

# Kimberly Ann Murphy

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## **PROFESSIONAL POSITIONS**

2018 – present Co-director, Kinesiology Program, Augustana College, Rock Island, IL  
2017 – present Chair, Department of Biology, Augustana College, Rock Island, IL  
2016 – present Associate Professor, Augustana College, Department of Biology, Rock Island, IL  
2015 – 2017 Co-director of the Center for Faculty Enrichment, Augustana College, Rock Island, IL  
2015 – 2017 Director of Departmental Advising, Augustana College, Rock Island, IL  
2011 – 2016 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 Graduate Teaching Assistant, Washington State University, Department of Biology, Pullman, WA

## **EDUCATION**

1998 - 2004 Ph.D. (Genetics and Cell Biology), Washington State University, School of Molecular Biosciences, Pullman, WA  
*Dissertation: Biochemical dynamics of soybean paraveinal mesophyll cell vacuoles and identification of cysteine proteases associated with these dynamics*, 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

- BIOL 101 Biological Principles and Laboratory
- BIOL 1530 Molecules to Cells
- BIOL 150 Becoming Biologists
- BIOL 210 Cell Biology Lecture and Laboratory
- BIOL 370 Genetics Lecture and Laboratory
- BIOL 464 Senior Inquiry (Exploring the Human Microbiome)
- BIOL INTR-KM Biology Internship
- ISS340 International Service Learning
- ISS341 Healthcare Service in Central America

### Gustavus Adolphus College

- 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

- 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

- Bio 575 Biochemistry I
- Bio 782 Graduate Seminar

#### Washington State University

- Biol 106/107 Introductory Biology
- MBios 303 Introductory Biochemistry

### **EXTERNAL GRANTS FUNDED**

- 2017 National Science Foundation Research Coordination Networks in Undergraduate Biology Education (RCN-UBE)  
A New Faculty Development Approach to Expand Authentic Course-based Research Opportunities Focused on Microbial Bioinformatics and Functional Genomics.
- 2014 Sigma Xi Science, Math and Engineering Grant “Establish a STEM Research Community”.  
Objective: Harness the energy and expertise of a network of schools with research programs (Augustana College, Black Hawk College and St. Ambrose University to provide student research presentation opportunities and opportunities for students, faculty and the public to come together to discuss and further their understanding of science.
- 2013 National Science Foundation Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics-Type 2 Project (TUES). Co-Principle Investigators: Bradley W. Goodner, David M. Rhoads and Derek W. Woods.  
Collaborative Research: Authentic Project-based Research in College Sciences  
Curricula: Assessing the Impacts on Students and Faculty.
- 2012 National Science Foundation Research Opportunity Award with Roy D. Welch, Syracuse University.  
*M. xanthus* as a model organism for undergraduate education at RUI institutions.
- 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.
- 2008 Amphibian Research Monitoring Initiative (ARMI). Co-Principal Investigators: Paul E. Bartelt and Robert W. Klaver.  
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. Principal Investigator.  
Undergraduate Research in Microbial Genome Annotation.

### INTERNAL GRANTS FUNDED

2019 Freistat Center Faculty Research Grant.  
Exploring perspectives and roles: from Augustana student athlete to global citizen.

2016 Student Research Assistantship, Augustana College Research Foundation.  
Unraveling the mystery of *Myxococcus xanthus* one-component regulators.

2013 Faculty Research Fund, Augustana College.  
Measuring the Effects of Restored Wet Prairies on Amphibian Populations.

2012 New Faculty Research Grant, Augustana College.  
Characterizing Genes Predicted to be involved in *Myxococcus xanthus* Motility and Fruiting Body Formation.

2012 Student Research Assistantship, Augustana College Research Foundation.  
Investigating one-component regulators in *Myxococcus xanthus*.

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 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*.

### PUBLICATIONS (\* denotes an undergraduate student)

Goodner, B., Scott, L., Wood, D., **Murphy, K.**, Houmiel, K., Rhoads, D.M., and Slater, S.C.. (In Preparation for Journal of Microbiology and Biology Education). Incorporating authentic research experiences into the teaching laboratory.

Scott, L.R., Nickle, T.C., Koury, S., Goodner, B., Houmiel, K., McFarland, B., Tenlen, J., Lumpe, A., **Murphy, K.**, Rhoads, D., Wood, D., and D. Chen. 2016. Creating a Microbial Genome Analysis Project Using Publically Available Genome Sequences and Online Bioinformatics Programs, Article 21 in *Tested Studies for Laboratory Teaching*, Volume 37 (K. McMahon, Editor). Proceedings of the 37<sup>th</sup> Conference of the Association for Biology Laboratory Education (ABLE).

