

# Michael Stephen Wollenberg

Assistant Professor of microBiology

Kalamazoo College | Department of Biology | 1200 Academy St. | Kalamazoo, MI 49006



## EDUCATION

### Postdoctoral Fellow

The Forsyth Institute and Harvard School of Dental Medicine, Cambridge, MA.  
Advisor: *Katherine P. Lemon, M.D. Ph.D.*

Fall 2011-2013

### Ph.D. Microbiology

Department of Medical Microbiology and Immunology, University of Wisconsin, WI.  
Advisor: *Edward G. Ruby, Ph.D.*

Fall 2004 - Spring 2011

### Research Technician

Laboratory of Cellular Biophysics, The Rockefeller University, Manhattan, NY.  
Mentor: *Sanford M. Simon, Ph.D.*

Spring 2002-2004

### Bachelor of Arts: Biochemistry Special Major

Swarthmore College, Swarthmore, PA.  
Summer Research Internships: *Mayo Clinic, DuPont Pharmaceuticals*

Fall 1997 - Spring 2002

## TEACHING AND MENTORING

### Teaching

#### Kalamazoo College

(Assistant Professor)

COURSE	# STUDENTS / TERM	TERMS TAUGHT
Biol 112 <b>Evolution and Genetics</b> with lab	~100 / Fall ~50 / Winter	Fall 2014, 2015, 2016 Winter 2014, 2015
Biol 295 <b>Computational Tools for Biologists</b> with lab	~10	Winter 2016
Biol 322 <b>General and Medical Microbiology</b> with lab	~20	Spring 2014, 2015, 2016
Biol 488 <b>Topics in Biology: Symbiosis</b>	~10	Winter 2014

#### University of Wisconsin, Madison

(Teaching Assistant and Team Teacher)

COURSE	# STUDENTS / TERM	TERMS TAUGHT
Bact 526 <b>Bacterial Physiology</b>	~60	Fall 2005, 2006
Med. Microbiol. 351 <b>Parasitology Laboratory</b>	~30	Spring 2006
Microbiol. 100 <b>The Microbial World (non-majors)</b>	~60	Spring 2010

### Research Mentoring

Wollenberg Lab, Kalamazoo College, Kalamazoo, MI

1X *Senior Individualized Project (SIP – senior thesis) biology research student*

6X *Independent study students during the academic term and summer*

1X *Independent study student author on peer-reviewed, published article*

4X *Student co-authors on two separate poster abstracts to ASM's Beneficial Microbes Conferences*

