

CURRICULUM VITAE

Raymond D. Semlitsch

PERSONAL:

Date of Birth: 8 January 1951
Citizenship: United States of America

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PROFESSIONAL EXPERIENCE:

Curators' Professor, Division of Biological Sciences, University of Missouri
January 2004 - present

Professor, Division of Biological Sciences, University of Missouri
May 1999 - January 2004

Associate Professor, Division of Biological Sciences, University of Missouri
November 1993 - May 1999

Associate Professor, Institute of Zoology, University of Zurich
January 1990 - November 1993

Assistant Professor, Department of Biology, Memphis State University
August 1986 - December 1989

Postdoctoral Research Associate, Department of Zoology, Duke University
September 1984 - August 1986

EDUCATION:

Doctor of Philosophy (Zoology), 1984, University of Georgia, Athens, Georgia
Master of Science (Zoology), 1979, University of Maryland, College Park, Maryland
Bachelor of Arts (Cum Laude, Biology), 1975, State University College at Buffalo, New York

MILITARY EXPERIENCE:

U.S. Marine Corps – July 1968 – May 1972

Honorable Discharge, Rank E-5

Vietnam Veteran – August 1969 – July 1970, 2nd Battalion, 4th Regiment, 3rd Marine Division

Honors and Medals:

Good Conduct, National Defense Service, Combat Action, Vietnam Service, Vietnam Campaign, Meritorious Unit Commendation, Republic of Vietnam Gallantry Cross w/Palm, Republic of Vietnam Civil Actions Unit Citation

ADMINISTRATIVE EXPERIENCE:

Co-Director of Graduate Studies, Division of Biological Sciences, MU. (2001-present):

I currently administer and manage 80-90 graduate students (primarily PhDs) in our department. I coordinate activities such as comprehensive exams, dissertation completion, course and degree requirements, and graduation with the MU Graduate School. The Graduate Education Committee and I review 50-100 applications (domestic & international) each year for admission to our program and then organize and conduct an intensive 2-day interview session with the top ~30 candidates. I am involved in developing graduate studies policy, criteria for admissions, training grants, fellowship grants, and evaluation protocols for our graduate program. Finally, each spring, I review the annual progress of all graduate students using a combination of their annual online report and by conducting intensive face-to-face interviews with each student to evaluate their progress, accomplishments, and potential issues concerning research progress. These efforts have resulted in an 85% graduation rate of Ph.D. students from our program and an average time to completion of 5.4 years. *I received an Outstanding Contribution Award from the MU Graduate School in 2010* for efforts in retention and graduation.

Editorial Board, *Journal of Wildlife Management*. (2014-present)

I have just been appointed to the Editorial Board of the Journal of Wildlife Management. Duties include the selection of reviewers, processing reviews, writing reviews, and forwarding all recommendations to the Managing Editor, Evelyn Merrill.

Board Member, Broader Impacts Network, Campus MU. (2014-present)

I am a newly appointed member of the MU Broader Impacts Network and will serve as an ambassador for developing creative broader impacts for research on campus, making connections between investigators and broader impact activities on or off campus, and provide advice and solutions for increasing the effectiveness of our network office and staff.

Science Resource Member, Flatwoods Salamander Working Group, USGS. (2013 –present):

I have been a science resource member of the recovery effort for the Federally endangered and threatened flatwoods salamanders in the southeastern U.S. since its inception in March 2013. I have been a member of the Structured Decision Making (SDM) team headed by Dr. Susan Walls, USGS Gainesville, FL involved in developing primary objectives, action plans, and procedures for the captive breeding program, restoration of habitat, and recovery of these species. As part of this effort, I have been a contributing partner to a DOD Legacy

research proposal and two SDM workshops.

Organizational Leader, Complexity Modeling Group, Campus MU. (2011-present):

I developed a campus-wide interdisciplinary initiative to bring together existing faculty at MU (<http://complexmodeling.missouri.edu/>) who use mathematical and statistical modeling in research. Currently, there are at least 80 faculty representing >18 departments that have been identified and are now actively discussing short- and long-term objectives for building and strengthening modeling in research and education. I organized a monthly Faculty-to-Faculty Seminar Series and obtained funds from Mizzou Advantage for an outside speaker series. I appointed a committee to develop a freshman-level mathematical modeling course through the Honors College. I now am working with our members on developing three faculty-hiring proposals for joint positions through Mizzou Advantage, the first of which has been approved (stochastic Bayesian modeling) to strengthen research and interdisciplinary linkages across campus.

Co-Director, U. S. Department of Education, Graduate Assistance in Areas of National Need (GAANN) Fellowship Program, Biological Sciences, MU. (2012-present):

The GAANN Fellowship program is designed to prepare Ph.D. students for academic positions. We emphasize recruitment of students from groups dramatically underrepresented in biological sciences. This project complement our active high school, undergraduate, post-baccalaureate and graduate programs, to further our efforts to increase the *diversity* and the *quality* of our teacher-researcher talent pool in the biological sciences. I am currently involved in the selection and management of 13 GAANN students in Biological Sciences.

Administrative Director, U. S. Department of Education, FIPSE Training Grant, MU. (1999-2002):

“Ecosystem management in cultural landscapes: Training a new generation of environmental professionals”: I was the administrator and Co-PI of a large program to exchange students (undergraduate and graduate) between three European universities (Barcelona, Lisbon, Bayreuth) and three universities in the U.S. (Wisconsin, Missouri, San Diego). This program included interdisciplinary training in cultural, sociological, and political issues affecting environmental problems and included practical internships on existing research projects in different countries. At the end of the grant, an agreement was developed to promote the future exchange of students and collaboration of faculty between the universities.

Director and Founder, Conservation Biology Program, Campus MU. (1998-2001):

I developed an interdisciplinary graduate program on campus to coordinate faculty from five MU departments, U.S.G.S., and the Missouri Department of Conservation. The goal was to better train students for an interdisciplinary career in the field of conservation biology. As part of this program, I organized of a monthly seminar series, a graduate studies recruitment poster, and a Website (<http://www.conservbio.missouri.edu/description.php>). I also obtained funding from the Graduate School Dean for three years for a Summer Research Fellowship program. I supported and supervised three graduate students who developed and wrote a conservation biology newsletter, *The Glade*. Further, a campus committee and I developed a graduate curriculum that resulted in one of the first graduate certificates at MU in Conservation Biology.

SCHOLARSHIPS AND HONORS:

ASIH Fitch Award for Excellence in Herpetology 2011
Director of Graduate Studies Outstanding Contribution Award, MU 2010
AAAS, Elected Fellow 2009
National Wetlands Award, Science Research 2008
Curators' Professor, University of Missouri 2004
Chancellor's Award for Outstanding Research and Creative Activity, MU 1999
Best Graduate Student Research Paper, Sigma Xi, local chapter Augusta, Georgia. (1984)
Oak Ridge Associated Universities Graduate Research Fellowship: University of Georgia's Savannah River Ecology Laboratory, Aiken, South Carolina (May - August 1976)
NSF Undergraduate Research Fellowship: University of Georgia's Savannah River Ecology Laboratory, Aiken, South Carolina (May - August 1975)

PROFESSIONAL SOCIETIES:

AAAS
Ecological Society of American (since 1975)
Society for Conservation Biology
American Society of Ichthyologists and Herpetologists
The Wildlife Society

UNIVERSITY OF MISSOURI SERVICE:

Evolutionary Biology Search Committee, 2014
Divisional Personnel Committee, 2006-2007, 2013-2014, Chair 2015
Dean of the Graduate School Search Committee, 2013
Informatics Institute, University of Missouri, 2013
Chancellor's Outstanding Research and Creative Activity Award Committee, 2013
Stochastic Modeling Joint Search Committee, Chair 2012-2013
Chair, MU Complexity Modeling Initiative 2011-present
Co-Director of Graduate Studies, Division of Biological Sciences 2001-present
Chair, Divisional Council, Division of Biological Sciences 2012
Chancellor's Advisory Committee for Veterans 2009-present
DBS Director's Search Committee, 2010-2011
Life Sciences Week, Organizing Committee 2010-present
Arts & Sciences Committee on Faculty Awards 2000-2006, 2010, Co-Chair 2008-2009
Divisional Council, Division of Biological Sciences 1999-2001, 2008-2011
Ecological Modeling Search Committee, Co-Chair 2008-2009
DBS Faculty Mentor, 2005-present
MU Colleague's Circle 2006-2007
Conservation Genetics Search Committee, Chair 2004-2005
Life Sciences Undergraduate Research Opportunity Program, Advisor 2000-2006
Conservation Biology Program, Chair 1997-2000

Conservation Biology Program, Curriculum Committee, Chair 1998-2003
 Conservation Biology Program, Seminar Program, Chair 1997-1999
 MU Tigers-for-Tigers Advisory Committee, 1999-2003
 President's Award for Research and Creativity Committee 1999-2000, 2009-2010
 Minority Graduate Education Program, Graduate School, Committee member 1998-99
 Behavior Search Committee, Division of Biological Sciences 1998-99
 Landscape Ecology Search Committee, Department of Fisheries & Wildlife 1998-99
 Graduate Affairs Committee, Division of Biological Sciences 1995-1999
 Genetics Area Program, University of Missouri-Columbia 1995-2005
 Population Genetics Search Committee, Division of Biological Sciences 1995-1996
 Divisional Retreat Committee 1995

PUBLICATIONS

SciVerse – SCOPUS Database (as of 2/5/2015):

