APPENDICES

A. Student and Faculty Statistical Summary
B. Financial Analysis Summary
C. External Community Involvement Names and Organizations
D. Placement of Microbiology Graduates (2013/2014 – 2017/2018)
E. Faculty CV
F. Baccalaureate Program Review (Program Unit Information & Graduation Based Metrics)
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Appendix A: Student and Faculty Statistical Summary
(*Note*: Data provided by Institutional Effectiveness)

Microbiology	2013-14	2014-15	2015-16	2016-17	2017-18*
Student Credit Hours Total [1]	**8,389**	**8,184**	**7,767**	**7,184**	**7,116**
Student FTE Total [2]	**279.63**	**272.80**	**258.90**	**239.47**	**237.2**
Student Majors [3]	*276*	*297*	*303*	*298*	*258*
Microbiology	270	292	297	291	254
Biotechnician	0	0	0	1	2
Program Graduates [4]					
Bachelor Degree	39	30	40	50	53
Student Demographic Profile [5]					
Female	126	126	128	149	137
Male	150	171	175	149	121
Faculty FTE Total [6]	**12.67**	**13.55**	**14.12**	**11.93**	n/a
Adjunct FTE	7.11	6.89	6.9	4.63	n/a
Contract FTE	5.56	6.66	7.22	7.3	n/a
Student/Faculty Ratio [7]	**22.07**	**20.13**	**18.34**	**20.07**	n/a

Appendix B: Financial Analysis Summary
(This information is provided by the Provost's Office)

Microbiology w/CE IW Support					
Funding	**13-14**	**14-15**	**15-16**	**16-17**	**17-18**
Appropriated Fund	774,993	808,266	904,709	1,051,000	1,013,871
Other:					
Special Legislative Appropriation					
Grants or Contracts					
Special Fees/Differential Tuition	7,491	412	0	13,202	8,173
CE - Instructional Wage Support	165,610	154,240	147,125	141,275	116,135
Total	948,094	962,918	1,051,834	1,205,477	1,138,179
FTE	279.63	272.80	258.90	239.47	237.20
Cost per FTE	$3,390	$3,530	$4,063	$5,034	$4,798

Appendix C: External Community Involvement Names and Organizations

Name	Organization
Ken Burgener	Sewage Treatment North Davis County
Evan Call	EC Services
Cristie Cothran	Fresenius Medical Care
Steve Curtis	Nutraceutical Corp.
Karen W. Fairbanks	The Distribution Group (TDG)
Kevin Jensen	Nelson Laboratory
Bruce Keswick	Procter & Gamble
Stephen Merrigan	ARUP
Randall Thunell	Vivolac Culture Company

Appendix D: Placement of Microbiology Graduates
(data collected from exit surveys and exit interviews)

2013-2014 GRADUATES	
Kyle Anderson	Job – Pharmacy
Enoch Brempong	Job – Dannon
Daniel Bowcutt	Dental School, West Jordan, UT
Erik Bruun	Dental School
Natalie Clark	
Megan DeMarco	Southern Research
Sarah Eccles	
Sara Erwin	
Jeffrey Eyring	Medical School Applicant
Jimmy Franco	
Matthew Fullmer	Medical School, Midwestern, AZ
Michael Goertzen	Osteopathic School, Lake Erie college of OS, FL
Randon Gruninger	Public Health degree program
Craig Housley	
Sean Hunt	
Lauren Johnson	BYU Graduate School
Heidi Krebs	
Madison Landreth	
Sean Lindsay	Dental School
McKenzee Murdock	Medical School applicant
Dylan Murnahan	
Jared Noall	
Scott Nagao	Medical School, Midwestern, AZ
Alexandra Pashley	
Joshua Penrod	Medical School applicant
AmyJo Proctor	Job- WSU COS Museum
Rebecca Reiva	
Kristi Russell	UofU Grad School applicant
Richard Shafer	
Caitlin Shaw	University of Utah Research Lab
Logan Torgison	Job-Clinical Lab Tech, BioSci Lab, Bozeman, MT
Hilary Vachon	
Brandon Wilde	Las Vegas Crime lab

2014-2015 GRADUATES	
Tyler Allen	MS program, USU, Dept. of Nutrition
Trevor Annis	Medical School, University of Utah
Brody Arave	Job
Kelli Behunin	Job - ARUP
Emma Bentley	Pacific Northwest Medical School, OR
Kayla Blackford	Job - ARUP
Edward Brown	MS program, USU, Dept. of Nutrition
Larissa Brunty	Medical School applicant
William Christensen	Medical School – Rocky Vista COM (DO)
Alisha Cluff	Medical School - Rocky Vista CO
Cristie Cothran	Job - ARUP
Gabriel Diarte	Job –SLC
Corby Dixon	Dental School - Rosemont, UT
Kelci Doxey	Vet School applicant
Kyle Gordon	
Sheldon Greener	Job – Insurance Company
Jordan Hendricks	Cardiac Perfusion School
Ashlee Henry	Working on Master's degree through Starbucks program
Anna Ivanova	Job – Dairy Management Corp, SLC, UT
Casey Kariya	Dental School applicant
Kyleen Magdaluyo	
Megan Medina	
Blake Montgomery	Job – Phlebotomist, PA School applicant
Lauren Montierth	Dental School, Utah, UT
Keyvan Namazi	Dental School, Baylor
Chance Nielsen	
Jason Ogden	
Randy Olson	
Kyle Palmer	Medical School applicant
Shawn Perry	Dental School Indiana University
Steven Pitcher	Dental School
David Sion	Medical School applicant
Sye Speth	Medical School applicant
Alyssa Staley	
Jami Stansfield	Medical School, Caribbean St. George's University
Colten Stokes	PA School applicant (wait-listed)
Kyle Syme	Medical School applicant
Darin Toone	
Tate Trujillo	Dental School, Utah, SLC, UT
Casey Ward	
Garrett Ward	Medical School applicant
Taylor Wuthrich	

2015-2016 GRADUATES	
Shelly Barker	ARUP Molecular Oncology Lab
Daniel Belnap	Medical School applicant – June 2016
Isaac Bowen	Graduate School, Utah State University, UT
Daniel Chavez	Dental School, Utah
John Cozzens	Dental School, CASE Western Reserve University
Raquel Dee	PA School Applicant - 2016
Andrew Dilks	Applicant, Masters of Health Admin, Weber State University
Vanessa Douangdara	
Evan Drage	
David Evans	Dental School, University of Utah, UT
Nathan Ferreira	PA School
Aaron Flanagan	
Zackary Flaten	Medical School Applicant – April 2017
Kaytee Flint	Job applicant CA (USDA)
Nicholas Friddle	PA School applicant
Spencer Gatten	
James Hardy	PA School, Rocky Mountain College, Billings, MT
Michael Harris	Medical School, A.T. Still University, Arizona
Jacob Haslam	Dental School, University of Utah, UT
Christine Inagaki	
Matthew Jamison	University of Utah, Public Health Masters Program
Phillip Jennrich	PA School, Western University, CA
Christina Jensen	
Hannah Jette	Works at a Dairy
Cerissa Johnson	
Madison Jones	Job – Medical Assistant (1 yr), Medical School applicant
Chelsey Kellum	Job app ARUP/Nelson Lab – January, Active Duty Army Chemical Officer
Connor Larsen	
Brittney Later	Job – Fresenius Lab Tech
Sarah Lofthouse	PA School Applicant
Kyleen Magdaluyo	
Marcus Matson	Medical School, AT Steel, MO
Jeremy Moore	
Brent Nelson	Medical School. AT Steel, MO
Ashley Norton	
Jakob Oberg	Post Inc, Ogden, project manager
Morgan Osborne	
Shawn Perry	Dental School, Indiana School of Dental Medicine, Indianapolis, IN
Aaron Peterson	
Tanoya Poulsen	Cell Biologist at Balchem Corporation, NY (since 2014)
Kyle Robbins	
Jeffery Rogers	Graduate School – University of Utah, SLC
Landon Sheffield	

2015-2016 GRADUATES (continued)	
Jared Smith	Medical School applicant
Daniel Spencer	
Stephanie Surnock	
Cherisse Thalman	
Ellena Thomas	
Heather Thomas	Utah Jazz Dance Team
Starly-Jazz Thoorsell	
Erin Tueller	
Marissa Walker	ARUP – Onocology lab, PA applicant
Samuel Whittier	Medical School, University of Utah, SLC, UT
Jhonny Yovera	Medical School, Trinity University (Caribbean)

2016-2017 GRADUATES	
Beatrice Alejandre	
Shaylee Anderson	
Shaylee Avery	Dental School University of Utah
Cristal Bedolla	PA school
Laura Bedolla	PA school
Amber Bennett	
Jaclyn Bott	
Chase Bourgeous	
Savannah Braner	
Kambri Broad	
Ryan Butler	
Kasey Call	Medical School, Rocky Vista (COM) (DO)
Lacey Chambers	
Connor Christensen	
Abigail Christoffersen	
Maddison Crezee	
Rusty Crofts	
Trent Dale	Medical School applicant
Juarez Gutierrez	
Kathleen Hagerty	
Jessica Hernandez	
Jason Heth	
Rebecca Horton	
J A Johnson	
George Kayser	Dental School applicant
Jake Kinsey	
Aaron Lavigne	
Isaac Marshall	Medical School, Utah (MD)
Miranda McCashland	
Shai anne Nalder	
Beck Nelson	Medical School, AT Still COM (DO)
Brandon Newell	
Jacob Ortega	
Cooper Park	
Lance Pettit	
Stephanie Pittman	ARUP
Wyatt Powelson	
Dustin Prince	Medical School, Rocky Vista COM (DO)
Raquel Quintana	
Cynthia Rudh	
Damien Ruiz	Graduate School Auburn University
Rylee Smith	
Samuel Smith	
Natalie Snow	
Brian Soderborg	

2016-2017 GRADUATES (continued)	
Britain Sorensen	
Tiffany Stauffer	
Brynli Tattersall	
Mikaela Thomas	
Dustin Van Bree	
David Welch	Marines
Weston Wells	
Ying Zhang	

2017-2018 GRADUATES	
Madison Ballif	
Sierra Bodily	Pre-Dental, University of Utah
Kamille Carter	
Ryan Clay	
David Coffman	Heritage park rehabilitation and health care center
Christian Curneal	Pre-Dental, Indiana
Spencer Denison	
Joseph Fackrell	Master's of Health Administration, WSU
Dariann Gallegos	
Jess Gann	Laboratory Tech, Ogden, Utah
Brody Gibson	
Trevor Grayson	
Ireland Green	Graduate School, Utah State University
Iretiola Hamzat	
Dana Hoffman	Medical School applicant
Chase Houston	Medical School, Philadelphia COM (DO)
Samuel Kalis	
Alexander Lopez	
Isaac Martineau	
Sophie Overbeck	Graduate School, Utah State University
Desiree Owsley	
Tyler Payne	
Bridget Pulver	
Madison Richards	
Francesco Sechi	
Sara Sherman	
Kennedy Stark	
Emily States	Graduate School
Alexander Wilcox	

Appendix E: Faculty CV

Daniel N. Clark, PhD

Assistant Professor

Microbiology Department

Weber State University

801-626-6948 (office)

www.linkedin.com/in/clarkdn
chroniclevitae.com/people/99999-daniel-clark

Education and training		Degree	Year	Field of study
Penn State University	(post doc)		2013-16	Virology/immunology
Brigham Young University		PhD	2008-13	Molecular biology
Weber State University		BS	2004-07	Microbiology/chemistry

Courses taught

- **Medical microbiology** 3305 class and lab, Spring **2018** & **2019**, Weber State University (Ogden, UT)

  I developed and taught one class and oversaw two lab sections, enrollment around 30.

- **Elementary public health** 1153 class, Spring **2018** & **2019**, Weber State University

  I taught one face-to-face course, enrollment around 30.

- **Tropical diseases** 3403 class and lab, Fall **2017** & **2018**, Weber State University

  I taught a course & lab, including developing the lab and class materials, assignments and assessments. Enrollment around 30.

- Team instructor, **Cell culture** 4252 lab, Fall **2017** & **2018** Weber State University

  I taught half of the lab session, and helped develop course content. Enrollment around 10.

- **Intro to Microbiology** 1113 class, Fall **2017** & Spring **2018**, Weber State University

  One-day-a-week night class. I developed the lecture and assessment materials.

- **Principles of microbiology** 2054 class and lab, Fall **2017** and Summer **2018**, Weber State University

  I taught two lab sections, one with a student TA. I was not involved in developing the lab course, but developed all the class material.

- **Immunology** 3254 lab, Fall **2017**, Weber State University

  I taught one of the lab sections. I was not involved in developing the course.

- **Microbiology** 306 class and lab, Spring **2017**, Lebanon Valley College (Annville, PA)

  I taught one class and two lab sections, total enrollment around 30. I developed the lecture, lab, and assessment materials.

- **General Biology** 112 lab, Spring **2017**, Lebanon Valley College

  I taught one section, enrollment at 15. I developed assessment materials. Run with student TA.

- **General Biology** 111 class and lab, Fall **2016** & **2014**, Lebanon Valley College

  I taught one section, with enrollment around 30. I developed all lecture and assessment materials for the class. The lab is run with a student TA.

- **Genetics** 201 lab, Fall **2016**, Lebanon Valley College

  I taught one lab section with around 15 students. As an existing shared course, I was not involved in developing the curriculum.

- Team instructor, **General virology** section, Anti-infective Therapeutics Pharmacology 551 class, Fall **2015** & **2014**, Penn State University (Hershey, PA)

  I taught one class on general virology each semester in this seminar-style course, enrollment was around 5 students each semester. I also developed the assessment for my section.

- **General Microbiology** 221 class, Summer **2012** & **2011**, Brigham Young University (Provo, UT)

  In accelerated 6-week courses, I developed the entire course each year, assisted by a TA for grading; there were around 35 students each semester.

<u>Other teaching experience</u>

- **Faculty research mentor** for undergraduates, current, Weber State University

  During startup phase, several students were guided in a research program involving basic bioinformatics and manuscript preparation for a review article

  Continued research includes projects involving CRISPR knock-out of viral receptor genes to determine virus requirements for attachment and entry.

- **Faculty research mentor** for undergraduates, Spring 2017, Lebanon Valley College

  During startup phase, two students were guided in a research program involving discovery and characterization of novel bacteriophage targeting bacteria that infected local apple orchards.

- **Research mentor** for over 30 undergraduates, 2009-2013, Brigham Young University

  Research mentoring during graduate school. I was also able to participate unofficially in advising many of these students.

- **Teaching assistant**, Advanced Molecular Biology 442 lab, Advanced Molecular Biology 441 class, Advanced Cell Biology 430 class, Brigham Young University, 2009 to 2013

  I assisted with lab setup and grading, developed several quizzes for assessments, and provided general support. These classes were taught by Dr. Brian Poole, my graduate school mentor.

Pedagogy training (both delivered and received)

Invited speaker: "Using Formative Feedback to Spark Student Self-Awareness", February 2017, Lebanon Valley College

Certificate of Training: "Scientists Teaching Science", Spring 2015, National Institutes of Health Office of Intramural Education (NIH-OIT)

Completion of BIO 679R: Advanced Topics in Science Education, Fall 2012, Brigham Young University

Peer-reviewed publications

****:** Publication involved undergraduate mentoring and authorship

** Bowersox AF, Buhlig TS, Braun DL, Owsley DN, James KD, Aranda AJ, Kendrick CD, Skalka NA, **Clark DN** (Submitted) Functional map of the terminal protein of hepatitis B virus polymerase: a meta-analysis.

Clark DN, Hu J (2017) In vitro assays for RNA binding and protein priming of the hepatitis B virus polymerase. Book chapter in Methods in Molecular Biology – Hepatitis B Virus: Methods and Protocols. H. Guo & A. Cocunati, editors. Springer. PMID: 27975315

Clark DN, Flanagan JM, Hu J (2016) Mapping of functional subdomains in the terminal protein domain of hepatitis B virus polymerase. *Journal of Virology.* PMID: 27852858

Cui X, **Clark DN**, Liu K, Xu XD, Guo JT, Hu J (2015) Viral DNA-dependent Induction of Innate Immune Response to Hepatitis B Virus in Immortalized Mouse Hepatocytes. *Journal of Virology.* PMID: 26491170

Clark DN, Hu J (2015) Hepatitis B Virus Reverse Transcriptase – Target of Current Antiviral Therapy and Future Drug Development. *Antiviral Research*. PMID: 26408354

Clark DN, Hu J. (2015) Unveiling the roles of hepatitis B virus polymerase for new antiviral strategies. *Future Virology*. PMID: 25893003

****Clark DN**, Lambert JP, Till RE, Greenhalgh KE, Henrie B, Hawkley TF, Argueta LB, Roznik MG, Sloan JM, Bills T, Woodland L Nelson EP, Tsai MH, Poole BD (2014) Molecular effects of autoimmune-risk promoter polymorphisms on expression, exon choice, and translational efficiency of interferon regulatory factor 5. *Journal of Interferon and Cytokine Research*. PMID: 24350899

Jones SA, **Clark DN**, Cao F, Tavis JE, Hu J. (2014) Comparative analysis of hepatitis B virus polymerase sequences required for viral RNA binding, packaging and protein priming. *Journal of Virology*. PMID: 24227865

Clark DN (2013) Promoter polymorphisms in interferon regulatory factor 5. Doctoral dissertation. Defense date June 11, 2013; Brigham Young University. Link

****Clark DN**, Read RD, Mayhew V, Petersen SC, Stutz LA, Till RE, Argueta LB, Bergsten SM, Robinson B, Baumann DG, Heap JC, Hawkley TF, Poole BD (2013) Four promoters of IRF5 respond distinctly to stimuli and are affected by autoimmune-risk polymorphisms. *Frontiers in Immunology*. PMID: 24223576

****Clark DN**, Markham J, Sloan CR, Poole BD (2012) Cytokine Inhibition as a Strategy for Treating Systemic Lupus Erythematosus. *Clinical Immunology*. PMID: 23200699

Guthridge J, **Clark DN**, Templeton A, Dominguez N, Lu R, Vidal G, Kelley JA, Kauffman K, Harley JB, Gaffney P, James JA, Poole BD (2012) Effects of IRF5 lupus risk haplotype on pathways predicted to influence B cell functions. *Journal of Biomedicine & Biotechnology*. PMID: 22500098

Clark DN, Poole, BD (2012) Interferon and apoptosis in systemic lupus erythematosus. Book chapter in Systemic Lupus Erythematosus, ISBN 978-953-51-0266-3. Hani Almoallim, Editor. Intech, 77-96. Full text link

****Clark DN**, Poole BD, Hammond DV, Hedman TJ, Catts DS, Stewart A, Johnson FB (2011) Characterization of herpes simplex virus clinical isolate Y3369 as a glycoprotein G variant and its bearing on virus typing. *Virology Journal*. PMID: 21658271

Niewold TB, **Clark DN**, Salloum R, Poole BD (2010) Interferon alpha in systemic lupus erythematosus. *Journal of Biomedicine and Biotechnology*. PMID: 20652065

Student research presentations

Poster presentation. "Analysis of Enterovirus Structural Mutations Reveals Changes Responsible for Neuroinvasive Disease in Enterovirus 71" Tri-branch meeting of the American Society for Microbiology in Durango, Colorado; April 6, 2018

Poster presentation. "Analysis of Enterovirus Structural Mutations Reveals Changes Responsible for Neuroinvasive Disease in Enterovirus 71" Annual Weber State University Symposium in Ogden, Utah; March 26, 2018

Research presentations

Invited speaker. "To mutate is viral; to cure, divine" Brigham Young University Microbiology and Molecular Biology department weekly seminar in Provo, Utah; April 5, 2018

Poster presentation. "Mapping HBV polymerase terminal domain functions" 35th Summer Symposium in Molecular Biology—Living with our Viromes in State College, Pennsylvania; May 24, 2016

Oral presentation. "Analysis of HBV polymerase functional regions using terminal domain mutations" International meeting on Molecular Biology of Hepatitis B viruses in Bad Nauheim, Germany; October 6, 2015

Presentation author. "Destabilization of hepatitis B virus nucleocapsids in cccDNA formation and innate immunity induction." International meeting on Molecular Biology of Hepatitis B viruses in Los Angeles, California; September 4, 2014

Invited speaker. "Genetic risk for autoimmune disease: exon marks the spot" Brigham Young University Microbiology and Molecular Biology department weekly seminar in Provo, Utah; January 19, 2012

Poster author. "Effects on IRF5 first exon usage of an allele associated with risk for lupus" Mary Kirkland Center for Lupus Research Kirkland Scholar 10th Anniversary Conference in New York, New York; September 17, 2011

Poster presentation. "Altered IRF5 exon usage and increased expression of IRF7 targets in cells with an allele associated with risk for lupus". American Association of Immunologists 98th annual meeting in San Francisco, California; May 14, 2011

Poster author. "A RT-PCR study of cytokine expression with macrophages and tumors" 102nd annual American Association for Cancer Research meeting in Orlando, Florida; April 2, 2011

Poster presentation. "Loss of function in IRF5: a key to lupus susceptibility". Intermountain Graduate Research Symposium in Logan, Utah; March 31, 2010

Poster presentation. "Loss of regulation in the Epstein-Barr virus gene LMP1 by an IRF5 allele associated with risk for lupus". 2010 American Society for Microbiology Intermountain Branch Annual Meeting in Provo, Utah; April 10, 2010

Presentation author. Characterization of herpes simplex virus clinical isolate Y3369. American Society for Microbiology Intermountain Branch Meeting in Provo, Utah; April 10, 2010

Oral presentation author. "Factors affecting the isolation of Enterococcus-like organisms from the Great Salt Lake" Utah Academy of Sciences, Arts & Letters annual meeting in Cedar City, Utah; April 13, 2007

Laboratory experience

Lab mentor for undergraduates, beginning September 2017, Weber State University; bioinformatics of next-generation sequencing data using Galaxy as a training vehicle, using CRISPR to delete viral receptor genes, using bacteriophage to clear *Staphylococcus aureus* biofilms

Lab mentor for undergraduates, January to May 2017, Lebanon Valley College; isolation and characterization of bacteriophage infecting *Erwinia* bacteria affecting local apple orchards

Post-doctoral research with Dr. Jianming Hu, July 2013 to July 2015, Pennsylvania State University; hepatitis B virus immunology and virology

Graduate research student with Dr. Brian Poole, January 2009 to June 2013, Brigham Young University; molecular biology, immunology, and genetics of lupus; virology studies of Epstein-Barr virus and herpes simplex virus

Lab Technician and Quality Control Technician at Institutes of Environmental Health, November 2007 to August 2008; food microbiology lab using multiplex PCR and basic microbiology to identify pathogenic bacteria

Undergraduate research assistant with Dr. Karen Nakaoka, November 2006 to May 2007, Weber State University (Ogden, UT); microbiology & ecology of *Enterococcus* in Great Salt Lake

Campus service

2016-17	Faculty Senate member, Lebanon Valley College
2016	Demonstration volunteer, It's Catalytic recruitment day, Lebanon Valley College
2016	Science fair judge, Capital Area Science and Engineering Fair
2014-15	Representative, Penn State Post-doctoral society
2015	Committee member, Penn State Post-doctoral awards committee
2015	Coordinator, Penn State Virology Intercampus Meeting
2013	Recruiting representative, BYU graduate student incoming class

Grants, memberships, and honors

2013-16	Recipient, post-doctoral training grant, Pennsylvania State University, NIH Ruth L. Kirschstein National Research Service Award, Institutional Research Training Grant 5 T32 CA 60395
2014-15	Member and representative, Penn State Hershey Postdoctoral Society
2015	Recipient, travel grant, International Meeting on the Molecular Biology of HBV
2013	Recipient, Best presentation award, BYU graduate retreat

2011-12 Member, American Association of Immunologists

2007 Recipient, "Outstanding Graduate in Microbiology" award, Weber State Univ.

2007 Distinction, *Magna cum laude*, Weber State University

Professional references

Please contact Drs. Goodman, Hu, Poole, and/or Bridgewater.

Dr. Stacy Goodman: goodman@lvc.edu 717-867-6172

Stacy is the department head, a mentor, and she and I teach different sections of a coordinated course (General Biology) and has knowledge of my teaching abilities.

Dr. Jianming Hu: juh13@psu.edu 717-531-6523

Jianming was my supervisor (PI). He advised me during my postdoctoral training.

Dr. Brian Poole: bpoole@gmail.com 801-422-8095

Brian was my supervisor (PI, adviser) during graduate school, and I worked with him as a teaching assistant for several courses.

Dr. Laura Bridgewater: laura_bridgewater@byu.edu 801-422-2434

Laura was my supervisor during a lab rotation during graduate school, and I was her student for one course. She also observed my teaching (General Microbiology).

Matthew B. Crook

Curriculum Vitæ
December 2018

Contact Information

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Email: matthewcrook@weber.edu

Professional Profiles

Google Scholar: https://scholar.google.com/citations?user=ZYxAR8gAAAAJ
LinkedIn: http://www.linkedin.com/in/matthewbcrook
Mendeley: https://www.mendeley.com/profiles/matthew-crook2/
ORCID: http://orcid.org/0000-0002-4023-160X
ResearchGate: http://www.researchgate.net/profile/Matthew_Crook

Education

January 2013	Ph.D. in Molecular Biology	Brigham Young University
April 2006	B.S. in Microbiology	Brigham Young University

Appointments

2018–present	Weber State University	Assistant Professor	Microbiology
2015–2017	University of Wisconsin–Madison	Post-doctoral fellow	Bacteriology
2013–2015	University of Wisconsin–Madison	Post-doctoral fellow	Agronomy
2005	University of Arkansas–Fayetteville	Summer intern	Plant Pathology

Publications

In Preparation

P. Estrada de los Santos, M. Palmer, B. Chávez-Ramírez, C. Beukes, E. T. Steenkamp, L. Briscoe, N. Khan, M. Maluk, E. Humm, **M. B. Crook,** W. B. Whitman, N. Shapiro, A. M. Hirsch, E. K. James, S. N. Venter. "*Trinickia dabaoshanensis* sp. nov., a new name for a lost species." *Int J Syst Evol Microbiol*. (*submitted*)

M. B. Crook, A. Wiley-Kalil, K. Garcia, J. Maeda, M. Babcock, A. Desbiez-Piat, A. Dalgarno, S. Gruber, S. Mitra, R. Hiltenbrand, P. Gyaneshwar, A. Mukherjee, J.-M. Ané. "Chitin oligomers and the double life of *Rhizobium* sp. IRBG74." *Mol Plant–Microbe Interact*. (*in revision*)

J. R. Hyde, J. T. Schouten, J. T. Crockett, T. A. Smith, T. S. Hodson, B. D. Merrill, **M. B. Crook**, J. S. Griffitts, S. H. Burnett, J. H. Grose, D. P. Breakwell. "Complete genome sequences of three *Sinorhizobium meliloti* bacteriophages that are closely related to phage ΦM12." *Genome Announc*. (*in revision*)

2018

P. Estrada de los Santos, M. Palmer, B. Chávez-Ramírez, C. Beukes, E. T. Steenkamp, L. Briscoe, N. Khan, M. Maluk, M. Lafos, E. Humm, M. Arrabit, **M. Crook**, E. Gross, M. F. Simon, F. B. Dos Reis Jr., W. B. Whitman, N. Shapiro, P. S. Poole, A. M. Hirsch, S. N. Venter, E. K. James. (2018) Whole genome analyses suggests that *Burkholderia sensu lato* contains two additional novel genera (*Mycetohabitans* gen. nov., and *Trinickia* gen. nov.): Implications for the evolution of diazotrophy and nodulation in the *Burkholderiaceae*. *Genes*, 9 (8): 389. DOI 10.3390/genes9080389

M. Griesmann, Y. Chang, X. Liu, Y. Song, G. Haberer, **M. B. Crook**, B. Billault-Penneteau**,** D. Lauressergues, J. Keller, L. Imanishi, Y. P. Roswanjaya, W. Kohlen, P. Pujic, Y. Song, K. Battenberg, N. Alloisio, Y. Liang, H. Hilhorst, M. G. Salgado, V. Hocher, H. Gherbi, S. Svistoonoff, J. J. Doyle, S. He, Y. Xu, S. Xu, J. Qu, Q. Gao, X. Fang, Y. Fu, P. Normand, A. M. Berry, L. G. Wall, J.-M. Ané, K. Pawlowski, X. Xu, H. Yang, M. Spannagl, K. F. X. Mayer, G. K.-S. Wong, M. Parniske, P.-M. Delaux, S. Cheng. (2018) "Phylogenomics reveals multiple losses of nitrogen-fixing root nodule symbiosis." *Science*, 361 (6398): 11 pp. DOI 10.1126/science.aat1743

2016

M. B. Crook, V. Poinsot, S. Erdn, F. Maillet, A. Bascaules, J.-M. Ané. (2016) "New insights into Nod factor biosynthesis: Analyses of chitooligomers and lipo-chitooligomers of *Rhizobium* sp. IRBG74 mutants." *Carb Res*, 434 (3): 83–93. DOI 10.1016/j.carres.2016.08.001

F. Mus, **M. B. Crook**, K. Garcia, A. Garcia Costas, B. A. Geddes, E. D. Kouri, P. Paramasivan, M. H. Ryu, G.E. Oldroyd, P. S. Poole, M. K. Udvardi, C. A. Voigt, J.-M. Ané, J. W. Peters. (2016) "Symbiotic nitrogen fixation and challenges to extending it to non-legumes." *Appl Environ Microbiol*, 82 (13): 3698–3710. DOI 10.1128/AEM.01055-16

2013

M. B. Crook, S. Mitra, J.-M. Ané, M. J. Sadowsky, P. Gyaneshwar. (2013) "Complete genome sequence of the *Sesbania* symbiont and rice growth-promoting endophyte *Rhizobium* sp. strain IRBG74." *Genome Announc*, 6 (1): e00934-13. DOI 10.1128/genomeA.00934-13

M. B. Crook, A. L. Draper, R. J. Guillory, and J. S. Griffitts. (2013) "The *Sinorhizobium meliloti* essential porin RopA1 is a target for numerous bacteriophages." *J Bacteriol*, 195 (16): 3663–3671. DOI 10.1128/JB.00480-13

2012

M. B. Crook, D. P. Lindsay, M. B. Biggs, J. S. Bentley, J. C. Price, S. C. Clement, M. J. Clement, S. R. Long, & J. S. Griffitts. (2012) "Rhizobial plasmids that cause impaired symbiotic nitrogen fixation and enhanced host invasion." *Mol Plant–Microbe Interact*, 25 (8): 1026–33. DOI 10.1094/MPMI-02- 12-0052-R

2011

C. L. Harrison, **M. B. Crook**, G. Peco, S. R. Long, and J. S. Griffitts. (2011) "Employing site-specific recombination for conditional genetics in *Sinorhizobium meliloti*." *Appl Environ Microbiol*, 77 (12): 3916–3922. DOI 10.1128/AEM.00544-11

Scholarships and Awards

2010–2011	Life Science Annual Fund Scholarship	Brigham Young University
2009–2010	Thomas and Agnes Myers Scholarship	Brigham Young University
2007–2008	Thomas and Agnes Myers Scholarship	Brigham Young University
2005	Adair Summer Internship Scholarship	University of Arkansas–Fayetteville
2005–2006	ORCA Undergraduate Research Grant	Brigham Young University
2001–2006	National Merit Scholarship	Brigham Young University

Research Grants

Funded

2018–2022 Subaward U.S. DOE
"Phylogenomic discovery and engineering of nitrogen fixation into the bioenergy woody crop poplar."

