

Dr. Annette M. Golonka

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Updated 11-14-2016

Education

Duke University, Department of Biology, Aug 1996 – Dec 2002, PhD in Botany, Certificate in Ecology, Certificate in Teaching College Biology

University of California, Irvine, Aug 1992 – June 1996, BS in Biology, *Cum Laude*, Specialization in Ecology

Brief Teaching Philosophy

I teach by interactive lecturing, asking students questions as I lecture, getting them involved in the lecture, and making them part of the learning process. Initially, students may be hesitant about answering my questions, but during the semester they learn that I enjoy the interaction, and I do not tolerate ridicule of an incorrect answer. In this way, the classroom becomes a place where they enjoy being and learning about biology. My teaching style is driven not only by a need to teach students about biological concepts and how to apply these concepts, but also by a desire to understand my students, to learn from them, and to become a better educator in the process. I want students to view me as both a mentor and a source of biological knowledge.

Academic Employment (abbreviated)

Associate Professor of Biology, USC Lancaster, Aug 2014 – present

Teach the following courses:

BIOL 101 - Biological Principles I (Biology majors course)

BIOL 302/302L - Cell & Molecular Biology lecture and lab (Biology majors course)

BIOL 303 - Fundamental Genetics (Biology majors course)

BIOL 250/250L - Microbiology (nonmajors course, nursing course, pre-health, pre-pharmacy)

Assistant Professor of Biology, USC Lancaster, Aug 2006 – 2014

Teach the same courses as above

Microbiology Lab Administrator / Instructor, Duke University, Aug 2003 – July 2006

Research Interests

My research interests focus around microbial ecology, diversity, and evolution as well as plant ecology, spanning disciplines. I am interested in population and community dynamics of plants, the interaction of microbes with plants and pollinators, yeast evolution and ecology, the evolution of gender in plants, and pollination biology.

Research Experience

Current Research, University of South Carolina Lancaster, 2006- present

I work on local plant species, such as *Silene caroliniana* and *Gelsemium sempervirens*. The work I do tends to be microbial oriented. I study the diversity of nectar-inhabiting microorganisms in these plant species as well as the volatile organic compounds produced by these plant species in collaborative research with our analytical chemist, Dr. Bettie Obi Johnson.

Dissertation Research, Duke University, 1996 – Dec 2002

I examined the presence and diversity of nectar-inhabiting yeasts in *Silene latifolia*, a dioecious plant species (separate male and female individuals), and investigated the interactions between plants, pollinators, and yeast. I isolated 28 species of yeast from *S. latifolia* and associated plant species, and identified them using DNA-based phylogenetic analyses and morphological techniques. There was evidence of both host specificity and widespread dispersal of yeast species. There were no consistent differences among the sexes of *S. latifolia*, but male plants appeared to have a lower diversity and species richness in some years than female plants. Eight yeast species were examined in regard to their growth in nectar and sugar solution. Several species were capable of growing in high sugar concentrations or water, but far fewer grew in real

nectar and more species grew in female nectar than male nectar. Hand-pollination experiments on female flowers inoculated with yeast species (*Candida bombi* and *Metschnikowia reukaufii*) indicated no direct effect of these microorganisms on seed production; however, there is some indication of indirect effects (*i.e.*, pollinator visitation patterns).

Undergraduate Research, University of California, Irvine. Jan 1995 – Aug 1996

Undergraduate research on the morphology of *Schiedea* and *Alsinidendron* (supervised by Drs. Ann Sakai and Stephen Weller, funded in part by a NSF Research Experience for Undergraduates).

I investigated sexual dimorphism in the Hawaiian genus, *Schiedea*, with emphasis on morphology (including primary and secondary sex traits), nectar volume, and concentration of nectar sugars. I compared dimorphic species of *Schiedea* with hermaphroditic species to determine how floral morphology has changed with the evolution of wind pollination and dimorphic breeding systems (gynodioecy, subdioecy, and dioecy). Results of some of this work have been published.