Semlitsch, R.D. - 183 documents, 1980-present; including 17 OECOLOGIA, 12 CONSERVATION BIOLOGY, 10 ECOLOGY, 8 EVOLUTION, 8 ECOLOGICAL APPLICATIONS, 5 BIOLOGICAL CONSERVATION, 2 SCIENCE, 3 BIOSCIENCE, 2 PNAS
6,827 total citations by 3,953 documents
***h*-index: 44**

***Top ECOLOGY citation** (*Semlitsch et al. 1988; Ecology 69: 184-192*)

(All articles are refereed; undergraduate student coauthors are underlined and graduate student coauthors are underlined and in bold face type)

IN REVIEW or REVISION:

Anderson, T.L. and R.D. Semlitsch. Top predators and habitat complexity alter an intraguild predation module in pond communities. *Journal of Animal Ecology* (in review)

Anderson, T.L., C. Linares, K. Dodson, and R.D. Semlitsch. Variability in functional response curves among different species and size classes of predatory larval salamanders on congeneric prey. *Functional Ecology* (in revision)

Peterman, W.E., **T.L. Andersom**, **B.H. Ousterhout**, D.L. Drake, R.D. Semlitsch, and L.S. Eggert. Maximizing genetic and demographic connectivity of ringed salamanders. (in revision)

O'Donnell, K.M., F.R. Thompson, III, and R.D. Semlitsch. Prescribed fire and timber harvest effects on terrestrial salamander abundance, detectability, and microhabitat use. *Journal of Wildlife Management* (in review)

Osborn, M.S., **G. Connette**, and R.D. Semlitsch. 2014. Behavioral responses to habitat quality and structure during initial terrestrial movements of juvenile Green Frogs (*Lithobates* [*Rana*] *clamitans*). *Ecological Applications* (in prep)

Walls, S.C., L.C. Ball, K.M. Enge, T.A. Gorman, J.G. Palis, and R.D. Semlitsch. 2014. Overcoming roadblocks to recovery of declining amphibian populations in the United States. *BioScience* (in prep)

Semlitsch, R.D., W.J. Barichivich, and S.C. Walls. 2014. A comprehensive multi-level approach to preventing amphibian extinction. *Journal of Wildlife Management* (in revision)

Semlitsch, R.D., **W.E. Peterman**, **T.L. Anderson**, D.L. Drake, and **B.H. Ousterhout**. Intermediate pond sizes contain the highest density, richness, and diversity of pond-breeding amphibians. *PLOS ONE* (in revision)

Semlitsch, R.D., **Ousterhout, B.H., Anderson, T.L.,** Drake, D.L., **Peterman, W.E.** Spatial variation and synchrony in larval production of pond-breeding salamanders: testing the “hot-spots” model of spatial dynamics. *Ecology* (in revision)

Semlitsch, R. D. and D. L. Drake. Structure and dynamics of Wood Frog (*Rana sylvatica*) populations at the periphery of their range in Missouri. *Southeastern Naturalist* (in revision)

Heemeyer, J.L., **T.L. Anderson, W.E. Peterman, B.H. Ousterhout**, D.L. Drake, and R.D. Semlitsch: Automated analysis of temperature dataloggers to determine hydroperiods of vernal wetlands. *Wetland Ecology and Management* (in review)

Ousterhout, B.H., and R.D. Semlitsch. Modeling nonlinear responses of larval ringed salamanders (*Ambystoma annulatum*) to intraspecific density. *Oecologia* (in review)

Pittman, S., and R.D. Semlitsch. Importance of movement bias in predicting the effects of habitat loss on the survival of juvenile pond-breeding amphibians. *Journal of Animal Ecology* (in review)

Pittman, S., G.M. Connette, and R.D. Semlitsch. Simulating the importance of movement behavior to juvenile pond-breeding amphibians in altered landscapes. *Journal of Ecology* (in review)

Luhring, T.M., D.E. Scott, and R.D. Semlitsch. Changes in vertebrate stoichiometry across ontogeny when complex life histories present stage-specific demands. (in revision)

PUBLISHED or IN PRESS:

O'Donnell, K.M., and R.D. Semlitsch. 2015. Advancing terrestrial salamander population ecology: The central role of imperfect detection. *Journal of Herpetology* (in press)

Drake, D.L., **B.H. Ousterhout**, **C.D. Shulse**, **D.J. Hocking**, **W.E. Peterman**, **T.L. Anderson**, K.L. Lohraff, **C.A. Conner**, **E.B. Harper**, **J.R. Johnson**, **T.A.G. Rittenhouse**, **B.B. Rothermel**, L.E. Eggert, and R.D. Semlitsch. 2014. Pond-breeding amphibian community composition in Missouri. *American Midland Naturalist* (accepted).

Ousterhout, B.H., T.L. Anderson, D.L. Drake, **W.E. Peterman**, and R.D. Semlitsch. Habitat traits and species interactions differentially affect abundance and body size in pond-breeding amphibians. *J. Animal Ecology* (accepted)

Anderson, T.L., B.H. Ousterhout, W.E. Peterman, D.L. Drake, and R.D. Semlitsch. Life history differences influence the impacts of drought on aquatic survival and occupancy of two pond-breeding salamanders. *Ecological Applications* (accepted)

O'Donnell, K.M., F.R. Thompson, III, and R.D. Semlitsch. 2015. Utilizing binomial mixture models to partition detectability components in populations subject to temporary emigration. *PLOS ONE* (in press)

Peterman, W.E., T.L. Anderson, B.H. Ousterhout, D.L. Drake, R.D. Semlitsch, and L.S. Eggert. 2015. Differential dispersal shapes population structure and patterns of genetic differentiation in two sympatric pond breeding salamanders. *Conservation Genetics* 16:59-69.

Earl, J.E., and R.D. Semlitsch. 2015. Effects of tannin source and concentration from tree leaves on two species of tadpoles. *Environmental Toxicology and Chemistry* 34:120-126.

Matisziw, T., M. Alam, K.M. Trauth, E.C. Inniss, R.D. Semlitsch, S. McIntosh, and J. Horton. 2015. A vector approach for modeling landscape corridors and habitat connectivity. *Environmental Modeling and Assessment* 20:1-16.

Semlitsch, R.D., **O'Donnell, K.M.**, and F.R. Thompson, III. 2014. Abundance, biomass production, nutrient content, and the possible role of terrestrial salamanders in Missouri Ozark forest ecosystems. *Canadian Journal of Zoology* 92:997-1004.

Anderson, T.L., D.J. Hocking, C.A. Conner, J.E. Earl, E.B. Harper, M.S. Osbourn, W.E. Peterman, T.A.G. Rittenhouse, and R.D. Semlitsch. 2014. Abundance and phenology patterns of two pond-breeding salamanders determine species interactions in natural populations. *Oecologia* DOI 10.1007/s00442-014-3151-z (online first)

Drake, D.L., **T.L. Anderson**, **L.M. Smith**, K.M. Lohraff, and R.D. Semlitsch. 2014. Predation of eggs and hatchlings of the endemic Ringed Salamander (*Ambystoma annulatum*) by native and invasive aquatic predators. *Herpetologica* 70:378-387.

Boone, M.D., C.A. Bishop, L.A. Boswell, R.D. Brodman, J. Burger, C. Davidson, M. Gochfeld, J.T. Hoverman, L.A. Neuman-Lee, R.A. Relyea, J.R. Rohr, C. Salice, R.D.

Semlitsch, D. Sparling, and S. Weir. 2014. Pesticide regulation amid the influence of industry. *BioScience* 64:917-922.

Peterman, W.E., and R.D. Semlitsch. 2014. Spatial variation in water loss predicts terrestrial salamander distribution and population dynamics. *Oecologia* 176:357-369.

O'Donnell, K.M., F.R. Thompson, III, and R.D. Semlitsch. 2014. Predicting variation in microhabitat utilization of a terrestrial woodland salamander. *Herpetologica* 70:259-265.

Osbourn, M.S., G. Connette, and R.D. Semlitsch. 2014. Effects of fine-scale forest habitat quality on movement and settling decisions in juvenile pond-breeding salamanders. *Ecological Applications* 24:1719-1729.

Peterman, W.E., G.M. Connette, R. D. Semlitsch, and L.S. Eggert. 2014. Ecological resistance surfaces predict fine-scale genetic differentiation in a terrestrial woodland salamander. *Molecular Ecology* 23:2402-2413.

Ousterhout, B.H., T. Luhring, and R.D. Semlitsch. 2014. No evidence of natal habitat preference induction in juveniles with complex life-histories. *Animal Behaviour* 93:237-242.

Lewis, J.D., G.M. Connette, M.A. Deyrup, J.E. Carrel, and R.D. Semlitsch. 2014. Relationship between diet and microhabitat use of red-legged salamanders (*Plethodon shermani*) in southwestern North Carolina. *Copeia* 2014: 201-205.

Dipple, K.M., G.M. Connette, and R.D. Semlitsch. 2014. Behavior of *Plethodon metcalfi* following anesthetization with tricaine methanesulfonate (MS-222). *Herpetological Review* 44:216-218.

Mackey, M.J., G.M. Connette, W.E. Peterman, and R.D. Semlitsch. 2014. Do golf courses reduce the ecological value of headwater streams for salamanders in the southern Appalachian Mountains? *Landscape and Urban Planning* 125:17-27.

