. E.**, N. E. Dunlap, and W. H. Benjamin, Jr. *In vitro* characterization of the *Mycobacterium tuberculosis* TrcR-TrcS two-component system. ASM General Meeting, Atlanta, GA. 1998.
7. **Haydel, S. E.**, N. E. Dunlap, and W. H. Benjamin, Jr. Autoregulation and target promoters of the *Mycobacterium tuberculosis* TrcR response regulator. Southeastern Branch ASM, Jekyll Island, GA. October 28, 1999.
8. **Haydel, S. E.**, N. E. Dunlap, and W. H. Benjamin, Jr. Autoregulation and characterization of the *Mycobacterium tuberculosis trcRS* two-component system. ASM General Meeting, Chicago, IL. 1999.
9. **Haydel, S. E.**, W. H. Benjamin, Jr., N. E. Dunlap, and J. E. Clark-Curtiss. Targeted promoters of the *Mycobacterium tuberculosis* TrcR response regulator. Keystone Meeting: Molecular and Cellular Aspects of Tuberculosis Research in the Post Genome Era, Taos, NM. 2001.
10. **Haydel, S. E.**, W. H. Benjamin, Jr., N. E. Dunlap, and J. E. Clark-Curtiss. DNA binding properties of the *Mycobacterium tuberculosis* TrcR response regulator. ASM General Meeting, Orlando, FL. 2001.
11. **Haydel, S. E.** and J. E. Clark-Curtiss. Global analysis of *Mycobacterium tuberculosis* two-component system regulators. World Congress on Tuberculosis, Washington, DC. 2002.

12. **Haydel, S. E.** and J. E. Clark-Curtiss. Global expression analysis of *Mycobacterium tuberculosis* two-component system regulators. Wind River Conference on Prokaryotic Biology, Estes Park, CO. 2002.
13. **Haydel, S. E.** and J. E. Clark-Curtiss. Construction and proteomic analysis of an *Mycobacterium tuberculosis* *trcRS* mutant. ASM General Meeting, Washington, DC. 2003.
14. **Haydel, S. E.** and J. E. Clark-Curtiss. Transcriptional repression of the *rv1057* gene by the *Mycobacterium tuberculosis* TrcR response regulator. ASM General Meeting, New Orleans, LA. 2004.
15. **Haydel, S. E.** and J. E. Clark-Curtiss. The *Mycobacterium tuberculosis* TrcR response regulator represses expression of the *rv1057* gene encoding a seven-bladed  $\beta$ -propeller. Keystone Meeting: Tuberculosis: Integrating Host and Pathogen Biology, Whistler, British Columbia. 2005.
16. Williams, L. B., **S. E. Haydel**, and D. D. Eberl. Scientific validation of antibacterial minerals needed for public policy support. Geological Society of America Annual Meeting, Philadelphia, PA. 2006.
17. Williams, L. B., **S. E. Haydel**, D. D. Eberl. Chemical and mineralogical characteristics of French green clays used for healing. Geological Society of America, Annual Meeting, Denver, CO. October 29, 2007.
18. Cotey, A. and **S. E. Haydel**. Antibacterial properties of natural clay minerals. ASU School of Life Sciences 15th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 28, 2008.
19. Turner, A., C. Remenih, **S. E. Haydel**, and L. B. Williams. Comparing antibacterial clay properties in search of new medicinal applications. American Chemical Society-Clay Minerals Society, National Meeting, New Orleans, LA. April 6, 2008.
20. Borchardt, T. and **S. E. Haydel**. Assessing the physicochemical properties of antibacterial clay minerals. American Chemical Society-Clay Minerals Society, National Meeting, New Orleans, LA. April 7, 2008.
21. Borchardt, T. and **S. E. Haydel**. Assessing the physicochemical properties of antibacterial clay minerals. ASM Arizona-Southern Nevada Branch 47th Annual Meeting, Tempe, AZ. April 12, 2008.
22. Guida, B. S. and **S. E. Haydel**. Comparative morphological and ultrastructural studies of wild-type and response regulator mutant strains of *Mycobacterium tuberculosis*. Arizona Imaging and Microanalysis Society Conference, Tucson, AZ. March 12, 2009.
23. Cotey, A., T. Borchardt, and **S. E. Haydel**. Minimum bactericidal concentrations and in vitro killing activities of a natural mineral mixture. ASU School of Life Sciences 16th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 27, 2009.
24. Koehl, J., T. Borchardt, and **S. E. Haydel**. Chelation of natural antibacterial mineral mixtures results in a decrease in bactericidal activity. ASU School of Life Sciences 16th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 27, 2009.
25. Borchardt, T. and **S. E. Haydel**. Characterization of the bactericidal properties and mechanism of action of antibacterial minerals. ASM General Meeting, Philadelphia, PA. 2009.
26. Guida, B. S. and **S. E. Haydel**. The *Mycobacterium tuberculosis* PdtA two-component response regulator mediates early intracellular adaptation and modulation of cellular morphology. ASM General Meeting, Philadelphia, PA. 2009.

