

CURRICULUM VITAE: ROBERT JOEL DUFF

Department of Biology

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EDUCATION

1995. Ph.D. – Molecular systematics and evolution. University of Tennessee, Knoxville, Department of Botany. Dissertation: Restriction site variation and structural analysis of the chloroplast DNA of *Isoetes* in North America. Advisor: Dr. Edward E. Schilling.

1991. M.S. - Botany. University of Tennessee, Knoxville, Department of Botany. Thesis: An electrophoretic study of two closely related species of *Isoetes* L. from the southern Appalachians. Advisor: Dr. A. Murray Evans.

1989. B.S. - Biology. Calvin College, Grand Rapids, Michigan.

PROFESSIONAL EXPERIENCE

August 2010 – present	Professor, Biology, University of Akron
August 2005 – July 2010	Associate Professor, Biology, University of Akron
August 2006 – 2008.	Associate Chair, Dept. of Biology, University of Akron
August 1999 – July 2005.	Assistant Professor, Biology, University of Akron.
October 1998- July 1999.	Postdoctoral Research Associate. Southern Illinois University, Dept. Plant Biology. Characterization of chloroplast DNA genomes of holoparasitic plants. Laboratory of Dr. Daniel L. Nickrent.
March – September 1998.	Postdoctoral Research Associate. Southern Illinois University. Molecular physiological studies of desiccation tolerance in <i>Tortula ruralis</i> (Bryophyta). Laboratory of Dr. Andrew. J. Wood.
June 1995 - February 1998.	Postdoctoral Research Associate. Southern Illinois University. Molecular evolutionary and systematic studies of holoparasitic plants. Laboratory of Dr. Daniel L. Nickrent.

HONORS AND AWARDS

- Sullivant Award – Best paper in the journal “The Bryologist” for 2008
- Early Career Research Award, 2004. College of Arts and Sciences, University of Akron
- Honors Colloquium Instructor of the Year 2000/2001, Honors College, University of Akron
- Margaret Menzel Award – Best paper: Genetics Section of the Botanical Society of America. 2000
- Professional Promise Award, College of Science, University of Tennessee, 1995
- Edgar Wherry award: Best Student paper AIBS Pteridological Section, 1994
- University of Tennessee, Science Alliance Award, 1992, 1993, 1994
- Sigma Xi paper competition, 1993 (Second Place)
- Holton Graduate Student Teaching Award, 1991.

RESEARCH:

FUNDED RESEARCH GRANTS

- 1) 2009-20012: NSF ARC: “Impacts of Climate Change and Ice Conditions on Microbial Food Web Dynamics in the Barents Sea” ca \$600K. 8/15/09-7/31/2012. PI Lavrentyev (Duff, un-named participant – see narrative for explanation)
- 2) 2008. U. of Akron summer fellowship. “Microsatellite development for genetic markers for clamshrimp” \$10,000. PI. J. Duff
- 3) 2008. U. of Akron RIG (Research in Integrative Biology) grant. “Novel bio-control of an invasive aquatic weed using a native aquatic herbivore: preliminary genetic and chemical assays of *Myriophyllum spicatum* and *Euhrychiopsis lecontei*. PIs Weeks (Biology), Duff, and Wesdemiotis (Chemistry) \$10,000
- 4) 2006. Ohio Board of Regents. “OBR-RC for purchase of ABI3130 Genetic Analyzer and PCR machine” Funded \$150,000 PI. J. Duff, co-PI Monte Turner.
- 5) 2003-2006. National Science Foundation: DEB: Systematic Biology. “Biodiversity, phylogeny, and biogeography of hornworts. Funded \$115,922. J. Duff Principle Investigator
- 6) 2003-2006. Ohio Board of Regents Individual Research Challenge Match to Collaborative Research: Biodiversity, Phylogeny and Biogeography of Hornworts. Funded \$20,000. J. Duff Principle Investigator.
- 7) 2003-2006. National Science Foundation: Microbial Observatories. “Eukaryotic microbial communities of the Old Woman Creek National Estuarine Reserve Reserve” Funded: \$220,574. P. Lavrentyev Principle Investigator, J. Duff co-Principle Investigator
- 8) 2003-2006. Ohio Board of Regents Individual Research Challenge Match to Collaborative Research: Eukaryotic microbial communities of the Old Woman Creek National Estuarine Reserve Reserve. Funded \$15,000. P. Lavrentyev Principle Investigator, J. Duff co-Principle Investigator.
- 9) 2002-2003. Herman Muehlstein Foundation (Fall 2002 – Fall 2003) at ca. \$300,000. J. Duff Senior Scientist
- 10) 2002-2005. National Science Foundation. IBN: Animal Behavior. “Reproductive tactics in an androdioecious crustacean – Laboratory and field tests of a model for the maintenance of a mixed mating system” Funded \$120,000, anticipated final funding level over 3 years - \$340,004. S. Weeks Principle Investigator, J. Duff co-Principle Investigator
- 11) 2002-2005. Ohio Board of Regents Individual Research Challenge Match to Collaborative Research: Reproductive tactics in an androdioecious crustacean – Laboratory and field tests of a model for the maintenance of a mixed mating system. Funded \$20,000. S. Weeks Principle Investigator, J. Duff co-Principle Investigator.
- 12) 2004-2005. National Science Foundation. IBN. Animal Behavior. “Reproductive tactics in an androdioecious crustacean – Laboratory and field tests of a model for the maintenance of a mixed mating system, REU supplement. Funded \$5,928. S. Weeks Principle Investigator, J. Duff co-Principle Investigator
- 13) 2001. University of Akron summer fellowship. “Phylogeny of an Ancient Plant Lineage” The Hornworts” PI. \$8000
- 14) 2001. U. of Akron Research II Equipment Matching Funds Program. \$7700
- 15) 2001. U. of Akron Research II Incentives Seed Grant. \$2000
- 16) 2000. U. of Akron summer fellowship. “Evolution of Ribosomal DNA Genes in Plant Mitochondria” \$8000
- 17) 2000. U. of Akron Research II Equipment Matching Funds Program. \$7700
- 18) 1994-1996. NSF: Dissertation Improvement Grant, National Science Foundation. Systematic Analysis of *Isoetes* in North America. **\$6,385**

EXTRAMURAL GRANT PROPOSALS – PENDING:

- 2010-2014 – NSF: “Maintenance of Androdioecy in Metapopulations: Empirical Tests Using a Temporary-Pool Freshwater Crustacean.” \$636,445. Submitted 07/07/09. Weeks PI, Duff co-PI, Pannell co-PI

EXTRAMURAL GRANT PROPOSALS-UNFUNDED:

- 2009-2013 – NSF:DEB “Maintenance of Androdioecy in Metapopulations: Empirical Tests Using a Temporary-Pool Freshwater Crustacean.” \$588,844. Submitted 07/23/08. Weeks PI, Duff co-PI, Pannell co-PI