Earl, J.E., P.O. Castello, K.E. Cohagen, and R.D. Semlitsch. 2014. Effects of subsidy quality on reciprocal subsidies and communities: how leaf litter species changes frog biomass export. *Oecologia* 175:209-218.

Pauley, L.R., J.E. Earl, and R.D. Semlitsch. 2014. Ecological effects and human use of commercial mosquito insecticides in aquatic communities. *Journal of Herpetology* (in press)

Ousterhout, B.H., and R.D. Semlitsch. 2014. Measuring terrestrial movement behavior using passive integrated transponder (PIT) tags: effects of tag size on detection, movement, survival and growth. *Behavioral Ecology & Sociobiology* 68:343-350.

Pittman, S.E., M.S. Osbourn, and R.D. Semlitsch. 2014. Movement ecology of amphibians: A missing component for understanding population declines. *Biological Conservation* 169:44-53.

Anderson, T.L., and R.D. Semlitsch. 2014. High intraguild predator density induces thinning effects on and increases temporal overlap with prey populations. *Population Ecology* 56:265-273.

Peterman, W.E., T.L. Anderson, D.L. Drake, **B.H. Ousterhout**, and R.D. Semlitsch. 2014. Maximizing pond biodiversity across the landscape: a case study of larval ambystomatid salamanders. *Animal Conservation* 17:275-285.

Semlitsch, R.D., **T.L. Anderson, M.S. Osbourn**, and **B.H. Ousterhout**. 2014. Structure and dynamics of ringed salamander (*Ambystoma annulatum*) populations in Missouri. *Herpetologica* 70:14-22.

Connette, G.M., and R.D. Semlitsch. 2013. Context-dependent movement behavior of woodland salamanders (*Plethodon*) in two habitat types. *Zoology* 116:325-330.

Dipple, K.M., **G.M. Connette**, and R.D. Semlitsch. 2103. Behavior of *Plethodon metcalfi* following anesthetization with tricaine methanesulfonate (MS-222). *Herpetological Review* 44:215-218.

Peterman, W.E., J.E. Earl, T.A. Rittenhouse, and R.D. Semlitsch. 2013. Demographic network and multi-season occupancy modeling of *Rana sylvatica* reveal spatial and temporal patterns of connectivity. *Landscape Ecology* 28:1601-1613.

Pittman, S., and R.D. Semlitsch. 2013. Habitat type and distance to edge affect movement behavior of juvenile pond-breeding salamanders. *Journal of Zoology* 291:154-162.

Peterman, W.E., L.R. Pauley, E.R. Brocato, E.C. Stuart, R. D. Semlitsch, and L.S. Eggert. 2013. Development and characterization of twenty-two microsatellite loci for the ringed salamander (*Ambystoma annulatum*) using paired-end Illumina shotgun sequencing. *Conservation Genetics Resources* 5:993-995.

Peterman, W.E., E.R. Brocato, L.R. Pauley, E.C. Stuart, R. D. Semlitsch, and L.S. Eggert. 2013. Development and characterization of eighteen microsatellite loci for the spotted salamander (*Ambystoma maculatum*) using paired-end Illumina shotgun sequencing. *Conservation Genetics Resources* 5:989-991.

Pittman, S.E., M.S. Osbourn, D. Drake, R.D. Semlitsch. 2013. Predation of juvenile Ringed salamanders (*Ambystoma annulatum*) during initial movement out of ponds. *Herpetological Conservation and Biology* 8:681-687.

Shulse, C.D., R.D. Semlitsch, and K.M. Trauth. 2013. Mosquitofish dominate amphibian and invertebrate community development in experimental wetlands. *Journal of Applied Ecology* 50:1244-1256.

Shulse, C.D., and R.D. Semlitsch. 2014. Western mosquitofish (*Gambusia affinis*) bolster the prevalence and severity of tadpole tail injuries in experimental wetlands. *Hydrobiologia* 723:131-144.

Connette, G.M., and R.D. Semlitsch. 2013. Life history determines recovery rate from historic land use in southern Appalachian forests. *Conservation Biology* 27:1399-1409.

Peterman, W.E., and R.D. Semlitsch. 2013. Fine-scale habitat associations of a terrestrial salamander: the role of environmental gradients and implications for population dynamics. *PLOS ONE* 8 (5): e62184.

Earl, J., and R.D. Semlitsch. 2013. Carryover effects in amphibians: Are characteristics of the larval aquatic habitat needed to predict juvenile terrestrial survival? *Ecological Applications* 23:1429-1442.

Peterman, W.E., J.L. Locke, and R.D. Semlitsch. 2013. Spatial and temporal patterns of water loss in heterogeneous landscapes: Using plaster models as amphibian analogues. *Canadian Journal of Zoology* 91:135-140.

Peterman, W.E., S.M. Feist, R.D. Semlitsch, and L.S. Eggert. 2013. Conservation and management of peripheral populations: spatial and temporal influences on the genetic structure of wood frog (*Rana sylvatica*) populations. *Biological Conservation* 158:351-358.

Earl, J., and R.D. Semlitsch. 2013. Spatial subsidies, trophic state, and community structure: Examining the effects of leaf litter input on ponds. *Ecosystems* 16:639-651.

Hocking, D.J., G.M. Connette, C.A. Conner, B.R. Scheffers, **S.E. Pittman, W.E. Peterman,** and R.D. Semlitsch. 2013. Effects of experimental forest management on a terrestrial, woodland salamander in Missouri. *Forest Ecology & Management* 287:32-39.

Semlitsch, R.D., S. Ecrement, A. Fuller, K. Hammer, J. Howard, C. Krager, J. Mozeley, J. Ogle, N. Shipman, J. Speier, M. Walker and B. Walters. 2012. Natural and anthropogenic substrates affect movement behavior of the southern graycheek salamander (*Plethodon metcalfi*). *Canadian Journal of Zoology* 90:1128-1135.

Spatola, B.N., W.E. Peterman, N.T. Nathan, G.M. Connette, D.B. Shepard, K.H. Kozak, R.D. Semlitsch, and L.S. Eggert. 2012. Development of microsatellite loci for the western slimy salamander (*Plethodon albagula*) using 454 sequencing. *Conservation Genetics Resources* DOI 10.1007/s12686-012-9784-5

- Peterman, W.E., G.M. Connette, B.N. Spatola, L.S. Eggert, and R.D. Semlitsch.** 2012. Identification of polymorphic loci in *Ambystoma annulatum* and review of cross-species microsatellite use in the genus *Ambystoma*. *Copeia* 2012:570-577.
- Osborn, M.S., A.R. Pinnell, and R.D. Semlitsch.** 2013. Efficacy of artificial burrows as microhabitat refuges for juvenile ambystomatid salamanders. *Herpetological Conservation and Biology* (in press)
- Osborn, M.S., S.E. Pittman, D.L. Drake, and R.D. Semlitsch.** 2012. *Ambystoma annulatum* (ringed salamander) and *Ambystoma maculatum* (spotted salamander). Climbing behavior. *Herpetological Review* 43:458–459.
- Shulse, C.D., R.D. Semlitsch, K.M. Trauth, and J.E. Gardner.** 2012. Testing wetland features to increase amphibian reproductive success and species richness for mitigation and restoration. *Ecological Applications* 22:1675-1688.
- Earl, J., and R.D. Semlitsch.** 2012. Reciprocal subsidies in ponds: Does leaf input increase frog biomass export? *Oecologia* 170:1077-1087.
- Earl, J., K.E. Cohagen, and R.D. Semlitsch.** 2012. Effects of leachate from different species of tree leaves and grass litter on tadpoles. *Environmental Toxicology & Chemistry* 31:1-7.
- Connette, G.M., and R.D. Semlitsch.** 2012. Successful use of a radiofrequency identification system (RFID) for below-ground detection of plethodontid salamanders. *Wildlife Research* 39:1-6.
- Peterman, W.E., J.A. Crawford, and R.D. Semlitsch.** 2011. Effects of even-aged harvest on stream salamanders: support for the evacuation hypothesis. *Forest Ecology & Management* 262:2344-2353.
- Earl, J.E., T.M. Luhring, B.K. Williams, and R.D. Semlitsch.** 2011. Aquatic salamander larvae have greater production with increases in canopy cover. *Freshwater Biology* 56:2473-2482.
- Osborn, M.S., D.J. Hocking, C.A. Conner, W.E. Peterman, and R.D. Semlitsch.** 2011. Use of fluorescent visible implant Alphanumeric tags to individually mark juvenile ambystomatid salamanders. *Herpetological Review* 42:43-47.
- Shulse, C.D., R.D. Semlitsch, K.M. Trauth, and A.D. Williams.** 2010. Influence of design and landscape placement parameters on amphibian abundance in constructed wetlands. *Wetlands* 30: 915-928.
- Mackey, M.J., G.M. Connette, and R.D. Semlitsch.** 2010. Monitoring of stream salamanders:

The utility of two survey techniques and the influence of stream substrate complexity. *Herpetological Review* 41:163-166.

James, S.M., and R.D. Semlitsch. 2010. Terrestrial performance of juvenile frogs in two habitat types after chronic larval exposure to a contaminant. *Journal of Herpetology* 45:186-194.

Semlitsch, R.D., B.D. Todd, S.M. Blomquist, A.J.K. Calhoun, J.W. Gibbons, J.P. Gibbs, G.J. Graeter, **E.B. Harper**, **J. Hocking**, M.L. Hunter, Jr., D.A. Patrick, **T.A.G. Rittenhouse**, **B.B. Rothermel**. 2009. Effects of timber harvest on amphibian populations: understanding mechanisms from forest experiments. *Bioscience* 59:853-862.

