

SHANNON D. FEHLBERG

Conservation Biologist
Research, Conservation, and Collections
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EDUCATION

- 2006 Ph.D. Ecology and Evolutionary Biology, University of Colorado, Boulder, CO
1999 M.A. Biology, University of Colorado, Denver, CO
1996 B.S. Biology (*summa cum laude*), Colorado Christian University, Lakewood, CO

PROFESSIONAL EXPERIENCE

October 2008 – present: **Conservation Biologist**, Research, Conservation, and Collections, Desert Botanical Garden, Phoenix, AZ

February 2009 – present: **Affiliate Faculty**, School of Life Sciences, Arizona State University, Tempe, AZ

June 2006 – September 2008: **Postdoctoral Research Associate**, Division of Biology, Kansas State University, Manhattan, KS

August 2000 – May 2006: **Graduate Assistant**, Ecology and Evolutionary Biology, University of Colorado, Boulder, CO

Teaching Assistant: General Biology I & II, Non-majors Biology, Plant Systematics, Principles of Ecology, and Writing Lab instructor.

Research Assistant: Systematics and evolution of ferns, Polypodiaceae: Grammitidoideae and *Hypolepis* (Dennstaedtiaceae).

August 1998 – May 2004: **Affiliate Faculty**, Biology, Colorado Christian University, Lakewood, CO

Instructor of record: General Biology II, Comparative Anatomy Lecture and Lab, Ecology, Ecosystem Ecology, Field Studies in Ecology: Desert Ecology, General Zoology Lecture and Lab, Invertebrate Zoology Lecture and Lab, and Introduction to Scientific Research.

Lab coordinator: General Biology I & II, Human Anatomy and Physiology I & II.

May 2001 – August 2001: **Research Assistant**, Denver Botanic Gardens, Denver, CO

August 1996 – December 1999: **Graduate Assistant**, Biology, University of Colorado, Denver, CO

Teaching Assistant: General Biology I & II, Field Studies: Desert Ecology, and General Cell Biology.

RESEARCH GRANTS AND FELLOWSHIPS

- 2013-2016 **National Science Foundation**, Phylogenetic Systematics, Division of Environmental Biology, Collaborative Research: Polyploidy in *Phlox* and its effects on diversity. Carolyn Ferguson and Alan Prather, co-PIs. \$216,867 (of \$774,000).
- 2012-2014 **Desert Landscape Conservation Cooperative** and **U.S. Bureau of Reclamation**, From genotype to river basin: The combined impacts of climate change on bio-control on a dominant riparian invasive tree/shrub (*Tamarix* spp.). Kevin Hultine, co-PI. \$149,269.
- 2012-2014 **Desert Botanical Garden**, Conservation Genetics and Biology research, restricted donations. \$55,000.
- 2014 **Desert Landscape Conservation Cooperative** and **U.S. Fish and Wildlife Service**, Population genetic study of the Cochise pincushion cactus (*Coryphantha robbinsorum*) in Arizona. William Radke and Julie Crawford, co-PIs. \$20,000.
- 2013 **U.S. Fish and Wildlife Service**, Improved genetic resources for the study of Huachuca Water Umbel. Endangered Species Act, Section 6 funding. \$11,178.
- 2012 **U.S. Fish and Wildlife Service**, Distinguishing Arizona hedgehog cactus from close relatives using genetic information. Endangered Species Act, Section 6 funding. \$16,807.
- 2011 **U.S. Fish and Wildlife Service**, Population genetic study of the Arizona hedgehog cactus in support of multiple Recovery Plan objectives. Kim McCue and Wendy Hodgson, co-PIs. Endangered Species Act, Section 6 funding. \$22,155.
- 2010 **Bureau of Land Management**, Comparative analyses of Pronghorn diet at Agua Fria National Monument based on feces analyses and plant DNA barcoding. Andrew Salywon, co-PI. \$35,000.
- 2010 **Environmental and Natural Resource Division, U.S. Army** and **Vernadero Group**, Research contract: Assessing genetic distinctiveness of *Lilaeopsis schaffneriana* var. *recurva* populations. \$42,664.
- 2008 **Kansas State University**, Ecological Genomics Institute, competitive seed grant: Applying genomic tools within the *Phlox* family: Evolutionary history and ecological significance of polyploidy in the *Phlox woodhousei* complex in the arid southwest. Carolyn J. Ferguson, co-PI. \$75,000.
- 2007 **Kansas State University**, Ecological Genomics Institute, Bulk fragment analysis and genotyping grant: Analysis of genetic structure, gene flow, and speciation in the closely related species *Phlox woodhousei* and *P. amabilis* (Polemoniaceae) using microsatellite loci. \$5,000.
- 2005 **University of Colorado**, Ecology and Evolutionary Biology Fellowship. \$9,500.
- 2005 **University of Colorado**, University of Colorado Museum, Walker Van Riper grant: Reconstructing population history using ancient and modern DNA: Macrofossils and contemporary samples of Brittlebush (*Encelia farinosa*) from the Sonoran Desert. \$1,437.