- 2008-2011 – NSF:DEB “Maintenance of androdioecy in metapopulations: Emperical tests using a temperty-pool freshwater crustacean. \$424,566. Submitted 01/24/2008 Weeks PI, Duff co-PI
- 2009-2012 – NSF:DEB “Maintenance of androdioecy in metapopulations: Emperical tests using a temperty-pool freshwater crustacean. \$398,955. Submitted 07/06/07 Weeks PI, Duff co-PI
- 2008-2011 – NSF:ARC “Impacts of Climate Change and Ice Conditions on Microbial Food Web Dynamics in the Barents Sea. \$873,975. Submitted 11/13/2007, Lavrentyev PI, Duff co-PI
- 2007-2010 – NSF:DEB “Maintenance of androdioecy in metapopulations: Emperical tests using a temperty-pool freshwater crustacean.” \$396,015. Submitted 12/19/2006 Weeks PI, Duff co-PI
- 2007-1020 – NSF:ARC “Collaborative Research: Impacts of Climate Change and Ice Conditions on Microbial Food Web Dynamics in the Barents Sea.” \$611,095. Submitted 12/15/06, Lavrentyev PI, Duff co-PI
- 2007-2010 – NSF:DEB “Maintenance of androdioecy in metapopulations: Emperical tests using a temperty-pool freshwater crustacean.” \$348,805. Submitted 07/07/06 Not funded Weeks PI, Duff co-PI
- 2007-2009 NSF:PIRE. Lake Taimyr Arctic Observatory (pre-proposal). Oct 2006 Lavrentyev Lead-PI (multi-institution co-PIs including Duff) ca. 1,250,000 Not funded
- 2006 - Ohio Board of Reagents: Improving Teaching Quality State Grant Program. “Concept Tests in the Classroom: Formative Assessment of Student Learning in Science.” \$199,594. Submitted 11/01/06. Not Funded. Program Directors: Donovan, Duff, McConnell, Ramlo and Owens.
- 2000-2003. National Science Foundation (Genetics Panel). “Plant Mitochondrial genome evolution: a gene cluster analysis” Requested funds: \$262,962.00. J. Duff Principle Investigator
- 2001-2004. National Science Foundation. “Do differential colonization rates in a metapopulation maintain androdioecy in a temporary-pool freshwater crustacean?” Requested funds \$253,294. S. Weeks Principle Investigator, J. Duff co-Principle Investigator
- 2001-2005. National Science Founation (Div. Molecular and Cellular Bioscience, Program: Microbial Observatories) “Nearshore-offshore trends in prokaryotic and eukaryotic microbial communities of Lake Erie.” Requested funds \$219,614 Peter Lavrentyev co-Principle Investigator, J. Duff co-Principle Investigator (collaborative proposal with Kent State)
- 2001-2005: National Science Foundation. Track – Science, Tech, Eng&Math Teacher. “The Metamorphosis Program: Accelerated Preparation and Investigation of Retention of Math and Science Teachers. Requested funds \$595,363. Lynn Pachnowski, Principle Investigator, J. Duff co-Principle Investigator. (Submitted two times and both were unfunded)
- 2002-2005. DEB: Systematic Biology. “Biodiversity, phylogeny, and biogeography of hornworts. Requested funds \$155,866. J. Duff Principle Investigator
- 2002-2006. Howard Hughes Medical Institute, The WISE Project: Working Inquiry into Science Education’, \$2,152,391. L. Fraser Principle Investigator, J. Duff Senior Scientist.
- 2002-2005. National Science Foundation. UMEB (Undergraduate Mentoring in Environmental Biology). Requested funds \$497,000. S. Weeks Principle Investigator, P. Moore, co-Principle Investigator, J. Duff Senior Scientist.

SCIENTIFIC PAPERS

35. Weeks, S.C., C. Benvenuto, T. F. Sanderson, and R. Joel Duff. 2010. Sex Chromosome Evolution in the Clam Shrimp, *Eulimnadia texana*. Evolution. In Press
34. Liu, Q., Y. Chen, D. Copeland, H. Ball, R. J. Duff, B. Rockich, R. L. Londraville. March 2010. Expression of leptin receptor gene in developing and adult zebrafish. General and Comparative Endocrinology. 166: 346-355.
33. JC Villarreal, **R.J. Duff**, C. Cargill, and B. Goffinett. March 2010. Phylogenetic delineation of *Nothoceros* and *Megaceros* (Anthoceroophyta: Dendrocerotaceae). The Bryologist. 113(1): 106-113.
32. Wood, A. J. and **R. J. Duff**. 2009 (March). The aldehyde dehydrogenase (ALDH) gene superfamily of the moss *Physcomitrella patens* and the algae *Chlamydomonas reinhardtii* and *Osteococcus tauri*. The Bryologist. 112(1): 1-11.