2018–2019 Co-PI North Dakota Pulse Grower's Association
"Survey of native rhizobia to improve nodulation."

Oral Presentations

Invited Talks

M. B. Crook. (2018) "The molecular and evolutionary bases of beneficial plant–microbe interactions." Presented to the Department of Microbiology and Molecular Biology at Brigham Young University on February 15, 2018.

Conference Talks

M. B. Crook, P. A. Price, D. P. Lindsay, M. B. Biggs, H. Tanner, J. C. Price, and J. S. Griffitts. (2012) "Accessory plasmids in *Sinorhizobium meliloti* can impair symbiosis on certain *Medicago* hosts." Presented at the 63rd Cold Spring Harbor Laboratory Meeting on Bacteria, Archaea & Phages.

M. B. Crook, and J. S. Griffitts. (2010) "Identification of a phage receptor in the soil bacterium *Sinorhizobium meliloti*." Presented at the American Society of Microbiology Intermountain Branch meeting.

Campus and Departmental Talks

M. B. Crook. (2015) "The root of all goodness: Plant–microbe interactions in the soil." Presented at the University of Wisconsin–Madison PLATO Frontiers in Life Sciences seminar.

M. B. Crook. (2014) "Adapting the CRISPR–*cas* system for generating transgenic roots in *Medicago*." Presented at the 2nd University of Wisconsin–Madison Genome Engineering and Editing at Wisconsin (GEEWisc) Meeting.

M. B. Crook. (2011) "Why symbiotic nitrogen fixation?" Presented at the First Annual SymLC Symposium at Brigham Young University.

POSTER PRESENTATIONS

2018

S. Cannon, J. Stai, L. Ren, **M. B. Crook**, J.-M. Ané, J. J. Doyle. (2018) "Genome evolution in the legumes: Common patterns, exceptions, and a candidate for the "ur-legume" genome." Presented at the 7th International Legume Conference.

P. Estrada-de los Santos, M. Palmer, B. Chávez-Ramírez, C. Beukes, E. T. Steenkamp, L. Briscoe, N. Khan, M. Maluk, M. Lafos, E. Humm, M. Arabit, **M. B. Crook**, E. Gross, M. F. Simon, F. Bueno dos Reis Jr., W. B. Whitman, N. Shapiro, P. S. Poole, A. M. Hirsch, S. N. Venter, E. K. James. 2018. Cleaning up the taxonomy of *Burkholderia sensu lato* using comparative genomics. Presented at the 2nd American Society of Microbiology Tribranch Meeting.

A. J. Watts, M. Guyader, **M. B. Crook**. (2018) "The role of auxin in growth promotion of rice by *Rhizobium* sp. IRBG74." Presented at the 2nd American Society of Microbiology Tribranch Meeting.

2016

M. B. Crook, A. Wiley-Kalil, V. Poinsot, S. Erdn, K. Garcia, M. Babcock, J. Maeda, A. Desbiez-Piat, A. Dalgarno, F. Maillet, A. Mukherjee, J. Dénarié, J.-M. Ané. (2016) "*nod* genes are required for the colonization of different hosts by *Rhizobium* sp. IRBG74." Presented at the 30th Annual Kenneth B. Raper Symposium, University of Wisconsin–Madison.

M. B. Crook, A. Wiley-Kalil, V. Poinsot, S. Erdn, K. Garcia, M. Babcock, J. Maeda, A. Desbiez-Piat, A. Dalgarno, F. Maillet, A. Mukherjee, J. Dénarié, J.-M. Ané. (2016) "*nod* genes are required for the colonization of different hosts by *Rhizobium* sp. IRBG74." Presented at the 17th Congress on Molecular Plant–Microbe Interactions.

K. Garcia, M. H. Ryu, J. Maeda, **M. B. Crook**, C. Voigt, J.-M. Ané. (2016) "Production of Nod factors by the gamma-proteobacterium *Pseudomonas protegens*." Presented at the 12th European Nitrogen Fixation Conference.

2015

M. B. Crook, A. Wiley-Kalil, V. Poinsot, S. Erdn, K. Garcia, M. Babcock, J. Maeda, A. Desbiez-Piat, A. Dalgarno, F. Maillet, A. Mukherjee, P. Gyaneshwar, J. Dénarié, J.-M. Ané. (2015) "Characterization of the *nod* genes required for the colonization of different hosts by *Rhizobium* sp. IRBG74." Presented at the 19th International Congress on Nitrogen Fixation.

M. B. Crook, A. Wiley-Kalil, V. Poinsot, S. Erdn, K. Garcia, M. Babcock, J. Maeda, A. Desbiez-Piat, A. Dalgarno, F. Maillet, A. Mukherjee, P. Gyaneshwar, J. Dénarié, J.-M. Ané. (2015) "Characterization of the *nod* genes required for the colonization of different hosts by *Rhizobium* sp. IRBG74." Presented at the 29th Annual Kenneth B. Raper Symposium, University of Wisconsin–Madison.

N. Schlief, K. Cope, **M. B. Crook**, and J.-M. Ané. (2015) "*Rhizobium pusense* strain IRBG74 as a potential symbiont of poplar." Presented at the 29th Annual Kenneth B. Raper Symposium, University of Wisconsin–Madison.

2014

M. B. Crook, A. K. Wiley, and J.-M. Ané. (2014) "Genetic and computational analysis of *Rhizobium* sp. IRBG74." Presented at the 11th European Nitrogen Fixation Conference.

K. Garcia, **M. B. Crook**, A. K. Wiley, and J.-M. Ané. (2014) "Engineering synthetic symbioses between plants and bacteria to deliver nitrogen to crops." Presented at the 11th European Nitrogen Fixation Conference.

2013

M. B. Crook, A. K. Wiley, A. Mukherjee, S. Mitra, P.-M. Delaux, M. J. Sadowsky, P. Gyaneshwar, and J.-M. Ané. (2013) "Characterization of the *nod* genes required for the colonization of different hosts by *Rhizobium* sp. IRBG74." Presented at the 27th Annual Kenneth B. Raper Symposium, University of Wisconsin–Madison.

M. B. Crook, A. K. Wiley, A. Mukherjee, S. Mitra, P.-M. Delaux, M. J. Sadowsky, P. Gyaneshwar, and J.-M. Ané. (2013) "Characterization of the *nod* genes required for the colonization of different hosts by *Rhizobium* sp. IRBG74." Presented at the 22nd North American Symbiotic Nitrogen Fixation Conference.

S. Mitra, A. Mukherjee, **M. Crook**, E. James, M. Sadowsky, J.-M. Ané, and P. Gyaneshwar. (2013) "*Rhizobium* sp. IRBG74 utilizes common mechanisms for endophytic colonization of *Sesbania cannabina* and rice." Presented at the 22nd North American Symbiotic Nitrogen Fixation Conference.

P. A. Price, **M. B. Crook**, H. R. Tanner, and J. S. Griffitts. (2013) "Accessory plasmid-dependent induction of late-stage incompatibility in the *Medicago–Sinorhizobium* symbiosis." Presented at the 22nd North American Symbiotic Nitrogen Fixation Conference.

2012

M. B. Crook, A. L. Draper, M. Bevans, and J. S. Griffitts. (2012) "Defining the mode of entry for *Sinorhizobium meliloti* bacteriophages." Presented at the 63rd Cold Spring Harbor Laboratory Meeting on Bacteria, Archaea & Phages.

2010

M. B. Crook, D. P. Lindsay, and J. S. Griffitts. (2010) "An accessory plasmid in *Sinorhizobium meliloti* dictates host range." Presented at the 21st North American Symbiotic Nitrogen Fixation Conference.

D. P. Lindsay, **M. B. Crook**, and J. S. Griffitts. (2010) "Investigating properties of host range." Presented at the 21st North American Symbiotic Nitrogen Fixation Conference.

2009

M. B. Crook, J. S. Bentley, S. L. Daley, and J. S. Griffitts. (2009) "Mapping host range determinant genes in natural isolates of *Sinorhizobium meliloti* using transduction." Presented at the 16th International Congress on Nitrogen Fixation.

2008

M. B. Crook, J. S. Bentley, S. L. Daley, and J. S. Griffitts. (2008) "Development of a genetic system enabling the study of wild isolates of *Sinorhizobium meliloti*." Presented at the 59th Cold Spring Harbor Laboratory Meeting on Bacteria, Archaea & Phages.

2006

D. Ritterband, M. Shah, **M. B. Crook**, and P. B. Savage. (2006) "*In vitro* activity of a ceragenin, CSA-13, against gram-positive ocular clinical isolates." Presented at the 46th Interscience Conference on Antimicrobial Agents and Chemotherapy. Abstract F1-1868

T. R. Fritsche, R. N. Jones, H. S. Sader, **M. B. Crook**, and P. B. Savage. (2006) "*In vitro* activity of nine developmental cationic steroid compounds." Presented at the 46th Interscience Conference on Antimicrobial Agents and Chemotherapy. Abstract F1-1869

X.-Z. Lai, J. Nielsen, Y. Feng, T. Jennings, N. Wallace, B. Ratcliff, **M. B. Crook**, C. Genberg, and P. B. Savage. (2006) "Controlled release of a bactericidal ceragenin–polymer conjugate." Presented at the 46th Interscience Conference on Antimicrobial Agents and Chemotherapy. Abstract F1-1864

X.-Z. Lai, Y. Feng, **M. B. Crook**, C. Genberg, and P. B. Savage. (2006) "Anti-biofilm activities of ceragenin CSA-13 and vancomycin against gram-positive and negative bacteria." Presented at the 46th Interscience Conference on Antimicrobial Agents and Chemotherapy. Abstract F1-1865

2005

C. C. Ellingson, H. Aamodt, **M. B. Crook**, M. R. Phillips, R. Hamblin, B. K. Murray, & K. L. O'Neill. (2005) "Apoptotic bodies from cancer cells may trigger an M2 phenotype in macrophages." Presented at the 96th American Association for Cancer Research meeting. Abstract 2436

TEACHING EXPERIENCE

Weber State University, Department of Microbiology

2017–present	3 semesters	Introductory Microbiology	Instructor
2017–present	2 semesters	Principles of Microbiology Lab	Co-Instructor
2017–present	2 semesters	Microbial Physiology Lab	Co-Instructor
2017–present	1 semester	Microbial Genetics	Instructor
2017–present	1 semester	Microbial Genetics Lab	Instructor

University of Wisconsin–Madison, Department of Bacteriology

2017	1 semester	The Microbiome of Plants, Animals, and Humans	Co-Instructor

Brigham Young University, Department of Microbiology and Molecular Biology

2011	1 semester	Introduction to Microbiology	Instructor
2011	1 semester	Introduction to Microbiology Lab	Instructor
2007–2012	5 semesters	Bacterial Genetics	TA
2005–2006	2 semesters	Advanced Lab Methods	TA
2004–2006	4 semesters	Cell and Molecular Biology Lab	TA

MENTORING EXPERIENCE

Current Achievements

Weber State University, Department of Microbiology

2018–present	Darian Santana	undergraduate	
2018–present	Isaac Trost	undergraduate	
2017–present	Austin Watts	undergraduate	

University of Wisconsin–Madison, Department of Bacteriology

2017	Daniel Coubier de Lara	undergraduate	
2016–2017	Matthew Guyader	undergraduate	
2015–2017	Maxwell Steeples	undergraduate	
2014–2016	Audrey Dalgarno	undergraduate	Research Tech., Dana-Farber
2016	Nandhitha Venkatesh	undergraduate	Graduate School
2016	Alisa Fox	undergraduate	Research Asst., Mt. Sinai
2015–2016	Marcus Babcock	undergraduate	Medical School
2015	Arnaud Desbiez-Piat	graduate intern	Graduate School
2014–2016	Steven Gruber	undergraduate	Illumina

University of Wisconsin–Madison, Department of Agronomy

2014	Mark Jasinski	undergraduate	Graduate School
2014	Lincoln Peppard	undergraduate	Promega
2014	Yarinka Rojas	undergraduate	
2013–2014	Charles-Etienne Sauvé	undergraduate	Student at Rice University
2013–2014	Jong Hwan "Greg" Kim	undergraduate	Chiropractic School
2013–2014	Brett Schwartz	undergraduate	Singer/Songwriter

Brigham Young University, Department of Microbiology and Molecular Biology

2012–2013	R. Jordan Guillory	undergraduate	Pharmacy School
2011–2012	Alicia Lewis (*née* Draper)	undergraduate	H.S. Science Teacher
2010–2011	Casey Crum	undergraduate	Dental School
2010–2011	Daniel P. Lindsay	undergraduate	Medical School
2009–2010	Elise Ryser (*née* Scoggin)	undergraduate	Stay-at-Home Mother
2009	Divyesh Choudhri	undergraduate	Medical School

Brigham Young University, Department of Chemistry and Biochemistry

2007	Jacob Pollard	undergraduate	
2007	Seth Olson	undergraduate	Lawyer
2006–2007	Brian Ratcliff	undergraduate	Optometrist
2006–2007	Nina Finter (*née* Wallace)	undergraduate	Elementary School Teacher
2006–2007	Timothy Jennings	undergraduate	Dentist

RESEARCH EXPERIENCE

2013–2017	Postdoctoral fellow	Dr. Jean-Michel Ané	University of Wisconsin–Madison
2007–2013	Graduate RA	Dr. Joel S. Griffitts	Brigham Young University
2006–2007	Research assistant	Dr. Paul B. Savage	Brigham Young University
2004–2006	Undergraduate RA	Dr. Kim L. O'Neill	Brigham Young University
2005	Summer intern	Dr. Jim Correll	University of Arkansas–Fayetteville

Outreach Activities

2017–present	Weber Science Day	Weber State University
2018–present	Weber Medical Academy	Weber State University
2013–2017	Darwin Day	University of Wisconsin–Madison
2014–2017	Science Expeditions	University of Wisconsin–Madison
2015	PLATO Frontiers in Life Sciences	University of Wisconsin–Madison
2013–2015	Family Horticulture Day	University of Wisconsin–Madison
2012	SymLC	Brigham Young University

Journal Peer Review

Microbiology Open, *Journal of Bacteriology*, *MPMI*, *BMC Genomics*, *Scientific Reports*, *Bioscience Horizons*, *FEMS Microbiology Letters*, *American Journal of Botany*

Professional Service

2018–present	College of Science Curriculum Committee	Chair: Michelle Arnold
2017	Lowe Fellowship Review Committee	Chair: Michele Culumber

Community Service

2016–2017	Buddy Congregation Co-Liaison	The Road Home of Dane County
2015–2017	Volunteer	The Road Home of Dane County
2016	New Scout Event Committee Member	Boy Scouts of America
2015–2017	Boy Scout Leader	Boy Scouts of America
2014–2015	Webelos Den Leader	Boy Scouts of America
2014	New Scout Day Camp Director	Boy Scouts of America
2013–2014	Boy Scout Leader	Boy Scouts of America

Professional Society Memberships

2017–present	American Society for Microbiology (ASM)
2016–2017	International Society for Molecular Plant–Microbe Interactions (IS-MPMI)
2012–2013	American Association for the Advancement of Science (AAAS)

Language Skills

Spanish	IRL Level 3

Michele D. Culumber
Department of Microbiology phone: 801.626.7795
Weber State University fax: 801.626.7445
1415 Edvalson Dept. 2506 mculumber@weber.edu
Ogden, UT 84408-2506
*Name changed to Culumber from Zwolinski in 2011

Professional Preparation
Undergraduate – Eastern Illinois University, Charleston IL B.S., 1995
Graduate – University of Wisconsin – Madison, Ph.D., 2002

Appointments
Weber State University, Department of Microbiology, Professor, – 2015 - present
Weber State University, Department of Microbiology, Chairperson, 2012-2016
Weber State University, Department of Microbiology, Associate Professor, 2010 - 2015
Weber State University, Department of Microbiology, Assistant Professor, 2004 – 2010
University of Wisconsin – Stout, Post Doctoral Teaching and Research Scholar, 2002-2004

Publications

Culumber, M., McMahon, D.J., Ortakci, F., Montierth, L., Villalba, B., Broadbent, J. and Oberg, C. 2017. *Hot topic*: Geographical distribution and strain diversity of *Lactobacillus wasatchensis* isolated from cheese with unwanted gas formation. *J. Dairy Sci.*, 100 (11):8764-8767.

Oberg, C. J., T. S. Oberg, **M. C. Culumber**, F. Ortakci, J. R. Broadbent and D. J. McMahon. 2016. *Lactobacillus wasatchensis* sp. nov., a non-starter lactic acid bacteria isolated from aged Cheddar cheese. *Int. J. System. Evol. Microbiol*. 66:158-164

Shen, P.S., Domek, M.J., Sanz-García, E., Makaju, A., Taylor, R.M., Hoggan. R*. **Culumber. M.**, Oberg, C., Breakwell, D.P., Prince, J.T., and Belnap, D.M. 2012. Sequence and Structural Characterization of Great Salt Lake Bacteriophage CW02, a Member of the T7-like Supergroup. *Journal of Virology* 86:7907-7917

Zwolinski, M.D. 2007. DNA Sequencing: Strategies for Soil Microbiology. *Soil Science Society of America Journal*. 71:592-600.

Zwolinski, M.D., Harris, R.F., Hickey, W.J. 2000. Microbial communities involved in anaerobic degradation of hydrocarbons in contaminated aquifers. *Biodegradation* 11:125-139.

Shi, Y., **Zwolinski, M.,** Schreiber, M.E., Bahr, J.M., Hickey, W.J. 1999. Responses of microbial communities in aquifers to hydrocarbon pollution and electron acceptor supplementation: Phylogenetic probe analysis. *Applied and Environmental Microbiology* 65:2143-2150.

Recent Selected Presentations to Professional Groups

Culumber, M. 2017. Developing interrupted case studies to increase student interactions with real data and primary literature sources. "MicroBrew" session. 24th Annual American Society for Microbiology Conference for Undergraduate Educators. 27-30 June 2017. Denver, CO.

Barker, S., **Culumber, M**., Fritzler, J., Domek, M., Nakaoka, K. 2017. *Vibrio* isolated from hypersaline waters of the Great Salt Lake., June 2017. New Orleans, LA.

Culumber, M., Oberg, C., Allen, T., Rodriguez, B.T., McMahon, D. 2016. Characterization of *Lactobacillus wasatchensis* from aged cheeses showing late-gas defects. ADSA ASAS Joint Annual Meeting. Salt Lake City, UT. 19-23 July.

Oberg, C.J., Walker, M.* **Culumber, M.D**., McMahon, D.J. 2016. Determination of antagonism between NSLAB strains and *Lactobacillus wasatchensis* WDC04 using the agar-flip method. ADSA ASAS Joint Annual Meeting. Salt Lake City, UT. 19-23 July.

Domek, M.J., G. Ward, **M.D. Culumber**. 2016. Detection of Halophilic Bacteriophage in Soils Near the Great Salt Lake. ASM Microbe, ASM 2016 Boston 16-20 June, Boston.

C. Oberg, M. Walker, **M. Culumber**. 2016. Determination of Antagonism between NSLAB strains and lactobacillus wasatchensis WDC04 using the agar-flip method ASM Microbe, ASM 2016 Boston 16-20 June, Boston.

Bowen, I., C. Oberg, **M. Culumber**. 2016. Determination of treatments to reduce late gassy defect in cheese due to *Lactobacillus wasatchensis* WDC04 contamination. ASM Microbe, ASM 2016 Boston 16-20 June, Boston.

Montierth, L.*, Oberg, C., **Culumber, M**., McMahon, D. 2015. Novel *Lactobacillus* associated with late gas production in aged cheese. American Society for Microbiology General Meeting, New Orleans, 1 June.

Oberg, C.J., **Culumber, M.,** Oberg, T., Broadbent, J.R., and McMahon. 2013. A New *Lactobacillus* species associated with late gas production in cheese. American Society for Microbiology General Meeting. Denver, CO. 10-23 May.

Culumber, M. D., Domek, M.J., Benson*, C.M., and Oberg, C.J. 2013. Genomic analysis of two novel *Idiomarina* bacteriophage isolated from the Great Salt Lake, UT. Halophiles Conference. Storrs, CT. 23-27 June.

Simon, T.B., Oberg, C.J., **Culumber, M.D**., and Domek, M.J. 2012. Characterization of a Novel *Marinobacter* and a related phage isolated from the Great Salt Lake, UT. American Society for Microbiology General Meeting in San Francisco, CA, June 16-19, 2012

Selected Professional Development

- 24th Annual American Society for Microbiology Conference for Undergraduate Educators, Denver, Co. June 2017
- American Society for Microbiology, Biology Scholars Assessment Residency, 2015-2016.
- ASM Curriculum Guidelines for Undergraduate Microbiology: Aligning Concepts, Learning Outcomes and Assessments, Sue Merkel, Cornell University, Ithaca, NY; Ann Stevens, Virginia Tech, Blacksburg, VA, Duration: 46:17, ASM M(icro)OOCs, 13 August 2014.
- WSU Innovative Teaching Workshop, 18-19 October 2013. The Canyons, Park City, UT
- National Conference for Undergraduate Research, April 2013, La Crosse WI
- 15th Annual American Society for Microbiology Conference for Undergraduate Educators, Beverly, MA, 30 May – 1 June 2008.
- Undergraduate Research in Microbial Genome Annotation, DOE Joint Genomes Institute, Walnut Creek, CA. 22-23 January 2009.
- ASM/JGI Spring Bioinformatics Institute, Washington DC, 11-14 March 2009.
- Science Education at the Crossroads. 28-30 September 2006, Ogden, UT.

Synergistic Activities

- Advisory committee for the Center for Science and Math Education Weber State University
- Chair of the Department of Microbiology 2012-2016
- Advising for microbiology and biology composite teaching majors.
- Outreach activities with K-12 teachers and students: field trips, workshops, demonstrations, Science Olympiad, mentored Science Fair participants
- Mentor undergraduate student researchers.

Matthew J. Domek, Ph.D.
Department of Microbiology
Weber State University
Ogden, UT 84408-2506
801-626-6950

Professional Preparation:

Saint Mary's College, Moraga, CA	Biology/Chemistry	B.S., 1976
California State University, Sacramento, CA	Biological Sciences	M.A., 1980
Montana State University, Bozeman, MT	Microbiology	Ph.D., 1984

Appointments:

Weber State University, Professor, 2015-present

Weber State University, Associate Professor, 2010-2015

Weber State University, Assistant Professor, 2004-2010

Walsh University, Assistant Professor, 2000-2004

California State University, Long Beach, Lecturer, 1997-2000

V. A. Medical Center, Long Beach, California, Microbiologist, 1993-1999

V. A. Medical Center, Sepulveda, California, Postdoctoral Research Fellow, 1991-1993

V. A. Medical Center, Sepulveda, California, Research Scientist, 1990-1991

Cedars-Sinai Medical Center, Los Angeles, California, Research Scientist, 1987-1990

Vitamins and Minerals Laboratory, University of California, Davis, Staff Research Assistant, 1987

University of California, Davis Staff Research Assistant, 1986

Publications and Presentations:

Abbreviated list

Shen, P.S., Domek, M.J., Sanz-García, E., Makaju, A., Taylor, R.M., Hoggan. R. Culumber. M., Oberg, C., Breakwell, D.P., Prince, J.T., and Belnap, D.M. Sequence and Structural Characterization of Great Salt Lake Bacteriophage CW02, a Member of the T7-like Supergroup. J. Virol. August 2012 86:7907-7917

Carlie M. Benson. Faculty Mentors: Matthew J. Domek, Craig Oberg, Michele Zwolinski. Isolation of Novel Phage from the Great Salt Lake that Infect Idiomarina. Poster Presentation: American Society for Microbiology General Meeting in San Diego on May 3rd, 2010.

Savage, N., Domek, M.J., Zwolinski, M.D., Belnap, D.M., Shen, P.S., and Oberg, C.J. Characterization of Bacteriophage Isolated from the Great Salt Lake. Joint Conference of 10th International Conference on Salt Lake Research & 2008 Friends of Great Salt Lake Issues Forum. May 13, 2008

Domek, M.J. Supplementing Lecture with "In Class Assignments" to Stimulate Greater Classroom Interaction. American Society for Microbiology Conference for Undergraduate Educators. May 31, 2008.

Savage, N., Domek, M.J., Zwolinski, M.D., and Oberg, C.J. Bacterial Predation by Bacteriophage Isolated from the Great Salt Lake; American Society for Microbiology General Meeting in Boston, MA. June3rd, 2008.

Tabel G, Hoa NT, Tarnawski A, Chen J, Domek M, Ma TY. Helicobacter pylori infection inhibits healing of the wounded duodenal epithelium in vitro. J Lab Clin Med. 2003 Dec;142(6):421-30.

Domek MJ, Netzer P, Prins B, Nguyen T, Liang D, Wyle FA, Warner A. Helicobacter pylori induces apoptosis in human epithelial gastric cells by stress activated protein kinase pathway. Helicobacter. 2001 Jun;6(2):110-5.

Pai R, Wyle FA, Cover TL, Itani RM, Domek MJ, Tarnawski A. Helicobacter pylori culture supernatant interferes with epidermal growth factor-activated signal transduction in human gastric KATO III cells. Am J Pathol. 1998;152 (6):1617-1624.

Fujiwara Y, Wyle F, Arakawa T, Domek M, Fukuda T, Kobayashi K and Tarnawski A. Helicobacter pylori culture supernatant inhibits binding and proliferative response of human gastric cells to epidermal growth factor: Implication for H. pylori ulcer healing? Digestion 1997;58:299-303.

National Meeting Presentations:
C. Oberg, ***D. Hoffman***, **M. Domek**. 2018. Rapid Method for Measuring the Effect of Prebiotics on Probiotic Bacteria Growth. Weber State Univ., Ogden, UT. American Society for Microbiology MICROBE (National Conference) Atlanta, GA. June 1-6, 2018

C. Oberg, ***I. Green***, **M. Domek**. 2018. Effect of Organic Acids on Suppressing Growth of *Lactobacillus Wasatchensis* Wdc04. Weber State Univ., Ogden, UT. American Society for Microbiology MICROBE (National Conference) Atlanta, GA. June 1-6, 2018

Barker, S., Culumber, M., Fritzler, J., Domek, M., Nakaoka, K., 2017. Vibrio isolated from hypersaline waters of the Great Salt Lake., June 1-7 2017. Microbe 2017 (American Society for Microbiology National Conference), New Orleans, LA.

