

# Kimberly Ann Murphy

Department of Biology, Augustana College, 639 38<sup>th</sup> Street, Rock Island, IL 61201.  
(W) 309-794-3444; (H) 641-210-0439; [kimberlymurphy@augustana.edu](mailto:kimberlymurphy@augustana.edu)

## **EDUCATION**

- 2011 – present    Assistant Professor, Augustana College Department of Biology, Rock Island, IL
- 2009 – 2011      Visiting Assistant Professor, Gustavus Adolphus College Department of Biology, St. Peter, MN
- 2007 – 2009      Assistant Professor, Waldorf College Department of Biology, Forest City, IA
- 2005 - 2007      Postdoctoral Fellow, Syracuse University Department of Biology, Syracuse, NY  
Principal Investigators, Anthony Garza and Roy Welch
- 1998 - 2004      Ph.D. (Genetics and Cell Biology), Washington State University School of Molecular Biosciences,  
Pullman, WA, Principal Investigator, Howard Grimes
- 1995 - 1998      B.S. (Cell and Molecular Biology), Winona State University, Winona, MN
- 1994 - 1995      St. Mary's University of Minnesota, Winona, MN

## **TEACHING EXPERIENCE**

Augustana College. 2011-present. Assistant Professor of Biology.

BIOL150 Becoming Biologists  
BIOL210 Cell Biology Lecture and Laboratory  
BIOL370 Genetics Lecture and Laboratory  
BIOL464 Senior Inquiry (Microbes in Action)

Gustavus Adolphus College, Biology Department. 2009-2011. Visiting Assistant Professor of Biology.

Bio 100 Biology Explorations  
Bio 102 Organismal Biology  
Bio 128 Introduction to Biomolecular Research  
Bio 201 Cell and Molecular Biology  
Bio 328 Developmental Biology  
Bio 392 Biology Research (Genetics, Molecular Biology, and Microbiology)  
Che 255 Biochemistry

Waldorf College, Biology Department. 2007-2009. Assistant Professor of Biology.

Bio 100 Orientation to the Biological Sciences  
Bio 120 General Biology  
Bio 330 Biochemistry  
Bio 332 Genetics  
Bio 352 Vertebrate Physiology  
Bio 440 Cell and Molecular Biology  
Bio 442 Developmental Biology

Syracuse University, Biology Department. 2005-2007. Postdoctoral Fellow.

Bio 575 Biochemistry I  
Bio 782 Graduate Seminar

Washington State University, Biology Department. 1998-2004. Graduate Teaching Assistant.  
Biol 106/107 Introductory Biology  
MBios 303 Introductory Biochemistry

**PUBLICATIONS** \* denotes an undergraduate student

**Murphy, K. A.**, and Garza, A. G. (In Preparation for Journal of Bacteriology) Regulation of the *Myxococcus xanthus* motility and developmental promoters by the NtrC-like regulator protein Nla28.

Bradley, M., Comstock, D.\*, Welch, R.D., and **Murphy, K.A.** (In Preparation) A high-throughput investigation of the one-component regulators in *Myxococcus xanthus*.

Stevens, D. C., Henry, M. R.\*, **Murphy, K. A.**, and Boddy, C. N. 2010. Heterologous Expression of the Oxytetracycline Biosynthetic Pathway in *Myxococcus xanthus*. Applied and Environmental Microbiology **76**:2681-3.

Viswanathan, P., **Murphy, K.**, Julien, B., Garza, A. G., and Kroos, L. 2007. Regulation of *dev*, an operon that includes genes essential for *Myxococcus xanthus* development and CRISPR-associated genes and repeats. Journal of Bacteriology **189**:3738-50.

**Murphy, K. A.**, and Garza, A. G. 2007. Genetic Tools for Studying *Myxococcus xanthus* Biology. In: *Myxobacteria Multicellularity and Differentiation* (D. E. Whitworth, editor), American Society for Microbiology Press, Washington, D.C., pp. 491-502.

**Murphy, K. A.**, Kuhle, R. A., Fischer, A. M., Anterola, A. M., and Grimes, H. D. 2005. The functional status of paraveinal mesophyll vacuoles changes in response to altered metabolic conditions in soybean leaves. Functional Plant Biology **32**:335-344.