Publications and Presentations (* indicates USCL undergrad student)

Peer-Reviewed Publications (complete list)

- Golonka, A.M., B. Obi Johnson, J. Freeman*, and D.W. Hinson*. 2014. Impact of nectarivorous yeasts on *Silene caroliniana*'s scent. *The Eastern Biologist*. **3**: 1-26. ([PDF](#))
- Golonka, A.M. and R. Vilgalys. 2013. Nectar inhabiting yeasts in Virginian populations of *Silene latifolia* (Caryophyllaceae) and coflowering species. *The American Midland Naturalist*. **169**: 235-258.
- Golonka, A.M., A.K. Sakai, and S.G. Weller. 2005. Wind pollination, sexual dimorphism, and changes in floral traits of *Schiedea* (Caryophyllaceae). *American Journal of Botany*. **92**: 1492-1502.
- Weller, S.G., A.K. Sakai, A.E. Rankin, A. Golonka, B. Kutcher, and K.E. Ashby. 1998. Dioecy and the evolution of pollination systems in *Schiedea* and *Alsinidendron* (Caryophyllaceae: Alsinoideae) in the Hawaiian Islands. *American Journal of Botany*. **85**:1377-1388.
- Golonka, A.M. 1996. Sexual dimorphism in *Schiedea* (Caryophyllaceae). *Journal of Undergraduate Research in the Biological Sciences*. University of California, Irvine. **26**: 160-166.

Conference Presentations (while at USCL)

- Golonka, A.M., B. Obi Johnson, J. Freeman*, and D.W. Hinson*. 2014. Impact of nectarivorous yeasts on *Silene caroliniana*'s scent. *Association of Southeastern Biologists Meeting*, oral presentation.
- Wolfram*, N., A.M. Golonka, B. Obi Johnson, and A. Blackwell*. 2014. The sweet smell of Carolina Jessamine: evaluating the floral scent profile of *Gelsemium sempervirens*. *Association of Southeastern Biologists Meeting*, oral presentation.
- Wolfram*, N., A.M. Golonka, and B. Obi Johnson. 2014. South Carolina's state flower: flower scent variation in *Gelsemium sempervirens*. *University of South Carolina Discovery Day*, oral presentation.
- Blackwell*, A., A.M. Golonka, and B. Obi Johnson. 2013. The sweet smell of Carolina jessamine: evaluating the floral scent profile of *Gelsemium sempervirens*. *University of South Carolina Discovery Day*, poster. First place winner.
- Golonka, A.M., B. Obi Johnson, J. Freeman*, and D. Hinson*. 2013. Production of volatile organic compounds by two *Metschnikowia* yeasts isolated from *Silene caroliniana* nectar. *South Carolina Branch Meeting of the American Society of Microbiology*, poster.
- Freeman*, J., B. Obi Johnson, and A.M. Golonka. 2012. Evaluation of the impact of yeast on floral scent in *Silene caroliniana*. *South Carolina Academy of Sciences National Meeting*, poster.
- Golonka, A.M., B. Obi Johnson, J. Freeman*, and D. Hinson*. 2012. Determination of volatile compounds produced by yeasts inhabiting the nectar of *Silene caroliniana* (Caryophyllaceae). *Association of Southeastern Biologists Meeting*, oral presentation.
- Freeman*, J., A.M. Golonka, B. Obi Johnson. 2011. The role of nectar inhabiting yeast in the floral scent of *Silene caroliniana* plants. *University of South Carolina Discovery Day*, poster.

Talks or Conference Presentations (Prior to USCL)

- Golonka, A.M. 2002. Diversity of nectar-inhabiting microorganisms in *Silene latifolia*. Ecology, Evolution and Organismal Biology Graduate Symposium at Duke University, oral presentation.

- Golonka, A.M. 2001. The life of a nectar-inhabiting microorganism. Mountain Lake Biological Station, VA, oral presentation.
- Golonka, A.M. 2000. Studying the potential effects of nectar inhabiting microorganisms (NIMs) on plant fitness. Society for the Study of Evolution meetings, oral presentation.
- Golonka, A.M. 2000. Ecological dynamics of yeast in nectar. Middle Atlantic States Mycological Conference (MASMC) held at Duke University, oral presentation.
- Golonka, A.M. 1999. Nectar creatures and what has gender got to do with them! Population Biology Group at University of Virginia, oral presentation.
- Golonka, A.M. 1999. Nectar-inhabiting microorganisms (NIMs) and *Silene latifolia* (= *S. alba*). South Eastern Ecological, Population Genetics and Evolution (SEEPAGE) Conference held at Mountain Lake Biological Station, VA, oral presentation.
- Golonka, A.M. Introduction to Nectar-Inhabiting Microorganisms (NIMs). Evolutionary Resynthesis: Ecological Genetics Mini-Symposium at Duke University, oral presentation.

