

# Mary Margaret Guisinger

Department of Plant and Microbial Biology

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## Education

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- Ph.D.** *Plant Biology*, 2009, University of Texas at Austin, Texas. Dissertation: Rates and patterns of plastid genome evolution in the flowering plant families Geraniaceae and Poaceae. Advisor: Dr. Robert Jansen
- M.S.** *Botany*, 1998, Miami University, Oxford, Ohio. Thesis: The influence of microgravity and spaceflight on columella cell ultrastructure in starch-deficient mutants of *Arabidopsis*. Advisor: Dr. John Z. Kiss
- B.S.** *Botany* major and *German* minor, 1996. Miami University, Oxford, Ohio

## Research Interests

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Molecular evolution, genomics, computational biology, systematics, phylogenetics, cell and molecular biology, and plastid genome evolution

## Research Experience

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- Current *NSF Postdoctoral Research Fellow in Biology*, Specht Laboratory at University of California, Berkeley
- 2004-2009 Dissertation research, University of Texas at Austin
- Summer 2007 *Guest Researcher*. Finishing rearranged and repeat-rich plastid genomes. The DOE's Joint Genome Institute, Walnut Creek, California
- 2003-2004 Chloroplast genomics, molecular evolution, and phylogenetics in the angiosperm family Geraniaceae and in the Australian fan flower, *Scaevola* (Goodeniaceae)
- 1996-1998 Influence of microgravity from space flight specimens on plastid and starch development in *Arabidopsis* root caps
- Summer 1996 *Research Assistant* to Dr. Andreas Sievers, Botanisches Institut, Friedrich-Wilhelm Universitaet, Bonn, Germany
- 1995-1996 Preparation for two space flights on the Space Shuttle/Mir and examination of starch content and gravitropic response in *Arabidopsis* starch deficient mutants

## Teaching Experience

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- 2010 *Guest Lecturer* for Dr. Chelsea Specht's *Plant Diversity and Evolution* graduate course Spring and Fall terms, University of California, Berkeley
- 2006 *Graduate Teaching Assistant* for *Structure, Physiology, and Reproduction of Seed Plants*, The University of Texas, Austin, Texas
- 1996-1998 *Graduate Teaching Assistant* for *General Botany and Plants, Humanity, and the Environment*, Miami University, Oxford, Ohio
- 1995 *Undergraduate Teaching Assistant* for *General Botany* lab course, Miami University, Oxford, Ohio

## Grants and Fellowships

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2010-2012	NSF Postdoctoral Research Fellowship in Biology. University of California, Berkeley. Sponsored by Chelsea Specht and Rasmus Nielsen. \$123,000
Summer 2008	Integrative Graduate Education and Research Traineeship (IGERT). The University of Texas. Evaluating rates and patterns of chloroplast genome evolution in the Geraniaceae within a phylogenetic framework. Summer stipend and expenses
2007	Phylogeny and Chloroplast Genome Evolution in Geraniaceae. Designated Graduate Research Assistant funded by NSF grant 0717372
2007	Integrative Graduate Education and Research Traineeship (IGERT). The University of Texas. \$7000
2004-2006	Integrative Graduate Education and Research Traineeship (IGERT). The University of Texas. Evaluating rates and patterns of chloroplast genome evolution in the Geraniaceae within a phylogenetic framework. Two-year stipend and expenses
2003-2004	Research Internship. The University of Texas. Stipend and expenses.
1997	Academic Challenge. Miami University. The influence of microgravity on plastid and starch development in roots of <i>Arabidopsis</i> seedlings: a stereological study. \$700
1996	Academic Challenge. Miami University. Evaluation of <i>Arabidopsis thaliana</i> plastid mutants for gravitropism studies. \$250
1996	Undergraduate Research Grant. Miami University. \$400
1995	Howard Hughes Research Grant. Miami University. \$2500

## Travel Grants

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2008	Travel expenses to collect endemic Hawaiian <i>Geranium</i> material. Kaua'i, Hawai'i
2008	Awarded by The University of Texas Plant Biology Graduate Program to attend BSA 2008. Vancouver, BC, Canada
2007	\$900 to conduct research at The DOE's Joint Genome Institute
2006	Awarded by The University of Texas Plant Biology Graduate Program to attend SMBE 2006. Tempe, Arizona
2005	Awarded by The University of Texas Plant Biology Graduate Program to attend BSA 2005. Austin, Texas
2004	Awarded by Lorraine I. Stengl Endowment to attend Evolution 2004. Fort Collins, Colorado
1996-1998	Awarded by Miami University to attend Missouri Botanical Garden 43rd-45th Annual Systematics Symposium. St. Louis, Missouri
1997	Awarded by Miami University Botany Department to attend Plant Biology 1997. Vancouver, BC, Canada
1996	Awarded by Friedrichs-Wilhelms-Universität to cover expenses for summer research at Botanisches Institut. Bonn, Germany
1996	Roschman Fund Grant for summer research at Botanisches Institut, Friedrichs-Wilhelms-Universität, Bonn, Germany
1996	Awarded by Miami University Botany Department to attend American Society of Plant Physiologists, Midwestern Section. Urbana, Illinois