Scheffers, B., E. McDonald, **D.J. Hocking**, **C.A. Conner**, and R.D. Semlitsch. 2009. Comparison of two artificial cover objects for monitoring herpetofauna communities in Missouri. *Herpetological Review* 40:419-421.

Williams, B.K., and R.D. Semlitsch. 2010. Larval responses of three Midwestern anurans to chronic, low-dose exposures of four herbicides. *Archives of Environmental Contaminants and Toxicology* 58:819-827.

Storrs-Mendez, S.I., and R.D. Semlitsch. 2009. Intersex gonads in frogs: understanding the time course of natural development and the role of endocrine disruptors. *Journal of Experimental Zoology (Mol. Dev. Evol.)* 314B:57-66.

Rittenhouse, T.A.G., and R.D. Semlitsch. 2009. Behavioral response of migrating wood frogs to experimental timber harvest surrounding wetlands. *Canadian Journal of Zoology* 87:618-625.

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competitive interactions. *Copeia* 1988: 290-298.

Semlitsch, R.D., **J.H.K. Pechmann**, and J.W. Gibbons. 1988. Annual emergence of juvenile mud snakes (*Farancia abacura*) at aquatic habitats. *Copeia* 1988: 244-246.

Semlitsch, R.D. 1987. Paedomorphosis in *Ambystoma talpoideum*: effects of density, food, and pond drying. *Ecology* 68: 994-1002.

Semlitsch, R.D. 1987. Density-dependent growth and fecundity in the salamander *Ambystoma talpoideum*. *Ecology* 68: 1003-1008.

Semlitsch, R.D. 1987. Interactions between fish and larval salamanders: costs of predator avoidance or competition? *Oecologia* 72: 481-486.

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Semlitsch, R.D. 1985. Reproductive strategy of a facultatively paedomorphic salamander *Ambystoma talpoideum*. *Oecologia* 65: 305-313.

Semlitsch, R.D. 1985. Analysis of climatic factors influencing migrations of the salamander *Ambystoma talpoideum*. *Copeia* 1985: 477-489.

Semlitsch, R.D., and **J.H.K. Pechmann**. 1985. Diel pattern of migratory activity for several species of pond-breeding salamanders. *Copeia* 1985: 86-91.

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Semlitsch, R.D., and J.W. Gibbons. 1978. Reproductive allocation in the brown water snake, Natrix taxispilota. *Copeia* 1978: 721-723.

Book Chapters:

Shulse, C.D., R.D. Semlitsch, and K.M. Trauth. 2009. Development of an amphibian biotic index to evaluate wetland health in northern Missouri. Pp. 2657-2667, in *World Environmental and Water Resources Congress, ASCE*.

Semlitsch, R.D., and **M.D. Boone**. 2009. Chapter 6. Using aquatic mesocosms in amphibian ecology and conservation. Pp. 87-104. In: *Ecology and Conservation of Amphibians: A Handbook of Techniques*. K. Dodd, editor. Oxford University Press.

Semlitsch, R.D., and D.K. Skelly. 2007. Chapter 6. Pool-breeding amphibians. Pp. 127-147. In: *Science and conservation of vernal pools in northeastern North America*. Editors, A.J.K. Calhoun and P.G. deMaynadier. CRC Press, New York, NY.

Boone, M.D., D.F. Cowman, C. Davidson, T.B. Hayes, W.A. Hopkins, R.A. Relyea, L. Schiesari, and R.D. Semlitsch. 2005. Chapter 6. Evaluating the Role of Environmental Contamination in Amphibian Population Declines in C. Gascon, J. P. Collins, R.D. Moore, D.R. Church, J. McKay, and J.R. Mendelson, III, editors. In: *Amphibian Conservation Action Plan*. The World Conservation Union (IUCN), Gland, Switzerland.

Semlitsch, R.D., and **C.M. Bridges**. 2005. Amphibian ecotoxicology. pp. 241-243. In: *Status and Conservation U.S. Amphibians*. M. Lannoo, editor, University of California Press.

Bridges, C.M., and R.D. Semlitsch. 2005. Xenobiotics. pp. 89-92. In: *Status and Conservation U.S. Amphibians*. M. Lannoo, editor, University of California Press.

Bridges, C.M., and R.D. Semlitsch. 2005. Variation in pesticide tolerance. pp. 93-95. In: *Status and Conservation U.S. Amphibians*. M. Lannoo, editor, University of California Press.

Semlitsch, R.D., and **B.B. Rothermel**. 2003. A foundation for conservation and management of amphibians. pp 242-259. In Semlitsch, R.D. editor. "Amphibian Conservation". Smithsonian Institution Press, Washington, D.C.

Semlitsch, R.D. 2003. Conservation of pond-breeding amphibians. pp 8-23. In Semlitsch, R.D. editor. Amphibian Conservation. Smithsonian Institution Press, Washington, D.C.

Semlitsch, R.D. 2003. Introduction: General threats to amphibians. pp 1-7. In Semlitsch, R.D. editor. Amphibian Conservation. Smithsonian Institution Press, Washington, D.C.

Semlitsch, R.D. 2002. Management of amphibians in floodplain wetlands: importance of local population and landscape processes. In Fredrickson, L. H., R. M. Kaminski, and S. L. King, editors. Ecology and Management of Bottomland Hardwood Systems: The State of Our Understanding. Bottomland Hardwood System Symposium Steering Committee and University of Missouri-Columbia.

Semlitsch, R.D., and **T.J. Ryan**. 1998. Amphibian migrations. pp. 221-227. In: "Encyclopedia of Reproduction", Vol. 3. Knobil, E. and J.D. Neill, editors, Academic Press, San Diego, CA.

Semlitsch, R.D., D.E. Scott, J.H.K. Pechmann, and J.W. Gibbons. 1996. Structure and dynamics of an amphibian community: evidence from a 16-year study of a natural pond. pp. 217-248. In: "Long-term Studies of Vertebrate Communities", Cody, M.L., and J.A. Smallwood, editors, Academic Press, Inc., San Diego, CA.

Gibbons, J.W., and R.D. Semlitsch. 1987. Activity patterns. pp 396-421. In: "Snakes: Ecology and Evolutionary Biology", Seigel, R.A., J.T. Collins, and S.S. Novak, editors, MacMillan Publ. Co., New York, NY.

Books:

Semlitsch, R.D. editor. 2003. "Amphibian Conservation". Smithsonian Institution Press, Washington, D.C. 311pp.

Gibbons, J.W., and R.D. Semlitsch. 1992. "Reptiles and Amphibians of the Savannah River Site. University of Georgia Press, Athens, GA. pp. 133.

White Papers:

Messerman, A.F., and R.D. Semlitsch. 2014. A conservation assessment and proposed management plan for the ringed salamander (*Ambystoma annulatum*).

Meyer, J.L., L.A. Kaplan, D. Newbold, D.L. Strayer, C.J. Woltemade, J.B. Zedler, R. Beilfuss, Q. Carpenter, R.D. Semlitsch, M.C. Watzin, P.H. Zedler. 2003. Where rivers are born: The scientific imperative for defending small streams and wetlands. sponsored by American Rivers and Sierra Club.

Newsletter Articles:

Semlitsch, R.D., **W.E. Peterman**, and Lori S. Eggert. 2014. Understanding the complex spatial and temporal variation in source-sink dynamics of salamanders. Natural Selections (fall 2014), p9.

Semlitsch, R.D., **T.L. Anderson**, D.L. Drake, **B.H. Ousterhout**, **W.E. Peterman** and **C.D. Shulse**. 2013. Small, clustered wetlands promote amphibian persistence. The National Wetlands Newsletter 35:20-21. Environmental Law Institute, Washington, D.C.

Semlitsch, R.D. 2008. Moving wetland mitigation towards conservation banking. The National Wetlands Newsletter 30:15-16. Environmental Law Institute, Washington, D.C.

Semlitsch, R.D., **M.D. Boone**, and **J.R. Bodie**. 2007. Using golf courses could bolster amphibian Communities. USGA Green Section Record 45:7-11.

Semlitsch, R.D., **M.D. Boone**, and **J.R. Bodie**. 2007. Golf courses could bolster amphibian Communities. Turfgrass and Environmental Research Online [<http://usgatero.msu.edu/currentpastissues.htm>]

Semlitsch, R.D. 2006. A paradigm shift in wetland boundaries. The National Wetlands Newsletter 28:6-8. Environmental Law Institute, Washington, D.C.

Semlitsch, R.D. 2005. Tips for scent control in hunting whitetail deer. MBH Release Vol. 39, p.7, Missouri Bowhunters Association, Gray Summit, MO.

Semlitsch, R.D., and J. Jensen. 2001. Core habitat, not buffer zone. The National Wetlands Newsletter 23:5-6, Environmental Law Institute, Washington, D.C.

Semlitsch, R.D., and J.B. Jensen. 2001. Resolving the distinction between buffer zones and core habitats. Missouri Chapter of the Society for Conservation Biology, Glade 4: 7-11.

Semlitsch, R.D. 2000. Size does matter: The value of small isolated wetlands. The National Wetlands Newsletter 22:5-7. Environmental Law Institute, Washington, D.C.

Bridges, C.M., and R.D. Semlitsch. 1999. Linking environmental contaminants and amphibian population declines. Missouri Chapter of the Society for Conservation Biology, Glade 2: 2-3.