Domek, Matthew J. 2017., "An Interdisciplinary Laboratory Experience for Microbiology and Physics Students", Microbrew presentation at American Society for Microbiology Conference for Undergraduate Educators, Denver, CO July 2017

M. J. Domek, T. Allen, R. Olson, C. Oberg. 2015. Salt Concentration and pH Alter Infectivity of Bacteriophages Isolated from the Great Salt Lake. Department of Microbiology, Weber State University, Ogden, UT Poster Presentation: American Society for Microbiology General Meeting in New Orleans, LA on June 1st, 2015

C. Oberg, K. Blackford, T. Allen, J. Oberg, H. Thomas, **M. Domek**. 2015. Method to Survey Seasonality of the Great Salt Lake Virosphere. Department of Microbiology, Weber State University, Ogden, UT Poster Presentation: American Society for Microbiology General Meeting in New Orleans, LA on June 1st, 2015

C. J. Oberg, E. Bentley, K. G. Nakaoka, M. J. Domek, M. D. Culumber. Microbial Screening of Potable Water Sources in Guatemala: A Potential Source of Disease Transmission. Department of Microbiology, Weber State Univ., Ogden, UT Poster Presentation: American Society for Microbiology General Meeting in Boston, MA on May 20th, 2014

M. J. Domek[1], L. E. Johnson[1], M.D. Culumber[1], D. M. Belnap[2], C. J. Oberg[1].Isolation and Characterization of Novel Bacteriophage from the Great Salt Lake that Infect Halomonas. [1]Department of Microbiology, Weber State University, Ogden, UT 84408. [2]University of Utah, Salt Lake City, UT.Poster Presentation: American Society for Microbiology General Meeting. Denver, CO. May 20, 2013

[1]Matthew Domek, [1]Michele Culumber, [1]Craig Oberg, [2]David Belnap. Diversity of Bacteriophages in the Great Salt Lake. [1]Department of Microbiology, Weber State University, Ogden, UT 84408, [2]University of Utah, Salt Lake City, UT. Poster Presentation: 2013 Molecular Genetics of Bacteria and Phages Meeting, Madison, WI August 9, 2013

M. J. Domek, R. Hoggan, B. Dahl, C. J. Oberg and M. D. Zwolinski. Molecular Characterization of Salinivibrio costicola Isolated from the Great Salt Lake, UT Poster Presentation: American Society for Microbiology General Meeting in New Orleans, LA on May 22nd, 2011.

T.B. Simon, M. D. Zwolinski, M. J. Domek and C. J. Oberg. Novel Roseobacter-like Organism and a Related Phage Isolated from the Great Salt Lake, UT Poster Presentation: American Society for Microbiology General Meeting in New Orleans, LA on May 22, 2011.

Simon, T.B., Oberg, C.J., Culumber, M.D. and Domek, M.J. Characterization of a Novel Marinabacter and a Related Phage Isolated from the Great Salt Lake, UT. Poster Presentation: American Society for Microbiology General Meeting in San Francisco, CA. June 17. 2012

Culumber, M., Domek, M.J., Benson C.M. and Oberg, C.J. Genomic Analysis of Two Novel Idiomarina Bacteriophage Isolated from the Great Salt Lake, UT. Poster Presentation: American Society for Microbiology General Meeting in San Francisco, CA. June 17. 2012

McLean, Trevor J. and Domek, Matthew J. Hitchhiker Phage of Salinivibrio Isolated from the Great Salt Lake, UT. Poster Presentation: American Society for Microbiology General Meeting in San Francisco, CA. June 17. 2012

Call, E., Pedersen, J, Domek, M, Baker, L, Oberg, C and Call, N. Stewing in your Own Juices: Heat and Humidity in the Seating Environment. Preceeding of the 4th International Interdisciplinary Conference on Posture and Wheeled Mobility, Glasgow, Scotland. June 7-9, 2010.

K. E. Oberg, K. E. Nelson, C. N. Jensen, T. L. Gray, A. M. Hutchinson, M. J. Domek, C. Oberg. Prophage Induction in Halophilic Bacteria Isolated from the Great Salt Lake, UT. Weber State Univ., Ogden, UT. Poster Presentation: American Society for Microbiology General Meeting in San Diego, CA. May 24, 2010

C. M. Benson, M. J. Domek, M. D. Zwolinski, C. Oberg Isolation of Novel Phage from the Great Salt Lake for Idiomarina-like Bacteria. Weber State Univ., Ogden, UT. Poster Presentation: American Society for Microbiology General Meeting in San Diego, CA. May 24, 2010

M. J. Domek, J. W. Moyes, C. Oberg An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT. Weber State Univ., Ogden, UT. Poster Presentation: American Society for Microbiology General Meeting in San Diego, CA. May 26, 2010

Local Meetings

Dariann Gallegos and ***Joshua Jorgensen***. 2018. Bacteriophage as an Alternative Treatment for Antibiotic Resistant Bacteria. (Mentor: **Matthew Domek**) WSU Symposium on Undergraduate Research in March 2018

Jess D Gann and ***Carson N Davis***. 2018. An Investigation of the Lysogenic Phage that Infects Halomonas Isoalted from the Great Salt Lake. (Mentor: **Matthew Domek**) WSU Symposium on Undergraduate Research in March 2018

Dana Hoffman. 2018. Rapid Method for Measuring the Effect of Prebiotics on Probiotic Bacterial Growth. (Mentors: **Craig Oberg** and **Matthew Domek**) WSU Symposium on Undergraduate Research in March 2018

Jess D Gann, ***Carson N Davis***, **Michele D. Culumber** and **Matthew J. Domek**. 2018. An Investigation of the Lysogenic Phage that infects Halomonas Isolated from the Great Salt Lake. Tri-branch meeting of the American Society for Microbiology in Durango, Colorado; April 6, 2018

Dariann Gallegos, ***Joshua Jorgensen***, ***Emily States***, **Michele D. Culumber**, and **Matthew J. Domek**. 2018. Bacteriophage as an Alternative Treatment for antibiotic Resistant Bacteria. Tri-branch meeting of the American Society for Microbiology in Durango, Colorado; April 6, 2018

Jakob Oberg*, ***Heather Thomas, Kayla Blackford, Tyler Allen***, **Craig Oberg**, **Matt Domek**. 2015. Method to Survey Seasonality of the Great Salt Lake Virosphere. Weber State University, Ogden, UT.Utah Academy of Science, Arts and Letters. Snow College, Ephraim, UT March 27, 2015

Garrett Ward*, **Matthew Domek** and **Michele Culumber**. 2015.Detection of Halophilic Bacteriophage in Soils Near the Great Salt Lake. Weber State University, Ogden, UT. Utah Academy of Science, Arts and Letters. Snow College, Ephraim, UT March 27, 2015.

Tyler Allen* (Mentor: **Matthew Domek**) 2015. Salt Conditions Affect Bacteriophage Infectivity of Salinivibrio costicola. 11th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 30, 2015.

Brody Arave, Jake Haslam and Trevor Annis. 2015. (Mentors: **Matthew Domek** and **Karen Nakaoka**) Isolation of Enterococcus Bacteriophage from Northern Utah Water Systems. Poster Presentation: 11th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 30, 2015.

Jakob Oberg, Heather Thomas, Kayla Blackford and ***Tyler Allen*** (Mentors: **Craig Oberg** and **Matthew Domek**). 2015.Method to Survey Seasonality of the Great Salt Lake Virosphere. Poster Presentation: 11th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 30, 2015.

Garrett Ward (Mentors: **Matthew Domek** and **Michele Culumber**). 2015. Detection of Halophilic Bacteriophage in Soils Near the Great Salt Lake. Poster Presentation: 11th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 30, 2015.

Cody Zesiger, and ***Autumn Brubaker*** (Mentors: **Karen Nakaoka** and **Matthew Domek**). 2015. Genotype Analysis of Enterococcus Isolates from the GSL. Poster Presentation: 11th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 30, 2015.

Garrett Ward (Mentors **Michele Culumber** and **Matthew Domek**) 2015. Detection of Halophilic Bacteriophage in Soils Near the Great Salt Lake. Oral Presentation: American Society for Microbiology Tri-Branch Annual Conference. Fort Lewis College, Durango, CO, April 24, 2015

Brent D. Nelson (Mentors: **Matthew Domek** and David M. Belnap) 2015. Electronmicrographs of Morphological Differences in Halophage Capsid Structure from the Great Salt Lake. Poster Presentation: American Society for Microbiology Tri-Branch Annual Conference. Fort Lewis College, Durango, CO, April 24, 2015

Randy Olson and Matthew J. Domek Infectivity of bacteriophage isolated from the Great Salt Lake is altered by pH. Department of Microbiology, Weber State University, Ogden, UT 84408. Oral Presentation: Utah Academy of Science, Arts and Letters. Dixie State University, St. George, UT April 11, 2014

Kayla Blackford, Matthew Domek and Craig Oberg. Survey of the Virosphere of the Great Salt Lake Department of Microbiology, Weber State University, Ogden, UT 84408. Oral Presentation: Utah Academy of Science, Arts and Letters. Dixie State University, St. George, UT April 11, 2014

Tyler Allen and Matthew J. Domek. Environmental parameters affect the ability of bacteriophages NS01 and DB01 to infect Salinivibrio costicola isolated from the Great Salt Lake. Department of Microbiology, Weber State University, Ogden, UT 84408. Poster Presentation: American Society for Microbiology Intermountain Branch Annual Conference. Brigham Young University, Provo, UT. March 8, 2014

Emma Bently, Craig Oberg, Karen Nakaoka, Michele Culumber, Matthew Domek. Microbial Screening of Potable Water Sources in Guatemala: A potential Source of Disease Transmission. Department of Microbiology, Weber State University, Ogden, UT 84408. Oral Presentation: American Society for Microbiology Intermountain Branch Annual Conference. Brigham Young University, Provo, UT. March 8, 2014

Lauren E. Johnson, Michele Culumber, Matthew J. Domek, Craig Oberg. Isolation and Characterization of Novel Bacteriophage from the Great Salt Lake that Infect *Halomonas*. Department of Microbiology, Weber State University, Ogden, UT 84408. Oral Presentation: Utah Academy of Science, Arts and Letters. Utah Valley University, Orem, UT April 12, 2013

McLean, Trevor J., Budke, Seth, and Domek, Matthew J. Hitchhiker Phage of Salinivibrio Isolated from the Great Salt Lake. American Society for Microbiology Intermountain Branch Annual Conference. Idaho State University, Pocatello, ID. April 7, 2012

Simon, T.B., Oberg, C.J., Culumber, M.D. and Domek, M.J. Host-Phage Interactions between an Euryhalophilic Marinabacter and Phage TS22 Isolated from the Great Salt Lake, UT. Poster Presentation: American Society for Microbiology Intermountain Branch Annual Conference. Idaho State University, Pocatello, ID. April 7, 2012

Carlie M. Benson, M.J. Domek and C. J. Oberg. Characterization and Genome Sequencing of Idiomarina Bacteriophage Isolated from Great Salt Lake. Poster Presentation. Utah Conference on Undergraduate Research. Weber State University, Ogden, UT. February 18, 2011

Preston Kerr and Matthew Domek. Molecular Analysis of two Halophage Isolated from the Great Salt Lake. Utah Conference on Undergraduate Research. Weber State University, Ogden, UT. February 18, 2011

Carlie Benson (Craig Oberg, Matthew Domek and Michele Culumber). Comparison of Idiomarina Bacteriophage Isolated from the Great Salt Lake. Poster Presentation: 8th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 28, 2011.

Andrew Farr (Matthew Domek). Investigation of a Unique Plaque Morphology Produced by Halophage. Poster Presentation: 8th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 28, 2011.

Preston Kerr and Jonas Peterson (Matthew Domek). Molecular Analysis of two Halophage Isolated from the Great Salt Lake. Poster Presentation: 8th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 28, 2011.

T. B. Simon, , C. J. Oberg, M. D. Culumber and M. J. Domek. Novel Marinobacter-like organism and a Related Phage Isolated from the Great Salt Lake. Utah Academy of Science, Arts and Letters. Salt Lake Community College, Salt Lake City, UT April 8, 2011.

Staples, A., Culumber, M. and Domek, M. Separation of Mixed Halophilic Cultures from the Great Salt Lake. Utah Academy of Science, Arts and Letters. Salt Lake Community College, Salt Lake City, UT April 8, 2011.

Carlie Benson, Craig Oberg, and Matthew Domek and Michele Culumber. Comparison of Idomarina Bacteriophage Isolated from the Great Salt Lake. Utah Academy of Science, Arts and Letters. Salt Lake Community College, Salt Lake City, UT April 8, 2011.

Ryan Hoggan, Blake Dahl, Matthew J. Domek, Craig J. Oberg and Michele D. Culumber. Molecular Characterization of Salinivibrio costicola Isolated from the Great Salt Lake, UT Utah Academy of Science, Arts and Letters. Salt Lake Community College, Salt Lake City, UT April 8, 2011.

Peter S. Shen[1], David Eng[1], Matthew Domek[2] and David M. Belnap[1]. Structural Characterization of Great Salt Lake Halophages by Means of Cryogenic Electron Microscopy. [1]Department of Chemistry and Biochemistry, Brigham Young University; [2]Department of Microbiology, Weber State University. American Society for Microbiology Intermountain Branch Annual Conference. Weber State University, Ogden, UT. April 9, 2011

Thomas B. Simon, Craig J. Oberg, Michele D. Culumber and Matthew J. Domek. Novel Marinobacter-like organism and a Related Phage Isolated from the Great Salt Lake. Department of Microbiology, Weber State University. American Society for Microbiology Intermountain Branch Annual Conference. Weber State University, Ogden, UT. April 9, 2011

Andrew L. Farr, Michael Holbert and Matthew Domek. An Investigation of a Unique Plaque Morphology Produced by Halophage. American Society for Microbiology Intermountain Branch Annual Conference. Weber State University, Ogden, UT. April 9, 2011

Preston Kerr, Jonas Peterson, Matthew Domek and Michele Culumber. Molecular Analysis of two Halophage Isolated from the Great Salt Lake. American Society for Microbiology Intermountain Branch Annual Conference. Weber State University, Ogden, UT. April 9, 2011

Adam Staples, Michele Culumber, and Matthew Domek. Separation of Mixed Halophilic Cultures from the Great Salt Lake. American Society for Microbiology Intermountain Branch Annual Conference. Weber State University, Ogden, UT. April 9, 2011

Carlie Benson, Craig Oberg, and Matthew Domek and Michele Culumber. Comparison of Idomarina Bacteriophage Isolated from the Great Salt Lake. American Society for Microbiology Intermountain Branch Annual Conference. Weber State University, Ogden, UT. April 9, 2011

Matthew J. Domek, Michele D. Zwolinski and Craig J. Oberg. Virosphere of the Great Salt Lake: Isolationa and Characterization of Novel Halophage. Poster Presentation: Friends of the Great Salt Lake Issues Forum, Salt Lake City, UT April 29, 2010.

Mary-Virginia Parker and W. Dane Schofield. Mentors: Matthew Domek and Michele Zwolinski. The Effects of Ultraviolet Radiation on Halophilic Bacteria Isolated from the Great Salt Lake. Poster Presentation: 7th Annual Undergraduate Research Symposium, Weber State University, Ogden, UT. March 29, 2010.

Karen. E. Nelson, Karli E. Oberg Christie N. Jensen, Trever L. Gray, Adam M. Hutchinson, Mentors: Matthew Domek and Craig Oberg. Prophage Induction in Halophiles Isolated from the Great Salt Lake. Poster Presentation: American Society for Microbiology Intermountain Branch Annual Conference. Brigham Young University, Provo, UT. April 10, 2010

Karen. E. Nelson, Karli E. Oberg Christie N. Jensen, Trever L. Gray, Adam M. Hutchinson, Mentors: Matthew Domek and Craig Oberg. Method Development to Study Lysogenization in Halophiles Isolated from the Great Salt Lake. Poster Presentation. Utah Conference on Undergraduate Research. Southern Utah University, Cedar City, UT. February 26, 2010

Ryan Hoggan, Blake Dahl and Matthew J. Domek. Characterization of Two Halophage Associated with Salinivibrio costicola. Poster Presentation: American Society for Microbiology Intermountain Branch Annual Conference. Brigham Young University, Provo, UT. April 10, 2010

James W. Moyes. Matthew J. Domek, Craig Oberg. An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT. Poster Presentation: Utah Conference on Undergraduate Research. Southern Utah University, Cedar City, UT. February 26, 2010

William H. Lorowitz
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Weber State University

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Professional Preparation

Lehigh University, Bethlehem, PA University of Illinois, Urbana	Biology Microbiology	B.S., 1980 M.S., 1983
University of Oklahoma, Norman	Microbiology	Ph. D., 1994

Appointments

2009 - present	Weber State University, Ogden, UT	Professor
2006 - 2009	Weber State University, Ogden, UT	Associate Professor
2000 - 2006	Weber State University, Ogden, UT	Assistant Professor
1994 - 2000	Pittsburg State University, Pittsburg, KS	Assistant Professor (tenured)
1985 - 1988	The Salk Institute Biotechnology/Industrial Associates, Inc., San Diego, CA	Senior Research Associate

Recent Publications (all with undergraduate students)

Stephen Merrigan, **William Lorowitz** and Karen Nakaoka, 2010, Bacterial Source Tracking of *Enterococcus* sp. and *Escherichia coli* Isolated from the Great Salt Lake Using Antibiotic Resistance Analysis. Journal of the Utah Academy of Sciences, Arts and Letters. 86: 61-75.

Scott Kagie, **William Lorowitz**, and Karen Nakaoka. 2009. Factors Affecting the Isolation of *Enterococcus* - like Organisms from the Great Salt Lake: Influence of Water Depth. Journal of the Utah Academy of Sciences, Arts and Letters. 85:69-87.

Christine O'Neil, Badreddin Edris, Elizabeth Saxton, and **William Lorowitz**. 2009. Comparison of Liquid and Solid Media for Enumeration of Probiotic Bacteria. Journal of the Utah Academy of Sciences, Arts and Letters. 85:89-95.

Garcia, S., B. Wade, C. Bauer, C. Craig, K. Nakaoka, and **William Lorowitz**. 2007. The effect of wastewater treatment on antibiotic resistance in *Escherichia coli* and *Enterococcus* sp. Water Environ. Res. **79**:2387-2395.

Edris, B., C. Waters, K. Nakaoka, and **W. Lorowitz**. 2007. Examining the stringency of the CLSI Disc Diffusion Assay Protocol. J. Utah Acad. Sci. Arts Lett. **84**:22-28.

Lorowitz, W. and Jeffrey Smith. 2007. Statistical design of experiments for an undergraduate laboratory. J. Utah Acad. Sci. Arts Lett. **84**:29-36.

Recent Presentations (all with undergraduate students)

Weber, Natalie and **W. Lorowitz**, 2010, Optimization of Medium M9 for *Escherichia coli*

Presented at:

The Annual Meeting of the Utah Academy of Science, Arts and Letters, Cedar City, UT.

The Annual Meeting of the Intermountain Branch of the American Society of Microbiology, Provo, UT. **(2nd Place Award)**

The First Annual Weber State University Sigma Xi Undergraduate Research Symposium, Ogden, UT.

Chris Burnett,Trista Delzer, Carrie Johnson, **William Lorowitz**, and Karen Nakaoka. 2010. *Host Factors Involved in the Nasal Carriage of* Staphylococcus aureus.

Presented at the Weber State University Undergraduate Research Meeting and at the Annual meeting of the Intermountain Branch of the American Society for Microbiology.

Merrigan, Stephen, Sarah Garcia, Aaron Fausett Jon Earl, Jake Taylor, Brett Schow, **William Lorowitz,** and Karen Nakaoka. 2009. Bacterial source tracking of *Escherichia coli* and Enterococcus sp. from the Great Salt Lake using antibiotic resistance analysis. Utah Academy of Sciences, Arts, and Letters.

Scott Kagie, **William Lorowitz** and Karen Nakaoka. 2008. Factors affecting the isolation of enterococcus-like organisms from the great salt lake: Influence of water depth and other physical parameters. 108th Annual Meeting, American Society for Microbiology, Boston, MA.

O'Neil, C., B. Edris, E. Saxton, and **W. Lorowitz**. 2008. Comparison of Liquid and Solid Growth Media for Probiotic Enumeration. Oral presentation at the Annual Conference of the Utah Academy of Sciences, Arts and Letters, University of Utah, Salt Lake City, Utah.

Kagie, S., A. Noland, E. Nelson, A. Hutchinson, **W. Lorowitz** and K. Nakaoka. 2008. Factors Affecting the Isolation of Enterococcus-like organisms from the Great Salt Lake: Influence of Water Depth and Other Physical Parameters. Oral presentation at the Annual Conference of the Utah Academy of Sciences, Arts and Letters, University of Utah, Salt Lake City, Utah and as an Oral presentation at the Weber State University Symposium for Undergraduate Research.

Badreddin Edris, Cristy Waters, Karen Nakaoka, and **William Lorowitz**. 2008. Robustness of the Disk Diffusion Assay Protocol. Oral presentation at the Weber State University Symposium for Undergraduate Research.

Courses Taught

Introductory Microbiology Lecture and Laboratory (non-majors)

General Microbiology Lecture and Laboratory (core course in majors curriculum)

Microbiological Procedures (core course in majors curriculum)

Ruminal Microbiology Laboratory (advanced undergraduate and graduate students)

Microbial Physiology Lecture and Laboratory (advanced undergraduate and graduate students)

Industrial Microbiology and Biotechnology (advanced undergraduate and graduate students)

Bacterial Diversity and Ecology (advanced undergraduate and graduate students)

Biomechanics (advanced undergraduate pre-physical therapy students)

Introduction to Research (graduate students)

Graduate Student Seminar (graduate students)

Elementary Public Health (non-majors)

Freshman Experience (academically-challenged freshman)

CURRICULUM VITAE

PERSONAL

Name:	**Karen Grandel Nakaoka, Ph.D.**
Department	**Microbiology**
Status	**Tenured**
Rank	**Professor**

EDUCATION

Ph.D.	Medical Microbiology/Immunology	Ohio State University	1981
B.S.N	Nursing	University of Colorado	1986
B.S.	Zoology with emphasis in Microbiology	Ohio University	1976

WORK EXPERIENCE

Professor of Microbiology at Weber State University (WSU) from July 2003 - present

Associate Professor of Microbiology at WSU from July 2000- June 2003

Assistant Professor of Microbiology at WSU from July 1997- June 2000

Visiting Assistant Professor of Microbiology at WSU from July 1996- June1997

Adjunct Professor of Microbiology at WSU from April 1994-June 1996

Medical Missionary with the Conservative Baptist Foreign Mission Society (CBFMS) to Cote D'Ivoire, West Africa, from 1987-1993. (CBFMS is now known as World Venture.)

Medical Surgical Nurse at St. Joseph Hospital in Denver, Colorado (1986-1987)

Research Associate at the National Jewish Center for Immunology and Respiratory Diseases, Denver Colorado from 1985-1986 (Did clinical research studying the role of Platelet Activating Factor in Human Diseases)

Postdoctoral training at the National Jewish Center for Immunology and Respiratory Diseases in Denver Colorado from 1981-1985 (Clinical researcher studying the role of Platelet Activating Factor in Human Diseases)

PUBLICATIONS

(Please note that I have published both under my maiden name, **Grandel**, and my married name, **Nakaoka**. Note that student authors are in **bold** type.)

1. Karen E. Grandel. 1981. The survival of *Staphylococcus aureus* in renal abscesses. *Ohio State University Dissertation*

2. Karen E. Grandel, R.S. Farr, A.A. Wassermann, T.E. Eisenstadt, and S.I. Wassermann. 1985. The association of platelet activating factor with primary acquired cold urticaria. *New England Journal of Medicine*. 313:404-409.

3. A.A.Wanderer, K.E.. Grandel, S.I. Wassermann, R.S. Farr. 1986. Clinical characteristics of cold-induced systemic reactions in acquired cold urticaria syndromes: Recommendations for prevention of this complication and a proposal for a diagnostic classification of cold urticaria. *J. Allergy and Clinical Immunology*. 78(3) part 1:417-423.

4. R.S. Farr, R.E. Chang, R.E., M.L. Wardlow, J.L Schulz, and K.E. Grandel, 1987. Platelet abnormalities in asthma-do they exist in humans? *Agents and Actions, suppl*. (21): 129-137.

5. Grandel, K.E. 1987. Platelet activating factor. *Drugs of Today*. 23(5):257-268.

6. Rita Moyes, Karen Nakaoka, Jeff Pommerville, and Peggy Johnson. 2000. Understanding and Interpreting the ELISA. Published online for the American Society for Microbiology's Teaching Resources entitled "The ASM Microbe Library Curriculum Resources". (www.microbelibrary.org)

7. W. Lorowitz, K. Nakaoka, D. Horne, and G. Harrington. Editions printed every semester from 2000- 2007. *Principles of Microbiology: Laboratory Manual for Microbiology 2054*.

8. Friedman, B.F., and Grandel, K.E. 2002. Platelet activating factor-like lipid in the nasal washings of allergic individuals following specific nasal antigen challenge. Best Paper in Biological Sciences in the *Journal of the Utah Academy of Sciences* 79: 15-25.

9. S.A.Benson, W.H. Coleman, L.E. Fisher, D. Kullman, and K. Nakaoka, April 2002. Using the Video Series *Unseen Life on Earth: An Introduction to Microbiology* to Enhance Student Learning. *ASM News* 68 (4): 182-4.

10. ***Blake Harrington***, Glenn Harrington, and Karen Nakaoka April 2003. The survival of *Staphylococcus aureus* on common hospital objects. *Journal of the Utah Academy of Sciences, Arts, Letters* 80: 39-48.

11. **Blake Harrington**, Karen Nakaoka, and Glenn Harrington,. April 2003. How to keep the public safe: Killing Anthrax Endospores Using a Hot-Air Oven. *Journal of the Utah Academy of Sciences, Arts, and Letters* 80:28-33.

12. Sue Chao, Marc Schreuder, Gary Young, Karen Nakaoka, Lynn Moyes and Craig Oberg. Winter 2004. Antioxidant Levels and Immunomodulatory Effects of Wolfberry Juice and other Juice Mixtures in Mice. *Journal of the American Nutraceutical Association* 7 (1): 32-38.

13. **Steven Babcock,** Karen Nakaoka, and William Lorowitz**.** 2004. Selective and differential media for isolating *Staphylococcus aureus* from environmental settings. *Utah Academy of Sciences, Arts and Letters* 81: 84-90.

14. William Lorowitz, **Elizabeth Saxton**, Mohammad Sondossi, and Karen Nakaoka. 2005. Integrating statistics with a microbiology laboratory activity. *Microbiology Education Journal* 6:14-19.

15. William Lorowitz, **Elizabeth Saxton**, and Karen Nakaoka. 2005. Using a disk diffusion assay to introduce statistical methods. ASM Microbe Library Curriculum Resources (www.microbelibrary.org) .

16. Karen Nakaoka. Case study for Chapter 4. In *Microbiology. A Systems Approach* by Cowan and Talaro. 2005. McGraw-Hill, NY, NY.

17. Karen Nakaoka. Case study for Chapter 8. In *Microbiology. A Systems Approach* by Cowan and Talaro. 2005. McGraw-Hill, NY, NY.

18. Karen Nakaoka. Case study for Chapter 9. In *Microbiology. A Systems Approach* by Cowan and Talaro. 2005. McGraw-Hill, NY, NY.

19. Karen Nakaoka. Case study for Chapter 14. In *Microbiology. A Systems Approach* by Cowan and Talaro. 2005. McGraw-Hill, Ny, NY.

19. Sue Chao, Gary Young, Craig Oberg and Karen Nakaoka. 2005. Inhibition of LPS induced Nitric Oxide Production in Murine RAW Macrophages-like Cells by Essential Oils of Plants. *Journal of the Utah Academy of Sciences, Arts and Letters* 82: 50-59.

20. **Sarah Garcia, Bradley Wade, Carrie Bauer, Carrie Craig**, Karen Nakaoka and William Lorowitz. 2007. The effect of wastewater treatment on antibiotic resistance in *Escherichia coli* and *Enterococcus* sp. *Water Environment Research* 79 (12): 2387-95.

21. Michele Zwolinski, **Angela Barnes, Devin Lindstrom, David Freestone,** and Karen Nakaoka. 2007. Association between Microorganisms and Brine Shrimp (*Artemia*) Cysts from the Great Salt Lake. *Journal of* the *Utah Academy of Sciences, Arts, and Letters* 84:49-61.

22. **Badreddin Edris, Cristy Waters**, Karen Nakaoka and William Lorowitz. 2007. Examining the Stringency of the CLSI Disc Diffusion Assay Protocol . *Journal of the Utah Academy of Sciences, Arts and Letters* 83:22-28.

23. Sue Chao, Gary Young, Craig Oberg, and Karen Nakaoka. 2008**.** Inhibition of Methicillin Resistant *Staphylococcus aureus* (MRSA) by Essential Oils. *Journal of Flavors and Fragrance* 23(6):444-449.

24. William Lorowitz, K. Nakaoka, M. Zwolinski and C. Oberg. Printed each semester from 2008- 2015. *Principles of Microbiology: Laboratory Manual for Microbiology 2054.*

25. **Scott Kagie**, William Lorowitz, and Karen Nakaoka. 2008. Factors Affecting the Isolation of Enterococcus-like Organisms in the Great Salt Lake: Influence of Water Depth**.** *The Journal of the Utah Academy of Sciences, Arts, and Letters* 85: 69-88.

26. **Stephen Merrigan**, William Lorowitz and Karen Nakaoka. 2009. Bacterial Source Tracking of *Enterococcus* sp. and *Escherichia coli* Isolated from the Great Salt Lake Using Antibiotic Resistance Analysis. *The Journal of the Utah Academy of Sciences, Arts, and Letters* 86: 57-71.

27. **Taylor Oberg**, Karen Nakaoka, Matthew Domek and Craig Oberg. 2009. Inhibition of *Staphylococcus aureus* Isolated from Human Nares by Lactic Acid Bacteria. *The Journal of the Utah Academy of Sciences, Arts, and Letters* 86:72-91.

28. **Bass, Jason J. and Hintze, David W.** (2013) "Determination of Microbial Populations in Synthetic Turf System" (Mentors: Craig Oberg, Karen Nakaoka and Joel Bass). *Skyline – The Big Sky Undergraduate Journal*: Vol. 1: Issue 1, Article 1.

