Wesley D. Swingley

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Education

Arizona State University – Ph.D. in Microbiology 2006
Advisor: Dr. Robert E. Blankenship
Ph.D. Thesis – *Genetic Approaches to the Study of Photosynthetic Prokaryotes*

Case Western Reserve University – B.S. in Biochemistry 2001

Professional Experience

Northern Illinois University – Assistant Professor 2012 - present
- Microbial Ecology and Bioinformatics

University of California – Merced – Postdoctoral Scholar 2009 - 2012
- hot spring metagenomics and geochemistry
- phenotype prediction using computational metabolomics
- origin of the plastid in cyanobacteria using tRNA functional elements

Hokkaido University – JSPS Postdoctoral Fellowship 2006 - 2009
- picophytoplankton light-harvesting complex biochemistry
- light adaptation in picophytoplankton

Arizona State University – Graduate Research 2001 - 2006
- genomics of phototrophic bacteria (4 completed genomes)
- chlorophyll metabolism in *Acaryochloris marina*

Case Western Reserve University – Lab Assistant 1999 - 2001
- properties of RNA polymerase binding

Mayo Clinic, Rochester, MN – Research Internship 1998
- proteomics of sensing early stages of cancer

Research Interests

Comparative genomics and metagenomics, microbe-environment interactions, evolution and origin of metabolic systems, evolution of photosynthesis and light-harvesting, biosynthesis of chlorophyll and carotenoids

Current Funding

NASA Exobiology (Co-Investigator with Hedlund (PI), Raymond, Quake, & Dodsworth)
Title: Exploration of "biological dark matter" in geothermal springs
Duration: 10/1/2011–09/30/2015 Amount: $995,350

Past Funding and Awards

NSF (subcontract with Touchman (PI), Blankenship, & Madigan)

Title: Evolutionary Diversification of Photosynthesis and the Anoxygenic to Oxygenic Transition
Duration: 09/1/2013–08/31/2014 Amount: $34,025

JSPS Postdoctoral Fellowship for Foreign Researchers
- Standard (24 months) 2007 - 2009
- Research Grant (24 months) 2007 - 2009
- Short-Term (11 months) 2006 - 2007

Certificate in Recognition for Excellence as a Teaching Assistant 2005
Arizona State University - Graduate Academic Fellowship 2001 - 2006
Howard Hughes Medical Institute - S.P.U.R. Fellowship 2000

Teaching Experience

Northern Illinois University

BIOS468X/568X Geomicrobiology	Spring	2016
BIOS761E Graduate seminar	Spring	2016
BIOS313 General Microbiology	Fall	2015
BIOS419/619 Microbial Systematics & Diversity	Fall	2015
BIOS468X/568X Geomicrobiology	Spring	2015
BIOS761E Graduate seminar	Spring	2015
BIOS419/619 Microbial Systematics & Diversity	Fall	2014
BIOS419/619 Microbial Systematics & Diversity	Spring	2014
BIOS468X/568X Geomicrobiology	Fall	2013
BIOS419/619 Microbial Systematics & Diversity	Spring	2013
BIOS761E High Throughput Sequencing Seminar	Fall	2012

University of California – Merced, Guest Lecturer

BIO120 General Microbiology – Guest Lectures	Fall	2009

Arizona State University, Teaching Assistant

BCH467 Analytical Biochemistry Laboratory	Fall	2005
BCH467 Analytical Biochemistry Laboratory	Spring	2005
BCH467 Analytical Biochemistry Laboratory	Spring	2004
BCH367 Elementary Biochemistry Laboratory	Spring	2003
BCH361 Principles of Biochemistry	Fall	2002
MIC205 Microbiology Lecture	Fall	2002
MIC206 Microbiology Laboratory	Spring	2002
MIC206 Microbiology Laboratory	Fall	2001

Workshops Administered

NSF International Research Assessment
- Tbilisi, Georgia Oct 2015
- Yerevan, Armenia Oct 2015

Research Development Workshop
- Yadanabon, University, Mandalay, Myanmar Aug 2015

Genome Annotation and Analysis using TIGR's Manatee Software
- Washington University in St. Louis May 2011
- Kyoto University June 2007