31. Ford, C.S, K. L. Ayres, N. Toomey, N. Haider, J. Van Alphen Stahl, L.J. Kelly, N. Wikstrom, P.M. Hollingsworth, **R. J. Duff**, S. B. Hoot, R. S. Cowan, M.W. Chase, M.J. Wilkinson. 2009 (Jan). Selection of candidate coding DNA barcoding regions for use on land plants. *Bot. J. Linnean Soc.* 159: 1-11.
30. **R. Joel Duff**. 2008 (Sept). Flood geology's abominable mystery. *Perspect. Sci. Christ. Faith.* 60(3): 162-171.
29. Renzaglia, K. S., J. C. Villarreal A., and **R. Joel Duff**. 2008 (December). New insights into morphology, anatomy, and systematics of hornworts. In "Bryophyte Biology, Vol II" (Eds. Shaw and Goffinet). 2008. Cambridge MA.
28. **R. Joel Duff**, H. Ball, and P. J. Lavrentyev. 2008 (July). Application of combined morphological-molecular approaches to the identification of planktonic protists from environmental samples. *J. Eukaryot. Microbiol.* 55(4): 306-312.
27. Renzaglia, K. S., S. Schutte, **R. J. Duff**, Ligrone, J. Shaw, B. Mishler, and J. Duckett. 2007 (June). Bryophyte phylogeny: advancing the molecular and morphological frontiers. *The Bryologist*, 110(2): 179-213.
26. **Duff, R. Joel.**, J. C. Villarreal, D. C. Cargill, and K. S. Renzaglia. 2007 (June). Progress and challenges toward developing a phylogeny and classification of the hornworts. *The Bryologist*, 110(2): 214-243.
25. **Duff, R. Joel**, Benvenuto, C. Branch T and S.C. Weeks. 2007 (January). DNA extraction from resting cysts of the conchostracan shrimp *Eulimnadia texana* (Crustacea, Branchiopoda, Spinicaudata). *Journal Crustacean Biology*, 27: 154-157.
24. Qiu, Yin-Long, ...**R. J. Duff**. et al. 2006 (October). The Deepest Divergences in Land Plants Inferred from Phylogenomic Evidence. *PNAS* 103(42): 15511-15516.
23. Liu, B. **R. J. Duff**, R. L. Londraville, J.A. Marrs, and Q. Liu. 2006 (May 8 2006, on-line). Cloning and expression of cadherin-7 in the central nervous system of the embryonic zebrafish. *Gene Expression Patterns*.
22. Liu, Q, **R. J. Duff**, B. Liu, A. Wilson, S. Babb-Clendenon, J. Francl, and J. Marrs. 2006 (Feb 20, on-line). Expression of *cadherin10*, a type II classic cadherin gene, in the nervous system of the embryonic zebrafish. *Gene Expression Patterns*.
21. **R. Joel Duff**. 2006 (January on-line and print). Divergent RNA editing frequencies in hornwort mitochondrial *nad5* sequences. *Gene* 366: 285-291.
20. **R. Joel Duff** and Francisco Moore. 2005 (October on-line, November print). Pervasive RNA Editing Inferred among Hornwort *rbcl* transcripts except *Leiosporoceros*. *Journal of Molecular Evolution*. 61: 571-578.
19. D. Christine Cargill, Karen S. Renzaglia, Juan Carlos Villarreal and **R. Joel Duff**. 2005 (February). Generic Concepts within Hornworts (Phylum Anthocerotophyta). *Australian Systematic Botany*. 18:1-10
18. **Duff, R. Joel**, C. Cargill, J. C. Villarreal and K. S. Renzaglia. 2004 (September). Phylogenetic relationships of the hornworts based on *rbcl* sequence data: novel relationships and new insights. *Monographs of the Annals Missouri Botanical Garden*. 98: 41-58.
17. **Duff, R. Joel**, W. R. Hoeh, D. Cook, and S. W. Weeks. 2004 (Summer). Isolation and characterization of thirteen polymorphic loci from the clam shrimp *Eulimnadia texana* (Crustacea: Spinicaudata). *Molecular Ecology Notes*. 4: 397-399.
16. Weeks, S. C. and **R. J. Duff**. 2002. A genetic comparison of two species of clam shrimp in the genus *Eulimnadia*: An electrophoretic approach. *Hydrobiologia*. 486: 295-302.