Spring 2014-Present

Summer 2016

Spring 2014-Present

Spring 2016

Fall 2014, 2016

Lemon Lab, The Forsyth Institute, Cambridge, MA

1X *Summer student author on peer-reviewed, published article*

Summer 2012, 2013

Spring 2014

## Peer-Reviewed, Published Papers (\*\* surround undergraduate mentees' names)

- Wollenberg, A.C., \*Jagdish, T.\*, Slough, G., \*Hoinville, M.\*, and **M.S. Wollenberg**. (2016) Death Becomes Them: Bacterial community dynamics and stilbene antibiotic production in *Galleria mellonella* cadavers killed by *Heterorhabditis/Photorhabdus*. *Appl. Environ. Microbiol.* 82(19): 5824-5837. PMID: 27451445
- Sun, Y., LaSota, E.D., Cecere, A.G., LaPenna, K.B., Larios-Valencia, J., **Wollenberg, M.S.**, T. Miyashiro. (2016) Intraspecific competition impacts *Vibrio fischeri* strain diversity during initial colonization of the squid light organ. *Appl. Environ. Microbiol.* 82(10): 3082-91. PMID 27016564.
- Wollenberg M.S.**, Claesen J, Escapa I.F., \*Aldridge K.L.\*, Fischbach M.A., and K.P. Lemon. (2014) Propionibacterium-produced coproporphyrin III induces *Staphylococcus aureus* aggregation and biofilm formation. *mBio*. Jul 22; 5(4): e01286-14. PMID 25053784.
- Wollenberg, M.S.**, Preheim, S.P., Polz, M.P., and E.G. Ruby. (2012) Polyphyly of non-bioluminescent *Vibrio fischeri* sharing a *lux*-locus deletion. *Environ. Micro.* 14: 655-668. PMID 21980988.
- Wollenberg, M.S.** and E.G. Ruby. (2012) Phylogeny and fitness of *Vibrio fischeri* from the light organs of *Euprymna scolopes* in two Oahu, Hawaii populations. *ISME J.* 6: 352-362. PMID 21776028.
- Bose, J.L., **Wollenberg, M.S.**, Colton, D.M., Mandel, M.J., Septer, A.N., Dunn, A.K. and E.V Stabb. (2011) Contribution of rapid evolution of the *luxR-luxI* intergenic region to the diverse bioluminescence outputs of *Vibrio fischeri* strains isolated from different environments. *Appl. Environ. Microbiol.* 77: 2445-2457. PMID 21317265.
- Miyashiro, T.M., **Wollenberg M.S.**, Cao X., Oehlert D., and E.G. Ruby. (2010) A single *qrr* gene is necessary and sufficient for LuxO-mediated regulation in *Vibrio fischeri*. *Mol. Micro.* 77: 1556-1567. PMID 20662783.
- Pollack-Berti, A.G., **Wollenberg M.S.**, and E.G. Ruby. (2010) Natural transformation of *Vibrio fischeri* requires *tfoX* and *tfoY*. *Environ. Micro.* 12: 2302-2311. PMID 21966921.
- Wollenberg, M.S.** and E.G. Ruby. (2009) Population structure of *Vibrio fischeri* within the light organs of *Euprymna scolopes* from two Oahu populations. *Appl. Environ. Microbiol.* 75: 193-202. PMID 18997024.
- Mandel, M.J., **Wollenberg M.S.**, Stabb E.V., Visick K.L., and E.G. Ruby. (2009) A single regulatory gene is sufficient to alter symbiosis host range. *Nature*. 458: 215-218. PMID 19182778.
- Wollenberg, M.S.** and S.M. Simon. (2004) Signal sequence cleavage of peptidyl-tRNA prior to release from the ribosome and translocon. *J. Biol. Chem.* 279: 24919-24922. PMID 15082722.

## Selected Lectures/Abstracts/Posters (≤ 3 years old) | \*\* denotes educational research

- Invited Talk: Photorhabdus: who rocks the bodies that rot the body!?!?*  
Wayne State University. Detroit, MI. (Nov. 2016)
- Poster: Bacterial community dynamics in *Galleria mellonella* cadavers killed by *Heterorhabditis/Photorhabdus* are influenced by a bacterially-produced stilbene antibiotic.*  
ASM Conference on Beneficial Microbes. Seattle, WA. (Sept. 2016)
- \*\*Interior co-author for Poster: Development of an inquiry-based approach to investigate strain diversity within the squid-*Vibrio* symbiosis*  
ASM Conference on Beneficial Microbes. Seattle, WA. (Sept. 2016)
- \*\*Interior co-author for Poster: "Unique down to our microbes" Assessment of an inquiry-based metagenomics activity*  
ASM Conference for Undergraduate Educators. Bethesda, MD. (July 2016)
- Invited Talk: "Pick yer nose?!? Sticky *Staphylococcus aureus* interactions are modulated by nasal *Propionibacterium* species."*  
University of Wisconsin, Parkside Biology Dept. Parkside, WI. (Dec 2014)

*Invited Talk: Murder by the Pale Green Light: A blood-curling tale of a bacterial pathogen and its deadly friends.*  
Western Michigan University Biology Dept. Kalamazoo, MI. (Oct 2014)

*Poster: Microbial Community Dynamics During Pathogenesis - Studies with *Galleria mellonella* infected by *Photobacterium/Heterorhabditis*.*  
ASM Conference on Beneficial Microbes. Washington DC. (Sept 2014)

*\*\*\*Invited Talk: Size Matters: Teaching Size and Scale in Microbiology*  
ASM Conference for Undergraduate Educators. Boston, MA. (May 2014)

*Poster: Propionibacterium-produced extracellular porphyrin induces *Staphylococcus aureus* aggregation*  
Gordon Conference. Waterville Valley, NH. (July 2013)