27. Otto, C. C. and **S. E. Haydel**. Ultrastructural analysis of methicillin-resistant *Staphylococcus aureus* exposed to antibacterial leachates. Arizona Imaging and Microanalysis Society Conference, Tempe, AZ. March 12, 2010.
28. Cotey, A. and **S. E. Haydel**. Minimum bactericidal concentrations and cytotoxic effects of antibacterial mineral mixtures. ASU School of Life Sciences 17th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 26, 2010.
29. Koehl, J. and **S. E. Haydel**. Investigating the role of iron in the antibacterial activity of natural mineral mixtures. ASU School of Life Sciences 17th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 26, 2010.
30. Otto, C. C., M. Hansen, and **S. E. Haydel**. Analysis of *Escherichia coli* and methicillin-resistant *Staphylococcus aureus* ultrastructure and membrane integrity following exposure to antibacterial mineral leachates. ASM Arizona-Southern Nevada Branch 49th Annual Meeting, Las Vegas, NV. April 17, 2010.
31. Koehl, J. L., T. M. Cunningham, and **S. E. Haydel**. Investigating iron involvement in pH-dependent mineral mixture toxicity. ASM Arizona-Southern Nevada Branch 49th Annual Meeting, Las Vegas, NV. April 17, 2010.
32. **Haydel, S. E.** and V. Stout. Improving student understanding of polymerase chain reaction by incorporating a kinesthetic learning activity. 17th Annual ASM Conference for Undergraduate Educators, San Diego, CA, May 20 – 23, 2010.
33. Cornelison, G. L., V. Malhotra, and **S. E. Haydel**. The *prfAB* two-component system is essential for *Mycobacterium tuberculosis* viability. ASM General Meeting, New Orleans, LA. May 21 – 24, 2011.
34. Otto, C. C. and **S. E. Haydel**. Exploiting natural products to combat antibiotic-resistant pathogens. 2011 Science Foundation Arizona Grand Challenges Summit, Flagstaff, AZ. May 22 – 24, 2011.
35. Otto, C. C., J. L. Koehl, and **S. E. Haydel**. The role of oxidative stress in the antibacterial mechanism of action of a natural clay mineral mixture. IV International Conference on Environmental, Industrial and Applied Microbiology (BioMicroWorld 2011), Torremolinos, Málaga, Spain, September 14 – 16, 2011.
36. Loes, A. N. and **S. E. Haydel**. Physicochemical properties that influence activity of synthetic microbicidal mixtures. ASU School of Life Sciences 19th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 30, 2012.
37. Solanky, D. and **S. E. Haydel**. Optimization of the bacterial comet assay for the detection of DNA double-strand breaks. ASU School of Life Sciences 19th Annual Undergraduate Research Poster Symposium, Tempe, AZ. March 30, 2012.
38. Otto, C. C. and **S. E. Haydel**. Oxidative stress contributes to the antibacterial activity of a natural clay mineral mixture. ASM Arizona-Southern Nevada Branch 51st Annual Meeting, Tempe, AZ. April 21, 2012.
39. Loes, A. N. and **S. E. Haydel**. Physicochemical properties that influence activity of synthetic microbicidal mixtures. ASM Arizona-Southern Nevada Branch 51st Annual Meeting, Tempe, AZ. April 21, 2012.
40. Solanky, D. and **S. E. Haydel**. Optimization of the bacterial comet assay for the detection of DNA double-strand breaks. ASM Arizona-Southern Nevada Branch 51st Annual Meeting, Tempe, AZ. April 21, 2012.



