

MICHAEL JOSEPH RYAN

Clark Hubbs Regents Professor in Zoology

Mailing Address:

Department of Integrative Biology
1 University Station C0990
University of Texas
Austin TX 78712 USA

mryan@utexas.edu

(office) 512-471-5078

(lab) 512-475-6164

(fax) 512-471-3878

(section office) 512-471-5858

url: <http://www.sbs.utexas.edu/ryan/>

Education:

1977-1982	Cornell University, Neurobiology and Behavior	Ph.D.
1975-1977	Rutgers University, Zoology	M.S.
1971-1975	Glassboro State College, Biology	B.A.

Academic Honors and Awards:

2013	<i>Eminent Ecologist</i> , Kellogg Biological Station, Michigan State University
2012	<i>Fellow of the American Association for the Advancement of Science</i>
2011	<i>Fellow Wissenschaftskolleg</i> (Institute of Advanced Studies), Berlin
2011	College of Natural Sciences <i>Teaching Excellence Award</i> , University of Texas
2011	ING <i>Professor of Excellence</i> , University of Texas
2010	<i>E.O. Wilson Naturalist Award</i> , American Society of Naturalists
2008	<i>Joseph Grinnell Medal</i> , Museum of Vertebrate Zoology, Univ. Calif., Berkeley
2007	<i>Exemplar Award</i> , Center for Integrative Studies in Animal Behavior, Indiana U.
2007	Presidential sequence, <i>Animal Behavior Society</i>
2007	Selected as one of 25 " <i>Leaders in Animal Behavior</i> " (Cambridge Univ. Press. 2010)
2006	<i>Fellow of the Animal Behavior Society</i>
2001	<i>Outstanding Academic Title</i> (Choice Magazine) <i>Anuran Communication</i> (ed.M.J. Ryan)
2001	<i>Fellow of the American Academy of Arts and Sciences</i>
1997	<i>Guggenheim Fellow</i>
1997	<i>Visiting Scholar</i> , University of California, Berkeley
1997	<i>Distinguished Visiting Professor</i> , James Cook University, Townsville, Australia
1996	<i>Distinguished Visiting Professor</i> , University of Torino, Italy
1995	<i>Distinguished Herpetologist</i> , Herpetologists' League

1994	<i>Erskine Fellow</i> , University of Canterbury, Christchurch, New Zealand
1994	<i>Distinguished Visiting Animal Behaviorist</i> , University of Nebraska, Lincoln
1993-date	<i>Clark Hubbs Regents Professor in Zoology</i> , University of Texas, Austin
1993	<i>Visiting Distinguished Professor</i> , University of Miami, Miami
1989	<i>Visiting Professor</i> , Wake Forest University
1985-1987, 1990-1991	<i>Reeder Fellowship in Ecology and Evolution</i> , University of Texas, Austin
1985	<i>Young Investigator Award</i> , American Society of Naturalists
1982-1984	<i>Miller Fellow</i> , University of California, Berkeley
1981	<i>Herpetologists' League Award</i> , "Best Student Paper" - Evolution Category, Memphis, Tennessee
1980	<i>Stoye Award</i> , American Society of Ichthyologists & Herpetologists, "Best Student Paper" (Ecology, Ethology, Evolution), Fort Worth, Texas
1978	<i>Herpetologists' League Award</i> , "Best Student Paper", Tempe, Arizona
1975	<i>Outstanding Biology Student Medallion</i> , Glassboro State College

Academic Positions:

1993-1999	Graduate Advisor, Department of Zoology, University of Texas, Austin
1993-date	Clark Hubbs Regents Professor in Zoology
1993-date	Professor of Zoology, University of Texas, Austin
1988-1993	Associate Professor of Zoology, University of Texas, Austin
1984-1988	Assistant Professor of Zoology, University of Texas, Austin
1982-1984	Miller Fellow, University of California, Berkeley
1982-date	Research Associate, Smithsonian Tropical Research Institute, Balboa, Panama

Professional Activities:

2013	External review committee, Biology Department, Indiana University
2012	External review committee, Biology Department, University of Kentucky
2012	National Science Foundation Panel
2012	Guest Editor, <i>Proceedings of the National Academy of Sciences</i>
2011	co-organizer National Science Foundation workshop- <i>The Future of Animal Behavior</i>
2011-date	Board of Reviewing Editors, <i>Science</i>
2011-date	Advisory Board, <i>Program in Cognition and Communication</i> , University of Vienna
2011-date	Associate Editor, <i>Biology Letters</i>
2011-date	Editorial Board, <i>Interaction Studies, Social Behaviour and Communication in Biological and Artificial Systems</i>
2010-2016	Scientific Advisory Board, <i>Max Planck Institute for Ornithology</i> , Seewiesen, Germany
2009 – date	Series Editor, <i>Biology of Behavior</i> , Princeton University Press
2009	President, <i>Animal Behavior Society</i>
2009	Script Consultant, <i>Bronx Born Film Productions</i>
2009	Science Fair judge, Brykerwoods Elementary, Austin, Texas

2009	External review committee, Biology Department, University of Utah
2008	External review committee, Department of Biology, Texas A&M
2007-2008	President-elect, <i>Animal Behavior Society</i>
2007	Organizer, <i>Winter Animal Behavior Conference</i>
2007	External review committee, Department of Biology, University of Cincinnati
2006	Oversight Committee, Department of Organismic and Evolutionary Biology, Harvard University
2006- date	Editorial Board, <i>Journal of Experimental Zoology Part A: Comparative Experimental Biology</i>
2004-2007	Associate Editor, <i>The American Naturalist</i>
2003-date	Advisory Committee, Department of Ecology and Evolution, Columbia University, New York, New York.
2003-date	Advisory Board, <i>Interaction Studies: Social Behaviour and Communication in Biological and Artificial Systems</i>
2002-2005	Editorial Board, <i>Annual Review of Ecology and Systematics</i>
2001	External review, School of Biological Sciences, University of California, Irvine
1997-1999	Editorial Board, <i>Behavioral Ecology and Sociobiology</i>
1997-2000	Editorial Board, <i>Evolution of Communication</i>
1994-1997	Secretary, <i>Society for the Study of Evolution</i>
1998	External review, Department of Biology, university of Minnesota
1993-1998	Board of Governors, <i>American Society of Ichthyologists and Herpetologists</i>
1993-1996	Associate Editor, <i>Evolution</i>
1988-1992	Council of the <i>Herpetologists League</i>
1986-1991	Board of Governors, <i>American Society of Ichthyologists and Herpetologists</i>

Research Grants and Fellowships:

2012-2013	National Science Foundation: Supplement to Multimodal communication and sexual selection (PIs MJ Ryan, R.A. Page, R. Taylor)
2012-2012	National Science Foundation: Meeting: The Future of Animal Behavior. (PIs J. Strassman, D. Rubenstein)
2011-2016	National Science Foundation: Multimodal communication and sexual selection (PIs MJ Ryan, R.A. Page, R. Taylor)
2006-2010	National Science Foundation: Eavesdroppers and signal evolution (sole PI)
2005-2006	National Science Foundation- cDNA microarray for studies of sexual communication (sole PI)
2006-2008	National Science Foundation- The role of multimodal cue assessment in sexual selection (PI; R. Taylor, Co-PI)
2005-2010	National Science Foundation- Neural basis for elaborate male traits (Co-PI; S. Burmeister, PI)
2002-2004	Texas Applied Research Program- Ultraviolet communication in swordtails (sole PI)
2001-2002	National Science Foundation- Ultraviolet communication in swordtails (sole PI)
2001-2005	National Science Foundation- The phylogenetic and functional integration of complex