*Invited Talk: Propionibacterium-produced porphyrins induce *Staphylococcus aureus* aggregation*  
Boston Bacterial Meeting. Cambridge, MA. (June 2013)

## FELLOWSHIPS and AWARDS

Amount/Award(s)	Grantor	Name	Date(s)
<i>Participant</i>	HHMI (U. of Minnesota)	<b>National Academies Education Fellowship in the Life Sciences</b>	Summer 2015
<i>Participant</i>	Alpha Lambda Delta (Kalamazoo College)	<b>Favorite Professor Award</b>	Fall 2014, 2015
<b>\$800, \$1,400, \$1,100</b>	Kalamazoo College	<b>Faculty/Student Summer Research Grant</b>	Summer 2014-2016
<b>\$1,800, \$1,800</b>	Kalamazoo College	<b>Professional Development Grant</b>	Fall 2014, 2016
<b>\$34,000 salary</b> <b>\$6,000/yr materials</b>	NIH (Forsyth Institute)	<b>T32 Oral Health Traineeship</b>	2012 and 2013
<b>\$24,000 salary</b> <b>\$3,000/yr materials</b>	NIH (UW Dept. MMI)	<b>T32 Microbes in Health and Disease Traineeship</b>	Spring 2010-2011
<i>Participant</i>	HHMI (UW-Madison Dept. Bacteriol.)	<b>HHMI Teaching Fellowship</b>	Fall 2009-2010
<b>\$1,500</b>	UW-Madison	<b>Vilas Research Travel Grant</b>	Summer 2010
<b>\$5,000 stipend</b> <b>\$2,500 living/travel to NZ</b>	NSF	<b>East Asia and Pacific Summer Institute Fellowship</b>	Summer 2008
<b>\$1,000</b>	International Society for Microbial Ecology	<b>Travel Award to ISME 2008</b>	Summer 2008
<b>\$30,000/yr fellowship</b>	NSF	<b>Graduate Research Fellowship</b>	Summer 2005-2008
<b>\$22,000 salary</b> <b>\$1500/yr travel+materials</b>	NIH	<b>Molecular Biosciences Traineeship</b>	Summer 2004-2005, Summer 2008-2010

### Recent, Unfunded Scientific Grants

Amount Requested	Grantor / Section	Details	Date Applied
NA	NSF / IOS	<b>Collaborative Grant with T. Miyashiro (Penn. State University); pre-proposal declined.</b>	Winter 2016
<b>\$772,341 over five years</b>	NSF / DEB Dimensions of Biodiversity	<b>Collaborative Grant with T. Miyashiro (Penn. State University); pre-proposal accepted, full grant declined.</b>	Winter 2015
<b>\$35,000 over two years</b>	Research Corp.	<b>Cottrell College Science Award for Chemistry/Biochemistry Research; full grant declined</b>	Fall 2013

## PROFESSIONAL ACTIVITIES

### Workshops, Courses, and Retreats

<i>Think Tank, Science and Social Justice Leadership @ Kalamazoo College, MI</i>	(April 2016)
<i>Retreat, Posse Plus Retreat @ Kalamazoo College, MI</i>	(Feb 2016)
<i>Workshop, National Academies/HHMI Summer Institute @ University of Minnesota, Minneapolis, MN</i>	(June 2015)
<i>Course, Applied Biostatistics @ Harvard University Catalyst, Cambridge, MA</i>	(May 2013)
<i>Workshop, Science Case Network @ ASM Conference for Undergraduate Educators, Denver, CO</i>	(May 2013)
<i>Course, Hopkins Microbial Diversity Summer Course @ Stanford University, CA</i>	(Summer 2007)

### Field Work and Research Abroad

<i>Visiting Scientist, Hawaiian Institute of Marine Biology, University of Hawaii, Oahu</i>	(August 2010)
<i>Visiting Fellow, Institute for Advanced Study, Massey University, New Zealand</i>	(Summer 2008)

### Society Memberships

<i>American Society of Microbiology</i>	(2004-Present)
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### Invited ad hoc Journal Reviews

<i>Environmental Microbiology</i>	(2012-Present)
<i>FEMS Microbiology Ecology</i>	