- Washington University in St. Louis May 2007
- Arizona State University June 2006

Peer Review

Manuscripts reviewed for publication in: *Astrobiology*, *BMC Microbiology*, *Environmental Microbiology*, *Frontiers in Microbiology*, *Frontiers in Terrestrial Microbiology*, *Genome Biology and Evolution*, *Geochimica et Geophysica Acta*, *ISME Journal*, *Journal of Basic Microbiology*, *Microbiology*, *Photosynthesis Research*, *Plant Physiology*, *Plant and Cell Physiology*, and *Scientific Reports*
Grants reviewed for: *NASA Astrobiology Insitute CAN7*, *NASA Exobiology and Evolutionary Biology*, *NASA Planetary Protection*, and *The Royal Society*

Students Mentored

Victoria Frank – Undergraduate	2014 - present
Rene Peralta – REU Summer Fellow	2014
Jared Sherwood – REU Summer Fellow	2014
Brenna Ritchie – Undergraduate	2014 - present
Allison Mengel – Undergraduate	2013 - present
Jan Ingemar Ohlsson – Graduate	2013 - present
Nicholas McKeown – Undergraduate	2013 - 2014
Marie Kroeger – REU Summer Fellow	2012
Kathryn Olson – REU Summer Fellow	2012
Lori Lovell – REU Summer Fellow	2012
Matthew Rodriguez – Undergraduate	2012 - 2013
Jennifer Rasmussen – Undergraduate	2012 – 2013

Graduate Committees

Adam Bauer, PhD; Karley Chantos, MS; Adam Hage, PhD; Jennifer Hintzsche, PhD; Clare Kron, PhD; Jennifer McConnaughy, PhD; Jan Ingemar Ohlsson, PhD; Lauren Orton, MS; Jay Osvatic, MS; Kathryn Quesnell, PhD; Emily Somova, MS; Karel Waska, PhD; William Wysocki, PhD

Current Collaborators

Robert Blankenship	Washington University in St. Louis
Eric Boyd	Montana State University
William Brazelton	University of Utah
Min Chen	University of Sydney
Jeremy Dodsworth	California State University, San Bernadino
Brian Hedlund	University of Nevada at Las Vegas
Stefan Green	University of Illinois at Chicago
Martin Hohmann-Marriott	Otago University / NTNU
David Kramer	Michigan State University
D'Arcy Meyer-Dombard	University of Illinois at Chicago
Jun Minagawa	National Institute for Basic Biology
Stephen Quake	Stanford University
Jason Raymond	University of California at Merced

Matthew Schrenk	Michigan State University
Everett Shock	Arizona State University
Yuichiro Takahashi	Okayama University
Jeff Touchman	Monsanto Corp.

Publications

Swingley, W.D. and Barber, N.A. (2016) Soil microbial community composition in tallgrass prairie restorations converge with remnants across a 27-year chronosequence. *In prep.*

Chantos, K., Madigan, M.T., Blankenship, R.E., and Touchman, J.W., and **Swingley, W.D.** (2016) The complete genome of the thermophilic Gammaproteobacterium *Thermochromatium tepidum*. *In prep*.

Becraft, E.D. and **Swingley, W.D.** (2016) Reconstruction of Archaeal phylogenetic history through conserved gene families identified by Markov clustering. *In prep.*

Becraft, E.D., Dodsworth, J.A., Murugapiran, S.K., Ohlsson, J.I., Briggs, B.R., Kanbar, J., De Vlaminck, I., Quake, S.R., Dong, H., Hedlund, B.P., and **Swingley, W.D.** (2016) Single-Cell-Genomics-Facilitated Read Binning of Candidate Phylum EM19 Genomes from Geothermal Spring Metagenomes. *Appl Environ Microbiol*. **82**, *In Press*.

Amrine, K.C.H., **Swingley, W.D.**, and Ardell, D.H. (2014) tRNA signatures reveal a polyphyletic origin of SAR11 strains among Alphaproteobacteria. *PLOS Comput Biol*. **10**, e1003454.

Sattley, W.M. and **Swingley, W.D.** (2013) "Properties and Evolutionary Implications of the Heliobacterial Genome," In Genome Evolution of Photosynthetic Bacteria.ed Beatty, J.T. Elsevier, Amsterdam, The Netherlands. pp 67-98.