15. Nickrent, D. L, Parkinson, Palmer, and **R. J. Duff**. 2000. Multigene phylogeny of plants: hornworts are basal and mosses are sister to liverworts. *Molecular Biology Evolution*. 17(12):1885-1895.
14. Wood, A. J., **R. J. Duff**, and M. J. Oliver. 2000. The translational apparatus of *Tortula ruralis*: polysomal retention of transcripts encoding the ribosomal proteins RPS14, RPS16, and RPL23 in desiccated and rehydrated gametophytes. *Journal Experimental Botany*. 51: 1-8. (October 2000)
13. **Duff, R. Joel** and E. E. Schilling 2000. The chloroplast structure and consensus gene order of *Isoetes* (Isoetaceae) is similar to the liverwort *Marchantia*. *American Fern Journal* 90:51-59.
12. Renzaglia, Karen, **R. J. Duff**, D. L. Nickrent, and D. Garabary. 2000. Vegetative and reproductive innovations of early land plants: implications for a unified phylogeny. *Transactions of the Royal Society, London* 355:769-793.
11. Wood, A. J., **R. J. Duff**, Q. Zeng, and M. J. Oliver. 2000. Molecular architecture of Bryophyte genes: putative polyadenylation signals in cDNA 3'-ends of the desiccation-tolerant moss *Tortula ruralis*. *The Bryologist* 103:44-51.
10. **Duff, R. Joel**, M. J. Oliver, and A. J. Wood. 1999. Isolation and characterization of a Bryophyte (*Tortula ruralis*) cDNA encoding ribosomal protein S3a. *Bryologist* 102: 418-425
9. **Duff, R. Joel** and D. L. Nickrent. 1999. Phylogenetic relationships of land plants using mitochondrial small-subunit rDNA sequences. *American Journal of Botany* 86: 372-386.
8. Gray, L. E., L. Achenbach, **R. J. Duff**, and D. Lightfoot. 1999. Pathogenicity of *Fusarium solani* f. sp. *glycines* in isolates on soybean and greenbean plants. *Plant Phytopathology* 147: 281-284.
7. Wood, Andrew, **R. J. Duff**, and M. J. Oliver. 1999. Expressed sequence tags (ESTs) from desiccated *Tortula ruralis* identify a large number of novel plant genes. *Plant Cell Physiology* 40(4): 361-368.
6. Nickrent, D. L., **R. J. Duff**, A. E. Colwell, A. D. Wolfe, N. D. Young, K. E. Steiner, and C. W. dePamphilis. 1998. Molecular Phylogenetic and Evolutionary Studies of Parasitic Plants. Pp. 211-241 (Chapter 8) In: *Molecular Systematics of Plants II. DNA Sequencing*. D. Soltis, P. Soltis, J. Doyle (eds.). Kluwer Academic Publishers, Boston, MA.
5. **Duff, R. Joel**, and D. L. Nickrent. 1997. Characterization of mitochondrial small-subunit ribosomal RNAs from holoparasitic plants. *Journal Molecular Evolution* 45: 531-539.
4. Nickrent, D. L., **R. J. Duff**, and D. M. Konings. 1997. Structural analysis of plastid-derived 16S rRNAs in holoparasitic angiosperms. *Plant Molecular Biology* 34: 731-743.
3. Nickrent, D. L., Y. Ouyang, **R. J. Duff**, and C. W. dePamphilis. 1997. Do nonasterid holoparasitic flowering plants have plastid genomes? *Plant Molecular Biology* 34: 717-729.
2. Nickrent, D. L, and **R. J. Duff**. 1996. Molecular studies of parasitic plants using ribosomal RNA. In: *Advances in Parasitic Plant Research*. Edited by M. T. Moreno, J. I., Cubero, D. Berner, L. J. Musselman, C. Parker. Cordoba, Spain: Junta de Andalucia, Direccion General de Inverstigacion Agraria;1996: 28-52.
1. **Duff, R. Joel** and A. M. Evans. 1992. Allozyme electrophoresis of two closely related taxa of *Isoetes* in the southern Appalachians. *American Fern Journal* 82: 129-141.

ABSTRACTS AND EDITED PAPERS (non-refereed)

Edited Papers:

Duff, R. Joel, M. J. Oliver, and A. J. Wood. 1999. Nucleotide sequence of a truncated H3 histone cDNA (Accession No. AF093108) from the desiccation-tolerant Bryophyte *Tortula ruralis* (PGR99-014), *Plant Physiology* 119:805.

Wood A. J and **R. J. Duff**. 1999. Subunit V (*PsaG*) of the Photosystem I reaction center (Accession No. AF157017) from desiccated *Tortula ruralis* (PGR99-140). *Plant Physiology* 121:113

Published Abstracts:

J. C. Villarreal A., R. J. Duff, and K. S. Renzaglia. Anatomical and ultrastructural innovations in *Leiosporoceros dussii* (Steph.) Hassel. 2005 Poster XVII International Botanical Congress, Vienna Austria. July 17-23 2005.