Genbank Submissions

Golonka, A.M., D. Hinson*, J. Freeman*, and B. Obi Johnson. May 20, 2013. KF059236 through KF059241.

Manuscripts in Preparation

- Golonka, A.M., and D.W. Hinson*. Nectar inhabiting microorganisms in flowers of *Silene caroliniana*.
- Golonka, A.M., B. Obi Johnson, N. Wolfram*, and A. Blackwell*. Scent profile of wild and domestic flowers of *Gelsemium sempervirens*.

Grants While at USCL:

- SC STEPS to STEM Student Research Internship with student Nigel Wolfram, 2013/2014, PI with Bettie Obi Johnson as Co-PI, stipend for the student to do research in Spring 2014. "Evaluation of the Scent Profile of and Nectar-Inhabiting Microbes in *Gelsemium sempervirens*."
- Faculty/Staff Research and Productive Scholarship, USCL, 2014, \$2241.98. "*Gelsemium sempervirens*: Scent Profile and Nectar Inhabiting Microorganisms."
- USC Magellan Scholar Award with student Austin Blackwell, 2013, PI, with Bettie Obi Johnson as Co-PI, \$2,400.00. "Evaluation of the Scent Profile of *Gelsemium sempervirens*."
- USC Magellan Scholar Award with student Jonathan Freeman, 2010/2011, Co-PI, with Bettie Obi Johnson as PI, \$2991.50. "The Role of Nectar Inhabiting Yeasts in the Floral Scent of *Silene caroliniana* Plants."
- Mini Faculty/Staff Research and Productive Scholarship, USCL, 2009/2010, \$1046.28. "Identification of Nectar-Inhabiting Microorganisms (NIMs) in Local Populations of the Plant *Silene caroliniana* (Wild Pink)."
- Mini Faculty/Staff Research and Productive Scholarship, USCL, 2006/2007, \$1421.16. "Exploration of Nectar-Inhabiting Microorganisms (NIMs) in Local Populations of the Plant *Silene caroliniana* (Wild Pink)."
- NSF Course, Curriculum, and Laboratory Improvement Grant, Co-PI, 2006-2009, \$189K, \$22K to USCL. "Continuous Renewal of Undergraduate Education via an Interdisciplinary, Inquiry Based Laboratory." NSF #0633648.

Grants, Scholarships, and Honors Prior to USCL:

Duke University

- Center for Instructional Technology Jump Start Grant with Dr. Xinnian Dong, Spring 2005. Funds to develop an instructional website focusing on genomics and its usage in microbiology.
- Catherine Keever Award. Supplies for research at MLBS, June 2000-2001.
- Mountain Lake Biological Station, University of Virginia Gift Grant. Support for room and board. June 2000.
- Sigma Xi Grant-in-Aid, June 1997. Funds to conduct research at MLBS.
- NSF Graduate Research Fellowship, June 1997 - 2000.

University of California, Irvine

- Honorable Mention NSF Graduate Research Fellowship Awards, June 1996.
- NSF Research Experience for Undergraduates (REU), June 1995 - Aug 1995
- Golden Key National Honor Society, 1994 - present.

National Science Scholars Program, 1992-1995.
Deans Honor List (11 quarters), 1993-1995.
Orange County Teachers Federal Credit Union Scholarship, 1992-1993.
Garden Grove Association of American University Women Scholarship, 1992-1993.
Italian Catholic Federation Scholarship, 1992-1993.