- 2004 **National Science Foundation**, Doctoral Dissertation Improvement Grant: Evolutionary diversification of *Encelia* (Asteraceae: Heliantheae) in the Sonoran and Mojave Deserts based on multiple DNA sequences. \$9,905.
- 2004 **University of Colorado**, Ecology and Evolutionary Biology Fellowship. \$9,500.
- 2004 **University of Colorado**, Ecology and Evolutionary Biology, Departmental grant: Phylogeography of *Encelia farinosa* (Asteraceae) in the arid Southwest. \$2,000.
- 2004 **University of Colorado**, University of Colorado Museum, Walker Van Riper grant: Diversification of *Encelia* (Asteraceae) in the Sonoran and Mojave Deserts. \$1,494.
- 2003 **California Native Plant Society**: Evolutionary diversification of *Encelia* (Asteraceae) in the Mojave and Sonoran Deserts. \$450.
- 2003 **University of Colorado**, University of Colorado Museum, Walker Van Riper grant: Phylogeography of Brittlebush (*Encelia farinosa*) in the Sonoran Desert. \$1,497.
- 2002 **University of Colorado**, Ecology and Evolutionary Biology, Departmental grant: Historical biogeography of the Saguaro cactus *Carnegiea gigantea*. \$2,411.
- 2002 **University of Colorado**, University of Colorado Museum, Walker Van Riper grant: Historical biogeography of the Saguaro cactus *Carnegiea gigantea*. \$1,000.
- 1999 **Sigma Xi**, Grants-in-Aid of Research: Genetic diversity and population structure in geographically marginal populations of *Carex viridula* Michx. (Cyperaceae). \$700.
- 1999 **Colorado Native Plant Society**, John W. Marr Fund grant: Genetic diversity and population structure in geographically marginal populations of *Carex viridula* Michx. (Cyperaceae). \$300.

Pending:

- 2015-2017 **U.S. Department of Agriculture**, National Institute of Food and Agriculture, Foundational grants: Host plant allocation strategies and mortality in response to a specialist herbivore. Kevin Hultine, Tom Dudley, Dan Bean, and Kevin Grady co-PIs. \$489,801 requested.
- 2014 **U.S. Fish and Wildlife Service**, Population survey, genetics, seed morphology and growth rate of *Echinocereus triglochidiatus* var. *arizonicus* (Arizona hedgehog cactus). Endangered Species Act, Section 6 funding. \$8,363 requested.

HONORS AND AWARDS

- 2006 **Excellence in Teaching**, Ecology and Evolutionary Biology, University of Colorado, Boulder, CO.
- 1999 **Outstanding Graduate Student**, College of Liberal Arts and Sciences, University of Colorado, Denver, CO.
- 1996 **Outstanding Woman of the Year**, Colorado Christian University, Lakewood, CO.

PEER-REVIEWED PUBLICATIONS

Fehlberg, S.D., M.C. Ty, and C.J. Ferguson. In press. Reexamination of a putative diploid hybrid taxon using genetic evidence: The distinctiveness of *Phlox pilosa* subsp. *deamii* (Polemoniaceae). *International Journal of Plant Science*.

Fehlberg, S.D., J.M. Allen, and K. Church. 2013. A novel method of genomic DNA extraction for Cactaceae. *Applications in Plant Sciences* 1: 1200013.

Tew, J.M., S.L. Lance, K.L. Jones, and **S.D. Fehlberg**. 2012. Microsatellite development for an endangered riparian inhabitant, *Lilaeopsis schaffneriana* subsp. *recurva* (Apiaceae). *American Journal of Botany Primer Notes & Protocols in the Plant Sciences* 99: e164-166.