Semlitsch, R.D., and **J.R. Bodie**. 1998. Are small isolated wetlands expendable? Missouri Chapter of the Society for Conservation Biology, Glade 1:5-6.

INVITED PRESENTATIONS:

Recent Major Presentations:

Symposium Speaker, "Understanding the spatial structure of salamander populations to develop conservation solutions". Multi-Scale Habitat Modeling: Advances and Applications to Conservation. North American Congress for Conservation Biology, University of Montana, Missoula, MT. July 2014.

Symposium Speaker, "Abundance, diversity, and disturbance relationships: examples from pond-breeding amphibians". Biodiversity Responses to Climate Change: Perspectives from the Southeastern US Symposium, East Carolina University, NC March 2014

Symposium Organizer & Speaker, "Effects of wildland fire and fire management on amphibians and reptiles". The Wildlife Society Annual Meeting, Milwaukee, WI. October 2013.

Invited Speaker, Habitat Fragmentation Symposium, "Initial dispersal and habitat resistance of metamorphosing salamanders in fragmented landscapes", University of British Columbia, Vancouver. August 2012.

Invited Speaker, European Pond Conservation Network, "Do pond features affect amphibian reproductive success?", Luxembourg. June 2012

Symposium Organizer & Speaker, "Criteria for terrestrial core habitat and importance of landscape connectivity for amphibians". Wetland Buffers: Theory, Science, Policy, and Implementation Symposium. Baraboo, WI. February 2011.

Keynote Speaker, "Hidden biological value: headwater streams, isolated wetlands, and terrestrial connections". Vulnerable Wetlands Forum, Plymouth, MA. April 2010

Plenary Speaker, "Hidden biological value: headwater streams, isolated wetlands, and terrestrial connections". Society for Wetland Scientists, Madison, WI. June 2009

Keynote Speaker, "Hidden biological value: headwater streams, isolated wetlands, and terrestrial connections". U.S. Environmental Protection Agency, Region 7, Water Resources Meeting, Kansas City, MO. April 2008

Conservation of Amphibians on Managed Landscapes Symposium, "Persistence of amphibians in a heterogeneous landscape: What do we really know?". The Wildlife Society Annual Meeting, Tucson, AZ. September 2007

Wisconsin Wetland Association, Wisconsin's Wetlands: Biodiversity and Threats. 11th Annual Wetland Science Forum, "Protection of wetland biodiversity: measuring the size and use of terrestrial core habitat for amphibians". Madison, WI. February 2006

Keynote Address, Southeast Partners in Amphibian and Reptile Conservation Annual Meeting. Protection of wetland biodiversity: measuring the size and use of terrestrial core habitats for amphibians". Andalusia, AL. February 2006

65th Midwest Fish and Wildlife Conference, "Extending the boundaries of wetland management to encompass amphibian use of terrestrial habitats", Indianapolis, IN. December 2004

Association of State Wetland Managers and the International Institute for Wetland Science and

Public Policy Annual Meeting, "Extending the boundaries of wetland management to encompass amphibian use of terrestrial habitats", Kansas City, MO. October 2004

Reserve Design for Protecting Freshwater Biodiversity Symposium. "Freshwater reserve design for amphibians". Society for Conservation Biology Annual Meeting, New York, NY. August 2004

Woodland Vernal Pool Symposium. "Upland and wetland connections: criteria for buffers and terrestrial core habitat of amphibians and reptiles". The Wildlife Society Annual Meeting, Burlington, VT. September 2003

Landscape Ecology Symposium. "Delineation of terrestrial buffers and core habitat around wetlands for amphibian and reptiles". Natural Areas Conference, Madison, WI. September 2003

Wisconsin Wetlands Association. "Protection of wetland biodiversity: criteria for buffers and terrestrial core habitat of amphibians and reptiles", La Crosse, WI. January 2003

EPA Wetlands Management Symposium. "Protecting small, isolated wetlands: biological criteria for core habitat and buffers", Kansas City, MO. March 2002.

Invited Speaker, 50th Anniversary of the University of Georgia's Savannah River Ecology Laboratory, "Riding a salamander: natural history to conservation biology", SC. October 2001

Partners in Amphibian and Reptiles Conservation, Management Workshop, "Amphibian management: importance of local population and landscape factors", Chicago, IL. March 2001

Ecology and Management of Bottomland Hardwood Systems Symposium, "Management of amphibians in forested wetlands: importance of population and landscape level factors", Memphis, TN March 1999

Recent Invited Lectures and Seminars (just since 2000):

DoD, SERDP – Wash DC (2014)

University of Maine – Orono (2014)

U.S.G.S. - Gainesville, FL (2013)

Iowa State University - Ames, IA (2013)

DoD, SERDP – Wash DC (2013)

Drexel University – Philadelphia (2011)

Purdue University – West Lafayette, IN (2010)

East Carolina University – Greenville, NC (2009)

Mid-west PARC Meeting – Iowa (2008)

University of Miami, FL – (2008)

St. Louis Zoo - Curators (2008)

University of Missouri- St. Louis (2008)

Iowa State University - Ames (2006)

Missouri Valley College - Marshall (2006)

Drexel University - Philadelphia (2005)

Highlands Biological Station, Nature Center, NC (2005)
Florida State University - Tallahassee (2005)
Eastern Illinois University - Charleston (2005)
University of Georgia, Institute of Ecology - Athens (2005, 2006)
University of Geneva- Aquatic Ecology Institute (2002)
University of Zürich- Institute für Umweltwissenschaften (2002)
University of Zürich- Zoologisches Institute (2002)
University of Georgia - Athens (2001)
University of Florida - Gainesville (2001)
Southeast Missouri State University- (2000)
Savannah River Ecology Laboratory- Aiken, SC (2000)
Oklahoma State University- Stillwater (2000)

CURRENT RESEARCH DIRECTION:

My research focuses on understanding basic ecological and behavioral processes in both natural populations of amphibians and those under varying degrees of disturbance or land use. It is specifically directed at understanding: 1) how land use affects population dynamics, 2) the role of species differences in population persistence, 3) the mechanisms of connectivity and spatial dynamics, and 4) basic principles or tools used to manage and conserve wetland species.

My lab currently has three primary research interests: 1) movement behavior and connectivity among populations, 2) spatial structuring and source-sink dynamics of populations, and 3) sustainable timber harvest and forest management practices such as prescribed fire. We are trying to understand how vital rates of amphibians like growth, reproduction, and survival are altered by disturbance factors and land use. Our studies often compare species in an attempt to understand why species vary in their ability to tolerate disturbance and persist whereas others don't. Our studies range from mechanistic laboratory experiments to large-scale forest or wetland manipulations to computer simulations.

The goal of my research is to understand how populations of amphibians persist and how we can maintain their biodiversity in human dominated landscapes. The ultimate goal is to provide biologically-based principles for amphibian management and conservation to natural resource managers and policy makers.

RESEARCH SUPPORT:

Current:

U.S. Forest Service, Joint Venture Agreement. 09-JV-11242311-064. 2010-2015. \$69,703. "Population and behavioral responses of amphibians to prescribed burns and timber harvest".

U.S. Department of Defense, SERDP, Conservation and Climate Change, RC-2155. 2011-

2015. \$910, 341. "Multi-scale approach to understanding source-sink dynamics of amphibians. (Co-PIs –Lori Eggert, Bill Peterman)

University of Missouri Research Council. URC-13-087. 2013-2014. \$7,500. "Identifying a juvenile dispersal syndrome: contributions of phenotype- and condition-dependent factors" (Co-PI- Britt Ousterhout)

Other grants:

Mizzou Advantage, 2012. \$50,000. per year, Joint Faculty position in stochastic modeling
Mizzou Advantage, 2012-2014. \$9,000. Development of Complexity Modeling Initiative at MU

Past:

U.S. Environmental Protection Agency, Region 7. 2010-2013. \$229,231. "Modeling stream-wetland connectivity and vulnerability to non-point source pollution". (Co-PI; T. Matisziw- PI, MU Environmental Engineering).

University of Missouri Research Board Grant. RB 10-20. 2010-2011. \$40,000. "Does landscape connectivity predict genetic structure?" (Co-PI- Lori Eggert)

MU Alumni Organization Grant. 2010-11. \$1,500. "Habitat induced diet shifts in tadpoles: a study using stable isotopes".

U.S. Forest Service, Joint Venture Agreement. 09-JV-11242311-064. 2010. \$14,812. "Population and behavioral responses of amphibians to prescribed burns and timber harvest".

National Fish and Wildlife Foundation, LINKS USGA. 2008-2010. \$65,811. "Abundance and diversity of stream salamanders on montane golf courses"

U.S. Environmental Protection Agency, Region 7. 2005-2010. \$250,000. "Comprehensive state-wide wetlands guidance utilizing amphibian health indicators and geospatial analysis. (Co-PI: PI -Kate Trauth-MU Engineering; Co-PI -Chris Shulse- MODot).

National Science Foundation, DEB 0239943, Ecological Studies. 2003-2009. \$1,200,000. "Collaborative Proposal: Land-use practices and the persistence of amphibian populations". (PI; Co-PIs M. Hunter, U. Maine; W. Gibbons, U. Georgia; J. Gibbs, Syracuse U.).

Missouri Dept. of Transportation. 2007. \$32,250. "Amphibian conservation in mitigation wetlands: determining optimal placement, design, and translocation methods for uncommon species. (with Co-PI C. Shulse).