- phenotypes regulating social/reproductive interactions (IRCEB) (Co-PI; D. Cannatella PI; W. Wilczynski Co-PI)
- 2000-2004 National Science Foundation- The evolution of acoustic signals of frogs (Co-PI; D. Cannatella PI; D. Hillis Co-PI)
- 1998-2001 National Science Foundation- Historical effects on the evolution of female mating preferences (PI; A.S. Rand Co-PI)
- 1998-1999 Smithsonian Institution Scholarly Studies Program - The evolution of female mating preferences in the túngara frog (Co-PI; A.S. Rand PI)
- 1998-1999 NATO- Maintenance of female sexual preferences in the unisexual molly (Co-PI; J. Páezfal, PI)
- 1996-1999 National Science Foundation- Fish TV: Unraveling the effects of female preferences on correlated characters in pygmy swordtails. (sole PI)
- 1995-1997 National Institute of Mental Health- Neuroethology of social communication. (Co-PI; W. Wilczynski PI)
- 1995-1996 Smithsonian Institution Scholarly Studies Program- The evolution of communication in frogs of the genus *Physalaemus*. (Co-PI; D. Cannatella Co-PI, A. Cardoso Co-PI; A.S. Rand PI)
- 1994-1998 National Science Foundation- The evolution of female mating preferences in the túngara frog (PI; A.S. Rand Co-PI)
- 1994-1995 Smithsonian Institution Scholarly Studies Program- The evolution of female mating preferences in the túngara frog (Co-PI; A.S. Rand PI)
- 1994 University Research Institute (Univ. Texas)- Video animation in studies of sexual selection. (sole PI)
- 1993-1994 National Science Foundation- The evolution of female mating preferences in swordtails. (sole PI)
- 1991-1994 National Science Foundation- Microevolution of acoustic communication in the cricket frog (PI; W. Wilczynski, Co-PI)
- 1991 National Institute of Mental Health Symposium Grant- American Society of Zoology Symposium- Mechanisms of mate choice (Co-PI; W. Wilczynski, PI)
- 1990 University Research Institute (Univ. Texas). Faculty Research Leave- Sexual selection and communication in the *Physalaemus pustulosus* species group. (sole PI)
- 1990 University Research Institute (Univ. Texas)- Sexual selection and communication in the *Physalaemus pustulosus* species group. (sole PI)
- 1989 National Geographic Society- Biogeography of body size polymorphism in *Xiphophorus nigrensis*. (sole PI)
- 1988-1989 Smithsonian Institution Scholarly Studies Program- The sensory basis of sexual selection (Co-PI; A.S. Rand, PI)
- 1987 University Research Institute (Univ. Texas)- Sexual selection and sound localization in the túngara frog. (sole PI)
- 1987 Smithsonian Institution Visiting Researcher Fellowship- Sexual selection and sound localization in the túngara frog. (sole PI)
- 1986 University Research Institute (Univ. Texas)- Sexual selection in swordtails (*Xiphophorus*). (sole PI)

- 1986-1989 National Science Foundation- Microevolution of acoustic communication in the cricket frog (PI; W. Wilczynski, Co-PI)
- 1985 University Research Institute (Univ. Texas)- Environmental bioacoustics in anurans
- 1985 Texas - Peru Partnership (Washington D.C.)- Field collection of bats (*Trachops cirrhosus*) for studies of sound localization (PI; G. Pollak Co-PI).
- 1985 University Research Institute (Univ. Texas)- Acoustical foraging in an Australian bat. (sole PI)
- 1984 University Research Institute (Univ. Texas)- Sound localization in non-tympanic frogs. (sole PI)
- 1983 National Geographic Society- Environmental influences on the evolution of frog vocalizations. (sole PI)
- 1983 National Geographic Society- Bat-frog interactions in Africa (Co-PI, M. Tuttle PI)
- 1982 American Philosophical Society- Synchronized calling in a Neotropical treefrog: mechanisms and evolution. (sole PI)
- 1981-1982 National Institute of Mental Health traineeship- Animal communication and neurophysiology
- 1981 National Geographic Society- Bat-frog interactions (PI, M. Tuttle Co-PI)
- 1979-1980 Smithsonian Institution Predoctoral Fellowship- Sexual selection and communication in a Neotropical frog.
- 1979-1980 National Science Foundation Doctoral Dissertation Improvement Grant- Sexual selection and communication in a Neotropical frog
- 1979 Gage Fund, American Society of Ichthyologists and Herpetologists- Sexual selection and communication in a Neotropical frog. (sole PI)
- 1979 Sigma Xi, Cornell Univ. chapter- Sexual selection and communication in a Neotropical frog. (sole PI)
- 1978 Graduate Student Research Appointment, Smithsonian Institution- Sexual selection and communication in a Neotropical frog.
- 1978 Smithsonian Institution Scholarly Studies Program- Lizard thermoregulation. (sole PI)
- 1975 Theodore Roosevelt Memorial Fund, American Museum of Natural History- Reproductive behavior of the bullfrog. (sole PI)

Teaching Experience:

University of Texas, Austin

- 2012 Graduate Seminar: Sexual Selection and the Brain
- 2009 Signature (Freshman) Course, Sex in the Wild
- 2008 Graduate Seminar: Principles of Brain Evolution
- 2006 Graduate Seminar: Sexual Conflict
- 2005-2013 Introduction to Ecology, Evolution and Behavior
- 2002 Graduate Seminar- Recognition Mechanisms in Plants and Animals
- 2001 Graduate Seminar- Sensory Ecology
- 2000 Graduate Seminar- Cognition, Evolution and Behavior

1997	Graduate Seminar- Human Language and Animal Communication
1993, 1995	Behavioral Ecology
1992	Graduate Seminar- Evolution of Behavior
1990-1994, 1996, 1998, 1999	Animal Behavior
1989, 1993, 1997	Herpetology
1987-1988 1994	Graduate Seminar- Advanced Topics in Animal Behavior
1986 1985, 1987, 1991, 1996 1998, 2001- 2008, 2010- 2012	Graduate Seminar- Graduate Student Seminar in Ecology Animal Communication
1985-1988 1984	Vertebrate Natural History Ecology, Evolution and Society (non-majors)

Other

1983	Graduate seminar- Sexual Selection Theory, University of California, Berkeley
1977-1979	Teaching assistant- General Biology, Cornell University
1976-1977	Teaching assistant- General Biology, Rutgers University
1975	Student teacher- General Biology, Glassboro High School, New Jersey
1975	Dual certification- Biology high school, Science high school, New Jersey

Invited Lectures:

2013— Colorado State University (Biology Department), Fort Collins; Kellogg Station, Michigan State University, Battle Creek; Nottingham University (School of Biology), Nottingham, United Kingdom; University of Montana, Missoula (Biology Department); University of Texas, Austin (Section of Neurobiology); Winter Animal Behavior Conference, Steamboat, Colorado

2012— Bielefeld University (Biology Department) Bielefeld, Germany; Louisiana State University (Museum of Zoology), Baton Rouge, Louisiana; McMaster's University (Biology Department), Toronto; Smithsonian Tropical Research Institute, Panama; St. Edwards University (Biology Department), Austin, Texas; Salisbury University (Biology Department), Salisbury, Maryland; Universidad de los Andes (Biology Department), Bogota, Colombia; University of Zurich (Biology Department), Zurich, Switzerland; Winter Animal Behavior Conference, Steamboat, Colorado

2011— Animal Behavior Symposium of Mexico, Tlaxcala, Mexico; Baylor University (Biology Department), Waco, Texas; Kellogg Biological Station, East Lansing, Michigan; Michigan State University (Department of Biology), Lansing; Museum für Naturkunde, Berlin, Germany; Trinity

- University (Biology Department), San Antonio, Texas; University of Californian (Department of Integrative Biology), Berkeley; University of Californian (Museum of Vertebrate Zoology), Berkeley; University of Kentucky (Department of Biology), Lexington; Univeristy of Vienna (Communication and Cognition Program), Vienna; Winter Animal Behavior Conference, Steamboat, Colorado
- 2010— University of Missouri (Department of Biological Sciences), Columbus; Universidad Nacional Autonoma (Institute of Ecology), Mexico City, Mexico; University of California, Santa Barbara (Department of Ecology, Evolution and Marine Biology), Oklahoma State University (Department of Biology), Stillwater; Winter Animal Behavior Conference, Steamboat, Colorado
- 2009— Cornell University (Department of Neurobiology and Behavior), Ithaca New York; Laboratory of Ornithology, Cornell University, Ithaca New York; University of Texas (Biology Department), San Antonio; University of Illinois (Biology Department), Champaign-Urbana; University of Vienna (Biology Department), Austria; Max Planck Institute, Seeweisen, Germany
- 2008— Harvard University, Cambridge, Massachusetts (Department of Evolution and Organismic Biology); Smithsonian Tropical Research Institute, Balboa, Panama; Texas A&M (Department of Biology), College Station; Winter Animal Behavior Conference, Steamboat Springs, Colorado
-
- 2007—University of Massachusetts, Amherst (Biology Department); University of Kansas, Lawrence (Department of Ecology and Evolutionary Biology); Winter Animal Behavior Conference, Steamboat Springs, Colorado; Barro Colorado Island, Smithsonian Tropical Research Institute, Panama; Department of Biology, Florida State University, Tallahassee; Department of Biology, Indiana University, Bloomington, Indiana; Department of Ecology & Evolution, University of California, Los Angeles; Winter Animal Behavior Conference, Steamboat Springs, Colorado; Department of Biology, University of North Carolina, Chapel Hill; Department of Ecology, Evolution and Behavior, University of Minneapolis, St. Paul
- 2006— Boston University (Biology Department), Boston, Massachusetts; University of Memphis, (Biology Department), Memphis, Tennessee; University of Montana, (Biology Department), Missoula, Montana; Institute in Neuroscience, Princeton University, Princeton, New Jersey; Purdue University (Biology Department), West Lafayette, Indiana; Winter Animal Behavior Conference, Steamboat Springs, Colorado
- 2005— Columbia University (Dept. Ecology and Evolution) New York, New York; University of California, Berkeley (Dept. Integrative Biology), Berkeley, California
- 2004— Bucknell University (Biology Dept.), Lewisburg, Pennsylvania; Max Plank Institute, Plön Germany; Trinity University (Biology Dept.), San Antonio, Texas; University of Washington (joint Biology and Psychology Depts.), Seattle, Washington; University of Alberta (Psychology Depts.),