Fehlberg, S.D. and C.J. Ferguson. 2012. Intraspecific cytotypic variation and complicated genetic structure in the *Phlox amabilis*-*P. woodhousei* (Polemoniaceae) complex. *American Journal of Botany* 99: 865-874.

Fehlberg, S.D. and C.J. Ferguson. 2012. Intraspecific cytotype variation and conservation: An example from *Phlox* (Polemoniaceae). *Calochortiana* 1: 189-195.

Fehlberg, S.D. and T.A. Ranker. 2009. Evolutionary history and phylogeography of *Encelia farinosa* (Asteraceae) from the Sonoran, Mojave, and Peninsular Deserts. *Molecular Phylogenetics and Evolution* 50: 326-335.

Lehnert, M., M. Kessler, A.N. Schmidt-Lebuhn, S.A. Klimas, **S.D. Fehlberg**, and T.A. Ranker. 2009. Phylogeny of the fern genus *Melpomene* (Polypodiaceae) inferred from morphology and chloroplast DNA analysis. *Systematic Botany* 34: 1-11.

Fehlberg, S.D., K.A. Ford, M.C. Ungerer, and C.J. Ferguson. 2008. Development, characterization and transferability of microsatellite markers for the plant genus *Phlox* (Polemoniaceae). *Molecular Ecology Resources* 8: 116-118.

Fehlberg, S.D. and T.A. Ranker. 2007. Phylogeny and biogeography of *Encelia* (Asteraceae) in the Sonoran and Peninsular Deserts based on multiple DNA sequences. *Systematic Botany* 32: 692-699.

Fehlberg (Kuchel), S.D. and L.P. Bruederle. 2000. Allozyme data support a Eurasian origin for *Carex viridula* ssp. *viridula* var. *viridula* Michx. (Cyperaceae). *Madroño* 47: 147-158.

Submitted:

Fehlberg, S.D. and K.M. Fehlberg. Phylogeographic patterns in *Encelia farinosa* (Asteraceae) in the southwestern deserts of North America: a comparison of nuclear and chloroplast DNA sequences. *Molecular Phylogenetics and Evolution*.

In preparation:

Fehlberg, S.D. and J.M. Allen. Clonality, fixed heterozygosity, and limited genetic structure in *Lilaeopsis schaffneriana* subsp. *recurva* (Apiaceae), an endangered herbaceous perennial. *Conservation Genetics*.

PEER-REVIEWED TECHNICAL REPORTS

- Fehlberg, S.D.** 2013. Distinguishing Arizona hedgehog cactus from close relatives using genetic information. *Report prepared for U.S. Fish and Wildlife Service, Phoenix, Arizona.*
- Fehlberg, S.D.** 2012. Population genetic study of the Arizona hedgehog cactus in support of multiple Recovery Plan objectives. *Report prepared for U.S. Fish and Wildlife Service, Phoenix, Arizona.*
- Fehlberg, S.D.** 2012. Assessing genetic distinctiveness of Huachuca Water Umbel (*Lilaeopsis schaffneriana* subsp. *recurva*) on Fort Huachuca, Arizona and other regional sites. *Report prepared for the Environmental and Natural Resource Division, Directorate of Public Works, U.S. Army Garrison, Fort Huachuca, Arizona.*

BOOK CHAPTERS

- Bruederle, L.P., S.L. Yarbrough, and **S.D. Fehlberg**. 2009. Allozyme variation in the genus *Carex*... 15 years later: 1986-2001. Pp.187-196 in R.F.C. Naczi and B.A. Ford, eds. *Sedges: Uses, Diversity, and Systematics of the Cyperaceae*. Missouri Botanic Garden Press, St. Louis, Missouri.
- Ferguson, C.J., **S.D. Fehlberg**, K.A. Ford, and S.C. Strakosh. 2008. Phylogenetic relationships of the genus *Phlox* (Polemoniaceae): comparing and combining data sets from the chloroplast genome. Pp. 153-172 in A.K. Sharma and A. Sharma, eds. *Plant Genome: Biodiversity and Evolution. Volume 1, Part E*. Science Publishers, Enfield, New Hampshire.