29. **Jason Bass, Joel Bass, Tana Eggleston and Blake Sellers** (Mentors: Craig Oberg and Karen Nakaoka). 2013. Occurrence of Bacteria on Fomites in a University Athletic Setting. *ERGO* volume 7:40-51.

30. **Jason Bass, David Hintze,** Craig Oberg, Karen Nakaoka and Joel Bass. 2013. Determination of Microbial Populations in a Synthetic Turf System. *The Journal of the Utah Academy of Sciences, Arts, and Letters* 90:19-29.

31. **Emma Bentley (Mentors:** Craig Oberg and Karen Nakaoka). 2014. Microbial screening of potable water sources in Guatemala: A potential source of disease transmission. *ERGO* volume 8:98-115.

32. **Emma Bentley (Mentors:** Craig Oberg and Karen Nakaoka). 2014. Microbial screening potable water sources in Guatemala: A potential source of disease transmission. Awarded Best Paper in Biology) *The Journal of the Utah Academy of Sciences, Arts, and Letters 91*:43-60.

33. **Eric Lancaster** and Karen Nakaoka.2018. Antibiotic Resistance and Hemolysins of Lactic Acid Bacteria Isolated from Over the Counter Probiotic Products. *ERGO* 12:112-121.

PRESENTATIONS from 2007-2018

National Presentations

1. **Scott Kagie, Alan Noland,** William Lorowitz and Karen Nakaoka. June 2008. Factors Affecting the Isolation of *Enterococcus*-like organisms from the Great Salt Lake: Influence of Water Depth and Other Physical Parameters. **Poster presentation at the 108th *Annual Meeting of the American Society for Microbiology* in Boston, Massachusetts in June 2008.**

2. **Blake Sellers, Jason Bass, Tana Eggleston**, Karen Nakaoka and Craig Oberg. Occurrence of Bacteria on Fomites in a University Athletic Setting. Poster presentation at the **National Conference of Undergraduate Research**.*, Ogden, Utah, March 29, 2012

3. **ShayLynne Clark**, Karen Nakaoka et al. Singing to Immunoenhancement. Poster presentation at the **National Conference of Undergraduate Research**, Ogden, Utah, March 29, 2012.

4. **Jason Bass, David Hintze**, (Craig Oberg, Karen Nakaoka and Joel Bass). April 2013. Determination of Microbial Populations in a Synthetic Turf System. Poster presentation at the 2013 National Conference for Undergraduate Research, University of Wisconsin, Lacrosse, WI.

5. **Jennifer Jorgenson, Ashley Badley, Amanda Zaugg, Alessia Banning**, Mo Sondossi, William Lorowitz and Karen Nakaoka. Poster presentation in May 2013. *Antibiotic resistance of enterococci isolated from the Great Salt Lake and freshwater sources.* Poster presentation at the Annual Meeting of the American Society for Microbiology, Denver, Colorado.

6. **Hilary Vachon, Seth Peterson,** Jason Fritzler and Karen Nakaoka. May 2013. Poster presentation. *Vibrio metschnikovii associated with brine shrimp eggs isolated from the Great Salt Lake*. Poster presentation at the Annual Meeting of the American Society of Microbiology, Denver, Colorado.

7. **Jason Bass, David Hintze**, Craig Oberg, Karen Nakaoka and Joel Bass. Accepted for a poster presentation in May 2013. *Determination of Microbial Populations in a Synthetic Turf System.* Poster presentation at the Annual Meeting of the American Society of Microbiology, Denver, Colorado.

8. **Emma Bentley,** Craig Oberg, Karen Nakaoka, Matt Domek and Michele Culumber. May 2014*. Microbial screening potable water sources in Guatemala: A potential source of disease transmission*. Poster presentation at the Annual Meeting of the American Society for Microbiology in Boston, Mass.

9. **Shelly Barker**, Michele Culumber, Jason Fritzler, Matt Domek,and Karen Nakaoka. *Vibrio Isolated from Hypersaline Waters of the Great Salt La*ke. June 2017. Poster presentation at the American Society for Microbiology, New Orleans, LA.

Regional Presentations

10. **D.G. Lindstrom**, K.G. Nakaoka, and M.D. Zwolinski. March 2007. The Presence of *Marinilactibacilllus*-like organisms in the North Arm of the Great Salt Lake. Poster presentation at the **Annual Meeting of the Intermountain Branch of the American Society for Microbiology**, Idaho State University, Pocatello, Idaho.

11. **D.G. Lindstrom**, K.G. Nakaoka, and M.D. Zwolinski. April 2007. The Presence of *Marinilactibacilllus*-like organisms in the North Arm of the Great Salt Lake. Poster presentation at the Annual Conference of the **Utah Academy of Sciences, Arts and Letters, Southern Utah University**, Cedar City, Utah.

12. **David Freestone, Ben Willis, Rich Beus, Nephi Redd, Ben Baird, Angie Barnes,** Michele Zwolinski and Karen Nakaoka. April 2007. **The Ability of *Enterococcus-like* Organisms to Survive in the Great Salt Lake.** Poster presentation at the Annual Conference of the **Utah Academy of Sciences, Arts and Letters**, Southern Utah University, Cedar City, Utah.

13. **Angie Barnes**, Michele Zwolinski and Karen Nakaoka. April 2007. Association of Microorganisms with Brine Shrimp Eggs (*Artemia*) from the Great Salt Lake. Oral presentation at the Annual Conference of the Utah Academy of Sciences, Arts and Letters, Southern Utah University, Cedar City, Utah.

14. **Scott Kagie, Daniel Clark, Brandon Frankino**, William Lorowitz and Karen Nakaoka. April 2007. Factors Affecting the Isolation of *Enterococcus*-like organisms from the Great Salt Lake: Influence of Water Depth and Other Physical Parameters. Oral presentation at the Annual Conference of the Utah Academy of Sciences, Arts and Letters, Southern Utah University, Cedar City, Utah.

15. **Badreddin Edris, Cristy Waters**, Karen Nakaoka, and William Lorowitz. April 2007. Robustness of the Disk Diffusion Assay Protocol. Oral presentation at the Annual Conference of the Utah Academy of Sciences, Arts and Letters, Southern Utah University, Cedar City, Utah.

16. **Scott Kagie, Alan Noland, Eric Nelson, Adam Hutchinson**, William Lorowitz and Karen Nakaoka. March 2008. Factors Affecting the Isolation of *Enterococcus*-like organisms from the Great Salt Lake: Influence of Water Depth and Other Physical Parameters. Oral presentation at the **Annual Conference of the Utah Academy of Sciences, Arts and Letters**, University of Utah, Salt Lake City, Utah.

17. **Stephen Merrigan, Sarah Garcia, Aaron Fausett, Jon Earl, Jake Taylor, Lori Brophy*, Josh Nakaoka, Brett Schow,** William Lorowitz and Karen Nakaoka. Bacterial Source Tracking of *Escherichia coli* and *Enterococcus* sp. from the Great Salt Lake Region using Antibiotic Resistance Analysis. Poster Presentation at the **Utah Academy of Sciences, Arts & Letters** (April 2009)

18. **Taylor Oberg**, Karen Nakaoka, Mathew Domek and Craig Oberg. Inhibition of *Staphylococcus aureus* Isolated from Human Nares by Lactic Acid Bacteria. Oral Presentation at the **Utah Academy of Sciences, Arts & Letters** (April 2009)

19. **Chris Burnett, Trista Delzer, Carrie Johnson,** William Lorowitz and Karen Nakaoka. Host Factors involved in the Nasal Carriage of *Staphylococcus aureus* among College Students. Oral presentation at the **Intermountain Branch Meeting of the American Society for Microbiology,** April 2011, in Ogden Utah.

20. **Blake Sellers, Jason Bass, Tana Eggleston**, Karen Nakaoka and Craig Oberg. Occurrence of Bacteria on Fomites in a University Athletic Setting. Poster presentation at the **Intermountain Branch of the American Society for Microbiology a**t Idaho State University in Pocatello, Idaho, April 7, 2012.

21. **Blake Sellers, Jason Bass, Tana Eggleston**, Karen Nakaoka and Craig Oberg. Occurrence of Bacteria on Fomites in a University Athletic Setting. Poster presentation at the Utah Academy of Science, Arts and Letters****** at Utah State University in Logan, Utah, April 13, 2012

22. **Erik Bruun, Kristi Russell, Matt McKee, Chelsey King**, and Karen Nakaoka. March 2013. *Internalization of Salmonella in Tomatoes*. Poster presentation at the Annual Meeting of the Intermountain Branch of the American Society for Microbiology, Idaho State University, Pocatello, Idaho.

23. **Kristi Russell, Erik Bruun, Matt McKee, Chelsey King**, and Karen Nakaoka. April 2013. *Internalization of Salmonella in Tomatoes.* Poster presentation at the Annual Meeting of the Utah Academy of Sciences, Arts and Letters, Utah Valley University, Orem, Utah.

24. **Seth Peterson, Hilary Vachon**, Jason Fritzler and Karen Nakaoka. April 2013. *Vibrio metschnikovii associated with brine shrimp eggs isolated from the Great Salt Lake.* . Poster presentation at the Annual Meeting of the Utah Academy of Sciences, Arts and Letters, Utah Valley University, Orem, Utah.

25. **Jennifer Jorgenson, Ashley Badley,** William Lorowitz and Karen Nakaoka. February 2013. Antibiotic resistance of enterococci isolated from the Great Salt Lake and freshwater sources. Oral presentation at the Utah Conference for Undergraduate Research, Utah State University, Logan, Utah.

26. **Jennifer Jorgenson, Ashley Badley, Amanda Zaugg, Alessia Banning**, Mo Sondossi, William Lorowitz and Karen Nakaoka. March 2013. Antibiotic resistance of enterococci isolated from the Great Salt Lake and freshwater sources. Poster Presentation at the Annual Meeting of the Intermountain Branch of the American Society for Microbiology, Idaho State University, Pocatello, Idaho.

27. **Amanda Zaugg, Alessia Banning, Jennifer Jorgenson, Ashley Badley,** Mo Sondossi, William Lorowitz and Karen Nakaoka. April 2013. Antibiotic resistance of enterococci isolated from the Great Salt Lake and freshwater sources. Poster presentation at the Annual Meeting of the Utah Academy of Sciences, Arts and Letters, Utah Valley University, Orem, Utah.

28. **Jason Bass, David Hintze**, Craig Oberg, Karen Nakaoka and Joel Bass. February 2013. Determination of Microbial Populations in a Synthetic Turf System. Poster presentation at the Utah Conference for Undergraduate Research, Utah State University, Logan, Utah.

29. **Jason Bass, David Hintze,** Craig Oberg, Karen Nakaoka and Joel Bass. March 2013. Determination of Microbial Populations in a Synthetic Turf System. Poster presentation at the Annual Meeting of the Intermountain Branch of the American Society for Microbiology, Idaho State University, Pocatello, Idaho.

29. Jason Bass, David Hintze, Craig Oberg, Karen Nakaoka and Joel Bass. April 2013. **Emma Bentley**, Craig Oberg, Karen Nakaoka, Matt Domek and Michele Culumber. April 2014. Microbial screening potable water sources in Guatemala: A potential source of disease transmission. Poster presentation at the annual meeting of the Utah Academy of Sciences, Arts and Letters, St. George, Utah.

Determination of Microbial Populations in a Synthetic Turf System. Poster presentation at the Annual Meeting of the Utah Academy of Sciences, Arts and Letters, Utah Valley University,

30. **Shelly Barker**, Michele Culumber, Jason Fritzler, Matt Domek,and Karen Nakaoka. *Vibrio* Isolated from Hypersaline Waters of the Great Salt Lake. April 2016. Poster presentation at the Intermountain Branch of the American Society for Microbiology at UVU, Salt Lake City, UT.

31. **Marissa Walker**, Craig Oberg, Joel Bass, **Shelly Barker** and Karen Nakaoka. Outbreak of Skin Infection among University Football Players. March 2016. Presented at the Utah Academy of Science Arts & Letters, Westminster University, Salt Lake City, UT.

32. **Wyatt Powelson, Rusty Crofts, Eric Lancaster an**d Karen Nakaoka. Characterization of lactic acid bacteria isolated from over the counter probiotic products. April 2017. Oral presentation at the Utah Academy of Science, Arts and Letters at Utah Valley University, Orem, UT.

33. **Eric Lancaster, Rusty Crofts, Wyatt Powelson, Connor Christensen, George Kayser** and Karen Nakaoka. Characterization of lactic acid bacteria isolated from over the counter probiotic products. April 2017. Poster presentation at the Intermountain Branch of the American Society for Microbiology at Weber State University, Ogden, UT.

34. **Christian Corneal, Cynthia Rudh, Brody Gibson** and Karen Nakaoka. Development of assays to study inhibition of pathogens by lactic acid bacteria and their hemolytic ability. April 2017. Poster presentation at the Intermountain Branch of the American Society for Microbiology at Weber State University, Ogden, UT.

35. **Brody Gibson, Christian Curneal, Cynthia Rudh**, and Karen Nakaoka. Development of assays to study inhibition of pathogens by lactic acid bacteria and their hemolytic ability. April 2017. Oral presentation at the Utah Academy of Sciences, Arts, & Letters conference at Utah Valley University, Orem, UT.

36. **Amber Smith, Sherie Thornton, Ammon Smart,** Michele Culumber and Karen Nakaoka. Inhibition of pathogens by probiotic strains of Lactobacilli. April 2018. Accepted for poster presentation at the Tri-Branch Meeting of the American Society of Microbiology, Durango, CO.

37. **Ammon Smart , Amber Smith, Sherie Thornton,** Michele Culumber and Karen Nakaoka. Inhibition of pathogens by probiotic strains of Lactobacilli. April 2018. Accepted for oral presentation at the Utah Academy of Sciences, Art and Letters, SUU, Cedar City, UT.

38. **Jesse Kupfer, Frank Sechi , Jayson Workman,** and Karen Nakaoka. Characterization of Hemolytic-like Activity of Probiotic Lactobacilli. April 2018. Accepted for poster presentation at the Tri-Branch Meeting of the American Society of Microbiology, Durango, CO.

39. **Jayson Workman, Frank Sechi, Jesse Kupfer** and Karen Nakaoka. Characterization of Hemolytic-like Activity of Probiotic Lactobacilli. April 2018. Accepted for oral presentation at the.
Utah Academy of Sciences, Art and Letters, SUU, Cedar City, UT.

Local Presentations

40. **D.G. Lindstrom**, K.G. Nakaoka, and M.D. Zwolinski. April 2007. The Presence of *Marinilactibacilllus*-like organisms in the North Arm of the Great Salt Lake. Poster presentation at the Annual Conference of the Fourth Annual Weber State Undergraduate Research Symposium and Celebration, Ogden, Utah.

41. **David Freestone, Ben Willis, Rich Beus, Nephi Redd, Ben Baird, Angie Barnes**, Michele Zwolinski and Karen Nakaoka. April 2007. **The Ability of *Enterococcus-like* Organisms to Survive in the Great Salt Lake.** Poster presentation at the Annual Conference of the Fourth Annual Weber State Undergraduate Research Symposium and Celebration, Ogden, Utah.

42. **Angie Barnes**, Michele Zwolinski and Karen Nakaoka. April 2007. Association of Microorganisms with Brine Shrimp Eggs (*Artemia*) from the Great Salt Lake. Oral presentation at the Annual Conference of the Fourth Annual Weber State Undergraduate Research Symposium and Celebration, Ogden, Utah.

43. **Scott Kagie, Alan Noland, Eric Nelson, Adam Hutchinson**, William Lorowitz and Karen Nakaoka. March 2008. Factors Affecting the Isolation of *Enterococcus*-like organisms from

the Great Salt Lake: Influence of Water Depth and Other Physical Parameters. Oral presentation at the Weber State University Symposium for Undergraduate Research.

44. **Badreddin Edris, Cristy Waters**, Karen Nakaoka, and William Lorowitz. March 2008. Robustness of the Disk Diffusion Assay Protocol. Oral presentation at the Weber State University Symposium for Undergraduate Research.

45. **Casey Johnston, Brian Bentley, Tyson Steel, Ryan Adams, Nate Brooks** and Karen Nakaoka. Survival of *Escherichia coli* in bruised apples and *Salmonella* Enteritidis in tomatoes. Oral Presentation at the **WSU 6th Annual Undergraduate Conference***(2009).*

46. **Trista Delzer, Chris Burnett, Carrie Johnson**, William Lorowitz and Karen Nakaoka. Host Factors involved in the Nasal Carriage of *Staphylococcus aureus* among College Students. Oral presentation at the **WSU Undergraduate Research Symposium**, April 2011.

47. **Ashley Badley, Jennifer Jorgenson, Amanda Zaugg, Alessia Banning, April Nelson, Colton Stokes** (Mo Sondossi, William Lorowitz and Karen Nakaoka). March 2013. Antibiotic resistance of enterococci isolated from the Great Salt Lake and freshwater sources. Poster Presentation at the WSU Symposium for Undergraduate Research, Ogden, Utah.

48. **Hilary Vachon, Seth Peterson,** Jason Fritzler and Karen Nakaoka. March 2013. *Vibrio metschnikovii associated with brine shrimp eggs isolated from the Great Salt Lake.* Poster presentation at the WSU Symposium for Undergraduate Research, Ogden, Utah.

49. **Jason Bass, David Hintze,** Craig Oberg, Karen Nakaoka and Joel Bass. March 2013. Determination of Microbial Populations in a Synthetic Turf System. Poster presentation at the WSU Symposium for Undergraduate Research, Ogden, Utah.

50. Autumn Brubaker, Jessica Brooke, Madison Landreth, Cody Zesiger, Colton Stokes, Zandy Pashley, April Foley, Michael Harris, Jhonny Yovera (Mentors:Karen Nakaoka,, William Lorowitz and Mo Sondossi). March 31, 2014. Antibiotic Resistance of Enterococci Isolated from the Great Salt Lake and Fresh Water Sources. Oral presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

51. **Matt Fullmer and Sterling Haws** (Mentors: Lauren Fowler, Karen Nakaoka, Jason Fritzler, William Lorowitz and Ed Walker). March 31, 2014. Impact of Fluoxetine on Cytokine levels in Mice. Oral presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

52. **Emma Bentley**, Craig Oberg, Karen Nakaoka, Matt Domek and Michele Culumber. March 31, 2014. Microbial screening potable water sources in Guatemala: A potential source of disease transmission. Poster presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

53. Autumn Brubaker, Jessica Brooke, Madison Landreth, Cody Zesiger, Colton Stokes, Zandy Pashley, April Foley, Michael Harris, Jhonny Yovera (Mentors:Karen Nakaoka,, William Lorowitz and Mo Sondossi). March 31, 2014. Antibiotic Resistance of Enterococci Isolated from the Great Salt Lake and Fresh Water Sources. Oral presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

54. **Matt Fullmer and Sterling Haws** (Mentors: Lauren Fowler, Karen Nakaoka, Jason Fritzler, William Lorowitz and Ed Walker). March 31, 2014. Impact of Fluoxetine on Cytokine levels in Mice.

Oral presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

55. **Emma Bentley**, Craig Oberg, Karen Nakaoka, Matt Domek and Michele Culumber. March 31, 2014. Microbial screening potable water sources in Guatemala: A potential source of disease transmission. Poster presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

56. **Shelly Barker**, Michele Culumber, Jason Fritzler, Matt Domek,and Karen Nakaoka. April 2016. Isolating and characterizing *Vibrio* species from Great Salt Lake. Presented at the Weber State University Symposium for Undergraduate Research, WSU, Ogden, UT.

57. **Eric Lancaster, Rusty Crofts, Wyatt Powelson, Connor Christensen, George Kayser** and Karen Nakaoka. "Characterization of lactic acid bacteria isolated from over the counter probiotic products". April 2017. Presented at the WSU Symposium for Undergraduate Research, WSU, Ogden, UT.

58. **Cynthia Rudh Christian Corneal, Brody Gibson, Ying Zhang** and Karen Nakaoka, Development of assays to study inhibition of pathogens by lactic acid bacteria and their hemolytic ability. April 2017. Poster presentation at the WSU Symposium for Undergraduate Research, Weber State University, Ogden, UT.

59. **Jayson Workman, Jesse Kupfer, Frank Sechi**. Michele Culumber and Karen Nakaoka Characterization of Hemolytic-like Activity of Probiotic Lactobacilli. April 2018. Accepted for poster presentation at the WSU Symposium for Undergraduate Research, Weber State University, Ogden, UT.

60. **Sherie Thornton, Ammon Smart, Amber Smith,** Michele Culumber and Karen Nakaoka . Inhibition of pathogens by probiotic strains of Lactobacilli. April 2018. Accepted for oral presentation at the WSU Symposium for Undergraduate Research, Weber State University, Ogden, UT.

Grants

During my tenure at WSU, I have been the recipient of several University grants from the WSU RSPG for faculty development as well as the mentor of several grants to students from the WSU Office of Undergraduate Research. Some of my research in the past years at WSU has also been funded by private organizations such as the Young Living Essential Oil Company.

Cody Zesiger & Autumn Brubaker, whom I mentored, were awarded an OUR grant for undergraduate research concerning speciation of our *Enterococcus* isolates. (~$800 for Summer & Fall semester 2014) Dr. Lauren Fowler, Dr. Ed Walker and I mentored two students, Sterling Haws and Matt Fullmer, who received a grant from the OUR entitled, *Do Gender/Antidepressants affect Immune Response in Stressed Mice*. They were awarded $ 2600 by OUR. (2012-2013)

TEACHING ACHIEVEMENTS

(Most significant teaching developments from 1997-2018):

- Outstanding Mentor Award from WSU Office of Undergraduate Research (March 2018)

Developed and teacher of a new elective course for Microbiology majors (Microbiology and Global Public Health (approved in 2014)

- awarded the Dr. Spencer L. Seager Distinguished Teaching Award by the WSU College of Science (April 2012)

-- Developed an online upper division course in Immunology (approved 2011)

- Co-developer and teacher of new elective course entitled "Tropical Diseases" (Microbiology 3403)

- awarded an American Society for Microbiology travel grant for two presentations about microbiology education. Presented these at the 8th ASM Undergraduate Microbiology Conference in Orlando, Florida. (2001)

- awarded "Exceptional Teacher 1998" by the Staff and Students of Services for Students with Disabilities

- Co-developer of skill-based assessment of lab skills in Microbiology 2054 and in Medical Microbiology 3305 (1997-current)

- Co-author of lab manuals for use in Microbiology 2054, Medical Microbiology and Immunology (1997-current)

Professional Service

Served for three years as Chair of the Biology Division of the Utah Academy of Sciences and as a representative to the National Academy of Sciences (one year)

Served for two years as Alternate Councilor of the Intermountain Branch of the American Society for Microbiology, voting at two national meetings.

Served on the following WSU Committees for varying periods of time:

Teaching Learning Assessment Committee, Admissions, Standards (University level)
Student Affairs, Admissions, Credits and Graduation Committee (University level)
Chemical Hygiene Committee (University level)
Biological Safety Committee (University level)
Chair of the Public Relations Committee of the College of Science
College of Science General Education Task Force
College of Science Rank, Tenure Committee
College of Science Curriculum Committee
Member of the College of Science Dean Evaluation Committee (2010 & 2014)
Various Departmental committees including:

Chair of Microbiology Departmental Faculty Search Committees (2006 and 2012 & 2017-2018)
Acting Chair of the Microbiology Department (Fall 2005)
Pre-PA adviser for Microbiology Students (2017-2018)

Served as the WSU Pre-PA advisor and Pre-PA club advisor for 20 years (1997-2017).

Initiated the WSU Neglected Tropical Diseases Club in 2010 which has been helping to raise funds for various national charitable organizations through student service projects.

Served in various capacities at the Ritchie Science and Engineering Fair at the Junior and Senior High Fairs from 1997-2011

Have consulted for several Textbook Publishers and for various local businesses

VITA

Craig J. Oberg
Presidential Distinguished Professor of Microbiology

EDUCATION

B.S.	Weber State College	1979	Major: Microbiology
Ph.D.	Utah State University	1985	Biology: Emphasis-Microbiology

WORK EXPERIENCE

A. TEACHING:

Utah State University	Teaching Asst. - Biology	Sep. 79 - June 81
Weber State College	Instructor - Microbiology	Sep. 81 - Aug. 82
Utah State University	Teaching Asst. – Biology and Bacteriology	Sep. 82 - June 83
Weber State College	Instructor - Microbiology	Sep. 83 - June 85
Weber State College	Assistant Professor	July 85 - June 88
Weber State University	Associate Professor	July 88 - June 92
Utah State University	Visiting Professor	July 90 - June 91
Weber State University	Professor of Microbiology	July 92 – present

B. ADMINISTRATIVE ASSIGNMENTS:

Chair, Department of Microbiology, WSU	July 1991 to June 2012
Faculty Athletic Representative, WSU	May 2009 to present

C. RESEARCH:

Western Dairy Center	Research Associate	June 84 - Oct. 96

D. ADJUNCT APPOINTMENTS:

Adjunct Professor, Nutrition and Food Sciences Dept. 1993-present
Utah State University, Logan, UT

E. AWARDS:

Outstanding Graduate, Dept. of Microbiology, WSU, 1979.
Most Innovative Course, WSU Honors Program, May 1992.
Hemingway Faculty Vitality Award, WSU, May 1992.
Crystal Crest Young Alumnus Award, WSU, June 1992.
Honors Service Professor, WSU Honors Program, 1994.
H. Aldous Dixon Award, WSU Alumni Association, 1996.
John S. Hinckley Fellow, WSU, 1998.
George and Beth Lowe Innovative Teaching Award, WSU, 1999.
Cortez Professor of the Year, Honors Program, WSU, 2000.
Dr. Spencer L. Seager Distinguished Teaching Award, College of Science, WSU, 2001.
Phi Kappa Phi Honor Society inductee, April 10, 2001.
Best Paper Award, 2004. Biological Division, Utah Acad. of Sciences, Arts, and Letters.
Hemingway Faculty Vitality Award, WSU, May 2004.
Endowed Scholar, College of Science, WSU, 2004-2007.
Brady Presidential Distinguished Professor of Microbiology, WSU, 2006
Distinguished Service Award, Utah Academy of Sciences, Arts, and Letters, 2009.
Faculty Governance Award, Weber State University, 2016
Undergraduate Research Mentor Award, College of Science, WSU, 2016
International Dairy Foods Association Award in Dairy Foods Processing, American Dairy Science Association, 2017

F. MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

American Dairy Science Association
American Society for Microbiology
Institute of Food Technologists

Sigma Xi
Utah Academy of Sciences, Arts, and Letters

RESEARCH

A. ARTICLES IN REFEREED JOURNALS:

1. Okigbo, O.N., C.J. Oberg, and G.H. Richardson. 1985. Lactic culture activity tests using pH and impedance instrumentation. J. Dairy Sci. 68:2521-2526.
2. Oberg, C.J., L.H. Davis, C.A. Ernstrom, and G.H. Richardson.1986. Manufacture of Cheddar cheese using proteinase negative mutants of *Streptococcus cremoris*. J. Dairy Sci. 69:2975-2981.
3. Oberg, C.J. 1986. Curdling Chemistry - Coagulated Milk Products. J. Chem. Ed. 63:770-771.
4. Weimer, B.C., C.J. Oberg, L.V. Moyes, R.J. Brown, and G.H. Richardson. 1989. Comparison of amino acid analysis and o-phthaldialdhyde methods to characterize proteolysis by *Lactobacillus bulgaricus*. J. Dairy Sci. 72:2873-2876.
5. Oberg, C.J., F.A. Khayat, and G.H. Richardson.1990. Proteinase profiles of *Lactococcus lactis* ssp. *cremoris* using high performance liquid chromatography. J. Dairy Sci. 73:1465-1471.
6. Oberg, C.J., B.C. Weimer, L.V. Moyes, R.J. Brown, and G.H. Richardson. 1991. Proteolytic characterization of *Lactobacillus delbrueckii* ssp. *bulgaricus* strains by the o-phthaldialdehyde test and amino acid analysis. J. Dairy Sci. 74:398-403.
7. Oberg, C.J., A. Wang, L.V. Moyes, R.J. Brown, and G.H. Richardson.1991. Effects of thermolactic culture proteolytic activity on physical properties of Mozzarella cheese. J. Dairy Sci. 74:389-397.
8. Oberg, C.J., R. Merrill, L.V. Moyes, R.J. Brown, and G.H. Richardson.1991. Effect of *Lactobacillus helveticus* cultures on physical properties of Mozzarella cheese. J. Dairy Sci. 74:4101- 4107.
9. Oberg, C.J., R. Merrill, R.J. Brown, and G.H. Richardson. 1992. Effect of milk-coagulating enzymes on physical properties of Mozzarella cheese. J. Dairy Sci. 75:669-675.
10. Oberg, C.J., R. Merrill, R.J. Brown, and G.H. Richardson. 1992. Effect freezing, shredding, and thawing on physical properties of Mozzarella cheese. J. Dairy Sci. 75:1161-1166.
11. Oberg, C.J., and J.R. Broadbent. 1993. Thermophilic starter cultures: another set of problems. J. Dairy Sci. 76:2392-2406.
12. Oberg, C.J., and R.J. Brown. 1993. Preservation by fermentation: Focusing on the chemistry and microbiology of vegetables. J. Chemical Education 70:653-656.
13. Oberg, C.J., W.R. McManus, and D.J. McMahon. 1993. Microstructure of Mozzarella cheese during manufacture. Food Structure J. 12:251-258.
14. McMahon, D. J., C. J. Oberg, and W. McManus. 1993. Functionality of Mozzarella cheese. Australian J. Dairy Sci. and Technol. 48:99-104.
15. McManus, W.R., C.J. Oberg, and D.J. McMahon.1993. High resolution scanning electron microscopy of milk products: a new sample preparation procedure. Food Structure J.12:475-482.
16. Merrill, R. K., C. J. Oberg, and D. J. McMahon. 1994. A method for manufacturing reduced fat Mozzarella cheese. J. Dairy Sci. 77:1783-1789.
17. Caldwell, S. L., D. J. McMahon, C. J. Oberg, and J. R. Broadbent. 1996. Development and characterization of lactose-positive *Pediococcus* species for milk fermentation. Applied and Environ. Microbiol. 62:936-941.
18. Fife, R. L., M. C. Alleyne, C. J. Oberg, and D.J. McMahon. 1996. Use of fat replacers in low fat Mozzarella cheese. J. Dairy Sci. 79:1911-1921.
19. Fife, R.L., D.J. McMahon, and C.J. Oberg. 1996. Functionality of low fat mozzarella cheese. J. Dairy Sci. 79:1903-1910.
20. Merrill, R. K., C. J. Oberg, W. R. McManus, M. Kalab, and D. J. McMahon. 1997. Microstructure and physical properties of a reduced fat Mozzarella cheese made using *Lactobacillus casei* ssp. *casei* adjunct culture. Food Sci. and Technol. 29:721-728.
21. Broadbent, J. R., C. J. Oberg, H. Wang, and L. Wei. 1997. Attributes of the heat shock response in three species of dairy *Lactobacillus*. Systematic and Applied Microbiol. 20:12-19.
23. Perry, D. B., D. J. McMahon, and C. J. Oberg. 1997. Effect of exopolysaccharide producing cultures on moisture retention in low fat Mozzarella cheese. J. Dairy Sci. 80:799-805.
24. Perry, D. B., D. J. McMahon, and C. J. Oberg. 1998. Manufacture of low fat Mozzarella cheese using exopolysaccharide-producing starter cultures. J. Dairy Sci. 81:563-566.
25. Caldwell, S. L., R. W. Hutkins, D. J. McMahon, C. J. Oberg, and J. R. Broadbent. 1998. Lactose and galactose uptake by genetically engineered *Pediococcus* species. Applied Microbiology and Biotechnology. 49:315-320.

