

CURRICULUM VITAE

MICHAEL SHANE BARKER

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RESEARCH INTERESTS

Ployploidy, Hybridization, Diversification, Speciation & Adaptation, Chromosome Evolution, Plant Evolutionary Genomics & Bioinformatics, Plant Systematics, Pteridophytes

POSITIONS & EDUCATION

January 2011	Assistant Professor, Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, Arizona
2009 – 2011	Biodiversity Postdoctoral Fellow, The Biodiversity Research Centre, University of British Columbia, Vancouver, British Columbia
2004 – 2009	Ph.D., Evolutionary Biology, Indiana University, Bloomington, Indiana Thesis: Paleopolyploidy and the evolution of plants Co-Advisors: Loren H. Rieseberg & Gerald J. Gastony
2001 – 2003	M.S., Botany, Miami University, Oxford, Ohio Thesis: A taxonomic revision of Caribbean <i>Adiantopsis</i> (Pteridaceae) Advisor: R. James Hickey
1997 – 2001	B.S. <i>cum laude</i> , Biology, Denison University, Granville, Ohio Thesis: An evaluation of <i>Sceptridium dissectum</i> (Spreng.) Lyon and <i>S. oneidense</i> (Gilb.) House (Ophioglossaceae) using ISSR markers Advisor: Warren D. Hauk

PUBLICATIONS

- Shi, T., H. Huang, and **M. S. Barker**. 2010. Ancient genome duplications during the evolution of kiwifruit (*Actinidia*) and related Ericales. *Annals of Botany* in press.
- Dempewolf, H., N. C. Kane, K. L. Ostevik, M. Geleta, **M. S. Barker**, Z. Lai, M. L. Stewart, E. Bekele, J. M. M. Engels, Q. C. B. Cronk, and L. H. Rieseberg. 2010. Establishing genomic tools and resources for *Guizotia abyssinica* (L.f.) Cass. - the development of a library of expressed sequence tags, microsatellite loci and the sequencing of its chloroplast genome. *Molecular Ecology Resources* in press.
- Barker, M. S.** and P. G. Wolf. 2010. Unfurling fern biology in the genomics age. *BioScience* 60(3): 177-185.
- Mayrose, I., **M. S. Barker**, and S. P. Otto. 2010. Probabilistic models of chromosome number evolution and the inference of polyploidy. *Systematic Biology* 59(2): 132-144.
- Barker, M. S.**, H. Vogel, and M. E. Schranz. 2009. Paleopolyploidy in the Brassicales: Analyses of the *Cleome* transcriptome elucidate the history of genome duplications in *Arabidopsis* and other Brassicales. *Genome Biology and Evolution* 1(1): 391-399.
- Wood, T. E., N. Takebayashi, **M. S. Barker**, I. Mayrose, P. B. Greenspoon, and L. H. Rieseberg. 2009. The frequency of polyploid speciation in vascular plants. *Proceedings of the National Academy of Sciences of the USA* 106(33): 13875-13879.
- Kane, N. C., M. King, **M. S. Barker**, A. Raduski, S. Karrenberg, Y. Yatabe, S. J. Knapp, and L. H. Rieseberg. 2009. Comparative genomic and population genetic analyses indicate highly porous genomes and high levels of gene flow between divergent *Helianthus* species. *Evolution* 63(8): 2061-2075.
- Barker, M. S.***, K. M. Dlugosch*, A. C. C. Reddy, S. N. Amyotte*, and L. H. Rieseberg. 2009. SCARF: Maximizing next-generation EST assemblies for evolutionary and population genomic analyses. *Bioinformatics* 25(4): 535-536.
*Co-first authors, *Undergraduate
- Barker, M. S.**, N. C. Kane, M. Matvienko, A. Kozik, R. W. Michelmore, S. J. Knapp, and L. H. Rieseberg. 2008. Multiple paleopolyploidizations during the evolution of the Compositae reveal parallel patterns of duplicate gene retention after millions of years. *Molecular Biology and Evolution* 25(11): 2445-2455.
- Nakazato, T., **M. S. Barker**, L. H. Rieseberg, and G. J. Gastony. 2008. Evolution of the nuclear genome of ferns and lycophytes. Pp. 177-200 in: *The Biology and Evolution of Ferns and Lycophytes*, T. Ranker and C. Haufler, eds. Cambridge University Press.
- Shaw, S. W., S. V. Sprunt, and **M. S. Barker**. 2008. New records for Puerto Rican Ferns. *American Fern Journal* 98(2): 107-111.
- Brandvain, Y.*, **M. S. Barker***, and M. J. Wade. 2007. Gene co-inheritance and gene transfer. *Science* 315: 1685.
*Co-first authors