POPULAR ARTICLES

- Hodgson, W., **S.D. Fehlberg**, and K. McCue. 2012. Rare plants as treasures and challenges. *Sonoran Quarterly* 66(2): 4-7.
- Fehlberg, S.D.**, A. Salywon, and K. McCue. 2011. Ciénegas: Rare oases in the desert. *Sonoran Quarterly* 65(2): 4-7.
- Fehlberg, S.D.** 2009. The conservation of desert plants: What can genetics tell us? *Sonoran Quarterly* 63(1): 8-11.

INVITED SEMINARS

- 2013 **Northern New Mexico College**, Biology Department, Espanola, NM: Plant diversity in the Southwestern Deserts: Rare plants, genetics, and conservation.
- 2011 **Desert Botanical Garden**, Volunteers in the Garden, Phoenix, AZ: Unlocking the data in DNA to understand plant relationships and conserve plants.
- 2010 **Arizona Science Center**, Adults' Night Out, Phoenix, AZ: Plant Conservation in the Desert Southwest- What Can Genetics Tell Us?

- 2010 **Arizona Native Plant Society**, Phoenix, AZ: Plant Conservation in the Desert Southwest- What Can Genetics Tell Us?
- 2010 **Arizona State University**, Plant Biology, School of Life Sciences, Tempe, AZ: Plant Conservation in the Desert Southwest- What Can Genetics Tell Us?
- 2009 **Achievement Rewards for College Scientists Foundation**, Phoenix, AZ: Linking new techniques and traditional approaches in botanical research.
- 2009 **Desert Botanical Garden**, Volunteers in the Garden, Phoenix, AZ: Using genetic tools to study plants in the southwestern deserts.
- 2006 **Kansas State University**, Division of Biology, Manhattan, KS: Post-glacial history of *Encelia farinosa* in southwestern North America- Inferences from phylogeography.
- 2004 **Colorado Native Plant Society**, Denver, CO: The use of morphology and genetics in determining relationships within a desert sunflower genus.
- 2000 **Colorado Native Plant Society**, Denver, CO: Status of the Green Sedge (*Carex viridula*) in Colorado.

CONTRIBUTED PRESENTATIONS

- Chansler, M., C.J. Ferguson, **S.D. Fehlberg**, and L.A. Prather. 2014. Analysis of morphological variation between diploid, tetraploid, and hexaploid *Phlox amabilis*. **Botanical Society of America**, Boise, ID.
- Fehlberg, S.D.**, J.M. Allen, and K. Church. 2014. Distinguishing Arizona hedgehog cactus, a federally endangered species, from its close relatives using genetic information. **Botanical Society of America**, Boise, ID.
- Waselkov, K., B. Wright, **S.D. Fehlberg**, M. Mayfield, and C.J. Ferguson. 2014. Perplexing polyploidy in the Polemoniaceae: patterns in *Phlox* phylogenies. **Botanical Society of America**, Boise, ID.
- Wright, B., M. Chansler, K. Waselkov, N. Busch, **S.D. Fehlberg**, L.A. Prather, and C.J. Ferguson. 2014. Engaging students in scientific discovery through a collaborative, multidisciplinary research project on polyploidy and plant biodiversity. **Botanical Society of America**, Boise, ID.
- Fehlberg, S.D.**, J.M. Allen, and K. Church. 2014. Genetic investigations hold promise for resolution of difficult relationships among red-flowered hedgehog cacti, *Echinocereus* section *Triglochidiatus*. **International Organization for Succulent Plant Study Congress**, Phoenix, AZ.
- Fehlberg, S.D.**, M.C. Ty, and C.J. Ferguson. 2013. Genetic evidence bolstering the hypothesis of a hybrid origin of *Phlox pilosa* subsp. *deamii* (Polemoniaceae). **Botanical Society of America**, New Orleans, LA.
- Waselkov, K., B. Wright, L.A. Prather, **S.D. Fehlberg**, and C.J. Ferguson. 2013. Polyploidy and diversity in the genus *Phlox*: development of polyploid assemblages as study