- Edmonton, Canada; Winter Animal Behavior Meetings, Breckenridge, Colorado; University of Oklahoma (Zoology Dept.), Norman
- 2003— Georgia State University (Neuroscience Group), Athens, Georgia; University of Florida, (Dept. of Zoology), Gainesville, Florida; University of Texas (Artificial Intelligence Group, Computer Sciences Dept.), Austin Texas; University of Louisiana (Dept. of Biology), Lafayette, Louisiana
- 2002— Virginia Tech University (Biology Dept.), Blacksburg, Virginia; University of Zurich (Biology Dept.), Zurich, Switzerland; Cornell University (Dept. of Ecology and Evolution), Ithaca, New York; McMaster University (Dept. of Psychology), Toronto, Canada
- 2001— Simon Fraser University (Dept. of Ecology and Evolution), Vancouver, Canada; Smithsonian Tropical Research Institute, Balboa, Panama; University of California- Los Angeles (Behavioral Ecology Symposium Series), Los Angeles, California; University of Tennessee (Dept. of Ecology, Evolution and Behavior), Knoxville, Tennessee; University of Wurzburg (Biocentrum), Wurzburg, Germany
- 2000— University of California- Davis (Animal Behavior Program), Davis, California; University of California (Depts. of Psychology and Ecology & Evolution), La Jolla, California; University of California (Dept. of Ecology, Evolution and Marine Biology), Santa Barbara, California; University of Pittsburgh (Dept. of Biological Sciences), Pittsburgh, Pennsylvania; Florida International University (Dept. of Biology), Miami, Florida; Michigan State University (Dept. of Zoology), East Lansing, Michigan; Southwestern University (Biology Dept.), Georgetown, Texas; Texas A&M (Dept. of Fisheries and Wildlife) College Station, Texas
- 1999— Baylor University (Biology Dept.), Waco, Texas; Institute of Science (Biology Dept.), Bangalore, India; University of Arizona (Dept. of Ecology and Evolution), Tucson, Arizona; Harvard University (Dept. of Organismal and Evolutionary Biology), Cambridge, Massachusetts; University of Maryland (Dept. of Biology), College Park, Maryland; University of North Carolina (Dept. of Zoology), Chapel Hill, North Carolina
- 1998— Arizona State University (Biology Dept.), Phoenix, Arizona; Indiana University (Center for Integrative Studies in Animal Behavior), Bloomington, Indiana; University of Texas (Nonlinear Dynamics Group, Physics Dept.), Austin, Texas; University of Texas (Biology Dept.), Brownsville, Texas
- 1997— Cairns University (Biology Dept.), Cairns, Australia; James Cook University (Dept. of Zoology and Tropical Biology), Townsville, Australia; University of California- Davis (Center for Animal Behavior), Davis, California; University of California- Berkeley (Museum of Vertebrate Zoology), Berkeley, California; University of Chicago (Dept. of Ecology and Evolution), Chicago, Illinois; University of Oregon (Dept. of Zoology), Corvallis, Oregon
- 1996— University of Chicago (Dept. of Ecology and Evolutionary Biology), Chicago, Illinois; Museo

- Specola, University of Florence, Florence, Italy
- 1995— Michigan State University (Kellogg Biological Station), Hickory Corners, Michigan; Southeastern Louisiana University (Dept. of Biology), Hammond, Louisiana; University of Washington (Dept. of Biology), St. Louis, Missouri
- 1994— University of Canterbury (Dept. of Zoology), Christchurch, New Zealand; Florida State University (Dept. of Biological Sciences), Tallahassee, Florida; University of Otago (Dept. of Zoology), Dunedin, New Zealand; Royal Society of New Zealand, Christchurch, New Zealand; University of Texas (Dept. of Zoology), Arlington, Texas; University of Utah (Biology Dept.), Salt Lake City, Utah
- 1993— State University of New York (Dept. of Biological Sciences), Albany, New York; University of Houston (Biology Dept.), Houston, Texas; Universidad Automico de Mexico (Centro de Ecologia), Mexico City, Mexico; University of Washington (Zoology Dept.), Seattle, Washington
- 1992— Cornell University (Section of Neurobiology and Behavior), Ithaca, New York; University of California- Davis (Animal Behavior Program) Davis, California; University of North Carolina (Biology Dept.), Chapel Hill, North Carolina; University of Toronto (Biology Dept.), Toronto, Ontario
- 1991— Smithsonian Tropical Research Institute, Balboa, Panama; University of Basil (Zoology Institute), Basil, Switzerland; University of Bern (Zoology Institute), Bern, Switzerland; Marine Science Institute, University of Texas, Port Aransas, Texas; University of Zurich (Zoology Institute), Zurich, Switzerland
- 1990— Harvard University (Organismal and Evolutionary Biology Dept.), Cambridge, Massachusetts; Princeton University (Biology Dept.), Princeton, New Jersey; Universidad de Católica (Biology Dept.), Quito, Ecuador
- 1989— Duke University (Zoology Dept.), Durham, North Carolina; Memphis State University (Zoology Dept.), Memphis, Tennessee; Rhodes College (Biology Dept.), Memphis, Tennessee; University of Wyoming (Zoology Dept.), Larimie, Wyoming; Wake Forest University, Winston-Salem, North Carolina
- 1988— Arizona State University (Zoology Dept.), Tempe, Arizona; Creighton University (Biology Dept.), Omaha, Nebraska; Kansas State University (Zoology Dept.), Manhattan, Kansas; Max Planck Institute, Seeweisen, West Germany; University of Missouri (Biology Dept.), Columbus, Missouri; Texas Christian University (Biology Dept.), Dallas, Texas.
- 1987— Baylor University (Biology Dept.), Waco, Texas; National Institutes of Health (Brain Evolution and Behavior Section), Poolesville, Maryland; University of California- Santa Barbara (Dept. of Biological Sciences), Santa Barbara, California; University of Kentucky (Zoology Dept.),

- Lexington, Kentucky; University of Oklahoma (Zoology Dept.), Norman, Oklahoma; Smithsonian Tropical Research Institute, Balboa, Panama; State University of New York (Biology Dept.), Stony Brook, New York
- 1986— Princeton University (Biology Dept.), Princeton, New Jersey; University of California- Riverside (Biology Dept.), Riverside, California; University of Munich (Zoology Institute), Munich, West Germany; Technical University of Munich (Zoology Institute), Munich, West Germany
- 1985— Harvard University (Biology Dept.), Cambridge, Massachusetts; Rice University (Biology Dept.), Houston, Texas; Savannah River Ecology Lab, Aiken, South Carolina
- 1984— California Academy of Sciences, San Francisco, California; Cambridge University (Sub-dept. Animal Behaviour), Cambridge, England; University of California- Berkeley, (Museum of Vertebrate Zoology), Berkeley, California; University of Washington (Zoology Dept.), Seattle, Washington; University of Kansas (Museum of Natural History), Lawrence, Kansas; University of Houston (Biology Dept.), Houston, Texas
- 1983— San Francisco State University (Biology Dept.), San Francisco, California; Sonoma State University (Biology Dept.), Rohnert Park, California; University of California- Davis (Zoology Dept.), Davis, California; University of Chicago (Biology Dept.), Chicago, Illinois; University of Illinois (Dept. Ecology, Ethology, Evolution), Urbana, Illinois; University of Missouri (Biology Dept.), Columbia, Missouri
- 1982— Arizona State University (Zoology Dept.), Tempe, Arizona; Cornell University (Neurobiology and Behavior), Ithaca, New York; University of California- Berkeley (Zoology Dept.), Berkeley, California; University of California- Berkeley (Museum of Vertebrate Zoology), Berkeley, California; University of California- Los Angeles (Biology Dept.), Los Angeles, California; University of Texas- Austin, (Zoology Dept.), Austin, Texas
- 1981— National Zoological Park, Washington, D.C.; Rockefeller University Field Research Center, Millbrook, New York; Rutgers University (Zoology and Physiology Dept.), Newark, New Jersey; Rutgers University (Institute of Animal Behavior), Newark, New Jersey; Syracuse University (Biology Dept.), Syracuse, New York
- 1980— Audubon Society, Balboa, Panama; Cornell University (Neurobiology and Behavior), Ithaca, New York; Sienna College (Biology Dept.), Albany, New York; Smithsonian Tropical Research Institute, Balboa, Panama; State University of New York- Albany (Biology Dept.), Albany, New York; U.S. National Museum of Natural History, Washington, D.C.