- Barker, M. S.** and R. J. Hickey. 2006. A taxonomic revision of Caribbean *Adiantopsis* (Pteridaceae). *Annals of the Missouri Botanical Garden* 93(3): 371-401.
- Barker, M. S.**, J. Demuth, and M. Wade. 2005. Maternal expression relaxes constraint on innovation of the anterior determinant, *bicoid*. *PLoS Genetics* 1(5): e57.
- Barker, M. S.**, S. W. Shaw, R. J. Hickey, J. E. Rawlins, and J. Fetzner. 2005. Lepidopteran soral crypsis on Caribbean ferns. *Biotropica* 37(2): 314-316.
- Shaw, S. W., **M. S. Barker**, and R. J. Hickey. 2004. New municipality records for Puerto Rican pteridophytes. *Fern Gazette* 17: 97-99.
- Hauk, W. D. and **M. S. Barker**. 2003. *Botrychium lanceolatum* subsp. *angustisegmentum* in Ohio. *American Fern Journal* 93(2): 93-94.
- Barker, M. S.** and W. D. Hauk. 2003. An evaluation of *Sceptridium dissectum* (Ophioglossaceae) with ISSR markers: Implications for *Sceptridium* systematics. *American Fern Journal* 93(1): 1-19.
- Hickey, R. J., **M. S. Barker**, and M. Ponce. 2003. An *Adiantopsis* hybrid from northeastern Argentina and vicinity. *American Fern Journal* 93(1): 42-44.
- Barker, M. S.** 1999. A molecular assessment of infraspecific genetic variation in *Draba verna* L. using ISSR (Inter-Simple Sequence Repeat) Markers. *Denison Journal of Biological Science* 33(1): 27-34.

NON-REFEREED ARTICLES

- Barker, M. S.** and G. Yatskievych. 2009. Proceedings of the Gastony Honorary Symposium, Botany 2008. *American Fern Journal* 99(2): 117-141.
- Barker, M. S.** 2005. A Natural History of Ferns by Robbin C. Moran. *American Fern Journal* 95(3): 128-129.
- Barker, M. S.** and L. Sanchez. 2005. Inks Lake State Park and Westcave Preserve, Botany 2005 AFS Fern Foray. *Fiddlehead Forum: Bulletin of the American Fern Society* 32(4-5): 31-33.
- Hauk, W. D. and **M. S. Barker**. 2000. Larch Mountain, 2000 AFS Fern Foray. *Fiddlehead Forum: Bulletin of the American Fern Society*. 27(5): 26-27.

INVITED PRESENTATIONS

- Barker, M. S.**, L. H. Rieseberg, and S. Graham. 2010. Botany 2010, Providence, Rhode Island.
- Barker, M. S.** and M. Bogonovich. 2010. Botany 2010, Providence, Rhode Island.
- Rieseberg, L. H., **M. S. Barker**, and K. M. Dlugosch. 2010. Plant Biology 2010, Montreal, Quebec.