Missouri Dept. of Conservation. 2007. \$21,300. "Wetland development and monitoring for amphibian conservation. (with Co-PI C. Shulse).

MU Alumni Organization Grant. 2007. \$1,000. "Ecologically relevant effects of agricultural contaminants on amphibians".

U.S. Department of Interior, U.S. Forest Service Cooperative Agreement, \$6,000. 2006-2007. "Effects of Experimental Riparian Zone Width on Stream Salamanders".

U.S. Department of Interior, U.S. Forest Service Cooperative Agreement, \$40,000. 2003-2006. "Effects of Experimental Riparian Zone Width on Stream Salamanders".

University of Missouri, Research Council. 2004. \$17,786. "A research support center for molecular population genetics", (Co-PI with Rex Cocroft, Carl Gerhardt, Candace Galen, Johannes Schul)

U.S. Geological Survey, 2003-2004. \$49,715. Effects of atrazine exposure on life-history characteristics, reproductive morphology, and breeding behavior of salamanders (*Ambystoma talpoideum*). Co-PI with C. Bridges.

Wildlife LINKS USGA. 2003-2004. \$38,240. How Golf Course Management Impacts Amphibian Communities: Dealing with Multiple Stressors of Invasive Species, Alteration of Pond Hydroperiod, and Sublethal Pesticides. (Co-PI Michelle D. Boone)

Swiss National Fund, 3100-059144.99/1. 2000-2003. \$193,000. "Evolutionary significance of genetic diversity: captured genomes and replicate genotypes in a hemiclinal frog system opens a new research window. (Co-PI; H. Hotz-PI, T. Uzzell, G.-D. Guex).

U.S. Department of Education, FIPSE, P116J990028. 1999-2003. \$150,120. "Ecosystem management in cultural landscapes: Training a New Generation of Environmental Professionals" (Co-PI; Michael Adams-PI-U. Wisconsin, Sedra Shapiro-San Diego U.).

U.S. Department of Interior, U.S.G.S., No. 01CRAG0007, \$9,300. 2001-2002. "Population dynamics of amphibians at natural ponds in central Missouri"

University of North Carolina, Highlands Biological Station, Seed Grant. 2000-2001. \$2,250. "Defining the effects of road edges on the abundance of terrestrial salamanders".

University of Missouri, Alumni Association Faculty Incentive Award. 2000. \$1,000. "Effects of forest fragmentation on the conservation of amphibian populations".

National Science Foundation, DEB-9903761. 1999-2001. \$142,639. "Trading off predator- and competitor-induced responses in larval anurans. (R. Relyea Post-Doc).

Environmental Protection Agency, Exploratory Research Program. 1998-2001, G8A11528. \$72,352. "Anthropogenic stressors and complex interactions in amphibian communities"

Missouri Department of Conservation, MCC 82-01-00-136. 1995-2001. \$102,000. "Wetland Ecology Studies in the Missouri River Flood Plain: Herpetofaunal communities of Missouri River

flood plain wetlands”.

National Science Foundation, IBN-8604990. 1998-2001. \$150,000. "Evolution of female mate-choice: field experiments using genetic markers in the gray treefrog". (plus REU Supplement; Co-PI with J. Krenz, C. Gerhardt, P. Mahoney)

National Science Foundation, Doctoral Dissertation Improvement Grants, DEB 9801458. 1998-2000, \$10,000. "Expression and Inheritance of a life history polymorphism". (with T. Ryan).

National Science Foundation, Doctoral Dissertation Improvement Grants, DEB 9801125. 1998-2000, \$9,000. "Analysis of fitness determinants in a natural hybrid zone between *Rana blairi* and *Rana sphenoccephala*". (with M. Parris).

National Science Foundation, Doctoral Dissertation Improvement Grants, DEB 9801568. 1998-2000, \$9,000. "The importance of tytoparthenogenetic reproduction in natural populations of the mayfly, *Stenomena femoratum*". (with S. Ball).

University of Missouri, Research Council Grant and Summer Fellowship. 1998. URC 98-042. \$8,875. "Genetic and morphological tests of biogeographical hypotheses”.

The Nature Conservancy, Missouri Chapter. 1996-1997. 9611289-1. \$1,000. "Prairie habitats and the viability and conservation of the northern crawfish frog, *Rana areolata circulosa*".

Swiss National Fund, 31-37579.93-2. 1995-1997. \$154,307. "Clonal diversity in a system of hybridogenetic frogs: testing the Tangled Bank hypothesis for maintenance of sexuality. (Co-PI with H. Hotz and G.-D. Guex).

Missouri Department of Conservation, MCC 82-01-00-140. 1995-1996. \$1,812. "Viability and reproductive status of the northern crawfish frog (*Rana areolata circulosa*) at known and potential sites in Missouri”.

Oak Ridge Associated Universities Research Travel Contract. S-3534. 1994-1997.

University of Missouri, Alumni Faculty Incentive Award. 1996. \$966. "Ecological and evolutionary consequences of asexual reproduction in mayflies”.

University of Missouri, Research Council International Travel Grant. 1996. 96-RC-061-ER. \$1,800. "Field testing local adaptation in hybridogenetic frogs”.

University of Missouri Research Board Grant. RB 94-074. 1994-1995. \$29,543. "Evolutionary consequences of mating decisions to paedomorphosis”.

Swiss National Fund, 31-37579.93. 1993-1995. \$116,300. "Clonal diversity in a system of hybridogenetic frogs: testing the Tangled Bank hypothesis for maintenance of sexuality. (Co-PI with H. Hotz and G.-D. Guex).

Swiss National Fund, 31-28568.90. 1990-1993. \$200,327. "Dynamics in mixed populations of Rana lessonae-Rana esculenta: an experimental approach to population ecology".

Swiss National Fund, 70PK-029652. 1990. \$4,460. Research Exchange Program with East-European Countries. (Prof. L. Berger, Poznan, Poland).

Faculty Research Grant, Memphis State University. 1987. \$2,700. "Environmental and genetic basis of a color polymorphism".

National Science Foundation, BSR-8604990. 1986-88. \$109,000. "Population variation in life history pathways". (Co-PI with H.M. Wilbur and R.N. Harris).

Research Grant, Center for Field Biology of LBL, Austin Peay State University. 1987-1988. \$6,000. "The success of amphibian larvae along a gradient of ephemeral to permanent pond types".

Oak Ridge Associated Universities Research Travel Contract, S-3249. 1986-1990.

National Science Foundation, BSR-8400109. 1984-86. \$72,000. "Environmental determinants of life history modes". (Co-PI with H.M. Wilbur).

PROFESSIONAL ACTIVITIES:

Journal Editor:

Associate Editor, 2014-present. JOURNAL OF WILDLIFE MANAGEMENT

Assigning Editor 1999, 2003, 2007. CONSERVATION BIOLOGY

Associate Editor. 2003-2004. ECOLOGICAL APPLICATIONS

Associate Editor. 1997-2000. BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY

Advisory Editor. 1997. BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY

Associate Editor. 1986-1989. HERPETOLOGICA (Ecology and Behavior)

Society Offices:

Executive Council, Herpetologist's League, 1995-1999

President, American Society of Ichthyologists and Herpetologists (ASIH), Southeastern Division 1988-1989

Vice-President, ASIH Southeastern Division 1987-1988

Secretary-Treasurer, ASIH Southeastern Division 1986-1987

Board of Governors, ASIH, 1986-1990

Journal Reviewer:

Nature, PNAS, PLOS ONE, Ecology, Journal of Animal Ecology, Journal of Applied Ecology, Ecological Applications, Functional Ecology, Evolution, Oikos, American Naturalist, Conservation Biology, Journal of Heredity, Biological Conservation, Biodiversity and Conservation, Quarterly

Review of Biology, Biological Reviews, Canadian Journal of Zoology, Herpetologica, Journal of Herpetology, Copeia, Southwestern Naturalist, American Midland Naturalist, Alytes, Animal Behaviour, Behavioral Ecology & Sociobiology, Behaviour, Ethology, Ecology, & Evolution, Herpetological Natural History, Ecography, Environmental Toxicology and Chemistry, Evolutionary Ecology, Journal of Range Management, Journal of Wildlife Management, Wetlands, Canadian Journal of Forest Research, Journal of Toxicology & Environmental Health, Forest Ecology & Management, Journal of Forest Research, Evolution and Development, Frontiers in Ecology and the Environment, Wetland Ecology & Management, Advances in Ecology, Journal of Zoology

Panel Member:

NSF, DEB, Population and Community Ecology, Pre-proposal Panel (March 2014, 2015)
 Environmental Protection Agency, STAR Fellowship Panel (March 2004)
 Environmental Protection Agency, STAR Fellowship Panel (February 2002)
 USGS Research Grade Evaluation Panel, Midwest Science Center (March 1997)
 NSF, DEB, Doctoral Dissertation Improvement Grants Panel, Population Biology (January 1996)
 Environmental Protection Agency, Office of Exploratory Research (January 1995)

Reviewer of Grant Proposals:

National Science Foundation (DEB, IBN), Swiss National Fund, U.S. Department of Agriculture, National Geographical Society, Organization for Tropical Studies, Florida Nongame Wildlife Program, NASA Global Change Research, Wildlife Conservation Society of N.Y., National Biological Service, Natural Environment Research Council, U.K., U.S. Fish & Wildlife Service, U.S. Environmental Protection Agency, Fuller Fellowships, Florida Fish & Wildlife Commission, Maine Agricultural & Forest Exp Station, NSERC Canada

TEACHING ACTIVITIES:

Teaching Statement and Background:

I have been in a formal university faculty teaching position since 1986. My philosophy is still centered on teaching the dynamic processes of biology (specifically in conservation and ecology) that serve as the basis for the patterns we see in the natural world. Over the years my methods have changed, I now focus on teaching principles through the use of real problems in the world in order to introduce concepts, summarize current knowledge, and design future research to solve the problems. The challenge of teaching, for me, is reduced to devising new and creative ways to solve problems and design interdisciplinary research, since there is no shortage of conservation or management problems. I continue to find students eager to offer new approaches and challenge me. This interactive two-way process of teaching, both undergraduate and graduate students, is what I enjoy most.