Plenary/Distinguished Lectures, Invited Symposia, and Workshops:

- 2013 *Renaissance Weekend*, Strange Attractions, Monterrey CA
- 2012 *Immelman Lecture*, University of Bielefeld, Germany
- 2011 *Symposium (organizer) What Do Animal Signals Mean?* Joint Meeting of Animal Behavior Society & International Ethology Congress, Bloomington IN
- 2011 *Symposium—Neuroecology*, Society for Integrative and Comparative Biology, Salt Lake City, Utah
- 2011 *Southwest Association of Naturalist*, after-dinner lecture, *The Natural History of Natural Beauty*, Denton, Texas
- 2010 *Storer Lecture*, University of California, Davis
- 2009 *Animal Communication Workshop*, Atlanta, Georgia
- 2009 *First Friday's—Darwin's Revolution*, LA County Museum, Los Angeles
- 2009 *Atwood Lecture*, University of Toronto, Toronto, Canada
- 2008 *Plenary Lecture, VII Latin American Herpetological Congress*, Havana, Cuba
- 2008 *Integrative Studies in Animal Communication*, International Congress in Zoology, Paris, France
- 2008 *Information and Representation in Signaling using Sound*, Center for Behavioral Neuroendocrinology, Atlanta
- 2008 *Dean's Scholars Lecture*, University of Texas, Austin
- 2008 *Signature Lecture*, University of Texas, Austin
- 2008 *Grinnell Medal Lecture*, University of Californian, Berkeley
- 2008 *Sinauer Lecture*, University of Massachusetts, Amherst
- 2007 *Keynote Address* Konnevesi Research Retreat, Univesirty of Javaskala, Finland
- 2007 *Keynote Address BENELUX Zoological Congress*, Amsterdam, The Netherlands
- 2007 *Keynote Address 10th Annual Biology Research Symposium*, University of California, Los Angeles, California
- 2007 *Keynote Address, Center for Integrative Studies in Animal Behavior Symposium*, University of Indiana, Bloomington, Indiana
- 2006 *Symposium-- Sensory Ecology*, Animal Behavior Society, Snowbird, Utah
- 2004 *Symposium-- Sexual Selection in Túngara Frogs*, Animal Behavior Society, Oaxaca, Mexico (symposium organizer)
- 2004 *Plenary Lecture: Phylogenies and Behavior*, Association for the Study of Animal Behaviour, London
- 2004 *Allen L. Edwards Endowed Lectureship in Psychology*, University of Washington, Seattle
- 2004 *Distinguished Scholar Lecture Series in Psychology*, University of Alberta, Canada
- 2003 *The Swordtail Alphabet: From P to U to V. First European Meeting of Poeciliid Biologists*, Zurich, Switzerland
- 2003 *Perspective in Biology*, Wake Forest University, Winston-Salem, North Carolina
- 2003 *Tinbergen Symposium*. Leiden, The Netherlands
- 2002 *Lang Memorial Lecture in Neuroscience*. Woods Hole, Massachusetts
- 2001 *CAST: A Science Odyssey (Science Teachers Association of Texas)*

- 2001 *University of Texas Outreach Lecture Series: Sexual Selection*. Austin, Texas
- 2000 *A Symposium in Honor of W.D. Hamilton*. University of California, Berkeley
- 2000 *Eminent Biologist Lecture Series*. Carnegie Museum, Pittsburgh, Pennsylvania
- 2000 *Annual Darwin Lecture*. University of Calgary, Calgary, Canada
- 1999 *Plenary Lecture: The Ethology and Evolution of Female Mating Preferences*, International Ethological Congress, Bangalore, India
- 1999 *Plenary Lecture: Reproductive Behavior in Anurans*, International Ethological Congress, Bangalore, India
- 1998 *Recent Advances in Anuran Communication, Herpetologists' League*, Guelph, Ontario (symposium organizer)
- 1997 *Sexual Selection and Phylogenetics*, Animal Behavior Society, College Park, Maryland (with D. McLennan)
- 1996 *Experimental Approaches to Evolution*, Japanese Research Development Corporation, Tokyo, Japan
- 1996 *Associates Meeting*, Institute of Neurosciences, La Jolla, California
- 1995 *Recognition: from Cell to Species*. Research NSF Training Grant Workshop, University of California, Davis, California
- 1995 *Distinguished Ecologist Lecture*. Louisiana Ecology Consortium. Hammond, Louisiana
- 1995 *Distinguished Herpetologist Lecture*. Herpetologists' League, Edmonton, Canada
- 1995 *Plenary Lecture: Historical Studies of Communication Systems*. (European) Animal Behavior Society, Leiden, The Netherlands
- 1995 *Gompertz Lecture*. Department of Integrative Biology, University of California, Berkeley
- 1994 *Phylogenetics in the Study of Behavior*. Animal Behavior Society, Seattle, Washington
- 1994 *Cognitive Ethology*. Animal Behavior Society, Seattle, Washington
- 1994 *Distinguished Animal Behaviorist Lecture*. Nebraska Behavioral Biology Group, Omaha, Nebraska
- 1993 *Sexual Selection in Ectotherms* (organizer). American Society of Ichthyologists and Herpetologists, Austin, Texas
- 1993 *Biology of Latin American Fishes*. American Society of Ichthyologists and Herpetologists, Austin, Texas
- 1993 *Short Course on Anuran Reproductive Behavior*. Latin American Herpetology Congress, Campinas, Brazil
- 1993 *Plenary Lecture: Why We Should Know More not Less Biology when Studying Behavioral Adaptations*. Second World Congress of Herpetology, Adelaide, Australia
- 1992 *Molecular Genetics and Evolution: Speciation*. American Society for the Advancement of Science, Chicago, Illinois
- 1992 *The Evolution and Design of Animal Signaling Systems*. The Royal Society, London, England
- 1992 *Behavioural Mechanisms in Evolutionary Perspective*. Instituto Juan March de Estudios e Investigaciones, Madrid, Spain
- 1991 *Sewall Wright Lecture*. Department of Biology, University of Chicago.
- 1991 *The Evolution of Geographic Variation in Behavior*. Animal Behavior Society,

- Wilmington, North Carolina
- 1991 *Species and Speciation*. Linnean Society, Cardiff, England
- 1991 *Plenary Lecture: Sexual Selection and Mating Systems*. International Ethological Congress, Kyoto, Japan
- 1990 *Does Sensory Biology Bias or Constrain the Direction of Evolution?* Vice Presidential Symposium, American Society of Naturalists, College Park, Maryland
- 1990 *The Role of Systematics in Behavior*. Society for the Study of Evolution, College Park, Maryland
- 1990 *Plenary Lecture: Sensory Systems and Sexual Selection*. Third International Conference of Behavioral Ecology, Uppsala, Sweden
- 1990 *Mechanisms of Mate Choice*. American Society of Zoologists, San Antonio, Texas
- 1989 *Sexual Selection and Communication in Amphibians and Reptiles*. International Herpetological Congress, Canterbury, England
- 1989 *Systematics and Phylogeny*. International Herpetological Congress, Canterbury, England
- 1988 *New Trends in Ichthyology*. Munich, West Germany
- 1986 *Energetic Constraints and Animal Behavior*. American Society of Zoologists, Nashville, Tennessee
- 1986 *The Evolution of the Amphibian Auditory System*. Bielefeld, West Germany
- 1985 *Common Principles in the Neuroethology of Acoustic and Electric Communication*. International Society of Neuroethology, Austin, Texas
- 1985 *Loftus-Hills Symposium*. American Society of Naturalists, Chicago, Illinois
- 1984 *Bioacoustics*. American Association for the Advancement of Science- Western Region, San Francisco, California
- 1983 *Acoustic Behavior of Anurans*. XVIIIth International Ethological Congress, Brisbane, Australia
- 1982 *The Ecology of Animal Communication*. Northeast Regional Animal Behavior Society, Boston, Massachusetts
- 1979 *Behavior, Ecology and Evolution of Iguanine Lizards*. Society for the Study of Amphibians and Reptiles, Knoxville, Tennessee

Reviewer for:

journals: American Naturalist, Animal Behaviour, Biological Journal of the Linnean Society, Copeia, Ecology, Evolution, Herpetologica, Journal of Herpetology, Nature, Oxford University Press, Philosophical Transactions of the Royal Society, Princeton University Press, Proceedings of the National Academy of Sciences, Science, Systematic Zoology, University of Chicago Press

granting institutions: National Science Foundation, National Geographic, Smithsonian Institution Scholarly Studies Program

prizes: AAAS- Cosmos Prize (government of Japan); Cleveland Prize (American Association for the Advancement of Science); Craawford Prize (government of Sweden)

external reviews: Biology Department, Univerist of California, Irvine; Biology Department, Univeristy of Minnesota; Biology Department, University of Utah; Biology Department, Texas A&M University; Biology Department, University of Cincinnati; Department of Organismic and Evolutionary Biology, Harvard University; Max Planck Institute for Ornithology, Seeweisen, Germany; Center for Integrative Studies of Animal Behavior, Indiana University

Research Interests:

Evolution and Mechanisms of Animal Behavior, especially Animal Communication and Sexual Selection

Publications:

Research Papers:

1. Ryan, M.J. 1978. A thermal property of the *Rana catesbeiana* (Amphibia, Anura, Ranidae) egg mass. *Journal of Herpetology* 12:295-297.
2. Ryan, M.J. 1978. Mirror image versus conspecific stimulation in adult male zebra finches. *Wilson Bulletin* 90:295-297.
3. Ryan, M.J. 1978. Parental care in salamanders. *Bulletin of the New York Herpetological Society* 13:23-27.
4. Anderson, J.D.; Hawthorne, K.; Galandak, J.; Ryan, M. 1978. A report on the endangered reptiles and amphibians of New Jersey. *Bulletin of the New Jersey Academy of Science* 23:26-33.
5. Prieto, A.A; Ryan, M.J. 1978. Some observations on the social behavior of the Arizona chuckwalla, *Sauromalus obesus tumidus* (Reptilia, Lacertilia, Iguanidae). *Journal of Herpetology* 12:327-336.
6. Ryan, M.J. 1980. Female mate choice in a Neotropical frog. *Science* 209:523-525.
7. Ryan, M.J. 1980. The reproductive behavior of the bullfrog, *Rana catesbeiana*. *Copeia* 1980:108-114.
8. Ryan, M.J.; Tuttle, M.D.; Taft, L.K. 1981. The costs and benefits of frog chorusing behavior. *Behavioral Ecology and Sociobiology* 8:273-278.
9. Barclay, R.M.R.; Fenton, B.; Tuttle, M.D.; Ryan, M.J. 1981. Echolocation calls produced by *Trachops cirrhosus* (Chiroptera: Phyllostomatidae) while hunting for frogs. *Canadian Journal of Zoology* 59:750-753
10. Rand, A.S.; Ryan, M.J. 1981. The adaptive significance of a complex vocal repertoire in a Neotropical frog. *Zeitschrift fur Tierpsychologie* 57:209-214.
11. Tuttle, M.D.; Ryan, M.J. 1981. Bat predation and the evolution of frog vocalizations in the Neotropics. *Science* 214:677-678.
12. Ryan, M.J. 1982. Variation in iguanine social organization: mating systems in chuckwallas

- (*Sauromalus*). In: G. Burghardt, A.S. Rand, editors, *Iguanas of the World: Their Behavior, Ecology and Conservation*. pp. 380-390. Noyes Press, Park Ridge, New Jersey.
13. Ryan, M.J.; Tuttle, M.D.; Rand, A.S. 1982. Sexual advertisement and bat predation in a Neotropical frog. *American Naturalist* 119:136-139.
 14. Bucher, T.L.; Ryan, M.J.; Bartholomew, G.W. 1982. Oxygen consumption during resting, calling and nest building in the frog *Physalaemus pustulosus*. *Physiological Zoology* 55:10-22.
 15. Tuttle, M.D.; Ryan, M.J. 1982. The roles of synchronized calling, ambient noise, and ambient light in the anti-bat-predator behavior of a treefrog. *Behavioral Ecology and Sociobiology* 11:125-131.
 16. Tuttle, M.D.; Taft, L.K.; Ryan, M.J. 1982. Acoustical location of calling frogs by philander opossums. *Biotropica* 13:233-234.
 17. Tuttle, M.D.; Taft, L.K.; Ryan, M.J. 1982. Evasive behaviour of a frog in response to bat predation. *Animal Behaviour* 30:393-397.
 18. Ryan, M.J. 1983. Frequency modulated calls and species recognition in a Neotropical frog. *Journal of Comparative Physiology* 150:217-221.
 19. Ryan, M.J. 1983. Sexual selection and communication in a Neotropical frog, *Physalaemus pustulosus*. *Evolution* 39:261-272.
 20. Ryan, M.J.; Bartholomew, G.W.; Rand, A.S. 1983. Reproductive energetics of a Neotropical frog, *Physalaemus pustulosus*. *Ecology* 64:1456-1462.
 21. Ryan, M.J.; Tuttle, M.D. 1983. The ability of the frog eating bat to distinguish among palatable and potentially poisonous prey using acoustic cues. *Animal Behaviour* 31:827-833.
 22. Ryan, M.J.; Tuttle, M.D.; Barclay, R.M.R. 1983. Behavioral responses of the frog-eating bat, *Trachops cirrhosus*, to sonic frequencies. *Journal of Comparative Physiology* 150:413-418.
 23. Rand, A.S.; Ryan, M.J.; Troyer, K. 1983. A population explosion in a tropical frog: *Hyla rufitela*. *Biotropica* 15:72-73.
 24. Waldman, B.; Ryan, M.J. 1983. Thermal advantages of communal egg deposition in *Rana sylvatica*. *Journal of Herpetology* 17:70-72.
 25. Ryan, M.J. 1985. Energetic efficiency of vocalization by the frog *Physalaemus pustulosus*. *Journal of Experimental Biology* 116:47-52.
 26. Ryan, M.J.; Brenowitz, E.A. 1985. The role of body size, phylogeny, and ambient noise in the evolution of bird song. *American Naturalist* 126:87-100
 27. Mendonca, M.; Licht, P.; Ryan, M.J.; Barnes, R. 1985. Changes in hormonal level in relation to

- breeding behavior in male bullfrogs (*Rana catesbeiana*) at the individual and population levels. *General and Comparative Endocrinology* 58:270-279.
28. Tuttle, M.D.; Ryan, M.J.; Bellwood, J. 1985. Acoustical resource partitioning by two phyllostomid bats. *Animal Behaviour* 33:1369-1371.
 29. Ryan, M.J. 1986. Environmental bioacoustics: evaluation of a commonly used experimental technique. *Animal Behaviour* 34:931-933.
 30. Ryan, M.J. 1986. Factors influencing the evolution of acoustic communication: biological constraints. *Brain, Behavior and Evolution* 28:70-82.
 31. Ryan, M.J. 1986. Neuroanatomy influences speciation rates among anurans. *Proceedings of the National Academy of Sciences USA* 83:1379-1382.
 32. Ryan, M.J. 1986. The Panamanian love call. *Natural History* 95:36-43.
 33. Ryan, M.J. 1986. Synchronized calling in a treefrog (*Smilisca sila*): short behavioral latencies and implications for neural pathways involved in call perception and detection. *Brain, Behavior and Evolution* 29:196-206.
 34. Ryan, M.J.; Tuttle, M.D. 1987. The role of prey generated sounds, vision, and echolocation in prey localization by the African bat *Cardioderma cor* (Megadermatidae). *Journal of Comparative Physiology* 161:59-66.
 35. Ryan, M.J.; Wagner, W. 1987. Asymmetries in mating preferences between species: female swordtails prefer heterospecific mates. *Science* 236:595-597.
 36. Ryan, M.J. 1988. Constraints and patterns in the evolution of anuran acoustic communication. In: B. Fritzsche, M. Ryan, W. Wilczynski, W. Walkowiak, T. Hetherington, editors, *The Evolution of the Amphibian Auditory System*. pp. 637-677. John Wiley and Sons Inc., New York.
 37. Ryan, M.J. 1988. Energy, calling, and selection. *American Zoologist* 28:885-898.
 38. Ryan, M.J. 1988. Phenotype, genotype, swimming endurance and sexual selection in a swordtail (*Xiphophorus nigrensis*). *Copeia* 1988: 484-487.
 39. Ryan, M.J.; Wilczynski, W. 1988. Coevolution of sender and receiver: effect on local mate preference in cricket frogs. *Science* 240:1786-1788.
 40. Nyman, S.; Ryan, M.J.; Anderson, J.D. 1988. The distribution of the *Ambystoma jeffersonianum* complex in New Jersey, and a re-evaluation of some hypotheses on the origin and distribution of the complex. *Journal of Herpetology* 22:224-228.
 41. Wilczynski, W.; Ryan, M.J. 1988. The amphibian auditory system as a model for neurobiology, behavior and evolution. In: B. Fritzsche, M. Ryan, W. Wilczynski, W. Walkowiak, T. Hetherington, editors, *The Evolution of the Amphibian Auditory System*. pp. 3-12. John Wiley and Sons Inc., New York.