- systems for phylogenetic and phylogeographic work. **Ecological Genomics Symposium**, Kansas City, MO.
- Fehlberg, S.D.**, J.M. Allen, and K. Church. 2012. Amplification and sequencing of genomic DNA extracted from cactus spines. **Botanical Society of America**, Columbus, OH.
- Fehlberg, S.D.**, J.M. Allen, M. Tluczek, and A. Salywon. 2012. Molecular analysis of pronghorn antelope diet using semiconductor sequencing. **Botanical Society of America**, Columbus, OH.
- Fehlberg, S.D.** 2010. Distribution of genetic variation in *Encelia farinosa* (Asteraceae) inferred from universal nuclear markers for the Asteraceae. **Botanical Society of America**, Providence, RI.
- Ferguson, C.J., T. Melhem, L.A. Prather, and **S.D. Fehlberg**. 2010. Perplexing patterns of polyploidy- investigating ploidy level variation and its correlates within the context of phylogeny in *Phlox* (Polemoniaceae). **Botanical Society of America**, Providence, RI.
- Fehlberg, S.D.**, M.P. Nepal, and C.J. Ferguson. 2009. The importance of genetic and cytotype variation in conservation- an example from *Phlox* (Polemoniaceae). **Botanical Society of America**, Snowbird, UT.
- Nepal, M.P., **S.D. Fehlberg**, and C.J. Ferguson. 2009. Developing and applying low-copy nuclear regions for phylogenetic study in the genus *Phlox* (Polemoniaceae). **Botanical Society of America**, Snowbird, UT.
- Ty, M.C., **S.D. Fehlberg**, and C.J. Ferguson. 2008. Using microsatellites to test the hypothesis of hybrid origin in a plant taxon. **Kansas State University**, Undergraduate Research Forum, Manhattan, KS.
- Fehlberg, S.D.** and C.J. Ferguson. 2008. Genetic structure and evolutionary history of the *Phlox woodhousei* (Polemoniaceae) complex inferred from microsatellite data. **Botanical Society of America**, Vancouver, BC.
- Fehlberg, S.D.**, M.P. Nepal, M.C. Ty, and C.J. Ferguson. 2008. Evolutionary history and ecological significance of polyploidy in the *Phlox woodhousei* complex in the arid southwest. **Ecological Genomics Symposium**, Kansas City, MO.
- Fehlberg, S.D.**, K.A. Ford, M.C. Ungerer, and C.J. Ferguson. 2007. Development, transferability, and application of microsatellite markers in *Phlox* (Polemoniaceae). **Botanical Society of America**, Chicago, IL.
- Ty, M.C., **S.D. Fehlberg**, and C.J. Ferguson. 2007. Initiating population genetic work on a *Phlox* of putative hybrid origin. **Kansas State University**, Undergraduate Research Forum, Manhattan, KS.
- Fehlberg, S.D.**, K.A. Ford, and C.J. Ferguson. 2006. Microsatellite marker development for *Phlox*- towards understanding the functional significance of reproductive character position. **Ecological Genomics Symposium**, Kansas City, MO.

- Fehlberg, S.D.** and T.A. Ranker. 2006. Phylogeography of *Encelia farinosa* (Asteraceae) in the Sonoran, Mojave, and Peninsular Deserts. **Botanical Society of America**, Chico, CA.
- Geiger, J.M.O., M.E. Wright, K. Christensen, **S.D. Fehlberg**, and T.A. Ranker. 2006. Alternate pathways of fern dispersal to the Hawaiian Islands, Part 1: *Hypolepis* & *Diplopterygium*. **Botanical Society of America**, Chico, CA.
- Fehlberg, S.D.** and T.A. Ranker. 2004. Diversification of *Encelia* (Asteraceae) in the Sonoran and Mojave Deserts. **Botanical Society of America**, Snowbird, UT.
- Fehlberg (Kuchel), S.D.** and L.P. Bruederle. 1999. Genetic diversity and structure in geographically marginal populations of *Carex viridula* Michx. (Cyperaceae). **XVI International Botanic Congress**, St. Louis, MO.
- Yarbrough, S.L., L.P. Bruederle and **S.D. Fehlberg (Kuchel)**. 1999. The effects of dioecy on population genetic structure in *Carex scirpoidea* Michx. (Cyperaceae). **XVI International Botanic Congress**, St. Louis, MO.