- Barker, M. S.** 2010. Academia Sinica, Taipei, Taiwan.
- Barker, M. S.** 2010. National Taiwan Ocean University, Keelung, Taiwan.
- Barker, M. S.** 2010. Wuhan Botanical Garden, Wuhan, China.
- Barker, M. S.** 2010. BGI, Shenzhen, China.
- Barker, M. S.** 2010. Sun Yat-Sen University, Guangzhou, China.
- Barker, M. S.** 2010. South China Botanical Garden, Chinese Academy of Sciences, Guangzhou, China.
- Barker, M. S.** 2010. Plant & Animal Genome Conference XIV, San Diego, California.
- Dlugosch, K. M., **M. S. Barker**, Z. Lai, and L. H. Rieseberg. 2010. Plant & Animal Genome Conference XIV, San Diego, California.
- Barker, M. S.** 2010. The Biodiversity Research Centre, University of British Columbia, Vancouver, BC.
- Barker, M. S.** and L. H. Rieseberg. 2009. Mayr Award Symposium, Evolution 2009, Moscow, Idaho.
- Barker, M. S.** and L. H. Rieseberg. 2009. International Conference on Polyploidy, Hybridization, and Biodiversity, St. Malo, France.
- Barker, M. S.** 2009. VanDusen Botanic Gardens, Vancouver, BC.
- Barker, M. S.** 2009. Department of Plant Biology, Purdue University, West Lafayette, Indiana.
- Barker, M. S.** 2009. Department of Plant Biology, University of Minnesota, St. Paul, Minnesota.
- Barker, M. S.** 2009. Department of Ecology & Evolutionary Biology, University of Arizona, Tucson, Arizona.
- Rieseberg, L. H. and **M. S. Barker**. 2009. European Society for Evolutionary Biology, Torino, Italy.
- Rieseberg, L. H., **M. S. Barker**, and T. E. Wood. 2009. 25th Symposium in Plant Biology, “The Evolution of Plant Development,” University of California, Riverside, California.
- Barker, M. S.** 2009a. Plant & Animal Genome Conference XVIII, San Diego, California.
- Barker, M. S.** 2009b. Plant & Animal Genome Conference XVIII, San Diego, California.
- Barker, M. S.** 2008. Department of Biology, Utah State University, Logan, Utah.
- Barker, M. S.** 2008. Gastony Symposium, Botany 2008, Vancouver, BC.
- Barker, M. S.** and M. Bogonovich. 2008. Polyploidy: Genetics, Evolution, and Ecology Symposium, Botany 2008, Vancouver, BC.
- Dlugosch, K. M., Z. Lai, **M. S. Barker**, and L. H. Rieseberg. 2008. Plant & Animal Genome Conference XVI, San Diego, California.

- Kane, N. C., **M. S. Barker**, and L. H. Rieseberg. 2008. Plant & Animal Genome Conference XVI, San Diego, California.
- Kane, N. C., **M. S. Barker**, and L. H. Rieseberg. 2007. European Society for Evolutionary Biology, Uppsala, Sweden.
- Barker, M. S.**, N. C. Kane, and L. H. Rieseberg. 2007. 5th Annual Canadian Plant Genomics Workshop, Vancouver, British Columbia.
- Barker, M. S.** 2007. Plant & Animal Genome Conference XV, San Diego, California.
- Barker, M. S.** 1998. 150th Annual Meeting of the American Association for the Advancement of Science, Philadelphia, PA.

SUBMITTED PRESENTATIONS

- Barker, M. S.**, K. M. Dlugosch, and L. H. Rieseberg. 2010. Evolution 2010, Portland, OR.
- Dlugosch, K. M., **M. S. Barker**, Z. Lai, and L. H. Rieseberg. 2010. Evolution 2010, Portland, OR.
- Barker, M. S.** and L. H. Rieseberg. 2008. Botany 2008, Vancouver, BC.
- Dlugosch, K. M., **M. S. Barker**, Z. Lai, and L. H. Rieseberg. 2008. Botany 2008, Vancouver, BC.
- Barker, M. S.**, L. Dinh, and L. H. Rieseberg. 2008. Botany 2008, Vancouver, BC.
- King, M. G., **M. S. Barker**, N. C. Kane, and L. H. Rieseberg. 2008. Botany 2008, Vancouver, BC.
- Barker, M. S.** and L. H. Rieseberg. 2008. Evolution 2008, Minneapolis, Minnesota.
- Barker, M. S.**, N. C. Kane, and L. H. Rieseberg. 2007. AGA Symposium, Mechanisms of Genome Evolution, Bloomington, Indiana.
- Barker, M. S.**, N. C. Kane, and L. H. Rieseberg. 2007. Botany 2007, Chicago, Illinois.
- Barker, M. S.**, N. C. Kane, and L. H. Rieseberg. 2007. SMBE 2007, Halifax, Nova Scotia.
- Barker, M. S.** 2006. AGA Symposium, Speciation Genetics, Vancouver, British Columbia.
- Barker, M. S.** 2006. Botany 2006. Chico, California.
- Barker, M. S.** 2005. Botany 2005, Austin, Texas.
- Shaw, S. W., **M. S. Barker**, R. J. Hickey, and J. E. Rawlins. 2005. Botany 2005, Austin, Texas.
- Barker, M. S.** and R. J. Hickey. 2004. Ferns for the 21st Century, Royal Botanical Garden, Edinburgh, Scotland.
- Barker, M. S.** and R. J. Hickey. 2003. Botany 2003, Mobile, Alabama.
- Barker, M. S.**, S. W. Shaw, R. J. Hickey, and J. E. Rawlins. 2003. Botany 2003, Mobile,