Educational Courses taken:

Educational Psychology-SUNY College at Buffalo
 Adolescent Development-SUNY College at Buffalo
 Teaching Methods in Science-SUNY College at Buffalo
 Historical Philosophy of Education-SUNY College at Buffalo

Teaching Experience:Memphis State University (1986-1989):

Comparative Anatomy (3rd-4th year course)	Fall 1986, 1987, 1988, 1989
Animal Ecology (4th year course)	Spring 1989
Herpetology (4th year & graduate course)	Spring 1988
Community Ecology (graduate course)	Fall 1987
Experimental Design (graduate course)	Fall 1988, 1989

University of Zurich (1990-1993):

Population Ecology (4th year course)	Summer 1990, 1991, 1992, 1993
Planning Field Experiments in Ecology (5th year course)	Spring 1991, 1992

University of Missouri (1993-present):

Biology 10 (1st year course)	General Biology	Spring 1994
Biology 302 (4th year course)	Evolution	Fall – 10 semesters
Biology 3360 (4th year course)	Herpetology	Spring – 10 semesters
Biology 8600 (graduate course)	Design of Ecological Experiments	Fall – 17 semesters
Biology 8610 (graduate course)	Current Concepts in Conservation	Fall/Spring 4 semesters
Biology 401 (graduate course)	Community Ecology of Vertebrates	Fall 1997
Biology 411 (graduate course)	Seminar: Amphibian Behavior	Fall 1995, 97, 98, 99
Biology 411 (graduate course)	Seminar: Conservation Biology	Fall 1999-2002

Special Courses:

Highlands Biological Station, NC. "Conservation Biology of Amphibians", Summer 2003-2013
 University of Missouri, "Conservation and Management of Amphibians", August 2002
 Highlands Biological Station, NC. "Management of Amphibians", August 2001
 Highlands Biological Station, NC. "Conservation Biology of Amphibians", June 2000
 Highlands Biological Station, NC. "Larval Amphibian Biology", June 1997
 University of Bern, Ethology Field Station, "Design of Ecological Field Experiments", July 1993

Sample Course Descriptions and Goals:**Biology 8600: Design of Ecological Experiments**

The intent of this course is to teach beginning graduate students the principles of experimental design in the context of ecological, behavioral, and evolutionary research. It is designed for graduate students in our division but is highly applicable to students in toxicology, entomology, fisheries, and wildlife management. My goal is to effectively integrate the processes of developing research questions and hypotheses with the physical layout of experiments and the assumptions of inferential statistics. The framework of the course is a combination of discussion and lecture. Discussions center around review papers from the current biological literature as well as research proposals prepared by each student. Topics are supplemented by lectures and thought-provoking homework problems. The course is also meant to be practical in that students can use this opportunity to help design their own thesis research. I require that all students participating in this course have at least a basic statistics course, and suggest at least one course

in ecology, behavior, or field biology. Emphasis is placed on traditional analysis of variance designs, but I also include some literature and discussion of alternatives and novel approaches such as Bayesian statistics.

Special Topics: Conservation and Management of Amphibians

This course is design for advanced students and wildlife professionals interested in understanding the basic processes regulating natural amphibian populations and communities as well as contemporary problems associated with the conservation of amphibian diversity. Topics will be discussed to illustrate how it might be impacted by anthropogenic factors. Thus, students should gain an understanding of basic biological processes and their importance to the conservation of amphibians. The course lectures will be grounded in basic theory but also reflect the current scientific literature on each topic. Students will have the opportunity to participate in a class field project on the effects of forest management practices on woodland salamanders and sharpen communication skills through individual presentations on select topics.

Biology 8610: Current Concepts in Conservation Biology

The intent of this course is to introduce graduate students to a broad range of concepts in the current literature of conservation biology. The primary mechanism of teaching will be through discussion and questioning. Literature will come from review articles published in nationally and internationally recognized journals during the last few years. Discussions of the literature are intended to provide students with an appreciation of the historical development of concepts, interdisciplinary nature of conservation problems, the research that is necessary for effective solutions, and future directions. The literature will also be used as a spring-board for discussions of research approaches, hypothesis development, experimental designs, and the development of collaboration across disciplines. The course also is meant to be practical in that students can use this opportunity to place their research into a larger conceptual framework and adopt research tools to pursue their thesis questions.

Post-Doctoral Associates:

Dr. Rick Relyea, NSF Post-doctoral Fellow, University of Missouri-Columbia, 1999.

Current Position: Associate Professor, University of Pittsburgh, Pennsylvania

Dr. John D. Krenz, Molecular Biology Fellowship, University of Missouri-Columbia, 1995-1998.

Current Position: Assistant Professor, Mankato State University, Minnesota

Dr. Howard H. Whiteman, Research Associate w/Dr. J. Whitfield Gibbons, Savannah River Ecology Laboratory, 1994-1996

Current Position: Associate Professor, Murray State University, Kentucky

Dr. Miguel Tejedo, University of Zurich, 1992-1993.

Current Position: Research Associate, Estacion Biologica de Donana, Sevilla, Spain.

Current Graduate Students (as of January 2015):

Anderson, T. Ph.D. (GANN Fellowship) Larval interactions among ambystomatid salamanders

Burkhart, J. Ph.D. Landscape genetics and connectivity of salamanders

Messerman, A. Ph.D. (Life Sciences Fellowship) Amphibian conservation and adaptive management, PVA analyses

Ousterhout, B. Ph.D. (NSF Pre-Doctoral Fellowship) Movement ecology and dispersal behavior of juvenile salamanders

Rowland, F. Ph.D. Understanding the structure and function of pond food webs.

Past Graduate Students (year graduated and current position is indicated in parentheses):

O'Donnell, K. (2014) Effects of prescribed burning and timber harvest on terrestrial salamanders. Ph.D. Thesis, University of Missouri. [currently Post-Doctoral Fellow, U.S. Geological Survey, Gainesville, FL]

Connette, G.M. (2014) Individual, population, and landscape-scale effects of timber harvest on the red-legged salamander (*Plethodon shermani*). Ph.D. Thesis, University of Missouri. [currently Post-Doctoral Fellow, U.S. Forest Service, Columbia]

Peterman, W.E. (2013) Factors affecting abundance, physiology, and fine-scale population structure of the western slimy salamander (*Plethodon albagula*). Ph.D. Thesis, University of Missouri. [currently Post-Doctoral Fellow, Illinois Natural History Survey]

Luhring, T.M. (2013) Complex life-histories and biogeochemical cycles: interactions between amphibian life-history strategies and elemental cycling. Ph.D. Thesis, University of Missouri. [currently Post-Doctoral Fellow, Michigan State University]

Pittman, S.E. (2013) Movement ecology of juvenile pond-breeding salamanders: implications for the management and conservation of amphibian populations. Ph.D. Thesis, University of Missouri. [currently Post-Doctoral Fellow, Davidson College]

Osborn, M.S. (2012) Initial juvenile movement of pond-breeding amphibians in altered forest habitat. Ph.D. Thesis, University of Missouri. [currently Instructor, Appalachian State University]

Markey, M. (2012) The abundance and diversity of stream salamanders on montane golf courses. M.A. Thesis, University of Missouri.

Earl, J.E. (2012) Effects of spatial subsidies and canopy cover on pond communities and multiple life stages in amphibians. Ph.D. Thesis, University of Missouri. [currently Post-Doctoral Fellow, National Institute for Mathematical and Biological Synthesis]

- Shulse, C.D. (2011) Building better wetlands for amphibians: investigating the roles of engineered wetland features and mosquitofish (*Gambusia affinis*) on amphibian abundance and reproductive success. Ph.D. Thesis, University of Missouri. [currently Senior Environmental Specialist, MoDOT]
- Storrs-Mendez, S.I. (2009) Exposure of amphibians to endocrine disruptors: intersex debate, species differences, and terrestrial uptake. Ph.D. Thesis, University of Missouri.
- Williams, B.K. (2008) A multi-scale investigation of ecologically relevant effects of agricultural runoff on amphibians. Ph.D. Thesis, University of Missouri. [currently a Research Biologist at U.S.G.S. in Columbia]
- Peterman, W.E. (2008) Effects of riparian buffer width on stream salamander populations in the southern Appalachian Mountains. M.A. Thesis, University of Missouri (with GIS Certificate).
- Rittenhouse, T.A.G. (2007). Behavioral choice and demographic consequences of wood frog habitat selection in response to land use. Ph.D. Thesis, University of Missouri (with Conservation Biology Certificate) [currently an Assistant Professor, University of Connecticut]
- Crawford, J.A. (2007) Beyond the edge: Riparian habitat use and forest management effects on stream salamanders in the southern Appalachian Mountains. Ph.D. Thesis, University of Missouri. [currently an Assistant Professor, Lindenwood University]
- Harper, E.B. (2007) The role of terrestrial habitat in the population dynamics and conservation of pond-breeding amphibians. Ph.D. Thesis, University of Missouri. [currently an Associate Professor, Paul Smith College, NY]
- Hocking, D.J. (2007) Gray treefrog breeding site selection and offspring performance in response to forest management. M.A. Thesis, University of Missouri. [currently a post-doctoral fellow at U. Massachusetts]
- Johnson, J.R. (2005) Multi-scale investigations of gray treefrog movements: patterns of migration, dispersal, and gene flow. Ph.D. Thesis, University of Missouri. [currently an Assistant Professor, Western Kentucky University]
- James, S. (2005) Amphibian metamorphosis and juvenile terrestrial performance following chronic cadmium exposure in the aquatic environment. Ph.D. Thesis, University of Missouri. [currently at a private water resources agency, Prairie Rivers Network, IL]
- Rothermel, B.B. (2003) Juvenile dispersal in disturbed habitats and connectivity of populations. Ph.D. Thesis, University of Missouri. [Assistant Research Scientist, Archbold Biological Station]
- Green-Rittenhouse, T.A. (2002) Spotted salamander migration at a pond located on a forest-grassland edge. M.A. Thesis, University of Missouri.