## Publications

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- Blazier J. C., **M. M. Guisinger**, and R. K. Jansen. 2011. Recent loss of plastid-encoded *ndh* genes within *Erodium* (Geraniaceae). *Plant Molecular Biology*. DOI 10.1007/s11103-011-9753-5
- Guisinger M. M.**, J. V. Kuehl, and J. L. Boore, and R. K. Jansen. 2011. Extreme reconfiguration of plastid genomes in the angiosperm family Geraniaceae: rearrangement, repeats, and codon usage. *Molecular Biology and Evolution*. 28(1):583-600
- Guisinger M. M.**, T. W. Chumley, J. V. Kuehl, J. L. Boore, and R. K. Jansen. 2010. Implications of the plastid genome sequence of *Typha* (Typhaceae, Poales) for understanding genome evolution in Poaceae. *Journal of Molecular Evolution*. 70(2):149-166
- Cai Z., **M. Guisinger**, H. Kim, E. Ruck, J. C. Blazier, V. McMurtry, J. V. Kuehl, J. Boore, and R. K. Jansen. 2008. Extensive reorganization of the plastid genome of *Trifolium subterraneum* (Fabaceae) is associated with numerous repeated sequences and novel DNA insertions. *Journal of Molecular Evolution*. 67(6):696-704
- Guisinger M. M.**, J. L. Boore, J. V. Kuehl, and R. K. Jansen. 2008. Genome-wide analyses of Geraniaceae plastid DNA reveal unprecedented patterns of increased nucleotide substitutions. *Proceedings of the National Academy of Sciences USA*. 105(47):18424-18429
- Steele P. R., **M. Guisinger-Bellian**, C. R. Linder, and R. K. Jansen. 2008. Phylogenetic utility of 141 low-copy nuclear regions in taxa at different taxonomic levels in two distantly related families of rosids. *Molecular Phylogenetics and Evolution*. 48(3):1013-1026
- Jansen R. K., Z. Cai, L. A. Raubeson, H. Daniell, C. W. dePamphillis, J. Leebens-Mack, K. F. Müller, **M. Guisinger-Bellian**, R. C. Haberle, A. K. Hansen, T. W. Chumley, S. Lee, R. Peery, J. McNeal, J. V. Kuehl, and J. L. Boore. 2007. Analysis of 81 genes from 64 plastid genomes resolves relationships in angiosperms and identifies genome-scale evolutionary patterns. *Proceedings of the National Academy of Sciences USA*. 104(49):19369-19374
- Guisinger M. M.** and J. Z. Kiss. 1999. The influence of microgravity and spaceflight on columella cell ultrastructure in starch-deficient mutants of *Arabidopsis*. *The American Journal of Botany*. 86(10):1357-1366
- Kiss J. Z., R. E. Edelmann, **M. M. Guisinger**, W. J. Katembe, and P.C. Wood. 1999. Graviperception studies in Biorack with wild-type and starch-deficient mutants of *Arabidopsis*. In Biorack on Spacehab, European Space Agency, Noordwijk, The Netherlands. pp 205-219
- Kiss J. Z., **M. M. Guisinger**, and A. J. Miller. 1998. What is the threshold amount of starch necessary for full gravitropic sensitivity? *Advances in Space Research*. 21:1197-1202
- Kiss J. Z., **M. M. Guisinger**, A. J. Miller, and K. S. Stackhouse. 1997. Reduced gravitropism in hypocotyls of starch-deficient mutants of *Arabidopsis*. *Plant and Cell Physiology*. 38(5):518-525

## Presentations and Published Abstracts

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- Guisinger, M. M.** 2011. Plastid genome evolution. Jepson Herbarium. University of California, Berkeley
- Guisinger, M. M.** 2010. Genomes gone wild: accelerated plastid evolution in flowering plants. Rhodes College, Memphis, Tennessee
- Guisinger, M. M.**, J. V. Kuehl, J. L. Boore, and R. K. Jansen. 2010. Genomes gone wild: plastid genomes in the angiosperm family Geraniaceae. Annual meeting of the Society for the Study of Evolution, Portland, Oregon.
- Jansen, R. K., **M. M. Guisinger**, J. V. Kuehl, and J. L. Boore. 2010. Extreme reconfiguration of plastid genomes in the angiosperm family Geraniaceae: rearrangement, repeats, and codon usage. 2<sup>nd</sup> International Symposium on Chloroplast Genomics and Genetic Engineering. Maynooth, Ireland.
- Blazier C., **M. M. Guisinger**, and R. K. Jansen. 2009. Gene loss and reductive rearrangement of the plastid genome throughout a divergent angiosperm clade. Annual Meeting for the Society for Molecular Biology and Evolution, Iowa City, Iowa.