42. Ryan, M.J.; Causey, B.J. 1989. Alternative mating behavior in the swordtails *Xiphophorus nigrensis* and *Xiphophorus pygmaeus* (Pisces: Poeciliidae). *Behavioral Ecology and Sociobiology* 24:341-348.
43. Ryan, M.J.; Sullivan, B.K. 1989. Transmission effects on patterns of amplitude modulation in the advertisement calls of two toads, *Bufo woodhousii* and *Bufo valliceps*. *Ethology*. 80:182-189.
44. Bruns, V.; Burda, H.; Ryan, M.J. 1989. Ear morphology of the frog-eating bat (*Trachops cirrhosus*, Family Phyllostomidae): Apparent specializations for low-frequency hearing. *Journal of Morphology* 199:103-118.
45. Wilczynski, W.; Ryan, M.J.; Brenowitz, E.A. 1989. The display of the blue-black grassquit: the acoustic advantage of getting high. *Ethology* 80:218-222.
46. Ryan, M.J. 1990. Sensory systems, sexual selection, and sensory exploitation. *Oxford Surveys in Evolutionary Biology* 7:157-195.
47. Ryan, M.J. 1990. Signals, species, and sexual selection. *American Scientist* 78:46-52. [reprinted In: Slatkin, M., editor, *Exploring Evolutionary Biology*, Sinauer Assoc. Inc., Sunderland MA, 1995]
48. Ryan, M.J.; Cocroft, R.B.; Wilczynski, W. 1990. The role of environmental selection in intraspecific divergence of mate recognition signals in the cricket frog, *Acris crepitans*. *Evolution* 44:1869-1872.
49. Ryan, M.J.; Drewes, R.C. 1990. Vocal morphology of the *Physalaemus pustulosus* species group (Family Leptodactylidae): morphological response to sexual selection for complex calls. *Biological Journal of the Linnean Society* 40:37-52.
50. Ryan, M.J.; Fox, J.H.; Wilczynski, W.; Rand, A.S. 1990. Sexual selection for sensory exploitation in the frog *Physalaemus pustulosus*. *Nature* 343:66-67.
51. Ryan, M.J.; Hews, D.K.; Wagner, W.E. Jr. 1990. Sexual selection on alleles that determine body size in the swordtail *Xiphophorus nigrensis*. *Behavioral Ecology and Sociobiology* 26:231-237.
52. Ryan, M.J.; Rand, A.S. 1990. The sensory basis of sexual selection for complex calls in the túngara frog, *Physalaemus pustulosus* (sexual selection for sensory exploitation). *Evolution* 44:305-314.
53. Cragon de Caprona, M.; Ryan, M.J. 1990. Conspecific mate recognition in swordtails, *Xiphophorus nigrensis* and *X. pygmaeus* (Poeciliidae): olfactory and visual cues. *Animal Behaviour* 39:290-296.
54. Morris, M.R.; Ryan, M.J. 1990. Age at sexual maturity of *Xiphophorus nigrensis* in nature. *Copeia* 1990:745-751.
55. Ryan, M.J. 1991. Sexual selection and communication in frogs: some recent advances. *Trends in Ecology and Evolution* 6:351-354.

56. Ryan, M.J.; Wilczynski, W. 1991. Evolution of intraspecific variation in the advertisement call of a cricket frog (*Acris crepitans*, Hylidae). *Biological Journal of the Linnean Society* 44: 249-271.
57. Kirkpatrick, M.; Ryan, M.J. 1991. The paradox of the lek and the evolution of mating preferences. *Nature* 350:33-38.
58. Ryan, M.J. 1992. Costs of reproduction. In: Feder, M., editor, *Physiology of the Amphibians*. pp. 426-434. University of Chicago, Chicago.
59. Ryan, M.J.; Keddy-Hector, A. 1992. Directional patterns of female mate choice and the role of sensory biases. *American Naturalist* 139:S4-S35.
60. Ryan, M.J.; Pease, C.M.; Morris, M.R. 1992. A genetic polymorphism in the swordtail *Xiphophorus nigrensis*: testing the prediction of equal fitnesses. *American Naturalist* 139:21-31.
61. Ryan, M.J.; Perrill, S.A.; Wilczynski, W. 1992. Auditory tuning and call frequency predict population-based mating preferences in the cricket frog, *Acris crepitans*. *American Naturalist* 139:1370-1383.
62. Keddy-Hector, A.; Wilczynski, W.; Ryan, M.J. 1992. Call patterns and basilar papilla tuning in cricket frogs. II. Intrapopulational variation and allometry. *Brain, Behavior and Evolution* 39:238-246.
63. Rand, A.S.; Ryan, M.J.; Wilczynski, W. 1992. Signal redundancy and receiver permissiveness in acoustic mate recognition by the túngara frog, *Physalaemus pustulosus*. *American Zoologist* 32:81-90.
64. Wilczynski, W.; Ryan, M.J. 1992. Introduction to the symposium: Mechanisms of mate choice. *American Zoologist* 32:15-17.
65. Wilczynski, W.; Keddy-Hector, A.; Ryan, M.J. 1992. Call patterns and basilar papilla tuning in cricket frogs. I. Differences among populations and between sexes. *Brain, Behavior and Evolution* 39:229-237.
66. Morris, M.J.; Batra, P.; Ryan, M.J. 1992. Male-male competition and access to females. *Copeia* 1992:980-986.
67. Morris, M.R.; Ryan, M.J. 1992. Breeding cycles in natural populations of *Xiphophorus nigrensis*, *X. multilineatus* and *X. pygmaeus*. *Copeia* 1992:1074-1077.
68. Ryan, M.J. 1993. Sexual selection on *P*-alleles and the evolution of mating asymmetries in swordtails (*Xiphophorus nigrensis* and *X. pygmaeus*). pp. 269-277. In: J.H. Schröder, J. Bauer, M. Schartl, editors, *Trends in Ichthyology, An International Perspective*. Blackwell Scientific Publications, Oxford.
69. Ryan, M.J.; Rand, A.S. 1993. Phylogenetic patterns of behavioral mate recognition systems in the *Physalaemus pustulosus* species group (Anura: Leptodactylidae): the role of ancestral and derived characters and sensory exploitation. pp. 251-267. In: D.R. Lees, D. Edwards, editors,

Evolutionary Patterns and Processes. Linnean Society Symposium Series, No. 14, Academic Press, London.

70. Ryan, M.J.; Rand, A.S. 1993. Species recognition and sexual selection as a unitary problem in animal communication. *Evolution* 47:647-657.[reprinted in *Ecología y Evolución en Los Tropicós*, editors, E.G. Leigh, E.A. Herre, J.B.C. Jackson, F. Santos-Granero, Smithsonian Institution press, 2007]
71. Ryan, M.J.; Rand, A.S. 1993. Sexual selection and signal evolution: the ghost of biases past. *Philosophical Transactions of the Royal Society series B*. 340:187-195. [reprinted In: Leigh, E.G.; Herre, A.A.; Jackson, J.B.C.; Santos-Granero, F., editors, *Ecología y Evolución en Los Tropicós*, Smithsonian Tropical Research Institute, 2007. And In: Bolhuis, J.; Giraldeau, L., editors, *Animal Behavior*, Sage Press, 2009]
72. Ryan, M.J. 1994. Mechanistic studies in sexual selection. pp. 190-215. In: Real, L., editor, *Behavioral Mechanisms in Evolutionary Ecology*. University of Chicago Press, Chicago.
73. Foran, M.C.; Ryan, M.J. 1994. Female-female competition in a unisexual/bisexual complex of mollies. *Copeia* 1994:504-508.
74. Schlupp, I.; Marler, C.A.; Ryan, M.J. 1994. Benefit to male sail fin mollies of mating with heterospecific females. *Science* 263:373-374.
75. Ryan, M.J.; Rand, A.S. 1995. Female responses to ancestral advertisement calls in the túngara frog. *Science* 269, 390-392.
76. Ryan, M.J.; Warkentin, K.M.; McClelland, B.E.; Wilczynski, W. 1995. Fluctuating asymmetries and advertisement call variation in the cricket frog, *Acris crepitans*. *Behavioral Ecology* 6:124-131.
77. Baer, C.F.; Dantzker, M.; Ryan, M.J. 1995. Schooling behavior in a color polymorphic poeciliid fish: laboratory observations. *Environmental Biology of Fishes* 43:207-212.
78. Cocroft, R.C.; Ryan, M.J. 1995. Patterns of mating call evolution in toads and chorus frogs. *Animal Behaviour* 49:283-303.
79. Morris, M.R.; Gass, L.; Ryan, M.J. 1995. Assessment and individual recognition of opponents in the pygmy swordtails *Xiphophorus nigrensis* and *X. multilineatus*. *Behavioral Ecology* 6:274-279.
80. Morris, M.R.; Mussel, M.; Ryan, M.J. 1995. Vertical bars on male *Xiphophorus multilineatus*: a signal that deters rival males and attracts females. *Behavioral Ecology* 6:274-279.
81. Morris, M.R.; Ryan, M.J. 1995. Large body size in the pygmy swordtail *Xiphophorus pygmaeus*. *Biological Journal of the Linnean Society* 54:383-395.
82. Sullivan, B.K.; Ryan, M.J.; Verrill, P. 1995. Sexual selection and mating systems in amphibians.