- Birchfield, G.L. (2002) Adult green frog (Rana clamitans) movement behavior and terrestrial habitat use in fragmented landscapes in central Missouri. Ph.D. Thesis, University of Missouri. [currently an instructor at Austin Peay State University, TN]
- Mills, N. (2002) Direct and indirect effects of chemical stressors on amphibian interactions. Ph.D. Thesis, University of Missouri. [Assistant Professor at Harding University, AR]
- Boone, M. (2000). Effects of the complex interactions of natural and chemical stressors on species interactions. Ph.D. Thesis, University of Missouri. [Associate Professor, Miami University-OH]
- Welch, A. (2000) Sexual selection and a test of the “good genes” hypothesis of mate choice. Ph.D. Thesis, University of Missouri. [Assistant Professor, College of Charleston, SC]
- Ryan, T. (2000) Fitness consequences of paedomorphosis and metamorphosis in the salamander Ambystoma talpoideum. Ph.D. Thesis, University of Missouri. [Professor at Butler University, IN]
- Parris, M. (1999). Evolution and maintenance of hybrid zone between two species of leopard frogs. Ph.D. Thesis, University of Missouri. [Associate Professor at Memphis University, TN]
- Bridges, C. (1999). Local and geographic variation in the susceptibility of amphibian larvae agricultural chemicals. Ph.D. Thesis, University of Missouri. [Research Biologist, Dow Chemical]
- Bodie, J. R. (1998). Contemporary hydrology of a large-river floodplain: multiple-scale effects on freshwater turtles. M.A. Thesis, U. of Missouri [Senior Scientist with Audubon International]
- Schmidt, B. (1995). On the maintenance of the genetic polymorphism at the LDH-B locus in the pool frog, Rana lessonae. M.Sc. Thesis, University of Zurich [Associate Professor at University of Zurich]
- Negovetic, S. (1995). Effects of food and temperature on development of hemiclonal hybrid waterfrog tadpoles and their sexual host parental species. M.Sc. Thesis, University of Zurich
- Fioramonti, E. (1994). Effects of triphenyltin concentration, pH, and genotype on the growth and development of tadpoles. M.Sc. Thesis, University of Zurich
- Bergen, K. (1994). Effects of different ratios of Rana lessonae and Rana esculenta on their mating system. M.Sc. Thesis, University of Zurich
- Rist, L. (1994). Feeding behaviour and growth efficiency among hemiclones of Rana esculenta tadpoles. M.Sc. Thesis, University of Zurich
- Horat, P. (1993). Effects of predation and hunger on the behaviour of tadpoles of the waterfrogs Rana esculenta and Rana lessonae. M.Sc. Thesis, University of Zurich. [currently a PhD student at ETH in Switzerland]

Koller, C. (1993). The role of familiarity and relatedness in sibling discrimination and parental-hybrid discrimination of tadpoles of Rana lessonae and Rana esculenta. M.Sc. Thesis, University of Zurich

Imhoof, B. (1993). Dear enemy recognition in wall lizards (Podarcis muralis). M.Sc. Thesis, University of Zurich. [currently a PhD student at ETH in Switzerland]

Gavasso, S. (1992). Anti-predator behaviour in tadpoles of the bisexual hybrid system of Rana lessonae, R. esculenta, and R. ridibunda. M.Sc. Thesis, University of Zurich

Kaehli, H. (1992) Habitat selection and species recognition in tadpoles of the waterfrogs Rana esculenta and Rana lessonae. M.Sc. Thesis, University of Zurich.

Jackson, M. (1990). Predation risk and facultative pedomorphosis. M.S., Memphis State University

Figiel, C. (1990). Effects of body size, tail injury, and habitat complexity on the susceptibility of tadpoles to predation. M.S. Thesis, Memphis State University. [received a Ph.D. and currently has a senior research position with US Fish & Wildlife Service, Warm Springs, GA]

Harkey, G. (1988). Environmental factors influencing the expression of a color polymorphism in the frog, Pseudacris ornata. M.S. Thesis, Memphis State University. [received a Ph.D. and currently has a research position with Thermo-Finnigan, Schaumburg, IL]

Undergraduate Research Students:

Brock, A. (2014) Life Sciences Research Fellowship, University of Missouri

Kroese, C. (2014) Life Sciences Research Fellowship, University of Missouri

Corbett, K. (2014) Highlands Biological Station Fellowship, NC

Nussbaum, S. (2014-15) A&S Fellowship, University of Missouri

Hollins, L. (2014-15) McNair Scholars Program, University of Missouri

Heligman, Z. (2013) Life Sciences Research Fellowship, University of Missouri

Romine, K. (2013) Life Sciences Research Fellowship, University of Missouri

Brocato, E. (2013) Life Sciences Research Fellowship, University of Missouri

Schondelmeyer, R. (2012) Life Sciences Research Fellowship, University of Missouri

Smith, L. (2012) Volunteer Research Assistant, University of Missouri

Sclick, S. (2012) Life Sciences Research Fellowship, University of Missouri

Locke, J. (2011-12) Volunteer Research Assistant, University of Missouri

Pinnell, A. (2010-12) Life Sciences Research Fellowship, University of Missouri

Melvin, K. (2010) Discovery Fellows Program, MU Honors College

Meadows, H. (2010) Volunteer Research Assistant

Pauley, L. (2010-12) Life Sciences Research Fellowship, University of Missouri

Spatola, B. (2010-12) Life Sciences Research Fellowship, University of Missouri

Castello, P. (2009-10) NSF UMEB Environmental Biology Summer Research Fellowship

Randolph, J. (2009) A&S Fellowship, University of Missouri

Kirkland, S. (2009) Treefrog habitat use project
Sappington, A. (2009) Box turtle habitat use project
Malone, K. (2007-08) NSF REU Summer Research Project
Leach, D. (2007-08) NSF REU & Life Sciences Summer Research Fellowship
Woodburn, N. (2007-08) Stream amphibian project
Randolph, J. (2007-08) NSF UMEB Environmental Biology Summer Research Fellowship
Wisdom, J. (2007) Life Sciences Research Fellowship, University of Missouri
Barlow, A. (2006) Life Sciences Fellowship and McNair Scholar, University of Missouri
Fountain, E. (2005, 2006) A&S Fellowship, University of Missouri
Walter, A. (2005) A&S Fellowship, University of Missouri
Rehard, L. (2005) Life Sciences Research Fellowship, University of Missouri
Mahan, R. (2004, 2005) Life Sciences & A&S Fellowship, University of Missouri
Miller, A. (2003) Life Sciences Research Fellowship, University of Missouri
Mank, R. (2002) Life Sciences Research Fellowship, University of Missouri
Doyle, M. (2002) University of Missouri
Saura-Mas, Sandra (2001) US FIPSE Exchange Program, University of Barcelona
Lambert, Dana (2001) Life Sciences Research Fellowship, University of Missouri
Deters, J. (2000) Life Sciences Research Fellowship, University of Missouri
Doty, G. (1999), A&S Fellowship, University of Missouri
Kirk-Connell, M. (1998), Hughes Research Program, University of Missouri
Laird, C. (1998), Hughes Research Program, University of Missouri
Duzenberry, R. (1998), Hughes Research Program, University of Missouri
Wyrick, C. (1998), Hughes High School Teacher's Program, University of Missouri
Mueller, P. (1997), Research Volunteer, University of Missouri
Bullerdieck, A. (1996 & 97) A&S Mentorship Program, University of Missouri
Wyrick, C. (1997), Hughes High School Teacher's Program, University of Missouri
Pickle, J. (1995), Research Volunteer, Augustana College
Winkeler, A. (1995), Hughes Research Program, University of Missouri
Gutmann, E. (1993), University of Zurich
Foglia, M. (1993), University of Zurich
Mueller, A. (1993), University of Zurich
Steiner, I. (1993), University of Zurich
Mulli, D. (1992), University of Zurich
Spillmann, H.-H. (1992), University of Zurich
Ruegsegger, R. (1992), University of Zurich
Stauffer, H.-P. (1991), University of Zurich
Bernasconi, M. (1991), University of Zurich
Reichling, S. (1988), Memphis State University
Nicholson, K. (1988), Memphis State University