**RESEARCH GRANTS SUBMITTED**

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|------|--|
| 2013 | National Science Foundation Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics-Type 2 Project. Co-Principle Investigator. Collaborative Research: Authentic discovery based research in college sciences curricula: Assessing the impacts on students and faculty. |
| 2013 | Faculty Research Fund. Augustana College. Measuring the Effects of Restored Wet Prairies on Amphibian Populations  |

**RESEARCH GRANTS FUNDED**

- |      |  |
|------|--|
| 2012 | National Science Foundation Research Opportunity Award with Roy D. Welch, Syracuse University. <i>M. xanthus</i> as a model organism for undergraduate education at RUI institutions |
| 2012 | New Faculty Research Grant. Augustana College. Characterizing Genes Predicted to be involved in <i>Myxococcus xanthus</i> Motility and Fruiting Body Formation                       |
| 2012 | Augustana Research Foundation 2012-2013 Student Research Assistantship. Investigating one-component regulators in <i>Myxococcus xanthus</i>  |
| 2012 | Faculty Research Fund. Augustana College. Measuring the Effects of Restored Wet Prairies on Amphibian Populations  |

- 2011 New Faculty Research Grant. Augustana College. Identification and Characterization of Genes Involved in *Myxococcus xanthus* Motility and Fruiting Body Formation
- 2010 National Science Foundation Research Opportunity Award with Roy D. Welch, Syracuse University.  
Research objective: To create insertion/disruption mutant strains of *M. xanthus* in genes currently annotated as 'hypothetical' and to establish a network of undergraduate colleges working together on *M. xanthus* as a genetic model system  
 - Supervised one Gustavus undergraduate and three Syracuse University undergraduates
- 2010 Research, Scholarship and Creativity Grant. Gustavus Adolphus College. Characterization of Genes Required for *Myxococcus xanthus* Fruiting Body Formation
- 2010 Sigma Xi Research Grant. Gustavus Adolphus College. Expanding genome annotation to functional genomics work in *Cellulomonas flavigena*
- 2008 Amphibian Research Monitoring Initiative (ARMI): Co-PI  
 Amphibians on a Changing Landscape: Measuring the Effects of Restored Wet Prairies on Amphibian Populations Inhabiting Agricultural Landscapes
- 2008 Department of Energy Joint Genome Institute: PI  
 Undergraduate Research in Microbial Genome Annotation

## **RESEARCH**

- 2009 - present A high-throughput investigation of the one-component regulators in *Myxococcus xanthus*.
- 2009 - present Identification and Characterization of Genes Involved in *Myxococcus xanthus* Motility and Fruiting Body Formation.
- 2008 - present Measuring the effects of restored wet prairies on amphibian populations inhabiting agricultural landscapes.
- 2008 - present U.S. Department of Energy Joint Genome Institute Undergraduate Research in Microbial Genome Annotation.
- 2005 - 2009 Waldorf College and Syracuse University, Departments of Biology  
 The application of phylogenomics to targeted large-scale mutagenesis as a means of expanding the functional annotation of multicellular prokaryotic genomes: *Myxococcus xanthus* and *Pseudomonas aeruginosa*.
- 1998 - 2004 Graduate Student, Washington State University, School of Molecular Biosciences  
 Utilization of multidisciplinary approaches in molecular biology, biochemistry, and laser microdissection (microscopy) to study the dynamics of the soybean paraveinal mesophyll cell layer.
- 1995 - 1998 Undergraduate Student, Winona State University, Department of Biology  
 Detecting variation within the sunflower species *Helianthus annuus*.

## UNDERGRADUATE STUDENT RESEARCH

### Augustana College

Mark Farrell ('13), Tommy Harris ('13), Abigail Jones ('14), and Kerri McGrail ('15). Characterizing Genes Predicted to be involved in *Myxococcus xanthus* Motility and Fruiting Body Formation. Mark, Abigail and Kerri are Biology majors. Tommy is a Pre-Medicine major.

Zachary Kozelichki ('13). Measuring the Effects of Restored Wet Prairies on Amphibian Populations. Zach is a Biology major.

### Gustavus Adolphus College

Dawn Comstock ('13). An investigation of one-component regulators in *Myxococcus xanthus*. Presented at Gustavus Adolphus Fall Student Research Symposium on Summer Research, St. Peter, MN, September 2010. Dawn is a Biology major.