26. Paulson, B. M., D. J. McMahon, and C. J. Oberg. 1998. Influence of sodium chloride on appearance, functionality, and protein arrangements in nonfat Mozzarella cheese. J. Dairy Sci. 81:2053-2064.
27. Low, D., J. A. Ahlgren, D. Horne, D. J. McMahon, C. J. Oberg, and J. R. Broadbent. 1998. Influence of *Streptococcus thermophilus* MR-1C capsular exopolysaccharide on cheese moisture level. Appl. Environ. Micro. 64:2147-2151.
28. Chao, S. C., D. G. Young, and C. J. Oberg. 1998. Effect of a diffused essential oil blend on bacterial bioaerosols. J. Essential Oil Res. 10:517-523.
29. Broadbent, J. R., C. J. Oberg, and L. Wei. 1998. Characterization of the *Lactobacillus helveticus groESL* operon. Research in Microbiology. 149:247-253.
30. McMahon, D. J. and C. J. Oberg. 1998. Influence of fat, moisture, and salt on functional properties of Mozzarella cheese. Aust. J. Dairy Technol. 53:98-101.
31. Oberg, C. J., J. R. Broadbent, and D. J. McMahon. 1998. Developments in thermophilic starter cultures for cheese. Aust. J. Dairy Technol. 53:102-104.
32. Caldwell, S., D. J. McMahon, C. J. Oberg, and J. R. Broadbent. 1998. An alternative approach to phage control in Italian-type cheese. European Dairy Magazine. August.
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B. BOOK CHAPTERS

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38. Oberg, C. J., and D. J. McMahon. Development of thermophilic cultures for manufacture of low-fat and nonfat Mozzarella cheese. Western Dairy Center Annual Meeting. August 27-28, 1997, Sun Valley, ID.
39. Oberg, C. J., and J. R. Broadbent. Influence of alternative starter cocci on the physical properties of lowfat Mozzarella cheese. Western Dairy Center Annual Meeting. August 27-28, 1997, Sun Valley, ID.
40. Oberg, C. J., and J. R. Broadbent. Improvement of Mozzarella cheese functionality by understanding exopolysaccharide production in thermophilic starter cultures. Western Dairy Center Annual Meeting. August 27-28, 1997, Sun Valley, ID.
41. Broadbent, J. R., L. Wei, D. J. McMahon, and C. J. Oberg. 1997. Characterization of the *Lactobacillus helveticus* groESL operon by inverse PCR. *E. coli* and Small Genomes Conf., October 12-15, 1997, Snowbird, UT.
42. Oberg, C. J., S. C. Chao, and D. G. Young. Antimicrobial activity of essential oils on selected bacteria, fungi, and viruses. Utah Academy of Sciences, Arts, and Letters Annual Meeting. April 3, 1998, Salt Lake City, UT.
43. Oberg, C. J., and J. R. Broadbent. Exopolysaccharide production in Streptococcus thermophilis. Western Dairy Center Annual Meeting. June 10, 1998, Logan, UT.
44. Oberg, C. J. Developments in thermophilic starter cultures for cheese. Cheese Science '98 Conference. July 1-3, 1998. Melbourne, Australia.
45. Oberg, C. J. Recent developments in Mozzarella starter cultures in the United States. Bonlac Dairy Cooperative. June 30, 1998. Melbourne, Australia.
46. Oberg, C. J., and D. J. McMahon. Mozzarella research in the United States. University of Melbourne. June 30, 1998. Victoria, Australia.
47. Oberg, C. J. Microbiology of thermal features in Yellowstone National Park. Deakin University. July 6, 1998. Warrnambool, Victoria, Australia.
48. Oberg, C. J. Exopolysaccharide production by lactic acid bacteria. Gilbert Chandler College, July 8, 1998. Werribee, Victoria, Australia.
49. Oberg, C. J. Microbiology of thermal features in Yellowstone National Park. University of Queensland. July 9, 1998. Brisbane, Queensland, Australia.
50. Oberg, C. J. Designing thermophilic cultures to solve cheesemaking problems. 13th Biennial Cheese Conference. August 10-12, 1998. Logan, UT.
51. Oberg, C. J. Influence of pH, Calcium, and Moisture on Physical Properties of Nonfat Mozzarella Cheese. ADSA Annual Meeting. July 28-31, 1998. Denver, CO.
52. Oberg, C. J. Effect of Diseases on World History, USU NFS Seminar, Nov. 10, 1999. Logan, UT.
53. Oberg, C. J. Fermented Microbiology. USTA Mid-Winter Conf., Feb. 4, 2000. Ogden, UT.
54. Oberg, C. J., and A. Taintor. Epistemology of Flyfishing. Western Regional Honors Conference. March 25, 2000. Ogden, UT.
55. Oberg, C. J. Characterization of proteolytic enzymes from thermophilic lactic acid bacteria and their influence on Mozzarella cheese functional properties. Western Dairy Center Annual Meeting. May 10, 1999. Newport, OR.
56. Oberg, C. J. Improvement of Mozzarella cheese functionality by understanding exopolysaccharide production in thermophilic starter cultures. Western Dairy Center Annual Meeting. May 10, 1999. Newport, OR.
57. Induction and characterization of Temperate Bacteriophages Harbored in *Pediococcus acidilactici* . American Society of Microbiology Annual Meeting. May, 1999. Chicago, IL.
58. Characterization of proteolytic enzymes from thermophilic lactic acid bacteria and their influence on Mozzarella cheese functional properties. Western Dairy Center Annual Meeting. June 14, 2001. Logan, UT.
59. The Microbiology of Pizza. Utah Museum of Natural History Summer Seminar Series, July 21, 2001. SLC, UT.
60. Fungal inhibition by lactic acid bacteria. Intermountain ASM Meeting, March 30, 2002. Logan, UT.
61. Effect of probiotic lactic acid bacteria on fungal growth. Utah Academy of Sciences, Arts, and Letters Annual Meeting, April 12, 2002. Logan, UT.

62. Welker, D. L., C. J. Oberg, A. D. Cefalo, D. J. McMahon and J. R. Broadbent. Insight on the mechanism for loss of exopolysaccharide phenotype in *Streptococcus thermophilus*. American Society of Microbiology meeting. SLC, UT. May, 20-23, 2002.
63. Oberg, C. J., J. R. Broadbent, and D. J. McMahon. Applications of EPS production by LAB. American Dairy Science Association Meeting. Quebec City, Quebec. July 23, 2002.
64. Oberg, C. J., J. R. Broadbent, and D. J. McMahon. Characterization of proteolytic enzymes from thermophilic lactic acid bacteria and their influence on Mozzarella cheese functional properties. Western Dairy Center Annual Meeting. Sun Valley, ID. August 6, 2002.
65. Oberg, K., J. Greenhalgh, M. Russell, and C. Oberg. 2003. Inhibitory effect of lactic acid bacteria on oral streptococci. American Society for Microbiology Intermountain Branch Meeting. Tooele, UT. March 29, 2003.
66. Wheeler, J., and C. J. Oberg. Effect of essential oils on *Trichophyton mentagrophytes*. Utah Academy of Sciences, Arts, and Letters meeting. Ogden, UT. April 11, 2003.
67. Oberg, C. J. Improving cheese functionality by modifying manufacturing procedures and culture selection. 39th Marschall Cheese Seminar. Visalia, CA. Oct. 2-3, 2002.
68. Oberg, C. J. Probiotic Primer: Bacteriological Basics concerning Probiotics. International Congress of Probiotics Medicine. Anaheim, CA. October 18-19, 2002.
69. Oberg, C. J. Antimicrobial Properties of Essential Oils. International Congress of Probiotics Medicine. Anaheim, CA. October 18-19, 2002.
70. Moyes, B. L., D. J. McMahon, and C. J. Oberg. 2003. Correlation between the USU stretch test and the pizza fork test. American Dairy Science Association Annual Meeting, Phoenix, AZ. July, 2003.
71. Oberg, C. J. Microbiology without a Microscope. USTA Mid-Winter Conf. Feb. 6, 2004. Provo, UT.
72. Marine Biological Laboratory. Direct Plate Isolation of Anaerobes from Environmental Samples, July 27, 2004, Woods Hole, MA.
73. USU Nutrition and Food Sciences Seminar. Effect of Microorganisms on World History. September 15, 2004, Logan, UT.
74. Utah Science Teachers Association Mid-Winter Conference. Microbiology with a Spoon and Shovel. Feb. 18, 2005. Layton, UT.
75. ASM Intermountain Branch Meeting. Novel Method for Isolating Unknown Anaerobic Bacteria from the Environment. March 12, 2005, Ogden, UT.
76. Utah Academy of Sciences, Arts, and Letters Annual Meeting. Novel Method for Isolating Unknown Anaerobic Bacteria from the Environment. April 15, 2005, Orem, UT.
77. T. Oberg, K. Nakaoka, M. Domek, and C. Oberg. International Union of Microbiological Societies. Inhibition of Nasal Strains of *Staphylococcus aureus* by Lactic Acid Bacteria. July 23-28, 2005. San Francisco, CA.
78. McMahon, D. J., and C. J. Oberg. 2005. How Cheese Composition Influences Functionality. North Central Cheese Industry Association annual meeting. Oct. 13.
79. Joseph, P. J., D. J. McMahon, J. R. Broadbent, and C. J. Oberg. Hydrolysis of caseins in Cheddar cheese: Effects of temperature and coagulants. American Dairy Science Association Annual Meeting. Minneapolis, MN. July 10-13, 2006.
80. Rasmussen, T. C., D. J. McMahon, J. R. Broadbent, and C. J. Oberg. Influence of adjunct starters and accelerated ripening on texture and melting properties of Cheddar cheese. American Dairy Science Association Annual Meeting. Minneapolis, MN. July 10-13, 2006.
81. Dynamics of Microbial Systems. 17th Biennial Cheese Industry Conference. August 9, 2006. Sun Valley, ID.
82. D. J. McMahon and C. J. Oberg. Molecular basis of cheese melting in relation to proteolysis. Western Dairy Center Annual Meeting. Sun Valley, ID. August 8, 2006.
83. America's Greatest Men and Women: Scientists. WSU 2007 History Alliance. June 7, 2007. Layton, UT.
84. Microbial Diversity of Yellowstone's Thermal Features. Idaho National Laboratory Biology Division. August 8, 2007. Idaho Falls, ID.
85. Microbiota of Yellowstone National Park's Thermal Features. Utah State University Faculty Forum September 6, 2007. Logan, UT.
86. Coliform Screening of Aguaje Fruit Vendors in Iquitos, Peru: A Potential Source of Disease Transmission. B. Oberg, S. Tringali, J. Watis, B. Wynn and C. Oberg, American Osteopathic Association Annual Meeting. September 30, 2007. San Diego, CA
87. Element Cycling and Unique Organisms in the Great Salt Lake. C. Oberg, M. Zwolinski, and M. Domek. Great Salt Lake Microbiology Research Forum. February 1, 2008, Logan, UT.

88. Coliform screening of Aguaje fruit vendors in Iquitos, Peru: A potential source of disease transmission. Oberg, C., B. Oberg, S. Tringali, J. Watis, and B. Wynn. Utah Academy of Sciences, Arts, and Letters Annual Meeting. March 21, 2008. Salt Lake City, UT.
89. C. Oberg and L. Moyes. Selective Media Techniques for the Enumeration of Probiotic Bacteria in Cheese. Western Dairy Center Annual Meeting, Logan, UT. May 6,2008.
90. C. Oberg, K. Bowcutt, T. Canova, and M. Zwolinski. Isolation and Characterization of Chitin-Utilizing Halophiles from the Great Salt Lake, UT. 10th International Conference on Salt Lake Research. Salt Lake City, UT. May 11-16, 2008.
91. N. Savage, M. Domek, M. Zwolinski, D. Belnap, P. Shen, and C. Oberg. Characterization of Bacteriophage Isolated from the Great Salt Lake. 10th International Conference on Salt Lake Research. Salt Lake City, UT. May 11-16, 2008.
92. M. Zwolinski, C. Sessions, J. Nichols, J. Scadden, and C. Oberg. Phosphate and phosphonate use by microorganisms isolated from the hypersaline environments of the Great Salt Lake. 10th International Conference on Salt Lake Research. Salt Lake City, UT. May 11-16, 2008.
93. C. J. Oberg, L. V. Moyes, and M. Zwolinski. Microbes of Harsh Environments: An In-service Microbiology Fieldtrip Course for Secondary Education Teachers. ASM Conference for Undergraduate Educators, Beverly, MA. May 30-June 1, 2008.
94. Bennett J. Oberg, Steve Tringali, Jake Waits, Brad Wynn, and Craig J. Oberg. Fecal Contamination of Aguaje Fruit Among Vendors in Iquitos, Peru: A Possible Source of Diarrheal Diseases. American Society for Microbiology Annual meeting. Boston, MA. June 1-5, 2008.
95. Kevin M. Bowcutt, Brigham Burton, Dan R. Cox, Michele D. Zwolinski, and Craig J. Oberg Isolation and Characterization of Chitin-Utilizing Halophiles from the Great Salt Lake, UT. American Society for Microbiology Annual Meeting. Boston, MA. June 1-5, 2008.
96. Lynn Moyes and Craig J. Oberg. Microbes of Harsh Environments: An In-service Microbiology Fieldtrip Course for High School Science Teachers. American Society for Microbiology Annual Meeting. Boston, MA. June 1-5, 2008.
97. M. Zwolinski, C. Sessions, J. Scadden, and C. Oberg. Phosphate and phosphonate use by microorganisms isolated from the hypersaline environments of the Great Salt Lake. American Society for Microbiology Annual Meeting. Boston, MA. June 1-5, 2008.
98. N. Savage, M. Domek, M. Zwolinski, and C. Oberg. Bacterial Predation by Bacteriophage Isolated from the Great Salt Lake. American Society for Microbiology Annual Meeting. Boston, MA. June 1-5, 2008.
99. T. Oberg, K. Nakaoka, M. Domek, and C. Oberg. Inhibition of *Staphylococcus aureus* isolated from human nares by lactic acid bacteria. Utah Academy of Sciences, Arts, and Letters Annual Meeting. Provo, UT. April10, 2009
100. Development of an Assay to Characterize Chitinase Utilization in Euryhaline Halophiles C. J. Oberg, T. J. Canova, and M. D. Zwolinski. American Society for Microbiology Annual Meeting. May 17-20, 2009. Philadelphia, PA.
101. Probiotic cultures in cheese and the enumeration challenge using selective media. 18th Biennial Cheese Industry Conference. May 5, 2009. Logan, UT.
102. American Frontiers in Science. WSU 2009 History Alliance. June 15, 2009. Layton, UT.
103. Survival of probiotic adjunct cultures added to low-fat, reduced-fat, and full fat Cheddar cheese. C. Oberg, C. Brothersen, D. McMahon, and L. Moyes, American Dairy Science Association Annual Meeting. July 12-16, 2009. Montreal, Canada.
104. Methodology for differentiation of lactic acid bacteria in cheese made with probiotic adjunct cultures. C. Oberg, C. Brothersen, D. McMahon, and L. Moyes, American Dairy Science Association Annual Meeting. July 12-16, 2009. Montreal, Canada.
105. Virosphere of the Great Salt Lake: Isolation and characterization of novel halophage. C. J. Oberg, M. J. Domek, and M. D. Zwolinski. Great Salt Lake Issues Forum. April 28-30, 2010. SLC, UT.
106. Chitinase Activity in Halophilic Bacteria Isolated the Great Salt Lake. M. D. Zwolinski, J. P. Phelps, and C. J. Oberg. Great Salt Lake Issues Forum. April 28-30, 2010. SLC, UT.
107. An investigation of a new predatory bacterium (BALO) inhabiting the Great Salt Lake, UT. M. J. Domek, J. W. Moyes, and C. J. Oberg. American Society for Microbiology Annual Meeting. May 23-27, 2010. San Diego, CA.
108. Prophage induction in halophilic bacteria isolated from the Great Salt Lake, UT. K. E. Oberg, K. E. Nelson, C. N. Jensen, T. L. Gray, A. M. Hutchinson, M. J. Domek, and C. J. Oberg. American Society for Microbiology Annual Meeting. May 23-27, 2010. San Diego, CA.

109. Isolation of Novel Phage from the Great Salt Lake for *Idiomarina*-like Bacteria. C. M. Benson, M. J. Domek, M. D. Zwolinski, and C. J. Oberg. American Society for Microbiology Annual Meeting. May 23-27, 2010. San Diego, CA.
110. Survey of chitinase activity in halophilic bacteria isolated from the Great Salt Lake, UT. J. T. Phelps, C. J. Oberg, and M. D. Zwolinski. American Society for Microbiology Annual Meeting. May 23-27, 2010. San Diego, CA.
111. Enumeration of bacteria in cheese using selective media: starter, non-starter, and probiotic bacteria. Western Dairy Center Annual Meeting. May 12, 2010. Logan, UT.
112. Influence of sodium gluconate on flavor and microbiology of low-fat Cheddar cheese. D. McMahon, C. Oberg, L. Moyes, R. Miracle, and M. Drake. American Dairy Science Association Annual Meeting. July 11-15, 2010. Denver, CO.
113. Virosphere of the Great Salt Lake: Isolation and characterization of novel halophage. C. J. Oberg, M. J. Domek, and M. D. Zwolinski. Sixth Annual Faculty Forum. October 21, 2010. WSU.
114. Novel *Marinobacter*-like organism and a related phage isolated from the Great Salt Lake, UT. T. B. Simon, M. D. Culumber, M. J. Domek, and C. J. Oberg. Utah Academy of Sciences, Arts, and Letters Annual Meeting, April 8, 2011, SLC, UT.
115. Comparison of *Idiomarina* Bacteriophage Isolated from the Great Salt Lake, UT. C. Benson, C. J. Oberg, M. J. Domek, and M. D. Zwolinski. American Society for Microbiology Annual Meeting. May 21-24, 2011. New Orleans, LA.
116. Novel *Roseobacter*-like Organism and a Related Phage from the Great Salt Lake, UT. T. B. Simon, M. J. Domek, M. D. Zwolinski, and C. J. Oberg. American Society for Microbiology Annual Meeting. May 21-24, 2011. New Orleans, LA.
117. Influence of salt-in-moisture of full fat and low-fat Cheddar cheese on microflora and flavor. D. McMahon, C. Oberg, L. Moyes, R. Miracle, and M. Drake. American Dairy Science Association Annual Meeting. July 10-14, 2011. New Orleans, LA.
118. Virosphere of the Great Salt Lake: Search for Microbial Predators. C. Oberg, M. Domek, and M. Culumber. WSU Sigma Xi Chapter. Oct. 20, 2011.
119. Isolation of an Oligotrophic *Lactobacillus* species that may be Associated with Late Gas Production and Splits in Cheese. C. J. Oberg, M. D. Culumber, T. S. Oberg, J. R. Broadbent, and D. J. McMahon. American Society of Microbiology Intermountain Branch Annual Meeting, April 7, 2012, Idaho State University, Pocatello, ID.
120. Occurrence of Bacteria on Fomites in a University Athletic Setting. Jason Bass, Blake Sellers, Tana Eggleston, Craig Oberg, Karen Nakaoka, and Joel Bass. American Society of Microbiology Intermountain Branch Annual Meeting, April 7, 2012, Idaho State University, Pocatello, ID.
121. Host-Phage Interactions Between a Euryhalophilic *Marinobacter* and Phage TS22 Isolated from the Great Salt Lake, UT. Thomas B. Simon, Craig J. Oberg, Michele D. Culumber, and Matthew J. Domek. American Society of Microbiology Intermountain Branch Annual Meeting, April 7, 2012, Idaho State University, Pocatello, ID.
122. Oberg, C. J. Influence of salt cations on survival of lactococcal starter cultures. Western Dairy Center Meeting. May 8, 2012. Logan UT.
123. Oberg, C. J. and M. D. Culumber. Isolation of oligotrophic LAB and gas production in cheese. Western Dairy Center Meeting. May 8, 2012. Logan UT.
124. Simon, T. B., C. J. Oberg, M. D. Culumber, and M. J. Domek. Characterization of a novel *Marinobacter* and a related phage isolated from the Great Salt Lake. American Society for Microbiology Meeting. June 16-19, 2012. San Francisco, CA.
125. Culumber, M. D., M. J. Domek, C. M. Benson, and C. J. Oberg. Genomic analysis of two novel *Idiomarina* bacteriophage isolated from the Great Salt Lake, UT. American Society for Microbiology Meeting. June 16-19, 2012. San Francisco, CA.
126. McMahon, D. J., N. Farkye, L. V. Moyes, and C. J. Oberg. Impact of sodium, potassium, magnesium, and calcium salt cations on pH, proteolysis and microbial populations during storage of Cheddar cheese. American Dairy Science Association Meeting. July 15-19, 2012. Phoenix, AZ.
127. Oberg, C. J., M. Culumber, T. Oberg, J. R. Broadbent, D. J. McMahon. Isolation of an oligotrophic *Lactobacillus* species that may be associated with late production and splits in cheese. American Dairy Science Association Meeting. July 15-19, 2012. Phoenix, AZ.
128. Oberg, C. J. Growth characteristics of gas-forming lactobacilli from cheese. Western Dairy Center Meeting. June 18, 2013. Corvallis, OR.

129. Oberg, C. J. and M. D. Culumber. Influence of salt cations on survival of lactococcal starter cultures. Western Dairy Center Meeting. June 18, 2013. Corvallis, OR.
130. Oberg, C. J. and M. D. Culumber. Genome sequencing of gas-forming lactobacilli from cheese. Western Dairy Center Meeting. June 18, 2013. Corvallis, OR.
131. Oberg, C. J. Methods for enumerating and identifying bacteria in cheese. Western Dairy Center Meeting. June 18, 2013. Corvallis, OR.
132. Culumber, M. D., C. J. Oberg, T. Oberg, J. R. Broadbent and D. J. McMahon. A new *Lactobacillus* species associated with late gas production in cheese. American Society for Microbiology Meeting. May 18-21, 2013. Denver, CO.
133. Domek, M. J., L. E. Johnson, M. D. Culumber, D. M. Belnap, and C. J. Oberg. Isolation and characterization of a novel bacteriophage from the Great Salt Lake that infects *Halomonas*. American Society for Microbiology Meeting. May 18-21, 2013. Denver, CO.
134. Oberg, C. J., J. Bass, K. Nakaoka, and D. Hintze. Determination of microbial populations in a synthetic turf system. American Society for Microbiology Meeting. May 18-21, 2013. Denver, CO.
136. Ortakci, F., C. Oberg, J. Broadbent, T. Oberg, and D. McMahon. Gas formation and growth characteristics of an oligotrophic *Lactobacillus* species isolated from Cheddar cheese. American Dairy Science Association Annual Meeting. July 8-12, 2013. Indianapolis, IN.
137. McMahon, D. J., C. J. Oberg, L. V. Moyes, M. A. Drake and N. Farkye. Impact of cation substitution on composition and microbiology of reduced-fat Cheddar cheese. American Dairy Science Association Meeting. July 8-12, 2013. Indianapolis, IN.
138. Oberg, C. J., M. D. Culumber, T. S. Oberg, J. R. Broadbent, D. J. McMahon and J. L. Steele. Comparative genome analysis of *Lactobacillus curvatus* strains isolated from cheese and fermented sausage. American Dairy Science Association Meeting. July 8-12, 2013. Indianapolis, IN.
139. Oberg, C. J., M. D. Culumber, T. S. Oberg, F. Ortakci, J. R. Broadbent, and D. J. McMahon. Genomic analysis of *Lactobacillus* WDC04, a novel species associated with late gas production in cheese. American Dairy Science Association Meeting. July 8-12, 2013. Indianapolis, IN.
140. Oberg, C. J., T. S. Oberg, J. R. Broadbent, M. D. Culumber, D. J. McMahon, M. D. Domek and J. L. Steele. Genome analysis of two *Lactobacillus curvatus* strains. Utah Academy of Sciences, Arts and Letters Meeting. April 11, 2014. St. George, UT.
141. Bentley, Emma, C. Oberg, K. Nakaoka, M. Domek, and M. Culumber. Microbial screening of potable water sources in Guatemala. Utah Academy of Sciences, Arts and Letters Meeting. April 11, 2014. St. George, UT.
142. Blackford, K., M. Domek and C. Oberg. Survey of the Great Salt Lake virosphere. Utah Academy of Sciences, Arts and Letters Meeting. April 11, 2014. St. George, UT.
143. DeYoung, N., C. Oberg and M. Culumber. Isolation of novel lactic acid bacteria from Italian Pasta Filata Cheeses: Potential flavor adjuncts for U.S. Mozzarella. Utah Academy of Sciences, Arts and Letters Meeting. April 11, 2014. St. George, UT.
144. McMahon, D., C. Oberg, M. Drake, N. Farkye, L. Moyes, and M. Arnold. Impact of potassium substitution on pH, proteolysis, organic acids, and microbial populations during the storage of Cheddar cheese. American Dairy Science Association Meeting. July 21-24, 2014. Kansas City, MO.
145. Oberg, C., T. Oberg, J. Broadbent, M. Culumber, D. McMahon, and J. Broadbent. Genome analysis of two *Lactobacillus curvatus* strains that have emerged as dominant non-starter lactic acid bacteria in cheese. American Dairy Science Association Meeting. July 21-24, 2014. Kansas City, MO.
146. Oberg, C. J., J. Hendricks, M. D. Culumber, T. S. Oberg, J. R. Broadbent, and D. J. McMahon. Sequencing and annotation of novel plasmids in *Lactobacillus curvatus*. Utah Academy of Sciences, Arts and Letters Meeting. March 27, 2015. Ephraim, UT.
147. Oberg, J. D., H. Thomas, K. Blackford, T. Allen, C. Oberg, and M. Domek. Method to Survey Seasonality of the Great Salt Lake. Utah Academy of Sciences, Arts and Letters Meeting. March 27, 2015. Ephraim, UT.
148. Monterieth. L., C. Oberg, and M. Culumber. Novel *Lactobacillus* associated with Late Gas Production in Aged Cheese. Utah Academy of Sciences, Arts and Letters Meeting. March 27, 2015. Ephraim, UT
149. Oberg, C., K. Blackford, T. Allen, J. Oberg, H. Thomas, and M. Domek. Method to Survey Seasonality of the Great Salt Lake Virosphere. American Society for Microbiology Meeting. May 30-June 3, 2015. New Orleans, LA.

