

Curriculum Vitae

JOSEPH S. WIRTH

(309) 370-7602 ◇ 329 Dearing St. Apt. 34D
jwirth8@uga.edu ◇ Athens, Georgia

EDUCATION

2013-present Doctoral Candidate

*Department of Microbiology
University of Georgia
GPA: 4.00*

2012 B.S., Molecular and Cellular Biology

*University of Illinois at Urbana-Champaign, Champaign, Illinois
GPA: 3.05*

2011-2012 Scholarship Chair

Alpha Kappa Lambda Fraternity

University of Illinois at Urbana-Champaign, Champaign, Illinois

Redefined the position's role and developed new practices to increase accountability among members in an attempt to improve the fraternity's grades. Hosted workshops put on by the career center, and coordinated with alumni to create a professional speaker series. Outlined a monetary scholarship for qualifying members of the fraternity. These efforts helped earn the fraternity an award for most improved grades within the campus-wide, Greek community.

2008-2009 Chancellor's Literary Society

Southern Illinois University, Edwardsville, Illinois

PROFESSIONAL DEVELOPMENT

2015-present Graduate Research Assistant

*William B. Whitman Laboratory
University of Georgia, Athens, Georgia*

2013-2015 Graduate Research Assistant

*Jorge C. Escalante-Semerena Laboratory
University of Georgia, Athens, Georgia*

Investigated the anaerobic biosynthesis of 5,6-dimethylbenzimidazole (DMB), the lower, axial ligand of coenzyme B₁₂, in the model organisms *Salmonella enterica* serovar Typhimurium LT2, *Geobacter lovleyi* SZ, and *Rhodobacter sphaeroides* 2.4.1. Identified a putative gene involved in cytokinin production that likely plays a role in the regulation of anaerobic DMB activation in *S. enterica*. Used genetic approaches such as phage transduction, transposon mutagenesis, site-specific mutagenesis, and "Wanner" gene deletions. Purified various proteins and assayed enzymatic activity *in vitro*. Sequenced whole genomes and used bioinformatics to aid in gene identification.

2015 "Crafting a Cover Letter to be Read and Considered"

Dr. Gary Green

*Graduate Student and Post-Doc Professional Development Series
University of Georgia, Athens, Georgia*

- 2013** **Poster Presentation**
Institute for Genomic Biology: Fellows Symposium
University of Illinois at Urbana-Champaign, Urbana, Illinois
Designed and presented an original poster depicting research on “CRISPR Diversity within a *Methanosarcina mazei* Population.” The work was partially funded by the Department of Energy’s Genomes to Life program. Research was performed in the Rachel J. Whitaker Laboratory.
- 2012-2013** **Undergraduate Researcher**
Rachel J. Whitaker Laboratory
University of Illinois at Urbana-Champaign, Urbana, Illinois
Cultured *Methanosarcina* isolates from the Columbia River estuary using anaerobic techniques. Developed a purification protocol for disaggregatase with help from the William Metcalf group. Extracted DNA from the environmental isolates, and used PCR and gel electrophoresis to screen the DNA for specific genes. Prepared the DNA samples for HiSeq library sequencing using Nextera-XT and Nextera-V2 kits. Used software like MacClade, Sequencher, Mauve, Velvet, Artemis, and CLCGenomics to analyze the draft genomes of *Methanosarcina* isolates. Measured methane produced with gas chromatography to determine the growth rates of environmental isolates (Youngblut, et al. 2015). Used bash scripting, perl scripting, R scripting, and the command line to help investigate the CRISPRs present. Characterized the CRISPR-Cas systems, and identified two novel CRISPR variants. Identified a novel, putative provirus in a *Methanosarcina* isolate (Wirth, et al. In Prep).
- 2011-2012** **Undergraduate Research Assistant**
Robert B. Gennis Laboratory
University of Illinois at Urbana-Champaign, Urbana, Illinois
Created plasmids for over-expression of recombinant proteins in *E. coli*, specifically archaeal, cNOR-related cupredoxins. Purified cupredoxins from the periplasm of transformants using an osmotic shock solution.