Dawn Comstock ('13), James Ebeling ('11), Laura Leland ('13), Kristen Liu ('13), Ryan Schmidtman ('13), and Jamison Utzig ('13). Characterization of *Myxococcus xanthus* Genes and Annotation of *Cellulomonas flavigena* Genes as Part of a Biomolecular Research Course. Presented at St. Mary's University of Minnesota Undergraduate Research Symposium, Winona, MN, April 2010.

James completed a BS in Biology. He is applying to dental school. Dawn, Laura, Kristen, Ryan, and Jamison are Biology majors.

Abigail Steele ('11) and Stephanie Hardel ('11). A study of the dispersal patterns of Northern leopard frogs (*Rana pipiens*) and American toads (*Bufo americanus*) among 20 restored wet prairies distributed across an agricultural landscape in north central Iowa.

Abigail completed a BS in Biology. She is pursuing a Pharm. D. at University of Minnesota Duluth. Stephanie completed a BS in Biology and a minor in Neuroscience.

Stephanie Hardel ('11). Understanding *Cellulomonas flavigena* through Genome Annotation and Functional Genomic Studies. Presented at Gustavus Adolphus Sigma Xi Symposium, St. Peter, MN, April 2010.

Kelly Broady ('11). How Much do Science and Law Inform Reproductive Choice?

Kelly completed a BS in Biology. She is applying to genetic counseling programs.

### Waldorf College

Amanda Burow ('09) and Amy Geffre. A study of the dispersal patterns of Northern leopard frogs (*Rana pipiens*) and American toads (*Bufo americanus*) among 20 restored wet prairies distributed across an agricultural landscape in north central Iowa. Presented at the Iowa Academy of Science Annual Meeting, Des Moines, IA, April 2009.

Amanda is pursuing a DVM at Iowa State University. Amy is attending Iowa State University.

Emily Hedum ('09). Antibiotic resistance in bacteria.

Emily is pursuing a DO at Kansas City University of Medicine and Biosciences.

Carrie Wubben. Identifying and characterizing genes involved in *Myxococcus xanthus* fruiting body formation to understand the formation of biofilms. Presented at the 51<sup>st</sup> Annual State Science & Technology Fair of Iowa, Ames, IA, March 2008; Iowa Academy of Science Annual Meeting, Cedar Rapids, IA, April 2008; Intel International Science and Engineering Fair, Atlanta, GA, May 2008.

Carrie completed her high school science fair project in my lab and won the 51<sup>st</sup> Annual State Science & Technology Fair of Iowa. She is pursuing a BS in Biology at Simpson College.

## Syracuse University

Michael Henry. Heterologous Expression of the Oxytetracycline Biosynthetic Pathway in *Myxococcus xanthus*.

Michael completed a BS at Syracuse University. He accepted a full-time research position in a laboratory at SUNY upstate medical school based on his experience in the laboratory.

William Murtaugh and Sijung Suh. Application of phylogenomics to identify genes involved in *Myxococcus xanthus* fruiting body formation.

William completed a BS in Biology. Sijung completed a BS in Biology.

## PRESENTATIONS AND ABSTRACTS

May, B. and **Murphy, K.** Integrating Genomics Research into the Classroom: a viable option for student learning and enhancing research experiences. Presented at Seventeenth Annual American Society for Microbiology Conference for Undergraduate Educators, San Diego, CA, May 2010.

**K. A. Murphy.** Using *Myxococcus xanthus* to Study the Formation of Bacterial Biofilms. Invited Presentation at Winona State University, Winona, MN, November 2007.

**Murphy, K. A.,** and Welch, R. D. Application of Phylogenomics to Genetic Systems Involved in Biofilm Formation in *Myxococcus xanthus* and *Pseudomonas aeruginosa*. Presented at Central New York MedTech 2<sup>nd</sup> Annual Biosciences Conference, Syracuse, NY, September 2006.

**Murphy, K. A.,** and Welch, R. D. Identification of Conserved Genetic Elements Required for Biofilm Formation. Presented at Syracuse University Biomedical Research Symposium, Syracuse, NY, August 2006.

**Murphy, K. A.,** Welch, R. D., and Garza, A. G. Application of Phylogenomics to Identify Genes Involved in Fruiting Body Formation. Presented at The 33<sup>rd</sup> International Conference on the Biology of Myxobacteria, Thompsonville, MI, July 2006.