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**

- 2018 – present    Analysis of the *Myxococcus xanthus* motility assay.
- 2011 - present    Identification and Characterization of Genes Involved in *Myxococcus xanthus* Motility and Fruiting Body Formation.
- 2013 – 2017        Pedagogical Research - *M. xanthus* as a model organism for undergraduate education.  
Collaborative Research: Authentic Project-based Research in College Sciences Curricula: Assessing the Impacts on Students and Faculty.
- 2009 – 2014        Measuring the effects of restored wet prairies on amphibian populations inhabiting agricultural landscapes.
- 2008 - 2010        U.S. Department of Energy Joint Genome Institute Undergraduate Research in Microbial Genome Annotation.
- 2005 - 2009        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        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        Detecting variation within the sunflower species *Helianthus annuus*.

## **SUPERVISION OF UNDERGRADUATE STUDENT RESEARCH**

### Augustana College

Ariana Raya ('21), Mackenzie Ryan ('18), and Francesca Scribano ('19). Identification and Characterization of Genes Involved in *Myxococcus xanthus* Motility and Fruiting Body Formation.

Mackenzie is pursuing her M.D. at Colorado State. Francesca is pursuing her Ph.D. at Baylor School of Medicine.

Anthony Acitelli ('19) and Lauren Judge ('19). Genetic Sequencing for Measuring Biodiversity in Recent and Ancient Marine Sediments.

Lauren is pursuing her Master's degree at University of Florida.

Charlie Bentley ('17), Annette Bugno ('14), Jamie Fee ('17), Eliot Kmiec ('20), Tim Michaels ('15), Linnea Ritchie ('16), Francesca Scribano ('19), Marie Skuby ('20), and Jennifer Vanderpool ('15). Exploring the Role of One-Component Regulators in *Myxococcus xanthus*.

Annette is pursuing her DVM at University of Wisconsin-Madison. Tim is pursuing his Ph.D. at SUNY Binghamton. Linnea is pursuing her Ph.D. at Syracuse University. Jennifer is pursuing her Physician Assistant degree at Carroll University.

Kristina Bowen ('15). Detecting human fecal contamination in urban watersheds of Rock Island County Illinois.  
Kristina completed her Master's in Public Health at Emory University.

Mark Farrell ('13), Tommy Harris ('13), Zachary Kozelichki ('13), Tim Michaels ('15), and Jennifer Vanderpool ('15). Characterizing Genes Predicted to be involved in *Myxococcus xanthus* Motility and Fruiting Body Formation.  
Tommy is pursuing his M>D. at University of Iowa. Mark is pursuing his Master's Degree at Indiana University Purdue University Indianapolis.

Zachary Kozelichki ('13) and Abigail Jones ('14). Measuring the Effects of Restored Wet Prairies on Amphibian Populations.  
Zachary is pursuing his Ph.D. at Indiana State University.

#### Gustavus Adolphus College

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. Presented at St. Mary's University of Minnesota Undergraduate Research Symposium, Winona, MN, April 2010.

Dawn is pursuing a Ph.D. and M.D. at Harvard. Laura is a Research Technician at the Fred Hutchinson Cancer Research Center.

Abigail Steele ('11) and 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.

Abigail completed a Pharm. D. at University of Minnesota Duluth and is a pharmacist in Minneapolis. Stephanie is employed by Abbott Northwestern Hospital in Minneapolis.

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

Kelly completed her MS in Human Genetics and Genetic Counseling at Stanford University and has a career as a genetic counselor.

#### Waldorf College

Amanda Burow ('09), Emily Hedum ('09), and Amy Geffre('09). 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 completed a DVM at Iowa State University and is practicing veterinary medicine in Iowa. Amy is a Research Associate at Iowa State University. Emily completed a DO at Kansas City University of Medicine and Biosciences and is practicing medicine in Montana.

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 completed a BS in Biology at Simpson College and is currently a pharmacy technician.

#### Syracuse University

Michael Henry. Heterologous Expression of the Oxytetracycline Biosynthetic Pathway in *Myxococcus xanthus*.  
Michael completed a Ph.D. at Syracuse University.

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

**PRESENTATIONS AND ABSTRACTS** (\* denotes an undergraduate student)

**Murphy, K. A.,** L. J. Ritchie, E. R. Curtis\*, F. Scribano\*, R. D. Welch, and A. G. An analysis of the motility assay as a means of distinguishing between mutant strains. Presented at The 46<sup>th</sup> Annual International Meeting on the Biology of Myxobacteria, Rice University, Houston, TX, June 2019.

**K. Murphy.** Genetics and the General Public. Presented to the Geneseo Hospital Women's Group, Geneseo, IL, April 2019.

L. Judge \*, **K. Murphy** and K. Arkle. Genetic Sequencing for Measuring Biodiversity in Recent and Ancient Marine Sediments. Presented at the 2019 Joint Geological Society of America Section Meeting, Manhattan, KS, March 2019.

M. Ryan \*, F. Scribano \* and **K. Murphy.** Effects of Evolution on Laboratory Sublines of *Myxococcus xanthus* DK1622. Presented at the National Conference on Undergraduate Research, University of Central Oklahoma, Oklahoma City, OK, April 2018.