## COMPUTATIONAL EXPERIENCE

### HARDWARE

- Use of Arduino and Raspberry Pi microcontroller/minicomputer platforms, as well as associated shields/hardware
- Familiar with low-level, simple electrical engineering (e.g. simple circuit prototyping/assembly via breadboards and soldering)
- Two, different desktop computer builds from component parts in the last five years
- Home server build and networking/software configuration for encrypted access at work/home in 2014

### OPERATING SYSTEMS and LANGUAGES

- Mac OS, Windows, Linux (Ubuntu)
- Perl (including BioPerl), Python (including Biopython), Java, C and C++, HTML

### SOFTWARE

- *Next-Generation Sequence Analysis:* FastQC, QIIME, mothur
- *Genome Assembly:* SPADES, Velvet, Mauve, RAST
- *Molecular Biology:* PlasmaDNA, Geneious, BLAST, Clustal, MEGA, DNASTAR/Lasergene package
- *Phylogenetics:* PAUP\*, MrBayes, PHYLIP package, RAxML, SplitsTree, FigTree, 4peaks, FinchTV
- *Teaching:* Moodle, Evernote, TurningPoint (clicker software)
- *Statistics:* MatLab, R (including GUIs like RStudio and Shiny), Stata
- *Image Processing:* Adobe Photoshop, GIMP, Inkscape

## KALAMAZOO COLLEGE COURSE DESCRIPTIONS

COURSE	# STUDENTS / TERM	TERMS TAUGHT
<b>Biol 112 Evolution and Genetics with lab</b>	~ 100 Fall ~ 50 Winter	Winter 2014, 2015 Fall 2014, 2015, 2016
<ul style="list-style-type: none"> <li>• <i>Mandatory, first biology class in the Biology core at Kalamazoo College. One of the largest classes on campus.</i></li> <li>• <i>Taught solo in Winter 2015; co-taught with Dr. Jim Langeland in other quarters.</i></li> <li>• <i>Developed three separate labs for this course on topics of human population genetics, Lederberg replica plating, and evolution of antibiotic resistance. Wrote a section of the lab manual on the Student's t-test.</i></li> <li>• <i>Edited and digitized the 150 page lab manual into .docx and .pdf formats;</i></li> <li>• <i>Developed active-learning activities and new lectures for all topics covered by the course.</i></li> </ul>		

COURSE	# STUDENTS / TERM	TERMS TAUGHT
<b>Biol 295 Computational Tools for Biologists with lab</b>	~ 10	Winter 2016
<ul style="list-style-type: none"> <li>• <i>Conception, development, and teaching of this new course within the Kalamazoo College curriculum.</i></li> <li>• <i>Course emphasizes building a cross-platform/OS computer-based skillset with command-line activities (e.g. bash) and script-based languages (e.g. Python; Arduino's version of C++, MySQL) via real-world datasets (e.g. Kalamazoo College Arboretum weather station data; next-generation sequencing data).</i></li> <li>• <i>Lab challenges small groups to build a micro controller-based, biological data collection project using the Arduino platform.</i></li> </ul>		
<b>Biol 322 General and Medical Microbiology with lab</b>	~ 20	Spring 2014, 2015, 2016
<ul style="list-style-type: none"> <li>• <i>Design, development, and solo teaching of this course since arrival on campus.</i></li> <li>• <i>Course emphasizes the process of scientific knowledge creation through a cycle of observation, hypothesis-generation, experimental design, data collection, and hypothesis-testing via both lecture activities and laboratory experimentation.</i></li> <li>• <i>Integrates my own primary research system (entomopathogenic nematodes/bacteria) into an inquiry-based laboratory module about experimental design and hypothesis testing with Koch's Postulates.</i></li> <li>• <i>In 2016, introduced a next-generation 16S data analysis module in collaboration with teachers/researchers at North Carolina State University (see Lentz et al. poster above).</i></li> </ul>		
<b>Biol 488 Topics in Biology: Symbiosis</b>	~ 10	Winter 2014
<ul style="list-style-type: none"> <li>• <i>Co-design, development, and teaching of this new course within the Kalamazoo College curriculum.</i></li> <li>• <i>Course is an upper-level literature review of mainly eukaryote-bacterial symbiosis topics using Dr. A. Douglas's book "The Symbiotic Habit" as a textual reference.</i></li> <li>• <i>Students prepare oral presentations and a Nature "News and Views" style written piece.</i></li> </ul>		