150. Hendricks, J., C. Oberg, M. Culumber, T. Oberg, J. Broadbent, and D. McMahon. Sequencing and annotation of novel plasmids in *Lactobacillus curvatus*. American Society for Microbiology Meeting. May 30-June 3, 2015. New Orleans, LA.
151. Monterieth. L., C. Oberg, M. Culumber, F Ortakci, and D. McMahon. Novel *Lactobacillus* associated with late gas production in aged cheese. American Society for Microbiology Meeting. May 30-June 3, 2015. New Orleans, LA.
152. Oberg, C. Unwanted gas production in cheese from *Lactobacillus wasatchensis*. BUILD Dairy Annual Meeting, June 18, 2015, Twin Falls, ID.
153. Ortakci, F., J. Broadbent, C. Oberg, and D. McMahon. Growth and gas formation by a novel obligatory heterofermentative nonstarter lactic acid bacterium in cheese made using a *Streptococcus thermophilus* starter. American Dairy Science Association Meeting. July 12-16, 2015. Orlando, FL.
154. Ortakci, F., J. Broadbent, C. Oberg, and D. McMahon. Late blowing of Cheddar cheese induced by accelerated ripening and ribose and galactose supplementation in the presence of by a novel obligatory heterofermentative nonstarter lactobacilli species. American Dairy Science Association Meeting. July 12-16, 2015. Orlando, FL.
155. Oberg, C., J. Hendricks, J., M. Culumber, T. Oberg, J. Broadbent, and D. McMahon. Sequencing and annotation of novel plasmids from *Lactobacillus curvatus*. American Dairy Science Association Meeting. July 12-16, 2015. Orlando, FL.
156. Oberg, C., L. Monterieth, M. Culumber, F Ortakci, J. Broadbent, and D. McMahon. *Lactobacillus wasatchensis* WDC04 associated with late gas production in aged Cheddar cheese. American Dairy Science Association Meeting. July 12-16, 2015. Orlando, FL.
157. Oberg, C. Cheese Microbiology – Nonstarter Bacteria and Unwanted Gas Production. Global Cheese Technology Forum. October 26-28, 2015. Reno, NV.
159. Oberg, C. Cheese Texture and Flavor Development in Hard Cheeses. *Inlactis* National Dairy Conference. November 17-88, 2015. Montevideo, Uruguay.
160. Oberg, C. Cheesemaking Parameters and their Relationship to Starter and Nonstarter Activity. *Inlactis* National Dairy Conference. November 17-88, 2015. Montevideo, Uruguay.
161. Oberg, C., M. Culumber, T. Allen, T. Oberg, B. Villalba, and D. McMahon. Characterization of *Lactobacillus wasatchensis* from aged cheese showing late-gas defects. American Dairy Science Meeting, July 19-23, 2016. Salt Lake City, UT.
162. Oberg, C., M. Walker, M. Culumber, and D. McMahon. Determination of antagonism between NSLAB strains and *Lactobacillus wasatchensis* WDC04 using the agar-flip method. American Dairy Science Meeting, July 19-23, 2016. Salt Lake City, UT.
163. Oberg, C., I. Bowen, M. Culumber, and D. McMahon. Determination of treatments to reduce late gassy defect in cheese due to *Lactobacillus wasatchensis* WDC04 contamination. American Dairy Science Meeting, July 19-23, 2016. Salt Lake City, UT.
164. C. Oberg, A. Lavigne, S. Smith, I. Bowen, and D. McMahon. Inhibition of *Lactobacillus wasatchensis* by bio-protective lactic acid bacteria cultures. Utah Academy of Sciences, Arts, and Letters Annual Meeting. April 7, 2017, Orem, UT.
165. Oberg, C. Advances in nonstarter microbiology related to gassy defect in cheese. American Dairy Science Association Annual Meeting. June 25-28, 2017, Pittsburgh, PA.
166. M. Culumber, T. Oberg, T. Allen, F. Ortakci, C, Oberg, and D. McMahon. Selective primer development for rapid detection of the gas-producing non-starter bacterium *Lactobacillus wasatchensis*. American Dairy Science Association Annual Meeting. June 25-28, 2017, Pittsburgh, PA.
167. C. Oberg, A. Lavigne, S. Smith, I. Bowen, and D. McMahon. Effect of bio-protective lactic acid bacteria cultures on *Lactobacillus wasatchensis*. American Dairy Science Association Annual Meeting. June 25-28, 2017, Pittsburgh, PA.
168. Oberg, C., M. Culumber, T. Allen, T. Oberg, B. Rodriguez, and D. McMahon. Characterization of *Lactobacillus wasatchensis* from aged cheeses showing late-gas defects. ADSA Annual Meeting, July 19-23, 2016. Salt Lake City, UT.
169. Oberg, C., I. Bowen, M. Culumber, and D. McMahon. Determination of treatments to reduce late gassy defect in cheese due to *Lactobacillus wasatchensis* WDC04 contamination. ADSA Annual Meeting, July 19-23, 2016, Salt Lake City, UT.
170. Oberg, C. M. Walker, M. Culumber, and D. McMahon. Determination of antagonism between NSLAB strains and *Lactobacillus wasatchensis* WDC04 using the agar-flip method. ADSA Annual Meeting, July 19-23, 2016, Salt Lake City, UT.

171. C. Oberg, M. Culumber, F. Ortakci, T. Oberg, B. Villalba, J. Broadbent, and D. McMahon. *Lactobacillus wasatchensis* is a causative agent of late gas defect in aged cheese. 12th International Symposium on Lactic Acid Bacteria. August 27-31, 2017. Egmond aan Zee, Netherlands.
172. T. Oberg, C. Oberg, J. Broadbent, M. Culumber, D. McMahon R. Ward, and J. Steele. Comparative genomics of *Lactobacillus curvatus* dairy and meat isolates. 12th International Symposium on Lactic Acid Bacteria. August 27-31, 2017. Egmond aan Zee, Netherlands.
173. Oberg, C. Update on *Lactobacillus wasatchensis* as a NSLAB causing slits and gassy cheese. Global Cheese Technology Forum. October 24026, 2017. Reno, NV.

G. STUDENT RESEARCH AWARDS

1. Second Place, Student Poster Competition, ASM Intermountain Branch Annual Meeting, March 30, 2002.
2. Third Place-Poster Competition. J. Wheeler , P. Stephenson, and B. Oberg. Inhibition of Human Dermatophytes by Essential Oils and their Components. American Society of Microbiology Intermountian Branch Annual Meeting. March 27, 2004, Idaho Falls, ID.
3. First Place-Poster Competition. S. Curtis. Inhibition of meat spoilage organisms by lactic acid bacteria. WSU Undergraduate Research Symposium. March 29, 2004.
4. Best Paper Award, 2004. S. Curtis and C. Oberg. Inhibition of meat spoilage organisms by lactic acid bacteria. Biological Division, Utah Academy of Sciences, Arts, and Letters.
5. First Place-Poster Competition. Karli Oberg, Lane Rolling and Craig Oberg. Selection of Essential Oils Components to Inhibit *Candida* without Affecting Lactic Acid Bacteria. American Society for Microbiology Intermountain Branch Annual Meeting. March 12, 2005, Ogden, UT.
6. Second Place-Poster Competition. J. Wheeler , P. Stephenson, and B. Oberg. Inhibition of Human Dermatophytes by Essential Oils and their Components. American Society for Microbiology Intermountain Branch Annual Meeting. March 12, 2005, Ogden, UT.
7. First Place, Poster Competition. Kevin Bowcutt Brigham Burton, Dan Cox, Michele Zwolinski, and Craig Oberg. Isolation and characterization of chitin-utilizing halophiles from the Great Salt Lake. American Society of Microbiology Intermountain Branch Annual Meeting, March 10, 2007, Pocatello, ID.
8. First Place, Poster Competition, AOA Bureau on International Osteopathic Medical Education and Affairs (BIOMEA) International Seminar. *Coliform screening of Aguaje fruit vendors in Iquitos, Peru: A potential source of disease transmission*. B. Oberg, S. Tringali, J. Watis, B. Wynn and C. Oberg, American Osteopathic Association Annual Meeting. September 30, 2007. San Diego, UT
9. Third Place, Poster Competition. Phosphate and Phophonate Use by Microorganisms isolated from Hypersaline Environments of the Great Salt Lake, UT. J. P. Nichols, C. L. Sessions, M. Zwolinski, and C. Oberg. American Society of Microbiology Intermountain Branch Annual Meeting, March 1, 2008, Logan, UT.
10. Fifth Place, Poster Competition. Development of signatures for the detection and differentiation of *Brucella*. Karli Oberg, Deborah Newby, and Craig Oberg. American Society of Microbiology Intermountain Branch Annual Meeting, March 1, 2008, Logan, UT.
11. Third Place, Poster Competition. Isolation of Novel Phage from the Great Salt Lake that infect *Idiomarina*. C. M. Benson, M. J. Domek, M. D. Zwolinski, and C. J. Oberg. American Society of Microbiology Intermountain Branch Annual Meeting, April 10, 2010, Provo, UT.
12. Outstanding Poster Award. Inhibition of *Clostridium difficile* by Lactic Acid Bacteria. J. Lowe, T. Webber, R. Lowe, and C. Oberg. American Society of Microbiology Intermountain Branch Meeting, April 9, 2011, Ogden, UT.
13. Outstanding Poster Award. Comparison of *Idiomarina* Bacteriophage Isolated from the Great Salt Lake, UT. C. M. Benson, C. J. Oberg, M. J. Domek, and M. D. Culumber. American Society of Microbiology Intermountain Branch Meeting, April 9, 2011, Ogden, UT.
14. Outstanding Sigma XI Paper (Biological Section) Award. Novel *Marinobacter*-like Organism and a Related Phage Isolated from the Great Salt Lake, UT. T. B. Simon, C. J. Oberg, M. D. Culumber, M. J. Domek. Weber State University Sigma Xi Chapter Student Paper Competition, April 9, 2011, Ogden, UT.
15. Utah Academy 2012 Outstanding Paper Award in Biological Sciences. Ryan Hoggan, Blake Dahl, Michele Culumber, Craig Oberg, and Matthew Domek. Molecular characterization of bacteriophages isolated from the Great Salt Lake.
16. David Hintze and Jason Bass (C. Oberg and J. Bass). Determination of Microbial Populations in a Synthetic Turf System. Student Award Poster Finalists consisting of Undergraduate, Masters and Doctoral posters. National Athletic Trainers Association Annual Meeting. June 2013, Las Vegas, NV.
17. Utah Academy 2013 Outstanding Paper Award in Biological Sciences. Bass, J., D. Hintze, C. Oberg, K. Nakaoka, and J. Bass. Determination of microbial populations in a synthetic turf system.

18. First Place Oral Presentation, ASM Intermountain Branch Meeting, BYU, Provo, UT. March 8, 2014. Emma Bentley. Microbial screening of potable water sources in Guatemala: A potential source of disease transmission.
19. UASAL 2014 Outstanding Paper Award in Biological Sciences. E. Bentley, C. Oberg and K. Nakaoka. Microbial screening of potable water sources in Guatemala: A potential source of disease transmission.
20. Third Place, Poster Competition. Isolation of Novel Phage from the Great Salt Lake that infect *Idiomarina*. C. M. Benson, M. J. Domek, M. D. Zwolinski, and C. J. Oberg. American Society of Microbiology Intermountain Branch Annual Meeting, April 10, 2010, Provo, UT.
21. Outstanding Poster Award. Inhibition of *Clostridium difficile* by Lactic Acid Bacteria. J. Lowe, T. Webber, R. Lowe, and C. Oberg. American Society of Microbiology Intermountain Branch Meeting, April 9, 2011, Ogden, UT.
22. Outstanding Poster Award. Comparison of *Idiomarina* Bacteriophage Isolated from the Great Salt Lake, UT. C. M. Benson, C. J. Oberg, M. J. Domek, and M. D. Culumber. American Society of Microbiology Intermountain Branch Meeting, April 9, 2011, Ogden, UT.
23. Outstanding Sigma XI Paper (Biological Section) Award. Novel *Marinobacter*-like Organism and a Related Phage Isolated from the Great Salt Lake, UT. T. B. Simon, C. J. Oberg, M. D. Culumber, M. J. Domek. Weber State University Sigma Xi Chapter Student Paper Competition, April 9, 2011, Ogden, UT.

H. GRANTS

1. Principal Investigator, "Acquisition of an UV Transilluminator for Microbiology and Chemistry", Instructional Development Committee, February, 1984, $350.00, (not funded).
2. Co-investigator, "Instrumentation to improve instruction in microbial technology", National Science Foundation (CSIP Grant), October, 1985, $18,780.00, (not funded).
3. Principal Investigator, "Determination of Plasmid Functions in *Streptococcus cremoris*", WSC R & PG Committee, April, 1986, $360.00, (funded).
4. Principal Investigator, "Data Analysis, Graphing and Modeling in Upper Division Microbiology Courses", WSC Academic Computer Committee, January, 1987, $230.00, (funded).
5. Co-investigator, "Instrumentation for Biotechnology Instruction", Natl. Sci. Foundation (CSIP Grant), November, 1986, $24,673.00, (not funded).
6. Principal Investigator, "Development of a Plasmid-cured strain of *Streptococcus cremoris* for use in conjugation studies", WSC R & PG Committee, June, 1987, $454.00, (funded).
7. Co-investigator, "Improvement of Mozzarella cheese yield and physical properties through proteinase modification of starter cultures", Western Dairy Foods Research Center, September, 1987, $22,620.00, (funded).
8. Principal Investigator, "Microflora of Milk used in the Manufacture of Raw milk Cheddar cheese", National Dairy Promotion and Research Board, October, 1987, $56,000.00, (not funded).
9. Principal Investigator, "Biofermenter Modelling Software", Academic Resources and Computing Committee, January, 1988, $450.00, (funded).
10. Co-investigator, "Improvement of physical properties of Mozzarella cheese". Western Dairy Foods Research Center, $23,000.00. April, 1988, (funded).
11. Co-investigator, "Selection of strains of *Streptococcus cremoris* for reduction of bitter flavor problems in Cheddar cheese". National Dairy Research and Promotion Board, $35,000.00, July 1988, (funded).
12. Principal Investigator, "Biomass energy/Waste Stabilization: Off the shelf technology for the small farm. U.S. Department of Energy, $118,026.00, August, 1990, (not funded).
13. Principal Investigator, "Biomass and Waste Stabilization of Dairy Cattle Waste", Research, Scholarship, and Professional Growth Comm., WSU, $975.00, May, 1990, (funded).
14. Co-investigator, "Instrumentation Enhancement for a Biotechnician Training Program", National Science Foundation, Nov. 1990, ($10,199.00) (not funded).
15. Co-investigator, "Causes and prevention of sticky texture in Mozzarella cheese", Western Dairy Foods Research Center, $19,300, July, 1990, (funded).
16. Co-investigator, "Characterization of milk proteolysis by lactococcal starter culture strains using amino acid analysis", Western Dairy Foods Research Center, $45,100.00, July, 1990, (funded).
17. Co-investigator, "Development of microbial selection criteria and delivery routes associated with *Lactobacillus acidophilus* and *Bifidobacterium bifidus*. National Dairy Promotion and Research Board, $110,711.00, July, 1990, (not funded).
18. Principal investigator, "Biomass energy and waste stabilization", Research and Professional Growth Comm., WSU, $510.00, December, 1990. (funded).

19. Co-investigator, "Effect of Iron level and source in culture media and Cheddar cheese on growth of *Listeria monocytogenes*", Western Dairy Foods Research Center, $90,838.00, Jan. 1991, (not funded).
20. Sub-contractor, "Effect of iron addition on the microbial flora of commercially manufactured Cheddar cheese", National Dairy Promotion and Research Board, $20,826.00, April 1991, (funded).
21. Co-investigator, "Development, microstructure, and rheology of lowfat and nonfat Mozzarella cheese", National Dairy and Promotion and Research Board, $100,000.00, July, 1991, (funded).
22. Principal investigator, "Development of a Probiotic Bacterial Strain", WSU R,S,& PG Committee, $580.00, May 1992, (funded).
23. Principal investigator, "Survey and Characterization of Raw Sheep Milk", WSU R,S,& PG Committee, $620.00, May 1992, (funded).
24. Principal investigator, "Integration of Microbiology in Rural High Schools," Hemingway Faculty Development Award, $770.00, May 1992, (funded).
25. Co-investigator, "Characterization of stress proteins in dairy lactobacilli to improve ripening of low-fat cheese", National Dairy and Promotion Board, $45,000.00, July 1992, (funded).
26. Principal investigator, "Insulated anaerobic lagoon energy collection cover," US Department of Energy, $69,207.00, July 1992, (not funded).
27. Principal investigator, "Development of thermophilic cultures for manufacture of low fat and non-fat Mozzarella cheese.", Western Center for Dairy Protein Research and Technology, $15,000.00, October, 1993, (funded).
28. Co-investigator, "Characterization, isolation, and analysis of stress proteins in dairy lactobacilli for improved ripening of low-fat cheese.", National Dairy Promotion and Research Board, $120,000.00, November, 1993, (funded).
29. Principal investigator, "Development of a new probiotic culture to treat yeast infections.", R,S and PG Comm., WSU, $520.00, December, 1993, (funded).
30. Co-investigator, "Influence of alternative starter cocci on the physical properties of lowfat Mozzarella cheese.", National Dairy Promotion and Research Board, $73,110.00, December, 1993, (funded).
31. Co-investigator, " Role of chemical composition of low fat Mozzarella cheese on its melting properties in high temperature ovens.", National Dairy promotion and Research Board, $115,500.00, December, 1993, (funded).
32. Co-investigator, "Influence of alternative starter cocci on the physical properties of lowfat Mozzarella cheese.", Western Center for Dairy Protein Research and Technology, $23,500.00, January, 1995, (funded).
33. Co-investigator, "Development of thermophilic cultures for manufacture of lowfat Mozzarella cheese.", Western Center for Dairy Protein Research and Technology, $33,000.00, January, 1995, (funded).
34. Principal investigator, "Microorganisms in Unusual Environments: A Handbook for Science Teachers," Hemingway Faculty Vitality Grant, WSU, $1,750.00, February, 1996, (funded).
35. Principal investigator, "Isolation of *Mycobacterium paratuberculosis* from raw and pasteurized milk." RS&PG Comm., WSU, $521.00, November, 1996, (funded).
36. Co-investigator, "Development of a screening method and rapid isolation procedure for exocellular polysaccharides produced by lactic acid bacteria," RS&PG Comm., WSU, $830.00, November, 1996, (funded).
37. Co-investigator, "Improvement of Mozzarella cheese functionality by understanding exopolysaccharide production in thermophilic starter cultures," Dairy Management Inc., $139,080, January, 1997, (funded).
38. Co-investigator, "Understand the role of proteolysis on functional properties of Mozzarella cheese." Dairy Management Inc., $290,935, January, 1997, (not funded).
39. Co-investigator, "Software for N.S. Learning Center/Math Student Computer Labs." ARCC, WSU, $3,500, May, 1997, (funded).
40. Co-investigator, "Understand the role of proteolysis on functional properties of Mozzarella cheese," Dairy Management Inc., $125,721, submitted October, 1997, (funded, December,1997)
41. Co-investigator, "Application of a metabolic control switch to improve and control starter proteolysis in Mozzarella cheese," Dairy Management Inc., $106,970, submitted October, 1997, (funded, December,1997)
42. Co-investigator, "Characterization of proteolytic enzymes from thermophilic lactic acid bacteria and their influence on Mozzarella cheese functional properties," Dairy Management Inc., $105,652, submitted October, 1997, (funded, December,1997)
43. Co-investigator, "Examination of microorganisms in extreme halophilic oil tar environments in the Great Salt Lake," National Science Foundation., $952,979, submitted March, 1999, (pending).

44. Co-investigator, "Development of starter streptococci to control and accelerate flavor development in Swiss cheese," DMI., $25.070, 1999, (not funded).
45. Co-investigator. “Effect of microbial exopolysaccharide on functionality in high moisture cheese.” DMI, $26,898.00, 1999, (funded).
46. Co-investigator, “Effect of microbial exopolysaccharide on functionality in high moisture cheese.” DMI, $56,333, 2000, (funded).
47. Co-investigator, "Measuring stretch properties of melted cheese," DMI., $53,000, 2001, (not funded).
48. Co-investigator. “Increase development of flavor in Swiss cheese without promoting splits.” DMI, $128,000.00, 2001, (not funded).
49. Analysis of capsule production in *Streptococcus thermophilus* by comparative genomics. DMI. $75,990. (partial funding)
50. Development and selection of *Propionibacterium* to reduce splits In Swiss cheese. DMI. $82,190. (partial funding)
51. An objective test for measuring stretch properties of mozzarella cheese. DMI. $39,350. (not funded, currently working with industry partner)
52. Co-investigator. Molecular Basis of Cheese Melting in Relation to Proteolysis. Dairy Management Inc. $195,545. Jan. 2004. (funded)
53. Microbial Diversity Summer Course – Woods Hole Marine Biological Laboratory. $5,885. Hemingway Foundation. April, 2004. (funded)
54. Effect of Essential Oil Components on Dermatophytes. WSU RSPG. ($950). May, 2004.
55. Phyllis Crosby Gardner Student Fellowship (Steve Curtis), WSU Undergraduate Research Committee, ($3,000) May, 2004.
56. Development of Erythema and Bruise Detectors. Collaboration with Stephen Sprigle (Georgia Institute of Technology) and Evan Call (WSU). $58,473, October 2006.
57. WSU Undergraduate Research Grant. (Brigham Burton) Isolation of Magnetotactic Bacteria from Extremely Halophilic Environments. $2,800. May 2006.
58. H. Raymond Bingham Faculty Collaboration Research Grant. Phyloprobe analysis of microbial communities in the Great Salt Lake. M. Zwolinski, M. Domek. C. Oberg, and J. Broadbent. ($10,350) November 2007.
59. National Dairy Board. Innovative approaches for improving low fat Mozzarella cheese. D. McMahon, C. Oberg, and S. Larson. ($132,340) January 2008.
60. Eccles Undergraduate Research Scholarship. (Chase Sessions) Characterization of phosphate utilizing pathways in halophilic bacteria. ($2,957) May 2007.
61. WSU Undergraduate Research Grant. (Natalie Savage) Isolation of bacterial predators for halophilic microorganisms. ($2,750) May 2007.
62. Paul and Carolyn Thompson Research Fellowship. (Kevin Bowcutt) Characterization of chitinase activity in halophilic bacteria. ($2,500) May 2007.
63. Dairy Management Inc. Influence of salt-in-water content on flavor of full fat and low fat cheddar cheese. D. McMahon and C. Oberg. ($30,850) December 2008.
64. Dairy Management Inc. Influence of starter culture growth on the development of rosey and burnt-brothy flavors during aging of low fat cheese. D. McMahon and C. Oberg. ($44,120) January 2009.
65. WSU Eccles Undergraduate Research Grant. (Karen Nelson and Karli Oberg) Prophage Induction in Halophilic Bacteria Isolated from the Great Salt Lake. ($2,682) April 2009.
66. Paul and Carolyn Thompson Research Fellowship. (Jared Phelps) Optimization and Utilization of a Novel Chitinase Assay to Study Halophiles. ($2,500) April 2009.
67. Hemingway Vitality Grant. Intravenous Flush Methodology Test Evaluation. E. Call and C. Oberg. ($4,800) 2010. (Funded).
68. WSU Travel Grant. Research Presentation at the American Society of Microbiology Annual Meeting, San Diego, May 2010. ($1,200) April 2010.
69. Paul and Carolyn Thompson Research Fellowship. (Carlie Benson) Characterization and genome sequencing of *Idiomarina* bacteriophage DNA. ($2,500) April 2010.
70. Ralph Nye Charitable Foundation Grant. (Carlie Benson) Characterization and genome sequencing of *Idiomarina* bacteriophage DNA. ($871.25) April 2010.
71. Dairy Research Institute. Adapt Terbium Measurement of Spores for use during Milk Processing. D. McMahon, C. Oberg, and M. Culumber. ($20,000) July 2012.

I. <u>PATENTS</u>

1. Development of lactose-positive *Pediococcus* species for dairy fermentations. 1995.
2. Manufacture of direct acid low fat and non-fat Mozzarella cheese. 2000.

J. STUDENT RESEARCH PRESENTATIONS (new category of research efforts started in 2003)

2003

American Society for Microbiology Intermountain Branch Meeting. Tooele, UT. March 29, 2003.

1. Oberg, K., J. Greenhalgh, M. Russell, and C. Oberg. 2003. Inhibitory effect of lactic acid bacteria on oral streptococci.

Utah Academy of Sciences, Arts, and Letters Annual Meeting. Ogden, UT. April 11, 2003.

1. Wheeler, J., and C. J. Oberg. Effect of essential oils on *Trichophyton mentagrophytes*.

2004

American Society of Microbiology Intermountain Branch Annual Meeting. March 27, 2004, Idaho Falls, ID.

1. S. Curtis. Inhibition of Meat Spoilage Organisms by Lactic Acid Bacteria.
2. K. Jensen and R. Payne. Shelf Life Extension of Pasteurized Milk using Ultraviolet Irradiation.
3. T. Oberg. Phage Suppression of Bioterrorism Agents: A Model System.
4. J. Wheeler, P. Stephenson, and B. Oberg. Inhibition of Human Dermatophytes by Essential Oils and their Components.

WSU Undergraduate Research Symposium. March 29, 2004. Ogden, UT

1. M. Roberts. Impaired Insulin Signaling and Metabolic Inflexibility Characterizes the Hearts of Leptin Deficient ob//ob Mice.
2. J. Wheeler , P. Stephenson, and B. Oberg. Inhibition of Human Dermatophytes by Essential Oils and their Components.
3. S. Curtis. Inhibition of Meat Spoilage Organisms by Lactic Acid Bacteria.
4. K. Jensen and R. Payne. Shelf Life Extension of Pasteurized Milk using Ultraviolet Irradiation.

Utah Academy of Sciences, Arts and Letters Annual Meeting. April 16, 2004, Cedar City, UT

1. M. Roberts. Impaired Insulin Signaling and Metabolic Inflexibility Characterizes the Hearts of Leptin Deficient ob//ob Mice.
2. J. Wheeler, P. Stephenson, and B. Oberg. Inhibition of Human Dermatophytes by Essential Oils and their Components.
3. S. Curtis. Inhibition of Meat Spoilage Organisms by Lactic Acid Bacteria.

2005

American Society of Microbiology Intermountain Branch Meeting, March 12, 2005, Ogden, Utah.

1. Oral Presentation. Steve Curtis, Jeff Douglas, Lane Rolling, and Craig Oberg. Dermatophyte Inhibition by Essential Oil Components.
2. Poster Presentation. Jeff Douglas, Steve Curtis, Cedric Rolling, and Craig Oberg. Efficacy of a Lotion-based Delivery System Utilizing Natural Compounds for the Inhibition of Dermatophytes and Bacteria.
3. Poster Presentation. Lane Rolling and Craig Oberg. Selection of Essential Oils Components to Inhibit *Candida* without Affecting Lactic Acid Bacteria.
4. Poster Presentation. Jennifer Munden, Kristen Froerer, and Craig Oberg. Efficacy of Three Methods for Detection of *Staphylococcus aureus* in Food Supplements at Variable pHs.
5. Oral Presentation. Taylor Oberg, Karen Nakaoka, and Craig Oberg. Inhibition of *Staphylococcus aureus* by Lactic Acid Bacteria.

WSU Undergraduate Research Conference, March 29, 2005, Ogden, UT.

1. Oral Presentation. Jeff Douglas, Steve Curtis, Lane Rolling, and Craig Oberg. Dermatophyte Inhibition by Essential Oil Components.
2. Poster Presentation. Jeff Douglas, Steve Curtis, Cedric Rolling, and Craig Oberg. Efficacy of a Lotion-based Delivery System Utilizing Natural Compounds for the Inhibition of Dermatophytes and Bacteria.
3. Poster Presentation. Jennifer Munden, Kristen Froerer, and Craig Oberg. Efficacy of Three Methods for Detection of *Staphylococcus aureus* in Food Supplements at Variable pHs.
4. Oral Presentation. Taylor Oberg, Karen Nakaoka, and Craig Oberg. Inhibition of *Staphylococcus aureus* by Lactic Acid Bacteria.

Utah Academy of Sciences, Arts, and Letters Annual Meeting, April 15, 2005, Orem, UT.

1. Oral Presentation. Lane Rolling and Craig Oberg. Selection of Essential Oils Components to Inhibit *Candida* without Affecting Normal Microbiota.
2. Oral Presentation. Steve Curtis, Jeff Douglas, Lane Rolling, and Craig Oberg. Dermatophyte Inhibition by Essential Oil Components.

3. Oral Presentation. Jeff Douglas, Steve Curtis, Cedric Rolling, and Craig Oberg. Efficacy of a Lotion-based Delivery System Utilizing Natural Compounds for the Inhibition of Dermatophytes and Bacteria.
4. Poster Presentation. Jennifer Munden, Kristen Froerer, and Craig Oberg. Efficacy of Three Methods for Detection of *Staphylococcus aureus* in Food Supplements at Variable pHs.
5. Oral Presentation. Taylor Oberg, Karen Nakaoka, and Craig Oberg. Inhibition of *Staphylococcus aureus* by Lactic Acid Bacteria.

2007

Utah Conference on Undergraduate Research, Feb. 2, 2007, Salt Lake City, UT.
1. Use of essential oils components to inhibit common fungi. Erik Oberg and Craig Oberg.
2. Antimicrobial activity of a liquid disinfectant containing cinnamaldehyde. Jeff Douglas, Erik Oberg, and Craig Oberg.
3. Phosphate use of halophilic microorganisms. Jennika Scadden, Chase Sessions, Doug Larsen, Michele Zwolinski, and Craig Oberg.