41. Otto, C. C. and **S. E. Haydel**. Chemical and mineralogical characterization of antibacterial and non-antibacterial clay mineral mixtures. Geobiology Gordon Research Conference – The Future of Geobiology: Perspectives from Graduate and Postdoctoral Research, Ventura, CA. January 27, 2013.
42. Otto, C. C. and **S. E. Haydel**. Chemical and mineralogical characterization of antibacterial and non-antibacterial clay mineral mixtures. Geobiology Gordon Research Conference – Microbe-Mineral Interactions, Biomineralization, and the Rock Record, Ventura, CA. January 30, 2013.
43. Adusumilli, S., E. Fox, R. S. Boyles, and **S. E. Haydel**. Effect of hydrated, antibacterial clay minerals on *Mycobacterium ulcerans* *in vitro* and *in vivo* growth. WHO Geneva Meeting on control and research of Buruli ulcer. WHO Headquarters, Geneva, Switzerland. March 25 – 27, 2013.
44. Loes, A. N. and **S. E. Haydel**. An improved method for rapid, high-quality RNA isolation and purification from *Escherichia coli* exposed to clay mineral mixtures and leachates for metatranscriptomic analysis. ASM General Meeting, Denver, CO. May 21, 2013.
45. Otto, C. C., J. Koehl, D. Solanky, and **S. E. Haydel**. Redox-active metal ions from antibacterial clay minerals damage macromolecules via oxidative stress. ASM General Meeting, Denver, CO. May 21, 2013.

## TEACHING

2001 - 2004	Instructor, Biology 5392 Molecular Microbiology and Pathogenesis, Dept. of Biology, University College, Washington University, St. Louis, MO
2006 - present	Instructor, MIC 381 Pathogenic Microbes, ASU School of Life Sciences, Tempe, AZ
2007 - present	Instructor, MIC 379 Medical Bacteriology, ASU School of Life Sciences, Tempe, AZ
2008	Lecturer, BDE 598 Fundamentals of Biological Design, Immunology and Infectious Diseases Module, ASU, Tempe, AZ
2009	Instructor, BIO/MCB/MIC 591 Scientific Teaching, ASU School of Life Sciences, Tempe, AZ
2009	Lecturer, MIC 598 Integrative Microbiology Topics, ASU School of Life Sciences, Tempe, AZ
2009, 2011	Guest lecturer, BIO 189 Life Sciences Career Paths, ASU School of Life Sciences, Tempe AZ
2010	Co-instructor, MIC/MBB 445 Techniques in Molecular Biology, ASU School of Life Sciences, Tempe, AZ
2010	Co-instructor, MIC/MBB 446 Techniques in Molecular Biology Lab, ASU School of Life Sciences, Tempe, AZ

## INSTRUCTIONAL SUPPORT AND FUNDING

- National Academies – Howard Hughes Medical Institute Summer Institute on Undergraduate Education in Biology Award in agreement with the ASU College of Liberal Arts and Sciences.  
07/01/08 – present  
Total amount - \$5,000  
Co-recipients – Shelley E. Haydel and Valerie Stout

## **SERVICE**

### PROFESSIONAL SERVICE AND SOCIETY MEMBERSHIPS

- Member, American Society for Microbiology, 1995 – present
- Member, Geological Society of America, 2007 – 2008
- Member, Clay Minerals Society, 2008 – 2009
- Member, American Chemical Society, 2009 – present
- Member, The International Society for Complementary Medicine Research, 2009 – 2010
- Member, Arizona – Southern Nevada ASM Branch, 2010 – 2011
- Judge, Graduate and undergraduate student oral presentations, 49th Annual Southern Nevada ASM Branch Meeting, April 17, 2010
- Review Editor, Frontiers in Cellular and Infection Microbiology Editorial Board, 2010 – present
- Scientific Collaborator, Sign of Science ([www.HearTheAnswer.com](http://www.HearTheAnswer.com)), 2010 – present