Dodsworth, J.A., Blainey, P.C., Murugapiran, S.K., **Swingley, W.D.**, Ross, C.A., Tringe, S.G., Chain, P.S.G., Scholz, M.B., Lo, C.-C., Raymond, J., Quake, S.R., and Hedlund, B.P. (2013) Single-cell and metagenomic analyses indicate a fermentative and saccharolytic lifestyle for members of the OP9 lineage. *Nat Commun*. **4**, 1854.

Swingley. W.D., Meyer-Dombard, D.R., Shock, E.L., Alsop, E.B., Falenski, H.D., Havig, J.R., and Raymond, J. (2011) Coordinating environmental genomics and geochemistry reveals metabolic transitions in a hot spring ecosystem. *PLoS ONE*. 7, e38108.

Meyer-Dombard, D.R., **Swingley, W.**, Raymond, J., Havig, J., Shock, E.L., and Summons, R.E. (2011) Hydrothermal ecotones and streamer biofilm communities in the Lower Geyser Basin, Yellowstone National Park. *Environ Microbiol*. **13**, 2216-31.

Swingley, W.D., Iwai, M., Chen, Y., Ozawa, S.-I.,Takizawa, K., Takahashi, Y., and Minagawa, J. (2010) Characterization of photosystem I antenna proteins in the prasinophyte *Ostreococcus tauri*. *Biochim Biophys Acta*. **1797**, 1458-64.

Lu Y.K., Marden J., Han M., **Swingley W.D.**, Mastrian S.D., Chowdhury S.R., Hao J., Helmy T., Kim S., Kurdoglu A.A., Matthies H.J., Rollo D., Stothard P., Blankenship R.E., Bauer C.E., Touchman J.W. (2010) Metabolic flexibility revealed in the genome of the cyst-forming alpha-1 proteobacterium *Rhodospirillum centenum*. *BMC Genomics*. **11**, 325.

Swingley, W.D., Blankenship, R.E., and Raymond, J. (2008) "Evolutionary Relationships Among Purple Photosynthetic Bacteria and the Origin of Proteobacterial Photosynthetic Systems," In *The Purple Phototrophic Bacteria*. eds. Hunter, C.N., Daldal, F., Thurnauer, M.C., and Beatty, J.T. Springer, Dordrecht, The Netherlands. pp 17-29.

Raymond, J. and **Swingley, W.D.** (2008) Phototroph genomics ten years on. *Photosynth Res*. **97**, 5-19.

Sattley, W.M., Madigan, M.T., **Swingley, W.D.**, Cheung, P.C., Clocksin, K. M., Conrad, A.L., Dejesa, L.C., Honchak, B.M., Jung, D.O., Karbach, L.E., Kurdoglu, A., Lahiri, S., Mastrian, S.D., Page, L.E., Taylor, H.L., Wang, Z.T., Raymond, J., Chen, M., Blankenship, R.E., and Touchman, J.W. (2008) The genome of *Heliobacterium modesticaldum*, a phototrophic representative of the Firmicutes containing the simplest photosynthetic apparatus. *J Bacteriol*. **190**, 4687-96.

Swingley, W.D., Blankenship, R.E., Raymond, J. (2008) Integrating Markov clustering and molecular phylogenetics to reconstruct the cyanobacterial species tree from conserved protein families. *Mol Biol Evol*. **25**, 643-54.

Swingley, W.D., Chen, M., Cheung, P.C., Conrad, A.L., Dejesa, L.C., Hao, J., Honchak, B.M., Karbach, L.E., Kurdoglu, A., Lahiri, S., Mastrian, S.D., Miyashita, H., Page, L., Satoh, S., Sattley, W.M., Shimada, Y., Taylor, H.L., Tomo, T., Tsuchiya, T., Wang, Z.T., Raymond, J., Mimuro, M., Blankenship, R.E., and Touchman, J.W. (2008) Niche adaptation and genome expansion in the chlorophyll *d*-producing cyanobacterium *Acaryochloris marina*. *Proc. Natl. Acad. Sci. USA*. **105**, 2005-10.