RESEARCH SUPERVISION AND MENTORSHIP

- 2014-present: Amrita Rhoads, high school student intern
- 2013-present: Tyffany Nidey, research assistant (grant funded)
- 2013-present: Margaret Wright, research assistant (grant funded)
- 2013-present: Dr. Donna Dehn, volunteer research assistant
- 2011-2013: Dr. Mary Lynn Formanack, volunteer research assistant
- 2011-2012: Christopher Lanter, graduate student, Arizona State University
- 2010-present: Jessica Allen (Tew), lab manager and research assistant (partially grant funded)
- 2010-present: Dr. Kathleen Church, volunteer research assistant
- 2010: Beth Carbone, research assistant (grant funded)
- 2009-2010: Melanie Tluczek, graduate student, Arizona State University
- 2009-2010: Camille Rucker, high school student intern
- 2009: Abby Medina, undergraduate student, Arizona State University
- 2007: Thelma Green, participant in SUROP, Kansas State University
- 2006-2008: Madhav Nepal, graduate student, Kansas State University
- 2006-2008: Maureen Ty, undergraduate student and participant in program for students from under-represented groups in research, Summer Undergraduate Research Opportunity Program (SUROP), Kansas State University
- 2006-2007: Kristen Ford, undergraduate student, Kansas State University
- 2005: Julie Fast, undergraduate student, University of Colorado

PROFESSIONAL DEVELOPMENT

- 2012 Landscape Genetics Distributed Graduate Course, University of Idaho
- 2011 Presenting Data and Information, Edward Tufte Seminar
- 2010 Introduction to GIS: Using ArcGIS, Mesa Community College
- 2010 Creative Alliances Seminar, National Strategies for the Arts
- 2010 Species Distribution Modeling Workshop, American Museum of Natural History
- 2009 Applied Plant Conservation Workshop, Center for Plant Conservation
- 2007 Summer Institute in Statistical Genetics, University of Washington
- 2002 Tropical Plant Systematics field course, Organization of Tropical Studies

PROFESSIONAL SERVICE AND COMMUNITY OUTREACH

- 2014 Organizational team member for the 33rd Congress of the **International Organization for Succulent Plant Study (IOS)**, meeting held at the Desert Botanical Garden
- 2013-present: Development team member for high school *Phlox* educational module, collaborative initiative with the **Desert Botanical Garden**, Kansas State University, and Michigan State University
- 2013-present: Panel member and *ad-hoc* reviewer, Division of Environmental Biology, **National Science Foundation**
- 2013-present: Curriculum development committee member, Masters in Plant Biology and Conservation, **Arizona State University**
- 2013-present: Organizational team member and workshop instructor for *Exploration Friday*, a local elementary school outreach with Arcadia Neighborhood Learning Center and the **Desert Botanical Garden**
- 2012-2013: Panel member for annual student involvement and career luncheon, **Botanical Society of America**.
- 2009-present: *Planting Science* mentor to high school science students and focus group member (2012), **Botanical Society of America**
- 2009-present: *Desert Studies Scholarship* committee member and chair (2012), **Garden Club of America**
- 2009-present: Annual attendee and organizational team member (2012) for the **Arizona Botany Meeting**
- 2009-present: **Reviewer** for: *Molecular Ecology*, *Molecular Phylogenetics and Evolution*, *American Journal of Botany*, *Journal of Biogeography*, *Conservation Genetics*, *BMC Evolutionary Biology*, *Botany*, *Plant Biosystems*, *Biological Invasions*, *Freshwater Biology*, *Applications in Plant Sciences*, and the US Fish and Wildlife Service.

2009-2013: Planning team member and leader in the coordination, communication, and design of the new molecular genetics laboratory for the Pulliam building expansion, **Desert Botanical Garden**

2009 Search committee member, Program Director, Conservation of Threatened Species and Habitats, **Desert Botanical Garden**

2009 Book reviewer, **Botanical Society of America**

2009 *Young Scientist* Science Fair judge, **Hidden Hills Elementary School**, Phoenix, AZ

2008-present: Planning team member and participant in outreach activities for scientists, students, and members of the public, **Desert Botanical Garden**

Including but not limited to workshops, presentations, and program tours for: American Public Garden Day, Arizona K12 Center, Arizona State University, Chinese Academy of Science, DBG 75th Anniversary Community Celebration, DBG Conservation Camp, DBG Planet Rescue Camp, DBG Docent training, DBG Patron's Circle events, DBG Research, Conservation, and Horticulture committee, Dorrance Family Foundation, Flagstaff Arboretum, Gateway Community College, Harvard Club, National Science Foundation, and University of Alberta

2007 Partner with High school science educators, **Kansas State University**

2002-present: member of **Botanical Society of America** and **American Society of Plant Taxonomists**