- pp. 469-517. In: Sullivan, B.K.; Heatwole, H., editors, *Social Behavior of Amphibians*, Surrey Beatty & Sons, New York.
83. Wilczynski, W.; Rand, A.S.; Ryan, M.J. 1995. The processing of spectral cues by the call analysis system of the túngara frog, *Physalaemus pustulosus*. *Animal Behaviour* 49:911-929.
 84. Ryan, M.J. 1996. Phylogenetics and behavior: some cautions and expectations. pp. 1-21. In: Martins, E. editor, *Phylogenies and the Comparative Method in Animal Behavior*. Oxford University Press, Oxford.
 85. Ryan, M.J.; Dries, L.A.; Batra, P.; Hillis, D.M. 1996. Male mate preference in a gynogenetic species complex of Amazon mollies. *Animal Behaviour* 52:1225-1236.
 86. Ryan, M.J.; Rand, A.S.; Weigt, L.A. 1996. Allozyme and advertisement call variation in the túngara frog, *Physalaemus pustulosus*. *Evolution* 50:2435-2453.
 87. Marler, C.A.; Ryan, M.J. 1996. Energetic constraints and steroid hormone correlates of male calling behaviour in the túngara frog. *Journal of Zoology* 240:397-409.
 88. McClelland, B.E.; Wilczynski, W.; Ryan, M.J. 1996. Correlations between call characteristics and morphology in male cricket frogs (*Acris crepitans*). *Journal of Experimental Biology* 199:1907-1919.
 89. Morris, M.R.; Wagner, W.E. Jr.; Ryan, M.J. 1996. A negative correlation between trait and mate preference in *Xiphophorus pygmaeus*. *Animal Behaviour* 52:1193-1203.
 90. Morris, M.R.; Ryan, M.J. 1996. Sexual difference in signal-receiver coevolution. *Animal Behaviour* 52:1017-1024.
 91. Schlupp, I.; Ryan, M.J. 1996. Mixed-species shoals and the maintenance of a sexual-asexual mating system in mollies. *Animal Behaviour* 52:885-890.
 92. Ryan, M.J. 1997. Sexual selection and mate choice. pp. 179-202. In: J.R. Krebs, N.B. Davies, editors, *Behavioural Ecology, An Evolutionary Approach*. fourth edition. Blackwell, Oxford.
 93. Marler, C.A.; Foran, C. Ryan, M.J. 1997. The influence of experience on mating preferences of the gynogenetic Amazon molly. *Animal Behaviour* 53:1035-1041.
 94. Marler, C.A.; Ryan, M.J. 1997. Origin and maintenance of a female mating preference. *Evolution* 51:1244-1248.
 95. McLennan, D.A.; Ryan, M.J. 1997. Responses to conspecific and heterospecific olfactory cues in the swordtail *Xiphophorus cortezi*. *Animal Behaviour* 54:1077-1088.
 96. Rand, A.S.; Bridarolli, M.E.; Dries, L.; Ryan, M.J. 1997. Light levels influence female choice in túngara frogs: predation risk assessment? *Copeia* 1997:447-450.

97. Schlupp, I.; Ryan, M.J. 1997. Male mollies (*Poecilia latipinna*) copy the mate choice of other males. *Behavioral Ecology* 8:104-107.
98. Ryan, M.J. 1998. Receiver biases, sexual selection and the evolution of sex differences. *Science*. 281:1999-2003.
99. Ryan, M.J.; Autumn, K.; Wake, D.B. 1998. Integrative biology and sexual selection. *Integrative Biology* 1:68-72.
100. Ryan, M.J.; Kime, N.M.; Rosenthal, G.G. 1998. Patterns of evolution in human speech processing and animal communication. *Behavioral and Brain Science* 21:282-283.
101. Ryan, M.J.; Rand, A.S. 1998. Evoked vocal response in male túngara frogs: Preexisting biases in male responses? *Animal Behaviour* 56:1509-1516.
102. Cannatella, D.C.; Hillis, D.M.; Chippinendale, P.; Weigt, L.; Rand, A.S.; Ryan M.J. 1998. Phylogeny of frogs of the *Physalaemus pustulosus* species group, with an examination of data incongruence. *Systematic Biology* 47:311-335.
103. Kime, N.M., Rand, A.S., Kapfer, M., Ryan, M.J. 1998. Repeatability of female choice in the túngara frog: A permissive preference for complex characters. *Animal Behaviour* 55:641-649.
104. McClelland, B.E.; Wilczynski, W.; Ryan, M.J. 1998. Intraspecific variation in laryngeal and ear morphology in male cricket frogs (*Acris crepitans*). *Biological Journal of the Linnean Society* 63:51-67.
105. Phelps, S.M.; Ryan, M.J. 1998. Neural networks predict response biases in female túngara frogs. *Proceeding of the Royal Society, London series B* 265:279-285.
106. Witte, K.; Ryan, M.J. 1998. Male body size influences mate-choice copying in the sailfin molly *Poecilia latipinna*. *Behavioral Ecology* 9:534-539.
107. Ryan, M.J. 1999. Phylogeny and mate choice. *Mus. Reg. Sci. nat. Torino* 1999:387-392.
108. Ryan, M.J. 1999. Sexual selection and sensory exploitation [Response]. *Science* 283:1083a
109. Ryan, M.J. 1999. Electrifying diversity [News & Views]. *Nature* 400:211-212.
110. Ryan, M.J.; Rand, A.S. 1999. Phylogenetic inference and the evolution of communication in túngara frogs. pp. 535-557. In: Hauser, M.; Konishi, M. editors, *The Design of Animal Communication*. MIT Press, Cambridge, MA.
111. Ryan, M.J.; Rand, A.S. 1999. Phylogenetic influences on mating call preferences in female túngara frogs (*Physalaemus pustulosus*). *Animal Behaviour* 57:945-956.
112. Burmeister, S.; Wilczynski, W.; Ryan, M.J. 1999. Temporal call changes and social context affect graded signaling in cricket frogs. *Animal Behaviour* 57:611-618 .

113. McLennan, D.A.; Ryan, M.J. 1999. Interspecific recognition and discrimination based upon olfactory cues in swordtails. *Evolution* 53:880-888.
114. Schlupp, I.; Waschulewski, M.; Ryan, M.J. 1999. Female preferences for naturally-occurring novel male traits. *Behaviour* 136; 519-527.
115. Wilczynski, W.; Rand, A.S.; Ryan, M.J. 1999. Female preferences for temporal order of call components in the túngara frog: A Bayesian analysis. *Animal Behaviour* 58:841-851.
116. Wilczynski, W.; Ryan, M.J. 1999. Geographic variation in animal communication systems. In: Foster, S.A.; Endler, J., editors, *Geographic Diversification of Behavior: An Evolutionary Perspective*, pp. 234-261. Oxford University Press, Oxford.
117. Ryan, M.J.; Getz, W. 2000. Signal decoding and receiver evolution: An analysis using an artificial neural network. *Brain, Behavior and Evolution* 56:45-62.
118. Bosch, J.; Rand, A.S.; Ryan, M.J. 2000. Acoustic competition in *Physalaemus pustulosus*, a differential response to calls of relative frequency. *Ethology* 106:865-871.
119. Bosch, J.; Rand, A.S.; Ryan, M.J. 2000. Signal variation and call preferences for whine frequency in the túngara frog, *Physalaemus pustulosus*. *Behavioral Ecology and Sociobiology* 49:62-66.
120. Kime, N.M.; Turner, W.R.; Ryan, M.J. 2000. The transmission of advertisement calls in Central American frogs. *Behavioral Ecology* 11:71-83.
121. Marsh, D.M.; Rand, A.S.; Ryan, M.J. 2000. Effects of inter-pond distance on breeding ecology of túngara frogs. *Oecologia* 122:505-513.
122. Phelps, S.M.; Ryan, M.J. 2000. History influences signal recognition: Neural network models of túngara frogs. *Proceedings of the Royal Society, London series B* 267:1633-1639.
123. Sun, L.; Wilczynski, W.; Rand, A.S.; Ryan, M.J. 2000. Trade-off in short and long distance communication in túngara (*Physalaemus pustulosus*) and cricket (*Acris crepitans*) frogs. *Behavioral Ecology* 11:102-109.
124. Rosenthal, G.G.; Ryan, M.J. 2000. Visual and acoustic communication in nonhuman animals: a comparison. *Journal of Bioscience* 25:285-290.
125. Witte, K.; Chen, K-C.; Wilczynski, W.; Ryan, M.J. 2000. Influence of amplexus on phonotaxis in the cricket frog *Acris crepitans blanchardi*. *Copeia* 2000:257-261.
126. Ryan, M.J. 2001. Seeing red in speciation. [News & Views]. *Nature* 411:900-901.
127. Ryan, M.J. 2001. Food, song and speciation. [News and Views]. *Nature* 409:139-140. [translated and reprinted in Japanese In: *The Fourth Nature News & Views Collection*, Tokuma Shoten, Tokyo, 2002]