Swingley, W.D., Blankenship, R.E., and Raymond, J. (2008) "Insight into cyanobacterial evolution from comparative genomics," In *The Cyanobacteria: Molecular Biology,Genomics and Evolution*. eds. Herrero, A. and Flores, E. Caister Academic Press, Norfolk, UK, pp 21-44.

Soule, T., Stout, V., **Swingley, W.D.**, Meeks, J.C., Garcia-Pichel, F. (2007) Molecular genetics and genomic analysis of scytonemin biosynthesis in *Nostoc punctiforme* ATCC 29133, *J. Bacteriol*. **189**, 4465-72.

Swingley, W.D., Gholba, S., Mastrian, S.D., Matthies, H.J., Hao, J., Ramos, H., Acharya, C.R., Conrad, A.L., Taylor, H.L., Dejesa, L.C., Shah, M.K., O'Huallachain, M.E., Lince, M.T., Beatty, J.T., Blankenship, R.E. and Touchman, J.W. (2007) The complete genome sequence of *Roseobacter denitrificans* reveals a mixotrophic rather than photosynthetic metabolism, *J. Bacteriol*. **189**, 683-90.

Swingley, W.D., Hohmann-Marriott, M.F., Le Olson, T., and Blankenship, R.E. (2005) Effect of iron on growth and ultrastructure of *Acaryochloris marina*, *Appl Environ Microbiol*. **71**, 8606-10.

Invited talks

Dodsworth, J.A., Blainey, P.C., Murugapiran, S.K., Swingley, W.D., Ross, C.A., Tringe, S.G., Chain, P.S.G., Scholz, M.B., Lo, C.-C., Raymond, J., Quake, S.R., and Hedlund, B.P. (July 2013) Coordinating single-cell and metagenome sequencing to illuminate microbial 'dark matter' in hot spring ecosystems. 2013 Annual Meeting of the Society for Molecular Biology and Evolution. Chicago, IL.

Swingley, W.D. (Jan. 2013) Integrating Genomics and Geochemistry in Bison Pool, Yellowstone National Park. *Indiana Wesleyan University*. Marion, IN.

Swingley, W.D. (Nov. 2012) Integrating Genomics and Geochemistry in Bison Pool, Yellowstone National Park. *Southern Illinois University*. Carbondale, IL.

Swingley, W.D, Amrine, K.C.H., and Ardell, D.H. (Mar. 2012) Using tRNA to Illuminate the Origin of the Chloroplast. *University of Nevada, Las Vegas*. Las Vegas, NV.

Swingley, W.D. (Sept. 2011) DNA sequencing and you. *DragonCon*. Atlanta, GA.

Swingley, W.D. (May 2011) Integrating Genomics and Geochemistry: The Co-Evolution of Organisms and Their Environment. *Washington University in St. Louis*. St. Louis, MO.

Swingley, W.D., Alsop, E.B., Falenski, H.D., and Raymond, J. (Nov. 2010) The Bison Pool metagenome: 470 megabases from a Yellowstone alkaline hot spring. *California Polytechnic State University*. San Luis Obispo, CA.

Swingley, W.D., Alsop, E.B., Falenski, H.D., and Raymond, J. (Nov. 2010) Yellowstone microbial diversity: A glimpse into the early Archaeon. *NASA Astrobiology Institute Workshop Without Walls on Molecular Paleontology and Resurrection: Rewinding the Tape of Life*.

Swingley, W.D. (Sept. 2010) Evolution by leaps and bounds. *DragonCon*. Atlanta, GA.

Swingley, W.D., Alsop, E.B., Falenski, H.D., and Raymond, J. (Aug. 2010) The Bison Pool metagenome: 470 megabases from 5 connected sites in a Yellowstone alkaline spring outflow channel. *Montata State University*. Bozeman, MT.

Swingley, W.D. (Dec. 2008) The origin and evolution of photosynthetic antennae in plants and algae: the earliest algal species exhibit surprisingly diverse light-harvesting systems. *University of Otago*. Dunedin, New Zealand.