PEDOGOGICAL DEVELOPMENT

- 2016** **Laboratory Assistant**
Microbiology and Healthcare
University of Georgia, Athens, Georgia
Prepared and delivered 25min lectures each week. Collaborated with the other instructors to create quizzes, practice problems, and test questions. Designed a new activity for the class, and implemented an IRB-approved research project to assess the effectiveness this activity.
- 2016** **Teaching-As-Research Course**
Dr. Nicholas Gross (Boston University) & Dr. Bhavna Sharma (Iowa State University)
Center for the Integration of Research, Teaching, and Learning (CIRTL)
Learned about various aspects of “Teaching as Research” including developing a research question, identifying the appropriate instruments to test a question, obtaining IRB approval, and finding appropriate sources in education research. Developed a research proposal, and received valuable insight from peers around the world. Helped review and critique other students’ research proposals.
- 2015** **Teaching Assistant**
Introduction to Microbiology
University of Georgia, Athens, Georgia
Prepared and delivered a fifty minute lecture on anaerobic metabolism and phototrophy. Designed a group activity for the class. Helped the instructor find and use Plicker, a free response system analogous to “clickers.” Helped create, apply, and grade course material.

- 2015** **Course Design (GRSC 7900)**
Dr. Paul Quick
University of Georgia, Athens, Georgia
Designed a microbiology course by applying the integrated approach to course design outlined in L. Dee Fink's "Creating Significant Learning Experiences."
- 2015** **"Improving Your Teaching with Improv: Theatre Techniques to Enhance Teaching"**
Wyatt Geist and Seth Wilson
Graduate Teaching Assistant, Laboratory Assistant and Post-Doc Pedagogy Series
University of Georgia, Athens, Georgia
- 2015** **"What a TA can do—Responding to Signs of Depression and Anxiety Among your Students"**
Kathryn Bryan
Graduate Teaching Assistant, Laboratory Assistant and Post-Doc Pedagogy Series
University of Georgia, Athens, Georgia
- 2015** **College Teaching and Student Learning (GRSC 7800)**
Denise Domizi
University of Georgia, Athens, Georgia
Practiced applying various forms of active learning. Observed multiple, undergraduate biology classes at the University of Georgia in order to better understand how the concepts in class applied to undergraduate education in the field of microbiology. Presented on active versus passive reading, and strategies that can be employed to increase active reading in undergraduate students.

OUTREACH

- 2016-present** **REU mentor**
- 2013-2015** **Volunteer Sample Collector**
Upper Oconee Watershed Network
River Rendezvous Sampling Events, Athens, Georgia
Volunteered four times each year in order to help Upper Oconee Watershed Network gather data on the "health" of the watershed. Collected water samples and helped process samples for Dr. Elizabeth Ottesen.
- 2014** **Adult Sponsor**
Georgia Science and Engineering Fair
University of Georgia, Athens, Georgia
Sponsored an eighth grade student's science fair project. Helped her design a hypothesis, design an experiment to test the hypothesis, implement the experiment, and analyze the resulting data.
- 2013** **Mentor**
Rachel J. Whitaker Laboratory
University of Illinois at Urbana-Champaign, Urbana, Illinois
Mentored an undergraduate research assistant during her time in the Whitaker lab. Taught her how to perform various laboratory techniques including gas chromatography, anaerobic culturing methods, and basic bioinformatics.

PUBLICATIONS

- 2015** Youngblut, N.D., **Wirth, J.S.**, Henriksen, J.R., Smith, M.W., Simon, H.M., Metcalf, W.W., Whitaker, R.J.
Genomic and phenotypic differentiation among *Methanosarcina mazei* populations from Columbia River sediment. *The ISME Journal*.

In prep **Wirth, J.S.**, Youngblut, N.D., Metcalf, W.W., Whitaker, R.J. Diverse and prevalent *Methanosarcina* CRISPR-Cas systems reveal the importance of host-virus interactions for the genus.

REFERENCES

Dr. William “Barny” Whitman

University of Georgia

Professor, Department of Microbiology

whitman@uga.edu

(706) 542-4219

Dr. Janet Westpheling

University of Georgia

Professor, Department of Genetics

janwest@uga.edu

(706) 542-1436

Dr. Rachel Whitaker

University of Illinois at Urbana-Champaign

Professor, Department of Microbiology

rwhitaker@life.illinois.edu

(217) 244-1493

Dr. William Metcalf

University of Illinois at Urbana-Champaign

Professor, Department of Microbiology

metcalf@life.illinois.edu

(217) 244-8420

Dr. Nicholas Youngblut

Cornell University

Postdoctoral Associate, Department of Crop and Soil Sciences

nyoungblut@cornell.edu

(815) 821-3911

Dr. James Hemp

California Institute of Technology

Postdoctoral Scholar

jim.hemp@gmail.com

(801) 907-1806