### NATIONAL SERVICE – REVIEWER – NATIONAL FUNDING AGENCIES

- NIH National Institute of Allergy and Infectious Diseases, Special Emphasis Panel Study Section, RFA Development of Novel Interventions and Tools for the Control of Malaria, Neglected Tropical Diseases and their Vectors, ZAI1-GSM-M, 2008
- NIH National Institute of Allergy and Infectious Diseases, Microbiology and Infectious Diseases B Subcommittee, February 2009
- US Army Medical Research and Material Command grants program, May 2009
- NIH National Institute of Allergy and Infectious Diseases, RC1 Challenge Grants, Special Emphasis Panel/Scientific Review Group ZRG1-IMM-E, 2009
- NIH National Institute of Allergy and Infectious Diseases, Microbiology and Infectious Diseases B Subcommittee, October 2009
- NIH National Institute of Allergy and Infectious Diseases, Special Emphasis Panel Study Section, U01 International Collaborations in Infectious Disease Research (ICIDR), ZAI1-GSM-M-J1, 2009
- NSF Division of Molecular and Cellular Biosciences, April 2011
- NIH National Center for Complementary & Alternative Medicine, Special Emphasis Panel Study Section, RFA Mechanistic Research on CAM Natural Products, ZAT1 SM (24), July 2011
- NIH National Center for Complementary & Alternative Medicine, Special Emphasis Panel Study Section, RFA Mechanistic Research on CAM Natural Products, ZAT1 SM (25), Feb-March 2012

### NATIONAL SERVICE – AD HOC REVIEWER – JOURNALS

- ACS Applied Materials & Interfaces, 2008
- Immunology Letters, 2008
- ACS Applied Materials & Interfaces, 2009
- ACS Applied Materials & Interfaces, 2010
- Nano LIFE, 2011

- BMC Microbiology, 2013

#### STATE SERVICE – REVIEWER – STATE FUNDING AGENCIES

- Northern Arizona University (TRIF) competitive grants program, 2009

#### UNIVERSITY SERVICE

- Member, Phi Kappa Phi, UAB Chapter, 2000
- Member, ASU Faculty Women's Association, 2005 – 2006
- Internal ASU Reviewer, Science Foundation Arizona Competitive Advantage Award New Opportunity Program, 2007
- Member, ASU Radiation Safety Committee, 2012 – present

#### COLLEGE SERVICE

- Honors Disciplinary Faculty, ASU Barrett Honors College, 2006 – 2007
- Member, ASU Graduate Program in Global Health Exploratory Committee, 2008 – 2009

#### SCHOOL OF LIFE SCIENCES SERVICE

- Member, Research and Training Initiatives Committee, ASU School of Life Sciences, 2005 – 2008
- Member, ASU School of Life Sciences Undergraduate Curriculum Review Committee for Microbiology, 2006 – 2009
- Scientific Contributor, School of Life Sciences Ask-a-Biologist, 2006 – present
- Member, ASU School of Life Sciences Undergraduate Programs Committee, 2008 – present
- Invited Guest Scientist, ASU School of Life Sciences Ask-a-Biologist. Special program with Mesa Academy student co-hosts. Available on ASU iTunes. 2008
- Invited Guest Scientist, ASU School of Life Sciences Ask-a-Biologist. ASU promotional video produced by Apple. December 2, 2008.
- Member, ASU School of Life Sciences MCB Graduate Program Admissions Committee, 2011 – 2012
- Member, ASU School of Life Sciences MIC Graduate Program Admissions Committee, 2012 – present
- Member, ASU School of Life Sciences Scholarship and Awards Selection Committee, 2012
- Member, ASU School of Life Sciences Instructional Professional Search Committee, 2012