- Guisinger M. M.**, J. Boore, J. V. Kuehl, and R. K. Jansen. 2008. Genome-wide analyses reveal patterns of increased nonsynonymous substitutions in plastids of the flowering plant family Geraniaceae. Botanical Society of America, Vancouver, B. C., Canada.
- Steele R., **M. M. Guisinger**, R. K. Jansen, and R. Linder. 2007. Identifying useful low-copy nuclear markers for examining phylogenetic relationships within angiosperms. Botany and Plant Biology, Chicago, Illinois.
- Guisinger M. M.**, T. W. Chumley, Z. Cai, J. L. Boore, J. V. Kuehl, and R. K. Jansen. 2006. Organization and evolution of chloroplast genomes in the flowering plant family Geraniaceae. Annual Meeting for the Society for Molecular Biology and Evolution, Tempe, Arizona.
- Guisinger M. M.**, T. W. Chumley, J. L. Boore, J. V. Kuehl, and R. K. Jansen. 2006. Organization and evolution of chloroplast genomes in the flowering plant family Geraniaceae. CIPRES: Cyberinfrastructure for Phylogenetic Research Annual Meeting, Austin, Texas.
- Guisinger, M. M.** 2005. Comparative chloroplast genomics of the flowering plant family Geraniaceae. The University of Texas Graduate Student Symposium, Austin, Texas.
- Guisinger M. M.**, R. K. Jansen, J. L. Boore, and J. V. Kuehl. 2005. Organization and evolution of the chloroplast genome of *Erodium texanum* (Geraniaceae). Botanical Society of America, Austin, Texas.
- Guisinger M. M.**, R. K. Jansen, J. L. Boore, and J. V. Kuehl. 2004. The highly rearranged chloroplast genome of *Scaevola aemula* in the flowering plant family Goodeniaceae. Annual meeting of the Society for the Study of Evolution, Fort Collins, Colorado.
- Guisinger M. M.** and J. Z. Kiss. 1997. Gravitropism in plastid mutants of *Arabidopsis*. Supplement to Plant Physiology 114(3): 133.
- Kiss J. Z., **M. M. Guisinger**, and J. B. Wright. 1996. What is the threshold of starch necessary for full gravitropic sensitivity? International Committee on Space Research (COSPAR) Meeting in Birmingham, England. COSPAR Abstract Book: 315.
- Guisinger M. M.**, A. J. Miller, and J. Z. Kiss. 1996. The response to gravity is correlated to the amount of starch in *Arabidopsis* hypocotyls. American Society of Plant Physiologists, Midwestern Section, Urbana, Illinois. ASPP Midwest Abstract Book: 7.
- Kiss J. Z., **M. M. Guisinger**, A. J. Miller, and J. B. Wright. 1995. The response to gravity is correlated to the amount of starch in *Arabidopsis* intermediate-starch mutants. American Society for Gravitational Space Biology, Arlington, Virginia. ASGSB Bulletin 9: 38.

### **Professional Meetings Attended**

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2010	<i>Evolution</i> . Portland, Oregon
2008	<i>Botanical Society of America</i> . Vancouver, B. C., Canada
2006	<i>Society for Molecular Biology and Evolution</i> . Tempe, Arizona
2006	<i>CIPRES: Mini-symposium and Workshop on Evolutionary Simulations</i> . University of Pennsylvania, Philadelphia, Pennsylvania
2005	<i>Botanical Society of America 2005</i> . Austin, Texas
2004	<i>Evolution</i> . Fort Collins, Colorado
1996-1998	<i>MOBOT 43<sup>rd</sup>-45<sup>th</sup> Annual Systematics Symposiums</i> . St. Louis, Missouri
1997	<i>Plant Biology</i> . Vancouver, B. C., Canada
1996	<i>International Workshop on Plant Biology in Space</i> . Bad Honnef, Germany
1996	<i>American Society of Plant Physiologists</i> . Midwestern Section. Urbana, Illinois

### **Professional Societies**

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American Association for the Advancement of Science  
 American Society of Plant Biologists  
 Botanical Society of America

Society of Systematic Biology  
Society for the Study of Evolution

### **Service**

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2008 Organizing Chair for Integrative Biology Graduate Research Symposium  
2007 Graduate student representative to The Section of Integrative Biology faculty meetings  
Reviewer for *Annals of Botany*

### **Awards**

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2009 Plant Biology Memorial Research Award, The University of Texas at Austin  
2007 One year membership to AAAS/Science through the AAAS/Science Program for Excellence in Science  
1996 Young Botanist Recognition Award, Botanical Society of America