Teaching Materials:

Golonka, A. M. Fall 2007 through Fall 2015 Semester Issue. Microbiology, BIOL 250L. University of South Carolina Lancaster, Lancaster, SC.
Golonka, A. M. and R. Vilgalys. Fall 2004 through Spring 2006 Semester Issue. Laboratory Exercises for Bio 103 General Microbiology. Duke University, Department of Biology, Durham, NC

Professional Service

Peer Reviewer (number of articles reviewed in parentheses)

2015: *Fungal Ecology* (1)
2014: *PLOS ONE* (1), *Environmental Microbiology and Environmental Microbiology Reports* (1).
2013: *Microbial Ecology* (1)
2011: *Microbial Ecology* (2), *FEMS Microbiology Ecology* (1)

Grant Reviewer

USC Magellan Grant Reviewer: Nov 2016, March 2014, Nov 2014, Nov 2013.

Poster or Presentation Judge

USC Discovery Day Judge, poster presentations in Biology & Biomedical Sciences, 2013 and 2014.
USC Discovery Day Judge, oral presentations, 2011.
Lancaster County Science Fair, Judge and Administrator, 2007-present.

Guest Lecturer

Guest speaker for Sun City Lifelong Learning Program at Sun City – “DNA Fingerprinting” March 2008
Guest speaker for Sun City Lifelong Learning Program at Sun City – “Human Genome Project” Nov 2007

Professional Development

McGraw-Hill Higher Education On-Line Workshop, USCLancaster, 2009

Workshop entitled "Integrating active learning into your microbiology course" to help faculty use technology in their courses.

Association for Biological Laboratory Education Conferences, attended in 2007 & 2008

Workshops on teaching different lab exercises. Hands-on laboratory experiences.

Instructional Technology Showcase Conference, Duke University, Spring 2006

Presentations, speakers, and poster sessions focused on the accomplishments of duke faculty using technology in teaching. Topics included information on new features available on-line through Blackboard as well as other teaching programs and websites. Introduction to computer based simulations as teaching tools for subjects ranging from economy to medical training

Teaching is the Art of Changing the Brain, Duke University, Spring 2006

Seminar by James Zull, author of *The Art of Changing the Brain*, Professor of Biology and Biochemistry and Director of the University Center for Innovation in Teaching and Education at Case Western Reserve University. Presentation on how the brain learns and why visual aids are necessary.

Teaching for Understanding: Active Learning and Assessment, Duke University, Fall 2004

Workshop by Diane Ebert May, Professor of Plant Biology, Michigan State University.

Questions addressed included: How can you run a large class and never lecture? And why is this a good idea? What do you do when your students have major misconceptions about your subject? And how can you be sure that your students actually learn anything?

Certificate in Teaching College Biology, Duke University, Spring 2002

Seminar in teaching Biology, Bio 390, Instructor Paula Lemons, PhD.

A seminar course on all aspects of how to teach biology including media usage, grading and testing, classroom dynamics, course development, and inquiry based teaching.

Faculty Mentorship, Duke University, Fall 2001 - Dec 2002

My mentor: Sandra Seidel, an Associate Professor of Biology at Elon University, currently at University of Virginia.

Meetings included discussions on how to teach non-majors, how to design a course, where to find information for courses, dynamics in the classroom, balancing content and quality of content. This is still an on-going mentorship.

Skills and Techniques

Ecology: Pollination biology techniques, nectar analysis (including extraction, volume quantification, and sugar content determination), species diversity indices, analysis of categorical data, species identification of plants and some insects, and other ecological methods used in the field.

Microbiology: Culture and staining techniques for bacteria and yeast, selective media usage, bacteria and yeast identification procedures, and basic microscopy, including fluorescence microscopy.

Molecular Biology: DNA extraction, polymerase chain reaction, DNA sequencing, transformation, cloning, PCR identification of bacteria and yeast, and phylogenetic analysis and reconstruction.

Computer skills: PC, MAC, and UNIX familiar; statistical software - SAS, JMP, some SPLUS; phylogenetic programs - PAUP, Genedoc, Clustal, DAMBE; spreadsheet software - Excel and Systat; graphics software - SigmaPlot, Adobe Illustrator, Ulead PhotoImpact; HTML designing software - HotDog, DreamWeaver; miscellaneous software - Word, Powerpoint, Netscape, IExplorer, Blackboard.

Professional Societies

Association for Biological Laboratory Education, Member (2006-Present)

Association of Southeastern Biologists, Member (2012-Present)

Botanical Society of America, Member (2005-2012)

Microbiological Society of America, Member (2005-Present)

Sigma Xi, Member (2007-Present)