#### INSTITUTE AND CENTER SERVICE

- Member, ASU Biodesign Institute Center for Infectious Diseases and Vaccinology Building B Operations Committee, 2006 – 2010
- Member, ASU Biodesign Institute Center for Infectious Diseases and Vaccinology Seminar Committee, 2007 – 2008
- Member, ASU Biodesign Institute Faculty Advisory Team, Space Allocation Team, 2011 – present
- Reviewer, ASU Biodesign Institute Industrial Liaison Program, 2013 – present

## PROFESSIONALLY-RELATED COMMUNITY SERVICE

- Invited Guest Scientist and Speaker, Girls, Math and Science Partnership, Carnegie Science Center and Arizona Science Center, Phoenix, AZ, 2009
- Invited Guest Scientist and Speaker, Arizona Science Center, Adults' Night Out Science Lecture Program, Phoenix, AZ, 2010
- Laboratory Host and Tour, Hands-On Science Day for young female students (grades 5 – 12) who won Excellence Awards from Central Arizona Chapter of the Association for Women in Science at the 2011 Arizona Science and Engineering Fair, May 5, 2011
- Invited Guest Scientist and Speaker, Humanist Society of Greater Phoenix, Phoenix, AZ, August 28, 2011
- Laboratory Host and Tour, Hands-On Science Day for young female students (grades 5 – 12) who won Excellence Awards from Central Arizona Chapter of the Association for Women in Science at the 2012 Arizona Science and Engineering Fair, May 4, 2012

## **PUBLIC OUTREACH AND SCIENTIFIC RECOGNITION**

### TELEVISION PRODUCTIONS, NEWSCASTS, OR RADIO INTERVIEWS

1. "Antibacterial clays." Medstar Television interview/production of a 2-minute health news segment for nationwide ABC network affiliates. Interview and taping, March 2007. Segment released June 2007. Shown as health segment on Phoenix ABC15 news.
2. Phoenix ABC15 news interview discussing tuberculosis. May 2007.
3. Live radio interview with John Pienaar and Lesley Ashmall on BBC Radio 5 LIVE, a national network in the UK. October 28, 2007.
4. MicrobeWorld Radio interview for 90-second radio feature on antibacterial clay minerals. Finger Lakes Productions International for the American Society of Microbiology. January 25, 2008.
5. Sign of Science interview. "Clay has been used in folk remedies to treat infections for centuries. Is there any evidence it works?" January 2008. Transcript is available online at <http://www.heartheanswer.com/index.php?action=feature&qid=475>
6. ReachMD Radio program interview discussing the antibacterial clay minerals. April 24, 2008. Broadcasted on XM Satellite radio.
7. Phoenix Channel 12 News Today segment, "Germsiest Desk", aired on November 16, 2011. Present in the studio and on the live news show. <http://www.azcentral.com/video/#/Germs+on+your+office+desk/1278506955001>

### PRESS AND NEWS RELEASES

1. "ASU researchers test antibacterial effects of healing clays: National Institutes of Health fund humanitarian response." ASU College of Liberal Arts and Science News Release. [http://clas.asu.edu/newsevents/newsreleases/2006/WilliamsHaydelResearch\\_11012006.htm](http://clas.asu.edu/newsevents/newsreleases/2006/WilliamsHaydelResearch_11012006.htm). November 1, 2006.
2. "Drugstore in the dirt." The Geological Society of America News Release. <http://www.geosociety.org/news/pr/07-58.htm>. October 25, 2007.

3. "Healing clays show promise for fighting deadly MRSA superbug infections, other diseases." American Chemical Society Press Release. April 6, 2008.
4. "Mineral studies advance antibacterial alternatives." ASU News Release. [http://asunews.asu.edu/20100303\\_killingclay](http://asunews.asu.edu/20100303_killingclay). March 3, 2010.
5. "Attacking MRSA with metals from antibacterial clays." ASU News Release. [http://asunews.asu.edu/20130517\\_antibacterialclays](http://asunews.asu.edu/20130517_antibacterialclays). May 17, 2013.