Alabama.

Barker, M. S. and W. D. Hauk. 2002. Annual Meeting of the Association of Southeastern Biologists.

Barker, M. S. and W. D. Hauk. 2001. Botany 2001, Albuquerque, New Mexico.

Barker, M. S. and W. D. Hauk. 2001. Ohio Academy of Science Annual Meeting.

Barker, M. S. 2000. Ohio Academy of Science Annual Meeting.

Barker, M. S. 2000. Ohio Academy of Science Annual Meeting.

Barker, M. S. 1998. Ohio Academy of Science Annual Meeting.

Barker, M. S. 1997. Ohio Academy of Science Annual Meeting.

Barker, M. S. 1996. Ohio Academy of Science Annual Meeting.

GRANTS & OTHER SUPPORT

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| 2004 | Willard Sherman Turrell Herbarium Grant #194, "Collecting ferns and microlepidoptera in Puerto Rico," \$3380.00. |
| 2004 | Cleland Travel Grant to attend Ferns for the 21 st Century in Edinburgh, Scotland, \$500.00. |
| 2002 | Ohio Academic Challenge Grant, "A morphological and SEM investigation of <i>Adiantopsis</i> taxa," \$1880.00. |
| 2001 | Willard Sherman Turrell Herbarium Grant #180, "A Joint proposal for collecting Puerto Rican <i>Adiantopsis</i> and Cyatheaceae," \$2,830.00. |
| 2001 | Ohio Academic Challenge Startup Grant, "A systematic investigation of <i>Adiantopsis pedata</i> ," \$250.00. |
| 2000 | Ohio Garden Club Scholarship and Grant, \$2000.00. |
| 2000 | Denison University Student Research Grant, "Evaluation of <i>Sceptridium dissectum</i> using ISSR markers," \$330.00. |
| 2000 | Anderson Research Assistantship, "Evaluation of <i>Sceptridium dissectum</i> using ISSR (Inter-Simple Sequence Repeat) markers," \$3500.00. |
| 1999 | Denison University Student Research Grant, "ISSR PCR investigations of <i>Draba verna</i> and <i>Sceptridium dissectum</i> population genetic variation," \$350.00. |
| 1999 | Denison University Young Scholar, "Genetic variation of <i>Draba verna</i> L. assessed by ISSR PCR," \$3500.00. |

RESEARCH AND RELATED AWARDS

2010 – 2011	Young International Scientist Fellowship, South China Botanical Gardens, Chinese Academy of Sciences, Guangzhou, China
2009 – 2011	NSERC BRITE Biodiversity Postdoctoral Fellowship, The Biodiversity Research Centre, University of British Columbia, Vancouver, BC
2008	Margaret Menzel Award, Best Paper in the Genetics Section, Botany 2008
2006	Pteridological Student Travel Award, Botany 2006
2004 – 2006	NIH Training Grant Appointee in Genetics, Cellular, and Molecular Biology, Department of Biology, Indiana University, Bloomington, Indiana
2004	NSF IGERT Fellow; Evolution, Development, and Genomics; Department of Biology, Indiana University, Bloomington, Indiana
2003	Edgar T. Wherry Award, Best Paper in the Pteridological Section, Botany 2003
2003	Heimsch Award, Outstanding Graduate Student, Department of Botany, Miami University, Oxford, Ohio
2003	Inducted in Phi Kappa Phi, Miami University
2001	Young Botanist Award, Botanical Society of America
2000 – 2001	Senior Fellow, Department of Biology, Denison University, Granville, Ohio
2000 – 2001	Margaret Ann Watkins Scholar, Department of Biology, Denison University, Granville, Ohio
2000	Inducted in Mortar Board, Denison University
1998	Denison University Phi Society