D. Cargill, **R. J. Duff** and K. S. Renzaglia. The Hornworts: An International Collaborative Project. Australian systematic botany symposium. August 2003

R. J. Duff, C. Cargill, and K. S. Renzaglia. Hornwort phylogeny and classification revisited. *Botanical Society of America* 2003 #62

R. J. Duff, C. Cargill, and K. S. Renzaglia. Phylogeny and classification of hornworts based on *rbcl* sequences. *Botanical Society of America* 2002 #478

R. J. Duff, M. Davis, and A. Boyle. The fate of conserved ribosomal RNA and protein coding gene clusters during the evolution of land plant mitochondrial genomes. *Amer. J. Bot.* 87:58. 2000.

Nickrent, D., C. Parkinson, J. Palmer and **J. Duff**. Parsimony and likelihood analyses of genes from all three subcellular genomes strongly support major land plant phylogenetic relationships. *Amer. J. Bot* 87:146. 2000.

Wood, A. J., **R. J. Duff** and M. J. Oliver. Expressed sequence tags (ESTs) from desiccated *Tortula ruralis* identify a large number of novel plant genes. *Cellular Basis of Adaption to Salt and Water Stress in Plants*, Oxford, England. August 1998.

Nickrent, D. L. and **R. J. Duff**. Unusual plastid-encoded 16S rRNAs in "nonasterid" holoparasitic angiosperms. *Amer. J. Bot.* 84: 219-220. 1997.

Duff, R. J. and D. L. Nickrent. Characterization of mitochondrial SSU (192) rDNA from holoparasitic plants. *Amer. J. Bot.* 84: 189. 1997.

Duff, R. J. and E. E. Schilling. Structural analysis of the chloroplast genome of *Isoetes*. *The ASB Bull.* spring 1995 81: 1995.

Duff, R. J. and E. E. Schilling. Chloroplast DNA restriction site variation and evidence of structural rearrangements in *Isoetes*. *Amer. J. Bot.* 81: 128; 1994.

Duff, R. J. and E. E. Schilling. The use of chloroplast DNA restriction site data for estimating relationships of *Isoetes* in North America. *Amer. J. Bot.* 80: 108,1993.

Duff, R. J. and E. E. Schilling. The use of chloroplast DNA restriction site data for estimating relationships of *Isoetes* in North America. *The ASB Bull.* 40(2): 104,1993.

Duff, R. J. and A. M. Evans. Allozyme electrophoresis and the taxonomy of two closely related taxa of *Isoetes* in the southern Appalachians. *The ASB Bull.* 39(2): 87, 1992.

PRESENTATIONS

Invited symposium presentations:

Progress and challenges in reconstructing hornwort phylogeny. July 22. 2005 XVII International Botanical Congress, Vienna Austria.

Wolf, P. G. and R. J. Duff. August 2005. RNA editing in land plant organellar genomes and its effect on phylogenetic analysis. Invited symposium talk, Annual Meeting of the Botanical Society of America, Austin TX.

Molecular and morphological diversification in the hornworts, an ancient land plant lineage. Sept 6, 2003. Molecular biology of bryophytes symposium. Missouri Botanical Garden, Annual Botanical Symposium, St. Louis Missouri.

Mitochondrial Small Subunit rRNA (19S) Sequences and Land Plant Phylogeny. Spring Systematics Symposium of the SIUC Center for Systematic Biology. April, 1999

Presentation at International Meetings:

Lavrentyev, P. J., Duff, R. J., Klarer, D. M. Protist diversity, distribution, and dynamics in a storm-driven coastal wetland. American Society of Limnology and Oceanography (ASLO) Annual Meeting, February 22-27, 2005, Salt Lake City, UT

Presentations at National and Regional Meetings:

Lavrentyev PJ, Jochem FJ, Moats KM, Duff RJ. Microplankton composition, distribution, and dynamics during seasonal hypoxia in Lake Erie and the Gulf of Mexico. Ecological Impacts of Hypoxia on Living Resources Meeting, 25-26, 2007, Bay St Louis, MS

Pervasive RNA editing among mitochondrial *nad5* transcripts in hornworts. Poster at the Midwest Ecology and Evolution Conference. March 2005. T. Branch and R. J. Duff.