Swingley, W.D., Blankenship, R.E., Beatty, J.T., and Touchman, J.W. (May 2006) Analysing the genome of *Roseobacter denitrificans*. *Annual Meeting for the Society for Molecular Biology and Evolution*. Tempe, AZ.

Presentations

Becraft, E.D., Dodsworth, J.A., Murugapiran, S.K., Ohlsson, I., Hedlund, B.P., and Swingley, W.D. (June 2015) Genomic analyses of candidate phylum EM19 populations in geothermal springs. Astrobiology Science Conference 2015. Chicago, IL.

Swingley, W.D., Sherwood, J., Peralta, R., and Becraft, E.D. (Sept. 2014) Microbial community analyses of the Nachusa Grasslands (Illinois) prairie restoration chronosequence. *Midwest Geobiology Conference*. Chicago, IL.

Swingley, W.D., Amrine, K.C.H., and Ardell, D.H. (Apr. 2012) Using tRNA to Illuminate the Origin of the Chloroplast. *Astrobiology Science Conference 2012*. Atlanta, GA.

Swingley, W.D. and Raymond, J. (Sept. 2010) Biochemical network rewiring during the aerobic transition. *Cold Spring Harbor Asia Computational Biology*. Suzhou, China.

Swingley, W.D., Alsop, E.B., Falenski, H.D., and Raymond, J. (Sept. 2010) The 470 megabase metagenome of the Bison Pool (Yellowstone National Park) alkaline hot spring outflow channel. *Cold Spring Harbor Asia Computational Biology*. Suzhou, China.

Swingley, W.D. and Raymond, J. (Apr. 2010) Biochemical network rewiring during the transition to aerobiosis or how to build an aerobe in just a few hundred million years. *Astrobiology Science Conference 2010*. Houston, TX.

Swingley, W.D., Alsop, E.B., Falenski, H.D., and Raymond, J. (Apr. 2010) The 470 megabase metagenome of the Bison Pool (Yellowstone National Park) alkaline hot spring outflow channel. *Astrobiology Science Conference 2010*. Houston, TX.

Swingley, W.D., Iwai, M., and Minagawa, J. (Mar. 2008) Understanding the evolution of eukaryotic light-harvesting through biochemical analysis of the prasinophyte alga *Ostreococcus tauri*. *50th Annual Meeting of the Japanese Society of Plant Physiologists*. Nagoya, Japan.

Swingley, W.D., Takizawa, K., Kato, N., and Minagawa, J. (Mar. 2008) High-light acclimation and the xanthophyll cycle in the prasinophytic green alga *Ostreococcus tauri*. *49th Annual Meeting of the Japanese Society of Plant Physiologists*. Sapporo, Japan.

Swingley, W.D. and Minagawa, J. (July 2007) Understanding the evolution of eukaryotic light-harvesting through the analysis of the prasinophyte *Ostreococcus tauri*, *14th Photosynthesis Congress*. Glasgow, Scotland.

Blankenship, R.E., Swingley, W.D., Hohmann-Marriott, M., and Raymond, J. (July 2007) The evolutionary transition from anoxygenic to oxygenic photosynthesis, (*Plenary lecture*). *14th Photosynthesis Congress*. Glasgow, Scotland.

Swingley, W. D., Gholba, S., Mastrian, S. D., Matthies, H. J., Hao, J., Ramos, H., Acharya, C. R., Conrad, A. L., Taylor, H. L., Dejesa, L. C., Shah, M. K., O'Huallachain, M. E., Lince, M. T., Beatty, J. T., Blankenship, R.E. and Touchman, J. W. (Mar. 2006) *Roseobacter denitrificans*: A ubiquitous marine phototroph with a novel carbon fixation pathway. *First Annual Joint Genome Institute User Meeting*. Walnut Creek, CA.

Swingley, W. D., Hohmann-Marriott, M. F., and Blankenship, R. E. (Jan. 2005) *Acaryochloris marina* culture optimization and growth characteristics. *Western Photosynthesis Conference*. Pacific Grove, CA.

Swingley, W. D. and Blankenship, R. E. (Jan. 2004) Genetic manipulations on the novel chlorophyll *d*-producing cyanobacterium *Acaryochloris marina*. *Western Photosynthesis Conference*. Pacific Grove, CA.

References

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