L. Ritchie \* and **K. Murphy.** Genes encoding hypothetical proteins in *Myxococcus xanthus*: Exploring their role in motility and fruiting development. Presented at the National Conference on Undergraduate Research, University of North Carolina Asheville, Asheville, NC, April 2016.

J. Tenlen and **K. Murphy.** Guiding Education through Novel Investigation: Facilitating authentic research in the teaching lab. Presented at the 37<sup>th</sup> Annual ABLE Meeting, Boston University, Boston, MA, June 2015.

**K. Murphy** and D. Wood. Guiding Education through novel Investigation (GENI): Facilitating authentic research in the classroom. Presented at the National Conference on Undergraduate Research, Eastern Washington University, Cheney, WA, April 2014.

A. Bugno \*, T. Michaels \*, J. Vanderpool \* and **K. A. Murphy.** Exploring the Role of One-Component Regulators in *Myxococcus xanthus*. Presented at Augustana College Celebration of Learning, Rock Island, IL, May 2014.

**K. A. Murphy** and D. Wegman-Geedey. The Skinny on "Using Grading Strategies to Understand & Improve Student Learning,". Presented at Augustana College Friday Conversation, Rock Island, IL, May 2013.

**K. A. Murphy.** Preparing for massively-parallel undergraduate phenotyping: *Myxococcus xanthus* as a model system. Presented at the American Society for Microbiology Northwest Conference, Seattle, WA, November 2013.

Z. Kozelichki \*, A. Jones \*, M. Farrell \* and **K. A. Murphy.** Genetic analysis of American toad dispersal in restored wetlands of Winnebago County, IA. Presented at Augustana College Celebration of Learning, Rock Island, IL, May 2013.

**K. A. Murphy.** Measuring the Effects of Restored Wet Prairies on Amphibian Populations. Presented at Augustana College Celebration of Scholarship, Rock Island, IL, February 2013.

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.,** 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**

2019	Selected Participant, Augustana Education-for-Vocation Seminar
2019	Nominated for a Biology Mentor Award from the Biology Division of the Council on Undergraduate Research (CUR)
2017	Selected Participant, Augustana Faculty Leadership Academy
2014	Inducted into the State Science and Technology Fair of Iowa Hall of Fame
2012	Elected 2013-2014 and 2014-2015 President of John Deere Chapter of Sigma Xi Scientific Research Society
2011	Inducted into Sigma Xi, Augustana College
2009	Holmen Professional Excellence Award, Waldorf College
2009	Selected Participant, American Society for Microbiology Bioinformatics Institute
2008	Early-Career Faculty Travel Grant to ASMCUE Conference
2008	Awarded Equipment Grant, National Science Foundation STEM Workshop
2006	Best Research Presentation, Syracuse University Biomedical Research Symposium
2001	Elected President, Washington State University Biosciences Graduate Student Association
1997	Dr. Martin & Joyce Laakso Scholarship, Winona State University Department of Biology

## **SERVICE**

### Augustana College

#### College and Departmental Service

- Co-chair of Student Research Committee
- Member of Knowlton Complex Advisory Board
- Volunteer for First Year Student Move-In Day each year
- Faculty Mentor for softball team
  - Traveled with team to South Africa for service-learning trip, December 2016
- Director of 3:4 Veterinary Medicine Coordinated Degree Program
- Past member of Assessment for Improvement Committee
- Member of Strategic Planning Working Group and Task Force
- Member of IRB Committee (Spring 2014)
- Mentor for New Faculty (Mentoring Circle)
- Volunteer for Augustana Board of Trustees Fellowship Events
- Volunteer at Midnight Breakfasts

- Served on Biology Department search committees and committees for Biology Department External Review
- Biology Club Faculty Advisor 2012-2019
- Faculty Advisor for Central America Medical Service-Learning Program
  - Traveled with student cohort to Central America, July 2013, 2014, 2016, 2017 and 2019
- Faculty Advisor for Student Internships in Biology Department
- Volunteer for Biology Department Alumni Weekends and the annual “Future Student Open House”

#### Community and Professional Service

- External Reviewer for Roanoke College Biology Department
- Member of the Macmillan Genetics Faculty Advisory Board
- State Science and Technology Fair of Iowa Board Member (Senior High Judging Chair)
- President of John Deere Chapter of Sigma Xi Scientific Research Society for 2013-14 and 2014-15
- Coordinator for Science Night at Longfellow Grade School in Rock Island, IL
- Bio-Diversity Day Volunteer in the Quad Cities Area (Illinois and Iowa)

#### Gustavus Adolphus College

##### College and Departmental Service

- Faculty Advisor for undergraduate biology research projects
- Interviewer for Scholarship Days (screening prospective students for scholarship awards)
- Member of Howard Hughes Medical Institute Peer Mentor Selection Committee
- Volunteer for a variety of service projects at the College and Departmental level

#### Other Service

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

### **PROFESSIONAL AFFILIATIONS**

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