Comparison of collection and DNA extraction methods for community analysis of unicellular eukaryotes from a lacustrine system. Poster at the Midwest Ecology and Evolution Conference. March 2005. H. Ball, L. Kay, P. Lavrentyev, and R. J. Duff.

Pervasive RNA editing in hornwort chloroplast and mitochondrial protein coding genes. August 2004, Botanical Society of America, Snow Bird Utah

The maintenance and evolution of RNA editing and its effects on phylogeny reconstruction in hornworts. August 2004, Botanical Society of America, Snow Bird Utah

Eukaryotic Microbial Communities of the Old Woman Creek National Estuarine Research Reserve. Ohio DNRA-sponsored research meeting at the OWC NERR. Huron, OH, July 2003. Lavrentyev, P.J., Duff, R.J., Jochem, F.J., Klarer, D.M.

Hornwort phylogeny and classification revisited. July 28, 2003, Botanical Society of America, Mobile, Alabama

Phylogeny and classification of hornworts based on *rbcL* sequences. August 4 2002, Botanical Society of America, Madison, Wisconsin

The fate of conserved ribosomal RNA and protein coding gene clusters during the evolution of land plant mitochondrial genomes. August 10, 2000, Botanical Society of America, Portland Oregon

Molecular phylogenies of basal embryophytes: new data, old problems. American Bryological and Lichenological Society, Southern Illinois University, August 1999

Structural analysis of the chloroplast genome of *Isoetes*. Association of Southeastern Biologists, Virginia Beach 1995.

Chloroplast DNA restriction site variation and evidence of structural rearrangements. American Institute of Biological Sciences, Knoxville, TN, 1994.

The use of chloroplast DNA restriction site data for estimating relationships of *Isoetes* in North America. American Institute of Biological Sciences, Ames Iowa, 1994.

The use of chloroplast DNA restriction site data for estimating relationships of *Isoetes* in North America. Association of Southeastern Biologists, Birmingham AL, 1993.

Allozyme electrophoresis and the taxonomy of two closely related taxa of *Isoetes* in the southern Appalachians.
The Association of Southeastern Biologists, Knoxville TN, 1992.

Workshops Attended:

NSF Microbial Observatory Workshop – September 2004, Big Sky, MT

SERVICE:

INVITED SEMINARS

- 1994. September. Calvin College, Grand Rapids, MI, Department of Biology
- 1995. February. Eastern Kentucky University, KY, Division of Biology
- 1995. February. Old Dominion University, VA, Department of Biology
- 1995. August. Southern Illinois Molecular Biology Symposium
- 1997. January. Hope College, MI. Department of Biology
- 1997. February. University of Tennessee. Department of Botany
- 1997. October. Southern Illinois University. Department of Plant Biology.
- 1998. February. West Chester University, PA, Department of Biology
- 1998. March. Trinity University, TX, Department of Biology
- 1999. February. Eastern Illinois University, Department of Biological Sciences
- 1999. February. University of Akron, Department of Biology
- 1999. December, University of Akron, Department of Biology
- 2000. January, Kent State University, Department of Biological Sciences
- 2002. May, The Ohio State University, Department of Ecology and Evolution
- 2003. October, Kent State University, Department of Biological Sciences
- 2003. November, University of Akron, Department of Biology
- 2005. October, John Carroll University, Department of Biology
- 2009. November, University of Pittsburgh, Department of Biology

PRESENTATIONS (last 5 years)

- 2004. October, University of Akron “ecolunch” talk. “Oil Crisis? Economists vs Geologists”
- 2005. April, University of Akron “ecolunch” talk. “Morphological Diversity and Evolution of Hornworts”
- 2005. September. University of Akron “ecolunch” talk. “Hurricane Potpourri: oil, prediction modeling and global warming”
- 2008. March, University of Akron “ecolunch” talk. “aDNA Lessons in Success and Failure”
- 2008. September, University of Akron “ecolunch” talk. “Peak Oil: 4 years later”