**Murphy, K. A.,** and Welch, R. D. Application of Phylogenomics to Disrupt Biofilms: *Myxococcus xanthus* as a Model Organism. Presented as a poster at the College of Arts and Sciences at Syracuse University Day of Discovery Research Showcase, Syracuse, NY, April 2006.

**Murphy, K. A.,** Welch, R. D., and Garza, A. G. Identification of New Genes Required for Motility and Fruiting Body Formation in *Myxococcus xanthus*. Presented at The 32<sup>nd</sup> International Conference on the Biology of Myxobacteria, Harrison Hot Springs, BC, July 2005.

**Murphy, K. A.,** Srinivasan, B. S., Caberoy, N. B., Suen, G., Taylor, R. G., Shah, R., Goldman, B. S., Welch, R. D., and Garza, A. G. Using Phylogenomic Analysis to Identify New Genes that are Required for Motility and Fruiting Body Formation in *Myxococcus xanthus*. Presented as a poster at the 2<sup>nd</sup> American Society for Microbiology Conference on Prokaryotic Development, Vancouver, BC, July 2005.

Elmer, A., **Murphy, K. A.,** Chao, W. C., and Grimes, H. D. The cytosolic loop of a soybean sucrose transporter interacts with proteins containing ankyrin repeats. Presented as a poster at the 2000 Annual Meeting of the American Society of Plant Physiologists, San Diego, CA, July 2000.

## HONORS AND AWARDS

2012	Elected as President of John Deere Chapter of Sigma Xi for 2013-14
2011	Inducted into Sigma Xi at Augustana College
2009	Waldorf College: Awarded Holmen Professional Excellence Award
2009	ASM Bioinformatics Institute: Selected Participant
2009	Waldorf College Title III Office: Awarded Competitive Faculty Development Grant

2008 ASMCUE Conference: Awarded Early-Career Faculty Travel Grant  
2008 NSF STEM Workshop: Awarded Equipment Grant  
2008 Waldorf College Title III Office: Awarded Competitive Faculty Development Grant  
2006 Syracuse University Biomedical Research Symposium: Best Research Presentation  
2001 Washington State University Biosciences Graduate Student Association: Elected President  
1999 Washington State University School of Molecular Biosciences: Awarded Competitive Travel Grant  
1999 Washington State Univ. Graduate Student Assoc.: Awarded Competitive Conference Registration Grant  
1998 Winona State University Department of Biology: Honors Graduate  
1997 Winona State University Department of Biology: Dr. Martin & Joyce Laakso Scholarship

## **SERVICE**

### Augustana College

Member of Assessment for Improvement Committee  
Member of Enrollment Committee  
Director of 3:4 Veterinary Medicine Coordinated Degree Program  
Biology Club Faculty Advisor  
Faculty Advisor for Internships in Biology Department  
Faculty Advisor for Nicaragua JETS Medical Service-Learning Program  
Member of IRIS Information Literacy Committee  
Member of Biology Learning ePortfolio Committee  
Member of Zoology Search Committee  
Member of three-year visiting Genetics and Developmental Biology Search Committee  
State Science and Technology Fair of Iowa Board Member (Senior High Judging Chair)  
Volunteer for Biology Department Alumni Weekend and Future Student Open House

### Gustavus Adolphus College

Faculty Advisor for undergraduate research projects  
Faculty Facilitator for orientation and participation in the Common Reading Project  
Interviewer for Scholarship Days  
Member of HHMI Peer Mentor Selection Committee  
Member of HHMI Exceptional Research Opportunities Program (EXROP) Committee  
Volunteer for a variety of service projects

### Other

Faculty Advisor for undergraduate research projects and Biology Club at Waldorf College and Syracuse University  
Volunteer Grand Awards judge at the 2008 Intel International Science and Engineering Fair in Atlanta, Georgia  
Habitat for Humanity Volunteer  
Member of Higher Learning Commission Mission and Integrity Criterion Team at Waldorf College  
Member of Core Curriculum Committee at Waldorf College  
Review Books for American Society for Microbiology *Focus on Microbiology Education* Newsmagazine

## **PROFESSIONAL AFFILIATIONS**

American Society for Microbiology  
Sigma Xi Scientific Research Society  
State Science and Technology Fair of Iowa  
Society For Science & The Public