American Society of Microbiology Intermountain Branch Annual Meeting, March 10, 2007, Pocatello, ID.
1. Isolation and Characterization of Chitin-Utilizing Halophiles from the Great Salt Lake. Kevin Bowcutt Brigham Burton, Dan Cox, Michele Zwolinski, and Craig Oberg.
2. Inhibition of Common Spoilage Fungi by Lactic Acid Bacteria. Miriam Bernardo, Karli Oberg, Kristen Froerer, and Craig Oberg.
3. Characterization of Phosphate Use by Halophilic Microorganisms isolated from the Great Salt Lake. Chase Sessions, Jennika Scadden, Michele Zwolinski, and Craig Oberg.

WSU Undergraduate Research Conference, March 26, 2007, Ogden, UT.
1. Characterization of Phosphate Use by Halophilic Microorganisms isolated from the Great Salt Lake. Chase Sessions, Jennika Scadden, Michele Zwolinski, and Craig Oberg.
2. Isolation and Characterization of Chitin-Utilizing Halophiles from the Great Salt Lake. Kevin Bowcutt Brigham Burton, Dan Cox, Michele Zwolinski, and Craig Oberg
3. Inhibition of Common Spoilage Fungi by Lactic Acid Bacteria. Miriam Bernardo, Karli Oberg, Kristen Froerer, and Craig Oberg.

Utah Academy of Sciences, Arts, and Letters Annual Meeting, April 13, 2007, Cedar City, UT.
1. Use of Natural Plant Compounds to Inhibit Bacteria Associated with Food borne Diseases. Erik Oberg, Matt Domek, and Craig Oberg
2. Isolation and Characterization of Chitin-Utilizing Halophiles from the Great Salt Lake. Kevin Bowcutt Brigham Burton, Dan Cox, Michele Zwolinski, and Craig Oberg.
3. Phosphate Use of Halophilic Microorganisms. Jennika Scadden, Chase Sessions, Doug Larsen, Michele Zwolinski, and Craig Oberg.
4. Inhibition of Common Spoilage Fungi by Lactic Acid Bacteria. Miriam Bernardo, Karli Oberg, Kristen Froerer, and Craig Oberg.

2008

Utah Conference on Undergraduate Research, Feb. 29, 2008, UVSC, Orem, UT.
1. Isolation and characterization of chitin-utilizing halophiles from the Great Salt Lake. Kevin Bowcutt Brigham Burton, Dan Cox, Michele Zwolinski, and Craig Oberg.
2. Inhibition of common spoilage fungi by lactic acid bacteria. Miriam Bernardo, Karli Oberg, Kristen Froerer, Matt Domek, and Craig Oberg.

American Society of Microbiology Intermountain Branch Annual Meeting, March 1, 2008, USU, Logan, UT.
1. Phosphate and phophonate use by microorganisms isolated from hypersaline environments of the Great Salt Lake, UT. J. P. Nichols, C. L. Sessions, M. Zwolinski, and C. Oberg.

WSU Undergraduate Research Conference, March 24, 2008, Ogden, UT.
1. Phosphate and phophonate use by microorganisms isolated from hypersaline environments of the Great Salt Lake, UT. J. P. Nichols, C. L. Sessions, M. Zwolinski, and C. Oberg.
2. Bacterial predation by bacteriophage isolated from the Great Salt Lake. Natalie Savage, Matthew Domek, Michele Zwolinski, and Craig Oberg
3. Development of signatures for the detection and differentiation of *Brucella*. Karli Oberg, Deborah Newby, and Craig Oberg.

Utah Academy of Sciences, Arts, and Letters Annual Meeting, March 21, 2008, Salt Lake City, UT.
1. Phosphate and phophonate use by microorganisms isolated from hypersaline environments of the Great Salt Lake, UT. J. P. Nichols, C. L. Sessions, M. Zwolinski, and C. Oberg.
2. Bacterial predation by bacteriophage isolated from the Great Salt Lake. Natalie Savage, Matthew Domek, Michele Zwolinski, and Craig Oberg.

2010

Utah Conference on Undergraduate Research, Feb. 26, 2010, SUU, Cedar City, UT.

1. Survey of Chitinase Activity in Halophilic Microorganisms from the Great Salt Lake. J. Phelps, M. Zwolinski, and C. Oberg.
2. Method development to study lysogenization in Halophilic Bacteria Isolated from the Great Salt Lake, UT. K. E. Oberg, K. E. Nelson, C. N. Jensen, A. M. Hutchinson, T. L. Gray, M. J. Domek, and C. J. Oberg.
3. An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT. James W. Moyes, Matthew J. Domek and Craig J. Oberg.
4. Isolation of Novel Phage from the Great Salt Lake for *Idiomarina*. C. M. Benson, M. J. Domek, M. D. Zwolinski, and C. J. Oberg.

7th Annual WSU Undergraduate Research Conference, March 29, 2010, Ogden, UT.

1. An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT. James W. Moyes (Matthew J. Domek and Craig J. Oberg).
2. Genetic Characterization of Two Halophage Associated with *Salinivibrio costicola*. Ryan Hoggan and Blake Dahl (Matthew J. Domek, Michele Zwolinski and Craig J. Oberg)
3. Prophage Induction in Halophilic Bacteria Isolated from the Great Salt Lake, UT. K. E. Oberg, K. E. Nelson, C. N. Jensen, A. M. Hutchinson, and T. L. Gray (M. J. Domek, and C. J. Oberg).
4. Isolation of Novel Phage from the Great Salt Lake that infect *Idiomarina*. C. M. Benson (M. J. Domek, M. D. Zwolinski, and C. J. Oberg).
5. Survey of Chitinase Activity in Halophilic Microorganisms from the Great Salt Lake. J. Phelps, (M. Zwolinski, and C. Oberg).

American Society of Microbiology Intermountain Branch Annual Meeting, April 10, 2010, BYU, Provo, UT.

1. Effects of Salt Concentration on the Growth of Bacteriophage isolated from the Great Salt Lake, UT. Derek L. Bunch, Michele D. Zwolinski, Craig J. Oberg, and Matthew J. Domek.
2. Isolation of Novel Phage from the Great Salt Lake for *Idiomarina*-like Bacteria. Carlie M. Benson, Matthew J. Domek, Michele D. Zwolinski, and Craig J. Oberg.
3. Survey of Chitinase Activity in Halophilic Bacteria Isolated from the Great Salt Lake. Jared T. Phelps, Craig Oberg, Michele Zwolinski
4. An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT. James W. Moyes, Matthew J. Domek and Craig J. Oberg.
5. Prophage Induction in Halophilic Bacteria Isolated from the Great Salt Lake, UT. K. E. Oberg, K. E. Nelson, C. N. Jensen, A. M. Hutchinson, T. L. Gray, M. J. Domek, and C. J. Oberg.

K. PROFESSIONAL SERVICES ACTIVITIES

1. Chair, Poster session, ADSA Mtg, Aug. 1992, Logan, UT.
2. Reviewer, Journal of Dairy Science.
3. Reviewer, Food Structure Journal.
4. Selected as a member of National Committee on Probiotics Standards, National Nutritional Foods Association. 1993.
5. Alfa Laval Agri Dairy Extension Award selection committee, American Dairy Science Association, 1994.
6. Alfa Laval Agri Dairy Extension Award selection committee, American Dairy Science Association, 1995.
7. Attended National Committee on Probiotics Standards, National Nutritional Foods Association. July 15-17, 1995. Las Vegas, NV.
8. Chair, Alfa Laval Agri Dairy Extension Award selection committee, American Dairy Science Association, 1996.
9. Chair, "Dairy Proteins" session, American Dairy Science Association Annual Meeting, July 16, 1996. Corvallis, OR.
10. Chair, Starter cultures, cheese flavor and low-fat cheese session. 12th Biennial Cheese Industry Conference, Aug. 21, 1996, Logan, UT.
11. Member, Probiotic Standards Committee, NNFA. Attended annual committee meeting at Las Vegas, July, 1997.
12. Vice-President, Intermountain Branch, American Society for Microbiology, 1997-98.
13. Session Chair, ASM Intermountain Branch Annual Meeting, Idaho Falls, ID, April 25, 1998.
14. President, Intermountain Branch, American Society for Microbiology, 1998-99.
15. Session Moderator, Western Regional Honors Conference, March 23-25, 2000. Ogden, UT.
16. Board Member, Intermountain Branch, American Society for Microbiology. 1999-2000.

17. Session Moderator, Western Regional Honors Conference, March 23-25, 2000. Ogden, UT.
18. President-Elect, Utah Academy of Sciences, Arts, and Letters. 1999-2001.
19. President, Utah Academy of Sciences, Arts, and Letters 2001-2004.
20. Manuscript reviewer, Journal of Industrial Microbiology and Biotechnology.
21. Associate Editor, Journal of the Utah Academy. 2000-2006.
22. Councilor, Intermountain Branch, American Society of Microbiology
23. Graduate Committee member, USU Dept. Nutrition and Food Sciences
    Robert Fife (Ph D); Andres Pastorino (Ph D), Bryce Moyes (Masters), Brian Paulson (Masters): Taylor Rasmussen (Masters).
24. President, Intermountain Branch, American Society of Microbiology 2004-05.
25. Centennial Chair, Utah Academy of Sciences, Arts, and Letters.
26. Graduate Committee member, USU Dept. Nutrition and Food Sciences Dept.
27. Session Moderator, *Arthur Conan Doyle and the Utah Connection: A Study in Scarle*t. Utah State History Conference. September 6, 2007

TEACHING

A. COURSES TAUGHT:

Weber State

Introductory Microbiology (Micro 1113)
Elementary Public Health (Micro 1153)
Industrial Microbiology (Micro 376)
Microbial Genetics (Micro 4154)
Recombinant DNA Techniques (Micro 420)
Food Microbiology (Micro 3853)
Directed Research (Micro 4800)
Life Science for Secondary Teachers (Micro 660)
Microbiology for Secondary Teachers (Micro 503)
Biotechnology and Society (Honors 151)
Epidemics of the Modern Age (Honors 151)
Microbiology of Harsh Environments (Meduc 6660)
Microbes Rule: Effect of Disease on History (WSU 1680)

Utah State

Food Fermentations (NFS 503)
Biotechnology of Lactic Starter Cultures (NFS 614)

B. TEACHING RELATED ACTIVITIES:

1. Attended one week at the University of Minnesota with Dr. Larry L. McKay learning plasmid isolation and genetic engineering techniques for *Streptococcus lactis*. August, 1983.
2. Attended the course "Biotechnology of Lactic Starter Cultures" (NFS 614), Utah State University, Logan, Utah. Spring Quarter, 1985.
3. Attended symposia on genetic engineering, food fermentations, and AIDS at the Annual Meeting for the American Society for Microbiology, Las Vegas, Nevada. March 5-7, 1986.
4. Attended WSC History course 341 - The History and Philosophy of Science. Winter, 1986.
5. Attended and participated in a series of interdisciplinary seminars on the nature and history of science, particularly examining the work of Darwin. Winter and Spring quarters, 1987. Fall quarter 1988. Seminars were partly sponsored by departments (including the Microbiology Dept.) of the School of Natural Sciences, Weber State College.
6. Faculty Advisor for Tim Robinett who received an Undergraduate Research Award grant from the School of Natural Sciences for his project entitled "Analysis of Antimicrobial Inhibitor Production and Resistance in *Streptococcus cremoris* Strains", May 1987.
7. Microbiology faculty representative/participant for "An Interdisciplinary Seminar on the Life of Charles Darwin and His Contemporaries" Fall, 1988. Responsible for two of the 10 weekly sessions.
8. Implemented "Writing Across Curriculum" exercises in both lower division and upper division courses. Introductory courses write 4 to 6 position papers during each quarter. Upper division courses write laboratory reports in journal style and we have a weekly critique to assist in writing improvement, 1989.

9. Garner, J.J., and C.J. Oberg. Conjugal transfer of lactose and proteinase activity from Lactococcus lactis ssp cremoris UC320 to L. lactis ssp. lactis LM2301. Presented at the Utah Academy of Sciences, Arts and Letters, Spring Meetings, Provo, UT., May 11, 1990.
10. Mentor, Young Scholar Program, Department of Nutrition & Food Sciences, June, 1990. Utah State University.
11. Developed a course for the Honors program, Honors 290/490 "Biotechnology and Society", Spring quarter, 1992.
12. Developing a course with Bryce Taggert from the Davis County Health Dept. entitled "Environmental Health", an upper division to prepare students to qualify to become National Registered Sanitarians. This course will be part of the community/industry outreach program of the new Environmental Services Center. (1992)
13. Developed a course for the Honors program, Honors 151 "Epidemics of the Modern Age", Winter quarter, 1994.
14. Deborah Low and C. J. Oberg, "Inhibitory Effects of *Lactobacillus reuteri* on *Candida albicans*.". Utah Academy of Sciences, Arts, and Letters, May 13. 1994, Ogden, UT.
15. Developed a course, "Micro 503: Microbiology for Secondary Ed. Science Teachers."
16. R. Gaurth Hansen Symposium, “Genomics in the 21st Century,” Nov. 8, 2001, Logan, UT.
17. ASM and TIGR Conference on Microbial Genomes, Feb. 10-13, 2002, Las Vegas, NV.
18. Taught Meduc 6660-“Microbes in Harsh Environments” course for high school science teachers and directed fieldtrip to Yellowstone National Park.
19. Directed departmental assessment efforts.
20. Developed new online course, Micro 1153 – Elementary Public Health, Spring 2004.
21. Completed Designer Training on WebCT Vista. Feb. 2004.
22. Completed Microbial Diversity Course, Marine Biological Laboratory, Woods Hole, MA. June 15 – July 31, 2004. (See attached certificate and letter)
23. Attended Holger Jannasch Symposium on Environmental Microbiology, June 19, 2004, Marine Biological Laboratory, Woods Hole, MA.
24. Attended Comparative Microbial Genomics Symposium, July 10, 2004, Marine Biological Laboratory, Woods Hole, MA.
25. Attended Colloquium on Global Infectious Diseases, July 22-24, 2004, Marine Biological Laboratory, Woods Hole, MA.
26. Converted online course, Micro 1113 – Introductory Microbiology, to WebCT Vista. Spring 2005.

C. SPEAKING PRESENTATIONS:

1. Utah State University Nursing Program, "Genetic Disorders," 1980.
2. Weber State College Microbiology Department, "Protease Negative Cheese Starters," 1983.
3. The Health Care System Class (HTHSRA 300), "U.S. Health Care System", April, 1984.
4. Industrial Microbiology Course (Micro 376), "Cheese Production and Starter Cultures," Apr. 1984.
5. Natural Sciences Week Presentation, "Sex and Streptococci--Genetic Engineering in the Food Industry," Apr. 1984.
6. Kanesville Elementary Sixth Grade Classes, "Public Health History and Disease Microorganisms," Nov. 1984.
7. Issues Forum - Weber State College Open Hour Program, "Applied Laboratory Research," Nov. 1985.
8. Utah State University Faculty and Graduate Students, "Studies on the Proteinase Negative Lactic Streptococci," Mar. 1985.
9. Science Seminar for Superior Students, Weber State College, "Genetic Engineering: What is it and where will it lead?", Weber State College, March 3, 1988.
10. Seminar, Nutrition and Food Science Department, Utah State University, "Proteinase Activity and Mozzarella Cheese," Feb. 24, 1988.
11. Science Seminars for Superior Students, "Genetic Engineering and Biotechnology." Feb. 13, 1992, WSU.
12. 1992 Utah Rural Schools Conference, "Integrating microbiology in biology courses." July 20, 1992. Provo Ut.
13. Honors-AP Focus Night address, "Not with my genes you don't or The Human Genome Project." October, 7, 1992, WSU.
14. Honors-AP Focus Night address, "Science and Religion," April 19, 1994, WSU.

15. Panel Member, "Expectations of a Dean by Department Chairs." Chairs Retreat, Jan. 7, 1994.
16. Issues Forum panel, "Science and Relion", March, 1994.
17. Plain City Lions Club, "Biotechnology and Agriculture" presentation, March 23, 1994.
18. North Ogden Kiwanis, "The Future of Biotechnolgy" presentation, May 17, 1994.
19 S4 Lecture, "Epidemics of the Modern Age." Jan. 5, 1995, WSU.
20. Guest lecture, "Diseases of College Students," Healthy Lifestyles class, Feb. 1995.
21. Honors-AP Focus Night address, "Flesh Eating Bacteria and other mutations to worry about," Feb. 22, 1995, WSU.
22. Honors-AP Focus Night address, "The Human Genome Project," April 5, 1995, Fremont H.S.
23. Honors-AP Focus Night panel discussion, "Which Career do I Choose?", April 5, 1995, Fremont H.S.
24. Pizza with a Prof, WSU Honors Program, "Genetically engineered bacteria," Nov. 21, 1995, WSU.
25. Honors-AP Focus Night address, "Playing God - Microbiology," Jan. 23, 1996, WSU.
26. Guest lecture, "Disease and the Westward Migration," History of the Far West, WSU, Feb. 1996.
27. Student Services Breaskfast, "Can we paten life?", WSU, Jan. 5, 128. Guest Lecture, "Genetic Engineering: What the Future Holds," Math, Engineering and Science Club, Northridge H.S., Nov. 20, 1997.
29. Presentation, "Future of Disease: Emerging Pathogens," AP Honors Night, WSU, Nov. 13, 1997.
30. Presentation, "Semester Conversion: a Survival Guide for Microbiology Students," ASM Open Hour, WSU, Jan. 29, 1998.
31. Presentation, "Implications of the Human Genome Project," Womens Relators Association, Ogden Country Club, March 11, 1998.
32. Radio West, “Microbe and Man,” KUER 90 FM, July 6, 2001.
33. “The Nature of Things,” KRCL 90.9 FM, June 16, 2001
34. Honors Issue Forum, Religion and Evolution: A Search for Harmony. Sept. 6, 2001.
35. Health Matters with Dr. Mac. *Emerging Infections*. News Radio 970, June 15, 2002.
36. Ogden Child Culture Club. *Wired for Learning: Online Courses*. February 6, 2003.
37. South Ogden Junior High National Honor Society. *Careers in Microbiology*. February 7, 2003.
38. “In the Interest of National Security” WSU History Dept Seminar. *Bioterrorism and Emerging Diseases*. February 12, 2003.
38. Judge, Utah Science and Engineering Fair, March 26, 2003.
40. North Ogden Kiwanis. *Applications of the Human Genome Project*. Nov. 18, 2003.
41. S4 Presentation. *Mad Cows and Wasted Elk: Prions in the U. S.* Feb. 19, 2004.
42. Judge, Oral Presentations, First Undergraduate Research Conference. WSU. March 29, 2004.
43. LS 1370 Presentation, *Microbiology for Elementary Teachers*. March 31, 2004.
44. Altrusa Club. *Role of Disease in Shaping US History*. April 19, 2004.
45. LS 1370 Presentation, *Antimicrobial Activity of Plant Extracts*. March , 2005.
46. “A Pocket Full of Rocks” or How Microbes Rule the World. 6th Annual Last Lecture. October 29, 2009. WSU.
47. Methodology for Differentiation of Lactic Acid Bacteria in Cheese made with Probiotic Adjunct Cultures. C. Oberg, C. Brothersen, D. McMahon, and L. Moyes. Sixth Annual Faculty Forum. October 29, 2009. WSU.
48. Survival of Probiotic Adjunct Cultures in low-fat, reduced-fat, and full fat Cheddar Cheese. C. Oberg, C. Brothersen, D. McMahon, and L. Moyes. Sixth Annual Faculty Forum. October 29, 2009. WSU.
49. Chitinase Activity and Diversity of Halophilic Bacteria isolated from the Great Salt Lake. M. Zwolinski, T. Canova, C. Oberg, and J. Phelps. Sixth Annual Faculty Forum. October 29, 2009. WSU.
50. Coughing pigs, flying foxes, and crazy cows: Modern plagues. S4 Science Seminar. February 4, 2010. WSU.

SERVICE

A. COMMITTEES SERVED ON AT WSU:

Admissions & Standards Committee (Faculty Senate)	1983-85
Science Education Committee (School of Natural Sciences)	1983-87
Academic Computer Use Committee (School of Natural Sciences)	1983-88
Museum Advisory Committee (School of Natural Sciences)	1984-87
Catalog Administrative Standing Committee	1985-86
Faculty Senate Representative	1985-86

Ad Hoc Committee on Academic Computing	1986-87
Faculty Senate Representative	1986-89
Academic Resources and Computing Committee	1987-89
Faculty Advisor for Alpha Sigma Mu Student Microbiology Society	1987-90
Human Subjects in Research Administrative Standing Committee	1988-91
Faculty Advisor for Sigma Alpha Epsilon Fraternity	1988-90
VAX Utilization Committee (Ad Hoc - Faculty Senate)	1988-89
Community Health Studies Task Force	1988-89
Search Committee, Vice President for College Relations	1988-89
Human Subjects in Research Committee	1989-93
ARCC, Subcommittee for Replacement Options	1989-90
Crystal Crest Scholar of the Year Committee	1990
Biotechnician Program Advisory Committee	1991-93
Center for Environmental Services Tech/Advisory Committee	1991-95
Science Ed. Center Advisory Committee	1991-2003
Faculty Advisor for Alpha Sigma Mu Student Society	1991-93
NCAA Certification Pilot Study, Institutional Mission Subcommittee	1991-92
Chair, Crystal Crest Personality of the Year Committee	1992
Faculty Board of Review, WSU	1993-95
Advising Committee, Strategic Planning Force, WSU	1992-93
Crystal Crest Selection Committee	1994-95
Department Promotion/Tenure Committee,	1995-96
Publicity Committee, College of Science,	1995-98
Promotion/Tenure Committee, Microbiology Dept.,	1997-98
Promotion/Tenure Committee, College of Business,	1997-98
Academic Resources and Computing Committee, Faculty Senate,	1996-99
Search Committee, Honors Director	1997-98
Steering Committee, NCAA Certification Committee	1997-99
Honors Faculty Advisory Committee	1999-02
Emergency/Safety Administrative Standing Subcommittee	
Steering Committee, NCAA Certification Committee	
Rank/Tenure Committee, College of Social and Behavioral Sciences	
Career Services Advisory Committee	
Rank/Tenure Committee, College of Business and Economics	
Honors Assessment Sub-committee	2001-02
Emergency Preparedness Committee	2001-03
Advising Committee	2001-02
Faculty Salary, Benefits, Budget, and Fiscal Planning Committee	2001-03
Program Review Committee	
New Faculty Selection Committee	
Spencer Seager Teaching Award Selection Committee	2002-08
Medical Benefits Steering Committee	
Online Steering Committee	
GSBE Ranking and Tenure Committee	
University Planning Council	
Presidential Distinguished Professor Screening Committee	
Chair - Salary, Benefits, Budget, and Fiscal Planning Committee	
Chair - Academic Integrity Committee, NCAA Athletics Certification	
NCAA Athletics Certification Steering Committee	
NCAA Athletics Certification Steering Committee	
Online Steering Committee	
University Planning Council	
Promotion and Tenure Committee, College of Health Professions	2009-11
Athletic Board	2009-
Athletic Equity Committee	2009-
Athletic Compliance Committee	2009-

B. COMMITTEE CHAIR ASSIGNMENTS:

Chair, Natural Sciences Academic Computing Committee	1986-87
Chair, Academic Resources and Computing Committee	1987-88
Chair, Academic Resources and Computing Committee	1988-89
Chair, ARCC Subcommittee for Replacement Options	1989-90
Chair, Crystal Crest Scholar of the Year Committee	1990
Chair, Dept. Promotion/Tenure Committee	1992-93
Chair, Crystal Crest Personality of the Year Committee	1992
Chair, Crystal Crest Selection Committee	1994-95
Chair, Zoology Dept. Peer Review Committee,	1997-98
Chair, NCAA subcommittee for Academic Integrity	
Chair, Faculty Salary, Benefits, Budget, and Fiscal Planning Committee	2000-02
Chair, Human Performance Management Program Review Team	
Chair, Faculty Salary, Benefits, Budget, and Fiscal Planning Committee	2005-06
Chair, Faculty Senate	2014-16

MOHAMMAD SONDOSSI

Work phone: (801) 626-6884

E-mail: msondossi@weber.edu

Education

Institution	Discipline	Degree Earned	Date
Wayne State University	Biological Sciences (Microbiology)	Ph.D.	1988
University of Detroit	Biology	M.S.	1979

Teaching and other professional Experiences

Institution	Position and Description	Date
Weber State University	Professor Microbiology	June 97 - Present
Weber State University	Associate Professor Microbiology	June 93 - June 97
Weber State University	Assistant Professor Microbiology	Sept. 91 - June 93
Institut National de la Recherche Scientifique- Sante	Post-Doctoral Research Associate	Feb. 88 - June 91

In preparation:
Mohammad Sondossi , Neal Adams, and Michel Sylvestre, A novel degradation pathway of 2, 2'-dihydroxychlorobiphenyl and metabolite profiles of ortho-hydroxybiphenyls produced by Pandoraea pnomenusa B356.

PUBLICATIONS

1. Truong, A., **M. Sondossi**, and J.B. Clark. 2016. Genetic identification of *Wolbachia* from Great Salt Lake brine flies. *Symbiosis* DOI 10.1007/s13199-016-0446-3

2. Thi Thanh My Pham, **Mohammad Sondossi** and Michel Sylvestre. 2013. The metabolism of doubly *para*-hydroxy and *para*-hydroxychlorobiphenyls by bacterial biphenyl dioxygenases. Environ. Microbiol. July 2015 vol. 81 no. 14 4860-4872.

3. Michael Koch, Tim S Bugni, **Mohammad Sondossi**, Chris M Ireland and Louis R Barrows, 2010, Exocarpic Acid Inhibits Mycolic Acid Biosynthesis in Mycobacterium tuberculosis. Planta Med. 76:1678-1682.

4. Michael Koch, Tim S. Bugni, Chris D. Pond, **Mohammad Sondossi**, Manah Dindi, Pius Piskaut, Chris M. Ireland, Louis R. Barrows, **2009.** Antimycobacterial Activity of *Exocarpos latifolius* is Due to Exocarpic Acid. *Planta Medica*, 75(12):1326-30.

5. William Lorowitz, Elizabeth Saxton, **Mohammad Sondossi**, and Karen Nakaoka, 2005, Intergrading statistics with a microbiology laboratory activity. In: Microbiology Education, American Society for Microbiology, May 2005, 14-19.

6. **Sondossi, M.,** Barriault, D. and Sylvestre, M., 2004. Metabolism of 2,2'- and 3,3'-dihdyroxybiphenyl by the biphenyl catabolic pathway of *Comamonas testosteroni* B-356. Applied and Environmental Microbiology 70: 174-181.

7. **Sondossi, M**. 2004, Biocides, Nonpublic health, Nonagricultural Antimicrobilas, In: The Desk Encyclopedia of Microbiology, Elsevier LTD. Chapter 11: 145-158.

8. C. Humpherys, D. Housley, **M. Sondossi**, and H. L. Berghout, 2003, Modeling A Proposed Non-Enzymatic Tautomerization Step In The Biotransformation Of A Dihydroxybiphenyl. Utah Academy of Sciences 80:117-122.

9. Wachocki, Barbara A., **Mohammad Sondossi**, Stewart C. Sanderson, Bruce L. Webb, and E. Durant McArthur. *Impact of Tebuthiuron on Biodiversity of High Elevation Mountain Big Sagebrush Communities.* Shrubland Ecosystem Genetics and Biodiversity: Proceedings, (Sept. 2001), pp. 216 -223.

10. **M. Sondossi**, H. W. Rossmoore, & R. Williams, 2001. Relative formaldehyde resistance among bacterial survivors of biocide-treated metalworking fluid. International Biodeterioration and Biodegradation 48: 286-300.
Reprinted in Special Millennium Issue: The first Quarter Century.

11. **Sondossi, M.** 2000, **Biocides**, In: Encyclopedia of Microbiology, Second Edition, Academic Press. pp 445-460

12. **Sondossi, M.** and H.W. Rossmoore. 1999. Influence of biocide treatment regimen on resistance development to isothiazolone in Pseudomonas aeruginosa. International Biodeterioration and Biodegradation 43: 85-92.

13. Merianos. J. J.: **Sondossi. M**.: Wachocki, B. **A;** Rossmoore, H. W. Factors involved in mode of action of imidazolidinyl urea and diazolidinyl urea biocide. In *Conference Proceedings Preservateck;* 27-28 *May* 1998: pp 29-38

14. **Sondossi, M**., and B.A. Wachocki. Hazardous waste minimization: use of industrial biocides to control microbiological contamination as a pollution prevention measure. Industrial and Engineering Chemistry Division, Emerging Technologies in Hazardous Waste Management, American Chemical Society, pp. 127-130, 1996.

15. J. Bergeroni, **M. Sondossi**, and M. Sylvestre. 1996. Genetic amplification as a means of

increasing PCBs degradation capabilities of Comamonas testestroni strain B-356. International Biodeterioration and Biodegradation. 37: 253-254.

16. Ahmad, D., Fraser, D., Sylvestre, M., Larose, A., Khan, A., Bergeron, J., Juteau, J. and **M. Sondossi**. 1995. Sequence of the bphD gene encoding 2-hydroxy-6-oxo-(phenyl/chlorophenyl)hexa-2,4-dienoic acid (HOP/cPDA) hydrolase involved in the biphenyl/polychlorinated biphenyl degradation pathway in Comamonas testosteroni: evidence suggesting involvement of Ser^{112} in catalytic activity. Gene: 156: 67-74.

17. **Sondossi, M.**, B.A. Lloyd, D. Bariault, M. Simard and M. Sylvestre.. 1995. A microbial transformation product form a phenylphenol. Acta Crystal. Sec. C 51: 491-494.