TEACHING EXPERIENCE

2008	Instructor, BIOL-415 Plant Evolutionary Biology, Department of Botany, University of British Columbia.
2007	Introductory Perl for Biologists Workshop, Department of Botany, UBC.
2002	Instructor, Field Botany BOT-155, Department of Botany, Miami University.
2001 – 2002	Graduate Assistant, Introductory Biology BMZ-115 & 116, Department of Botany, Miami University.
1998 – 2000	Undergraduate Teaching Assistant, Department of Biology, Denison University. Assisted faculty with teaching laboratory sections for Plant Biology (BIOL – 102), Plant Systematics (BIOL - 320), Ecology and Evolution (BIOL - 202), and Molecular Biology (BIOL - 112).

UNDERGRADUATE STUDENTS MENTORED

2009 – 2010	Shing Zhan – The evolution of chromosome numbers across the green plant tree of life.
2008	Vakil Perbhoo – Assessing the impact of molecular evolutionary rate heterogeneity on the rate of neo- and subfunctionalization of duplicate genes.
2007 – 2009	Louie Dinh – Development of a bioinformatic pipeline for whole genome referenced ortholog determination and the EvoPipes.net server.
2007	Caitlin Der – Reproduction of a <i>Ceratopteris</i> mapping population.
2007	Sarah Amyotte – Identifying patterns of selection on duplicate genes across the green plants and developing software for 454-EST scaffolding and alignment.
2006	Lim Kah Suan – Detecting diploid hybrids in <i>Osmunda</i> .

OTHER EXPERIENCE

2003	Curatorial Assistant for Willard Sherman Turrell Herbarium, Department of Botany, Miami University.
1994 – 1998	Laboratory Technician, USDA-Forest Service Northeast Experiment Station, Delaware, Ohio.

SERVICE

2009 – 2010	NESCent Working Group for Plant Evolutionary Genomics
2008	Co-Organizer of the Gastony Honorary Symposium, Botany 2008
2008	Local representative and organizer for the American Fern Society at Botany 2008
2001 – 2006	Fern Foray group leader at annual All Taxa Biodiversity Initiative forays in the Great Smokey Mountains National Park
2002	Graduate Student Representative to Botany Department, Miami University
1999 – 2004	Director of Student Advisory Council and Voting member of Ohio Academy of Science Executive Committee and Board of Trustees
1998 – 2003	Judge at local, district, and Ohio state science fairs
1998 – 2001	Editor of the <i>Denison University Journal of Biological Sciences</i>

Reviewer for the American Fern Journal, American Journal of Botany, Annales Botanici Fennici, Annals of Botany, Bioinformatics, BMC Plant Biology, Current Biology, Genome Research, Ecology Letters, Journal of Heredity, Molecular Biology and Evolution, Molecular Ecology, Molecular Phylogenetics and Evolution, New Phytologist, NSF, Plant Cell, PNAS, Proceedings of the Royal Society B, and Science.

SOFTWARE DEVELOPMENT

- SCARF: An evolutionary genomic assembly tool for next-generation sequence data. <http://msbarker.com/software.htm>
- EvoPipes.net Evolutionary Genomics Webserver: Publicly available pipelines and forums for evolutionary genomics and bioinformatics. <http://evopipes.net>
- chromEvol: A tool for testing patterns of chromosome evolution across phylogenies. <http://www.zoology.ubc.ca/~mayrose/cp/chromEvol>
- NU-IN: A tool for simulating gene family evolution with real sequence data. <http://kdlugosch.net/software/>

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science
American Fern Society
American Society of Plant Taxonomists
British Pteridological Society
Botanical Society of America
National Association of Academies of Science
Ohio Academy of Science
Society for Molecular Biology and Evolution
Society for the Study of Evolution