## KALAMAZOO COLLEGE ACTIVITIES

### SENIOR INDIVIDUALIZED PROJECTS (SIPs)

**Faculty Reviewer for Biology Oral and Poster SIPs** (2014-Present)  
*Yearly review of all senior biology majors' SIP oral and poster presentations (typically 40-60 individual SIPs) during an annual spring departmental conference; collaborative grading of these presentations during department meetings.*

**Moderator for SIP Peer Review Groups** (2015-Present)  
*Yearly moderator and organizer of a peer-review group that includes 6-8 senior biology majors and their associated biology SIPs. This group reads all participants' biology SIPs, discusses these SIPs, and suggests improvements for these SIPs. As the moderator, I not only organize and schedule the group's meetings, but also edit and critique all the SIP drafts of all biology SIPs from students in the group and meet with all students at least once one-on-one over the course of the peer-review process.*

**Research Mentor for Biology SIP Research** (Feb. 2016-Present)  
*Advisor for one biology junior who completed his SIP in my research lab during the summer of 2016. Conception and implementation of Senior thesis molecular biology project in my lab. Basic instruction on scientific process and scientific writing with more specialized instruction on cloning, gene expression technologies, small regulatory RNAs, prokaryotic genomics, and molecular biology.*

### ADVISING

**Academic Advisor** (Winter 2014-Present)  
*Meet with, advise, and mentor ~15-20 students each trimester. Facilitate communication between these students and their programs of interest, college administrators, and faculty. Attend administrative advising lunches/meetings in order to learn about advising and become a better-informed advisor.*

### STANDING COMMITTEES

**Faculty Development Committee** (Fall 2014-Present)  
*Interim chair for sabbatical applications in Fall 2015.*

**Socially Responsible Investment Advisory Committee** (Fall 2015-Present)  
*Sole faculty representative; volunteered for the position and appointed by the Provost.*

## AD-HOC COMMITTEES

Chemistry and Biology Office Manager Search Committee Member	(Summer 2015)
Biology Tenure-Track Faculty Search Committee Member	(Fall 2014)
Chemistry and Biology Office Manager Search Committee Member	(Fall 2014)
Biology Department Stockroom Manager Search Committee Member	(Spring 2014)
Biology Visiting Instructor Search Committee Member	(Spring 2014)

## OTHER BIOLOGY DEPARTMENT SERVICE

Biology class of 2018 "Shepherd" (*responsible for communicating with the class as a whole as they move through the declaration of major, junior year study-abroad and SIP research, and SIP presentation/senior thesis process.*)(Winter 2016-Present)

Contributor to Sherman-Fairchild grant reports (*an institutional grant at K College*) (Winter 2014-Present)

Represent Biology department at fall department fair

Develop departmental core curriculum

Participate in annual department assessment, SIP awards, and general biology major awards

Maintain microbial stocks for teaching labs

Clean out, move, and organize laboratory equipment left in my to-be research lab upon arrival at K (Winter 2014)

## **HOBBIES...**

### LONG-DISTANCE BACKPACKING

- Solo thru-hike of the 2100 mile-long Appalachian Trail in 2000
- Co-leader and co-organizer of outdoor orientation program at Swarthmore College in fall of 2001 (50 mile hike with 20 incoming first-years along the Appalachian Trail)
- Solo hike of ~300 miles of the Continental Divide Trail in Colorado in 2004
- Partner thru-hike of the California portion of the Pacific Crest Trail (~1500 miles) in 2011
- Partner hike of ~250 miles of the Washington Pacific Crest Trail in 2013 and 2016

### FERMENTATION

- (Home)Brewing experience (don't ask about the exploding Rockefeller stout : )...)
- I love to experiment with recipes from Sandor Katz's *The Art of Fermentation*

### MUSIC

- Practiced and played clarinet and guitar for over 20 years, both solo and in different ensembles