18. Sylvestre, M. and **M. Sondossi**. Selection of enhanced PCB degrading bacterial strains for bioremediation, consideration of branching pathways. 1994. In *Biological Degradation and Bioremediation of Toxic Chemicals* (Chapter 3: 47-73), Dioscorides Press, Portland, Oregon,

19. Guilbeault, B., **M. Sondossi**, D. Ahmad, and M. Sylvestre.1994. Factors affecting the enhanced capacity of soil microbial populations to degrade PCB. International Biodeterioration and Biodegradation, special issue on Bioremediation. 33:73-91.

20. **Sondossi, M**., V. Riha, H. W. Rossmoore, and M. Sylvestre.. 1993. Factors involved in bacteriocidal activities of formaldehyde condensate/ isothiazolone mixtures. International Biodeterioration and Biodegradation 32: 1-19.,

21. **Sondossi, M**., M. Sylvestre, D. Ahmad and D. Barriault. 1993. Importance of stringent control of biphenyl-induced biphenyl and chlorobenzoate catabolic pathways for chlorobiphenyl degradation in enhanced strain of Pseudomonas testosteroni B-356. In Proceedings of The Ninth International Biodeterioration and Biodegradation Symposium, University of Leeds, Leeds, UK., (Bousher, A., Chandra, M., Edyvean, R., eds.) Hobbs Ltd., Hampshire, UK. pp. 456-461.

22. **Sondossi, M.**, M. Sylvestre and D. Ahmad. 1992. Effects of chlorobenzoate transformation on Pseudomonas testosteroni biphenyl and chlorobiphenyl degradation pathway. Applied and Environmental Microbiology 58:485-495.

23. **Sondossi, M.**, M. Sylvestre. D. Ahmad and R. Masse.1991. Metabolism of hydroxybiphenyl and chlorohydroxybiphenyl by biphenyl/chlorobiphenyl degrading Pseudomonas testosteroni strain B-356. Journal of Industrial Microbiology., 7:77-88.

24. Ahmad, D., M. Sylvestre, **M. Sondossi** and R. Masse.1991.Subcloning of *bph* genes from Pseudomonas testosteroni B-356 in Pseudomonas putida and Escherichia coli: Evidence for dehalogenation during initial attack on chlorobiphenyls. Applied and Environmental. Microbiology 57:2880-2887.

25. Ahmad, D., M. Sylvestre, **M. Sondossi** and R. Masse. 1991.Bioconversion of 2-hydroxy-

6-oxo-6-(4'-chlorophenyl)-hexa-2,4-dienoicacid, the meta-cleavage product of 4-chlorobiphenyl. Journal of General Microbiology. 137:1375-1385.

26. Ahmad, D., **M. Sondossi** and M. Sylvestre. 1991. Bacterial clones carrying PCB degradation genes to study the metabolic steps involved in PCB degradation. In *Biodeterioration and Biodegradation 8,* H. W. Rossmoore ed., pp.579-581

27. Riha, V.F., **M. Sondossi** and H.W. Rossmoore. 1990. The potentiation of industrial biocide activity with Cu^{2+}. II: Synergistic effects with 5-chloro-2-methyl-4-isothiazolin-3-one. International Biodeterioration 26:303-313,

28. **Sondossi, M.**, V.F. Riha and H.W. Rossmoore. 1990. The potentiation of industrial biocide activity with Cu^{2+}.I: Synergistic effects with formaldehyde. International Biodeterioration 26:51-61.

29. **Sondossi, M.**, H.W. Rossmoore and R. Williams.1989. Relative formaldehyde resistance among bacterial survivors of biocide treated metal working fluid. International Biodeterioration 25:423-437,.

30. Rossmoore, H.W. and **M. Sondossi**.. 1988. Applications and mode of action of formaldehyde condensate biocides. Advances in Applied Microbiology, 33:223-277.

31. **Sondossi, M**., H.W. Rossmoore and J.W. Wireman. 1986. The effect of fifteen biocides on formaldehyde-resistant strains of Pseudomonas aeruginosa. Journal of Industrial Microbiology 1:87-96.

32. **Sondossi, M.**, H.W. Rossmoore and J.W.Wireman. 1986. Induction and selection of formaldehyde-based resistance in Pseudomonas aeruginosa. Journal of Industrial Microbiology 1:97-103.

33. **Sondossi, M.**, H.W. Rossmoore and J.W. Wireman.1985. Observations of resistance and cross-resistance to formaldehyde condensate biocide in Pseudomonas aeruginosa. International Biodeterioration 21:105-106.

34. **Sondossi, M.**, H.W. Rossmoore and John Wireman.1985. Factors affecting regrowth of Pseudomonas aeruginosa following biocide treatment. Lubrication Engineering 41:366-369.
35. **Sondossi, M.,** H.W. Rossmoore and John Wireman. 1984. Regrowth of Pseudomonas aeruginosa following treatment with formaldehyde condensate biocide. Developments in Industrial Microbiology 25:515-522.

Selected Uundergraduate Student Research / Presentation

J. Hansen, M. Sondossi and H. L. Berghout, 2007. Mapping the pathway of a nonenzymatic tautomerization in the biotransformation of a dihydroxybiphenyl. Presented at Utah Academy of Sciences, Art and Letters, Annual Conference 2007

Cottrell, C., M. Sondossi, and J.B. Clark. 2009. Metagenomic identification of bacteria associated with Great Salt Lake brine flies. Sigma Xi Annual Meeting and International Research Conference, Woodlands, TX, Nov. 12-15, 2009.

Cottrell, C. 2009. Using metagenomics to assess the diversity of bacteria associated with Great Salt Lake brine flies. Annual Meeting, Friends of Great Salt Lake, May 27, 2009.

Benjamin Lewis, B. A. Wachocki and M. Sondossi. 2009. Calcium oxalate crystals in leaves of Halogeton glomeratus and their possible contribution to alteration of soil chemistry. The Botanical Society of America National Annual Meeting: Botany - Mycology 2009

Cottrell, C., M. Sondossi and J.B. Clark. 2010.

Metagenomic identification of bacteria associated with Great Salt Lake brine flies. Annual Undergraduate Research Symposium, Weber State University, March 29, 2010

Jon Hansen, Timothy Herzog, Mohammad Sondossi. 2010
Biodegradation and Biotransformation of para-Substituted Hydroxybiphenyls
Annual Undergraduate Research Symposium, Weber State University, March 29, 2010

Gregory R. Hill, Mohammed Sondossi, And Timothy A. Herzog, *Investigating Algae Growth with Varying Levels of Salt, Nitrogen, and Phosphorous for use in Biodiesel Production.* Annual Undergraduate Research Symposium, Weber State University, March 29, 2010

Ty Flint, Timothy Herzog, and Mohammad Sondossi, *GC-MS Analysis of Algal Lipids: Method Validation.* 4th Annual Utah Conference on Undergraduate Research. Feb. 26, 2010. SUU, Cedar City, UT.

Gregory R. Hill, Mohammed Sondossi, and Timothy A. Herzog, *Investigating Algae Growth with Varying Levels of Salt, Nitrogen, and Phosphorous for use in Biodiesel Production.* 4th Annual Utah Conference on Undergraduate Research. Feb. 26, 2010. SUU, Cedar City, UT.

Timothy Herzog and Mohammad Sondossi "*From algae to biofuel. An interdisciplinary research effort.*" CUR 2010 National Conference.

Amanda Truong, Mohammad Sondossi, and Jonathan Clark, *Initial Characterization of the Wolbachia endosymbiont associated with Great Salt Lake brine flies.*

Annual Meeting and International Confrence of *Sigma Xi* , the scientific research honor society. Nov 11-14, 2010, Raleigh, North Carolina.

Jon Hansen, Timothy Herzog , Mohammad Sondossi.
Growth of Corynebacterium glutamicum and lipid extraction for biofuel production: a sequential step in biofuel production from algae. Annual Utah Conference on Undergraduate Research. Feb. 2011, WSU, Ogden, Utah.

Amanda Truong, Mohammad Sondossi, and Jonathan Clark, *Initial Characterization of the Wolbachia endosymbiont associated with Great Salt Lake brine flies.* Annual Utah Conference on Undergraduate Research. Feb. 2011, WSU, Ogden, Utah.

Amanda Truong, Mohammad Sondossi and Jonathan Clark, *"Genetic Analysis of the Wolbachia Endosymbiont Associated With Great Salt Lake Brine Flies,"* NCUR 2011 at Ithaca College. NY.

Mohammad Sondossi, Amanda Truong, and Jonathan Clark,
"Genetic characterization of the bacterial endosymbiont, Wolbachia, in shore flies from Great Salt Lake in Utah, USA".
The 11th International Conference on Salt Lake Research, May 9-14, 2011, Cordoba, Argentina.

Amanda Truong, Mohammad Sondossi, and Jonathan Clark, *Analysis of Great Salt Lake brine flies expands the phylogenetic diversity of Wolbachia endosymbionts.* Society for Molecular Biology and Evolution Annual Meeting, July 26-30, 2011, Kyoto, Japan.

Truong, A., M. Sondossi and J.B. Clark. 2012. Comparative genetics of the *Wolbachia* endosymbiont associated with Great Salt Lake brine flies. National Conference on Undergraduate Research, Ogden, UT. March 29-31.

Jennifer Jorgenson, Ashley Badley, Amanda Zaugg, Alessia Banning, Mo Sondossi, William Lorowitz and Karen Nakaoka. Poster presentation in May 2013. *Antibiotic resistance of enterococci isolated from the Great Salt Lake and freshwater sources.* Accepted for a poster presentation at the Annual Meeting of the American Society for Microbiology, Denver, Colorado.

Madison Landreth, Autumn Brubaker, Jessica Brooke, Colton Stokes, Jhonny Yovera, Cody Zesiger, Zandy Pashley, April Foley, Michael Harris (Mentors:Karen Nakaoka,, William Lorowitz and Mo Sondossi). March 2014. Antibiotic Resistance of Enterococci Isolated from the Great Salt Lake and Fresh Water Sources. Poster presentation at the Annual Meeting of the Intermountain Branch of the American Society for Microbiology at BYU in Provo, UT.

Madison Landreth, Autumn Brubaker, Jessica Brooke, Colton Stokes, Jhonny Yovera, Cody Zesiger, Zandy Pashley, April Foley, Michael Harris (Mentors: Karen Nakaoka, William Lorowitz and Mo Sondossi). February 2014. Antibiotic Resistance of Enterococci Isolated from the Great Salt Lake and Fresh Water Sources. Oral presentation at the Annual Meeting of the Utah Conference for Undergraduate at BYU in Provo, UT

Madison Landreth, Autumn Brubaker, Jessica Brooke, Colton Stokes, Jhonny Yovera, Cody Zesiger, Zandy Pashley, April Foley, Michael Harris (Mentors:Karen Nakaoka,, William Lorowitz and Mo Sondossi). April 2014. Antibiotics Resistance of Enterococci Isolated from the Great Salt Lake and Fresh Water Sources. Poster presentation at the Annual Meeting of the Utah Academy of Sciences, Arts and Letters, St. George, Utah.

Autumn Brubaker, Jessica Brooke, Madison Landreth, Cody Zesiger, Colton Stokes, Zandy Pashley, April Foley, Michael Harris, Jhonny Yovera (Mentors:Karen Nakaoka,, William Lorowitz and Mo Sondossi). March 31, 2014. Antibiotic Resistance of Enterococci Isolated from the Great Salt Lake and Fresh Water Sources. Oral presentation at the Annual Meeting of the Weber State University Symposium on Undergraduate Research. WSU, Ogden, UT.

Hill, C., M. Sondossi and J. Clark. Metagenomics of Great Salt Lake Microbes. Annual Undergraduate Research Symposium, Weber State University. March 31, 2014.

Barbara Wachocki and Mohammad Sondossi, Extent of Fungal Symbiosis in *Halogeton glomeratus.* Presentation was made at Botanical Society of America Conference, Edmonton, Alberta, CA, July 2015.

Jess Gann, Microorganisms and other particulate sampling in Earth atmosphere.
WSU Symposium on Undergraduate Research in March 2015.
(With Dr. Sohl, Physics Department)

Sadie Yearsley, Assessing Microbial Diversity of Great Salt Lake Using DNA Sequence Comparisons. WSU Symposium on Undergraduate Research in March 2015.
(With Dr. Clark, Zoology Department)

Rebbeca Horton, Investigating adaptive niche construction of *Pseudomonas aeruginosa* under nutrient limitation. WSU Symposium on Undergraduate Research in March 2016.

Appendix F: Baccalaureate Program Review (Program Unit Information & Graduation Based Metrics)

WEBER STATE UNIVERSITY
Worthy of Your Dreams

Baccalaureate Program Review
Program Unit Information

DRAFT

Program Review Unit
Microbiology

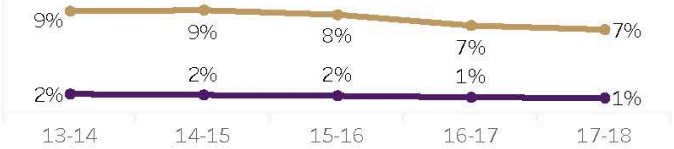
Include Remedial/Developmental Courses?
Yes

Data as of: 12/15/2018 7:21:10 AM

Annual Undergraduate SCH/FTE

Program Unit SCH Trend

Program Unit's Percentage of College and University SCH



Annual SCH

	13-14	14-15	15-16	16-17	17-18
University	490,098	501,594	497,468	500,686	516,439
College	96,336	93,057	92,359	95,823	99,452
Program Unit	8,389	8,184	7,767	7,184	7,116

Annualized FTE

	13-14	14-15	15-16	16-17	17-18
University	16,337	16,720	16,583	16,689	17,214
College	3,211	3,102	3,079	3,194	3,315
Program Unit	280	273	259	240	237

Percent of Program Unit SCH Offered as General Education Courses by Academic Year

Breakdown of Remedial/Lower/Upper Division SCH

Course Level		2013-14	2014-15	2015-16	2016-17	2017-18	2020
Remedial	University Level	4.3%	3.3%	2.9%	3.0%	2.6%	0.0%
	College Level	15.9%	12.2%	11.1%	11.6%	8.9%	0.0%
	Program Unit Level	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lower	University Level	65.5%	66.4%	67.1%	68.2%	69.2%	26.5%
	College Level	74.7%	78.2%	79.3%	79.1%	82.0%	0.0%
	Program Unit Level	65.1%	64.1%	63.8%	67.1%	66.4%	0.0%
Upper	University Level	30.2%	30.3%	30.0%	28.9%	28.3%	73.5%
	College Level	9.4%	9.6%	9.6%	9.2%	9.1%	0.0%
	Program Unit Level	34.9%	35.9%	36.2%	32.9%	33.6%	0.0%

Completion

Completion equal to 73% or better (C or better grades)

Grade Level

	13-14	14-15	15-16	16-17	17-18
University	80.6%	81.2%	81.4%	81.7%	81.5%
College	64.7%	67.5%	70.2%	71.4%	72.0%
Program Un..	81.6%	79.6%	83.6%	80.4%	84.5%

Section Level

	13-14	14-15	15-16	16-17	17-18
University	83.7%	85.3%	84.8%	85.9%	85.7%
College	48.4%	56.8%	58.2%	57.0%	58.4%
Program Unit	81.3%	79.7%	85.2%	78.5%	84.7%

WEBER STATE UNIVERSITY
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Baccalaureate Program Review
Graduation Based Metrics

DRAFT

Program Review Unit
Microbiology

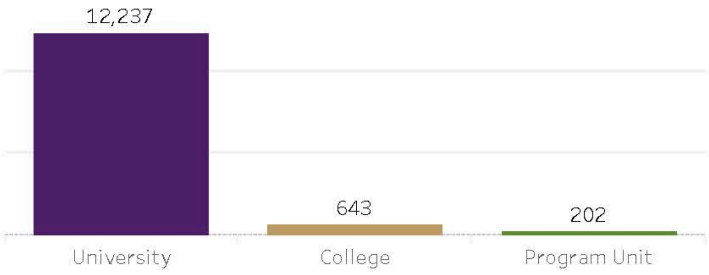
Data as of: 12/15/2018 7:21:10 AM

Undergraduate Degrees Awarded by Academic Year

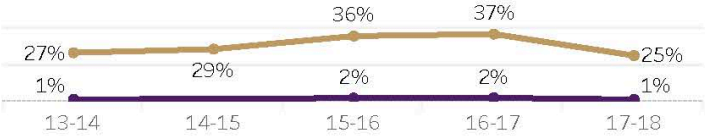
Include Associates Degrees? No

Number of Degrees Awarded By the Program Unit

5YR -Total Degrees Awarded



Percent of Degrees Awarded



	13-14	14-15	15-16	16-17	17-18
University	2,359	2,516	2,490	2,458	2,414
College	111	138	138	142	114
Program Unit	30	40	50	53	29

Median Hours Earned For Baccalaureate Degrees

Only uses records of students who admitted as new freshmen.

	13-14	14-15	15-16	16-17	17-18
University	140.00	139.58	141.00	139.50	138.00
College	156.00	154.50	152.67	147.17	149.50
Program Unit	154.00	147.75	145.75	143.00	147.50

Median Years to Baccalaureate Degree For Entering New Freshmen

Uses first term after high school graduation date if high school graduation date is known, else first term non-concurrent enrollment.
Only uses records of students who admitted as new freshmen.

	13-14	14-15	15-16	16-17	17-18
University	5.98	5.69	5.99	5.99	5.67
College	5.67	5.69	5.69	5.69	5.30
Program Unit	5.99	4.69	5.32	5.14	4.98

Appendix G: Evidence of Learning General Education Courses

Assessment in MICR 1153, Elementary Public Health

Interpretation

Scores for some of the outcomes are lower than we would expect. We are concerned that the Chitester reports are not giving us accurate results, either because too many questions have been selected from too many different instructors, or because the questions do not represent the outcomes. This makes it difficult to determine if the students are truly struggling with these outcomes. There also seems to be extreme differences between semesters and years. Short answer and essay questions cannot be aligned with outcomes at this time, making it more difficult to assess the more complex objectives, such as Nature of Science.

Action Plan

- Create a common course assessment for the LS/NS objectives that can be used in all sections of MICR 1153
- Explore new assessment techniques, including rubric-graded assignments and projects
- Evaluate online and face-to-face sections separately to determine if there are significant differences between sections
- Develop more content that explicitly addresses objectives that have not met the threshold levels, especially, S4 Problem Solving ,and LS1 Levels of Organization

Microbiology 1153: Elementary Public Health

Outcome	Content	Assessment	Threshold
Nature of Science	Historical Microbiology, Classical Experiments in Microbiology,	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Rubric assessed assignment in Canvas (indirect)	1. 65 % of students will have 70% or better on these questions (69 questions) 2. Class average 80%
Integration of Science	Sciences of Public Health: Biomedical Science, Social and Behavioral Science, Health Policy, Epidemiology, Statistics, Environmental Health	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Rubric assessed assignment in Canvas (indirect)	1. 65 % of students will have 70% or better on these questions (85 questions) 2. Class average 80%
Science and Society	The impact of microorganisms on the health and well-being of humans, especially their ability to cause disease. Vaccines, antibiotics. Socioeconomic impact of health and disease.	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Rubric assessed assignment in Canvas (indirect)	1. 65 % of students will have 70% or better on these questions (232 questions) 2. Class average 80%
Problem Solving	Epidemiology, identifying types of epidemiologic studies, calculating incidence rates and relative risks, Interpreting and evaluating health claims (e.g. vaccine side effects)	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 65 % of students will have 70% or better on these questions (69 questions)
Levels of Organization	Cell structure and function, microbial diversity, three domains of life	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Open note quiz on Canvas	1. 65 % of students will have 70% or better on these questions (88 questions) 2. 80% of students will have 70% or better on assignment
Metabolism and homeostasis	Metabolic diversity in prokaryotic organisms. Organisms used in food production.	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 65 % of students will have 70% or better on these questions (65 questions)
Genetics and Evolution	Central Dogma of Biology, DNA replication, transcription, translation, mutations, genetic exchange, and the relationship between genetic change and microbial diversity and evolution. Antibiotic resistance, sickle cell anemia	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty. Measure 2: Open note quiz on Canvas	1. 65 % of students will have 70% or better on these questions (86 questions) 2. 80% of students will have 70% or better on assignment
Ecological Interactions	Impact of environmental quality on health and disease. Examples: role of climate change in changing disease patterns, impact of drought on plant pathogens, relationships between UV exposure and skin cancer, air pollution, importance of water and sewage treatment.	Measure 1: Selected Chitester exam questions. These are from a selection of sections taught by different faculty.	1. 65 % of students will have 70% or better on these questions (88 questions)

Microbiology 1153: Elementary Public Health Results

Outcome	Results 2013-2014	Results 2014-2015
Nature of Science	1. 64% of students earned 70% or better. 2. Criteria was met average score 86%	1. 64% of students earned 70% or better.
Integration of Science	1. 74% of students earned 70% or better 2. Criteria was met average 93%	1. 74% of students earned 70% or better
Science and Society	84% of students earned 70% or better 2. Criteria was met average score 94%	84% of students earned 70% or better
Problem Solving	45% of students earned 70% or better	25% of students earned 70% or better* (also see assessment measured through Canvas below)
Levels of Organization	1. 38% of students earned 70% or better 2. 93% had better than 70% on assignment	1. 42% of students earned 70% or better 2. 93% had better than 70% on assignment
Metabolism and homeostasis	60% of students earned 70% or better	62% of students earned 70% or better
Genetics and Evolution	1. 59% of students earned 70% or better 2. 89% had 70% or better on assignment	1. 64% of students earned 70% or better 2. 89% had 70% or better on assignment
Ecological Interactions	72% of students earned 70% or better	74% of students earned 70% or better

Additional Assessments:

Rubric graded assignments: Measured in one section of 1153 using Canvas Rubrics Fall 14-Spring 15

Outcome	Assessment	Threshold	Fall 14	Spring 15 (measured with multiple questions)
Integration of Sciences	Rubric graded assignments	70% will meet or exceed the expectation	76% met or exceeded threshold	100%, 100%
Nature of Science	Rubric graded assignments	70% will meet or exceed the expectation	92% met or exceeded	88%, 75%
Levels of Organization	Rubric graded assignments	70% will meet or exceed the expectation	97%	97%
Ecological Interactions	Rubric graded assignments	70% will meet or exceed the expectation	62%	74%,
Science & Society	Rubric graded assignments	70% will meet or exceed the expectation		95%, 87%, 97%, 100%

Problem solving	Rubric graded assignments	70% will meet or exceed the expectation		100%

In Spring 15, the rubrics were changed to more accurately assess outcomes for this course, e.g. specific content related to each outcome, however that changed the way that the outcomes are reported. Could not extract Fall 15 data from Canvas.

Assessment in MICR 1113, Introduction to Microbiology

Interpretation

Because we have several instructors that teach this course in different formats (including online, face-to-face, and IVC), and using different assessment techniques developing standard assessment tools has been a challenge. However, based on Chitester administered assessments most of the objectives are being met. This does seem to vary from semester to semester as seen in the table below. Objectives with a low percentage of success may be low because the assessment tool does not use enough questions to determine proficiency or because those objectives are difficult to assess using Chitester multiple choice exams. We are experimenting with using other assessment tools (e.g. rubric graded discussions and assignments, Signature Assignments). We are also beginning to use more common materials to teach this class and will develop common assessment tools to use between courses.

Action Plan

- We are working to develop a standardized assessment tool or tools that can be used to measure the LS learning outcomes for MICR 1113 across sections, instructors, and formats.

Fall 2015-Summer 2016

Outcome	Content	Assessment	Measure	Percent of students meeting criteria
Nature of Science	Current research in microbiology, Historical Microbiology, Classical Experiments in Microbiology,	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	49%
		2. Selected Exam Questions (Spring 2016) 15 questions		88%
Integration of Science	Role of other disciplines in microbiology, physics, chemistry, biochemistry, and the impact of microbiology on other sciences, ecology, zoology, botany, agriculture, etc.	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	36%
Science and Society	The impact of microorganisms on the health and well-being of humans, especially their ability to cause disease. Vaccines, antibiotics	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	53%
		2. Selected Exam Questions (Spring 2016) 52 questions		74%

Problem Solving	DNA transcription and translation	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	59%
		2. Selected Exam Questions (Spring 2016) 9 questions		83%
Levels of Organization	Cell structure and function. Three domains of life. Basics of evolution	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	61%
		2. Selected Exam Questions (Spring 2016) 35 questions		74%
Metabolism and homeostasis	Central metabolic pathways, including anabolism and catabolism, aerobic and anaerobic respiration, and fermentations.	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	63%
		2. Selected Exam Questions (Spring 2016) 55 questions		71%
Genetics and Evolution	Central Dogma of biology, DNA replication, transcription, translation, mutations, genetic exchange, and the relationship between genetic change and microbial diversity and evolution. Antibiotic resistance	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	63%
		2. Selected Exam Questions (Spring 2016) 54 questions		72%
Ecological Interactions	Impact of microbial activity on their environment. Including human-microbe interactions, Metabolic diversity, nitrogen fixation, waste water treatment, other examples	1. Chitester, Selected Question	65% of students will earn 70% or better on questions	64%
		2. Selected Exam Questions (Spring 2016) 25 questions		74%

Measure 1. Outcome-linked Chitester exam questions
Measure 2. Chitester exam questions, tagged by category, from a set of 50-point exams
Results from outcome-linked Chitester questions, by semester.

Assessment in MICRO 2054 Principles of Microbiology

Interpretation

Most of the outcomes are met when assessed with the Chitster tools. Data vary semester to semester in part because the exams are different depending on the semester (slightly different content, different number of exams/questions per exam). Objective SS1 (NS1) Nature of Science is difficult to assess with multiple choice questions, it would be better assessed with rubric graded essays. There were not enough questions on the assessment.

Action plan:

- Give students more practice with problem solving and with ecological terminology and examples.
- Give students more examples of Nature of Science. Assess this outcome with essays/projects.

Outcomes and assessment Grid

Outcome	Content	Assessment	Measure
SS1: Nature of Science	Current research in microbiology, Historical Microbiology, Classical Experiments in Microbiology, Laboratory Exercises.	Selected Exam questions on Chitester Exams	70% of students will have 70% or better # of items depends on semester
SS2: Integration of Science	Role of other disciplines in microbiology, physics, chemistry, biochemistry, and the impact of microbiology on other sciences, ecology, zoology, botany, agriculture, etc.	Selected Exam questions on Chitester Exams	70% of students will have 70% or better
SS3: Science and Society	The impact of microorganisms on the health and well-being of humans, especially their ability to cause disease. Vaccines, antibiotics.	Selected Exam questions on Chitester Exams	70% of students will have 70% or better
SS4: Problem Solving	Microbiological laboratory techniques that require data collection and analysis, e.g. determining the number of cells per milliliter in a food or water sample.	1. Selected Exam questions on Chitester Exams	70% of students will have 70% or better
		2. Lab Exam 3, student use data to calculate the outcomes of microbiological dilutions. They must plan and execute a dilution scheme to quantify bacteria in a sample culture.	70% of students will earn 70% or better on Lab exam 3.
		3. Dilution Quiz: 10 questions, take home quiz. Students solve dilution problems	90% of students will earn 80% or better. Canvas Quiz
LS1: Levels of Organization	Cell structure and function. Three domains of life. Basics of evolution.	Multiple choice and short answer questions on macromolecules, and cell structure and functions.	70% of Students will answer 70% of the questions correctly Measured with ChiTester
LS2: Metabolism and homeostasis	Central metabolic pathways, including anabolism and catabolism, aerobic and anaerobic respiration, and fermentations.	Multiple choice and short answer questions on Glycolysis, Citric Acid Cycle, Electron Transport and related topics	70% of Students will answer 70% of the questions correctly. Measured with ChiTester
LS3: Genetics and Evolution	Central Dogma of biology, DNA replication, transcription, translation, mutations, genetic exchange, and the relationship between genetic change and microbial diversity and evolution. Antibiotic resistance.	Multiple choice and short answer questions on DNA replication and protein synthesis, mutations, and genetic exchange	70% of Students will answer 70% of the questions correctly. Measured with ChiTester
LS4: Ecological Interactions	Impact of microbial activity on their environment. Including human-microbe interactions, Metabolic diversity, nitrogen fixation, waste water treatment.	Multiple choice and short answer questions on the interactions between microorganisms and between microorganisms and the human immune system	70% of Students will answer 70% of the questions correctly. Measured with ChiTester

Results	**% of students earning at or above the threshold**	**Conclusions**

	2015	2016	2017	2018*	
NS 1 Nature of Science	77%	77%	86%	61%	Assess with rubric graded essays in addition to chitester
NS2 Integration of Science	75%	75%	64%	62%	Give more explicit examples in class
NS 3 Science and Society	90%	90%	84%	92%	
NS 4 Problem solving.					Students don't do well with calculations on Chitester exams, use paper-based or lab practical for assessment. Give more practice with problem solving
Chitester	62%	62%	57%	67%	
Lab Exam	84%	91%	90%	96%	
Dilution quiz	90%	90%	na	92%	
LS 1: Levels of Organization	82%	82%	78%	72%	
LS 2: Metabolism and homeostasis	81%	81%	70%	69%	
LS 3: Genetics and Evolution	83%	83%	70%	74%	
LS 4: Ecological Interactions	70%	62%	57%	61%	Include more examples in class. Give more practice in ecological terminology.

* exams were modified so that all students received the same number of assessed questions