#### PODCASTS

1. "Antibacterial Clay, a New Medical Frontier." ASU School of Life Sciences Science Studio. Vol. 002. November 2006. <http://sols.asu.edu/podcasts/index.php?year=2007>
2. "Tuberculosis." ASU iPopping Podcast Vol. 021. Student Programming, May 2007.
3. "Mud Science – Healing with Clays." ASU Ask A Biologist with Mesa Academy student co-host. October 2008. <http://askbiologist.asu.edu/podcasts/mud-science-healing-clays>

#### NEWS ARTICLES AND MEDIA INTERVIEWS

1. "ASU researchers test antibacterial effects of healing clays: National Institutes of Health fund humanitarian response." ASU School of Life Sciences. [http://sols.asu.edu/sols\\_news/43\\_news\\_06.php](http://sols.asu.edu/sols_news/43_news_06.php). November 1, 2006.
2. "Researchers mold clay into potential therapy." ASU home web page. [http://www.asu.edu/news/features/archive\\_fall06.htm](http://www.asu.edu/news/features/archive_fall06.htm). November 2, 2006.
3. "Move over, penicillin: Researchers mold clay into potential therapy." ASU Insight newspaper. [http://www.asu.edu/news/stories/200611/20061102\\_clay.htm](http://www.asu.edu/news/stories/200611/20061102_clay.htm), November 2, 2006.
4. "Clays heal skin disease: Researchers study healing properties of old French remedy." ASU State Press student newspaper. <http://www.asuwebdevil.com/issues/2006/11/06/news/698684>. November 5, 2006.
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6. "Bacteria beware! Novel technologies could knockout old enemies." ASU School of Life Sciences Newsletter, Spring 2007, Volume 3, No. 1, p. 16-17.
7. "Researchers delve into antibacterial properties of particular French clays." Microbe, The News Magazine of the American Society for Microbiology, February 2007, Vol. 2, No. 2.
8. "Antibacterial effects of healing clays." 2007. Geology Today. News and Comment. 23(2):51.
9. "Healing clay." ASU Research Magazine, Magazine of Scholarship and Creative Activity at ASU, Spring/Summer 2007 edition, p. 20-23.
10. "The dirt on curing clays". Discovery News. <http://dsc.discovery.com/news/2007/10/25/clay-cure-bacteria.html>. October 25, 2007.
11. "Scientists find dirty way to kill bacteria." The Washington Times. <http://www.washingtontimes.com/article/20071026/NATION/110260077/1002/NATION> October 26, 2007.
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- <http://www.sciencedaily.com/releases/2007/10/071025120514.htm>. October 26, 2007.
13. "French muck: is this the new penicillin?" The London Independent. <http://news.independent.co.uk/health/article3104663.ece>. October 28, 2007.
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  15. "Clay that kills: ground yields antibacterial agents." Science News. Vol. 172, No. 18, p. 276. <http://www.sciencenews.org/articles/20071103/fob4.asp>. November 3, 2007.
  16. "How do you stop flesh-eating bacteria? Apply some clay." Scientific American. <http://www.sciam.com/article.cfm?SID=mail&articleID=264E90CF-E7F2-99DF-3457F4A15A6235B9&chanID=sa003>. November 9, 2007.
  17. Reader's Digest interview for Medical Breakthrough story on antibacterial clay minerals. December 20, 2007.
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  19. "Mud harnessed to fight infection." HealthDay, NY Times syndicate. Featured in The Washington Post, Yahoo News, and U.S. News & World Report. April 6, 2008. <http://www.healthday.com/Article.asp?AID=614228>
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  21. "ASU professors study healing potential of clay." The Arizona Republic. Front page story, top of fold. April 7, 2008. <http://www.azcentral.com/community/tempe/articles/2008/04/07/20080407claycure0407.html>
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  23. "Clays hold promise in fight against infections." Arizona State University News. Featured on the [www.asu.edu](http://www.asu.edu) home page. April 7, 2008. [http://asunews.asu.edu/20080409\\_healingclay](http://asunews.asu.edu/20080409_healingclay)
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