128. Ryan, M.J.; Phelps S.M.; Rand A.S. 2001. How evolutionary history shapes recognition mechanisms. *Trends in Cognitive Science* 5:143-148.
129. Ryan, M.J.; Rand. A.S. 2001. Feature weighting in signal recognition and discrimination by the túngara frog. Pp. 86-101. In: Ryan, M.J. editor, *Anuran Communication*. Smithsonian Institution Press, Washington D.C.
130. Ryan, M.J.; Rosenthal, G.G. 2001. Variation and selection in swordtails. pp. 133-148. In: Dugatkin, L.A. editor, *Model Systems in Behavioral Ecology*. Princeton University Press, Princeton, New Jersey.
131. Dries L.A.; Morris M.R.; Ryan, M.J. 2001. Why are some male pygmy swordtails large? *Copeia*. 2001: 355-364.
132. Gabor, C.R.; Ryan, M.J. 2001. Geographic variation in reproductive character displacement in mate choice by male sailfin mollies. *Proceedings of the Royal Society, London series B* 268:1063-1071.
133. Rosenthal , G.G.; Flores Martinez, T.Y.; García de León, F.J.; Ryan, M.J. 2001. Shared preferences by predators and females for males ornaments in swordtails. *The American Naturalist* 158:146-154.
134. Phelps, S.M.; Ryan, M.J.; Rand, A.S. 2001. Vestigial preference functions in neural networks and túngara frogs. *Proceedings of the National Academy of Sciences USA* 98:13161-13166.
135. Schlupp, I.; McNab, R.; Ryan, M.J. 2001. Sexual harassment as a cost for molly females: bigger males cost less. *Behaviour*:138:277-286.
136. Wilczynski, W.; Rand A.S.; Ryan, M.J. 2001. Evolution of calls and auditory tuning in the *Physalaemus pustulosus* species group. *Brain, Behavior and Evolution* 58:137-151.
137. Witte, K.; Ryan, M.J.; Wilczynski, W. 2001. Changes in the frequency structure of a mating call decrease its attractiveness to females in the cricket frog *Acris crepitans blanchardi*. *Ethology* 685-699.
138. Autumn, K.; Ryan, M.J.; Wake, D.B. 2002. Integrating historical and organismal biology enhances the study of adaptation. *Quarterly Review of Biology* 77:383-408.
139. Bosch, J.; Rand, A.S.; Ryan, M.J. 2002. Response to variation in chuck frequency by male and female túngara frogs. *Herpetologica* 58:95-103.
140. Burmeister, S.S.; Ophir, A.G.; Ryan, M.J.; Wilczynski, W.W. 2002. Information transfer during cricket frog contests. *Animal Behaviour* 64:715-725.
141. Dearborn, D.C.; Ryan; M.J. 2002. A test of the Darwin-Fisher theory for the evolution of male secondary sexual traits in monogamous birds. *Journal of Evolutionary Biology* 15:307-313.

142. Farris, H.F.; Rand, A.S.; Ryan, M.J. 2002. The effects of spatially separated call components on phonotaxis in túngara frogs: Evidence for auditory grouping. *Brain, Behavior and Evolution* 60:181-188.
143. Pröhl, H.; Adams, R.; Mueller, U.; Rand, A.S.; Ryan, M.J. 2002. Polymerase chain reaction primers for polymorphic microsatellite loci from the túngara frog *Physalaemus pustulosus*. *Molecular Ecology Notes* 2:341-343.
144. Rosenthal, G.G.; Wagner, W.E. Jr.; Ryan, M.J. 2002. Secondary reduction of preference for swords in the pygmy swordtail *Xiphophorus nigrensis* (Pisces: Poeciliidae). *Animal Behaviour* 63:37-45.
145. Táranó, Z.; Ryan, M.J. 2002. No preexisting biases for heterospecific calls traits in the frog *Physalaemus enesefae*. *Animal Behaviour* 64:599-607.
146. Witte, K.; Ryan, M.J. 2002. Mate-choice copying in the sailfin molly (*Poecilia latipinna*) in the wild. *Animal Behaviour* 63:943-949.
147. Ryan, M.J.; Kime, N.M. 2003. Selection on long distance acoustic signals. pp. 225-274. In: Simmons, A.; Fay, R.; Popper, A. editors, *Springer Handbook of Auditory Research; Acoustic Communication*. Springer Verlag, Berlin.
148. Ryan, M.J.; Rand, A.S. 2003. Mate recognition in túngara frogs: A review of some studies of brain, behavior, and evolution. *Acta Zoologica Sinica* 49:713-726.
149. Ryan, M.J.; Rand, W.; Hurd, P.L.; Phelps, S.M.; Rand, A.S. 2003. Generalization in response to mate recognition signals. *The American Naturalist* 161:380-394.
150. Ryan, M.J.; Rand, A.S. 2003. Sexual selection and female preference space: How female túngara frogs perceive and respond to complex population variation in acoustic mating signals. *Evolution* 57:2608-2618.
151. Castellano, S.; Giacoma, C.; Ryan, M.J. 2003. Call degradation in diploid and tetraploid green toads. *Biological Journal of the Linnean Society* 78:11-26.
152. Cummings, M.E.; Rosenthal, G.G.; Ryan, M.J. 2003. A private ultraviolet channel in visual communication. *Proceedings of the Royal Society, London series B* 270:897-904.
153. Kingston, J.; Rosenthal, G.G.; Ryan, M.J. 2003. The role of sexual selection in maintaining a colour polymorphism in the pygmy swordtail, *Xiphophorus pygmaeus*. *Animal Behaviour* 65:735-743.
154. Lampert, K.P.; Rand, A.S.; Mueller, U.G.; Ryan, M.J. 2003. Fine scale genetic pattern and evidence for sex-biased dispersal in the túngara frog, *Physalaemus pustulosus*. *Molecular Ecology* 12:3325-3334.

155. Rosenthal, G.G.; de la Rosa Reyna, X.F.; Kazianis, S.; Stephens, M.J.D.; Morizot, D. C.; Ryan, M.J.; García de León, F.J. 2003. Dissolution of sexual signal complexes in a hybrid zone between the swordtails *Xiphophorus birchmanni* and *X. malinche* (Poeciliidae). *Copeia* 2003:299-307.
156. Ryan, M.J. 2004. Ambrosia beetles and genetic intelligence. pp. 13-16. In: Conley, B. editor, *Decipherment of Linear X*. Pierogi, New York.
157. Ryan M.J. 2004. Fickle females? [News & Views]. *Nature* 428:708-709.
158. Boul, K.E.; Ryan, M.J. 2004. Population variation of complex advertisement calls in *Physalaemus petersi* and comparative laryngeal morphology. *Copeia* 2004:624-631.
159. Engeszer, R.E.; Ryan, M.J.; Parichy, D.M. 2004. Learned social preference in zebrafish. *Current Biology* 14:881-884.
160. Hoke, K.L.; Burmeister, S.S.; Fernald, R.D.; Rand, A.S.; Ryan, M.J.; Wilczynski, W. 2004. Functional mapping of the auditory midbrain during mate call reception. *Journal of Neuroscience* 24:11264-11272.
161. Kime, N.; Burmesiter, S.S.; Ryan, M.J. 2004. Female preference for socially variable call characters in the cricket frog. *Animal Behaviour* 68:1391–1399.
162. Rosenthal, G.G.; Rand, A.S.; Ryan, M.J. 2004. The vocal sac as a visual cue in anuran communication: an experimental analysis using video playback. *Animal Behaviour* 28:55-58.
163. Roney, K.E.; Cuthbertson, B.J.; Godwin, U.B.; Kazianis, S.; Coletta, L.D.; Rosenthal, G.G.; Ryan, M.J.; Schmidt, M.; McConnell, T.J. 2004. Alternative splicing of major histocompatibility complex class II *DXB* transcripts in *Xiphophorus* fishes. *Immunogenetics* 56:462-466.
164. Ryan, M.J. 2005. Evolution of behavior. pp. 294-314. In: J.J. Bolhuis, L-A. Giraldeau, editors, *The Behavior of Animals; Mechanisms, Function, and Evolution*. Blackwell Pub. Co., Oxford.
165. Ryan, M.J. 2005. The evolution of behavior, and integrating it towards a complete and correct understanding of behavioral biology. *Journal of Animal Biology*. 55:419-439. [reprinted as: Ryan, M.J. 2009. [same title as above]. In: *Tinbergen's Legacy, Function and Mechanism in Behavioral Biology*. J.J. Bolhuis and S.Verhulst, editors. pp: 127-146. Cambridge University Press, Cambridge]
166. Farris, H.E.; Rand, A.S.; Ryan, M.J. 2005. The effect of time, space and spectrum on auditory grouping in túngara frogs. *Journal of Comparative Physiology* 191:1173-1183.
167. Gabor, C.R.; Ryan, M.J.; Morizot, D.C. 2005. Character displacement in sailfin mollies, *Poecilia latipinna*: allozymes and behavior. *Environmental Biology of Fishes* 73:75-88.
168. Hoke, K.L.; Ryan, M.J.; Wilczynski, W. 2005. Acoustic social cues shift functional connectivity in the hypothalamus. *Proceedings of the National Academy of Sciences, USA*. 102:10712-10717.

169. Lynch, K.S.; Rand, A.S.; Ryan, M.J.; Wilczynski, W. 2005. Reproductive state influences female plasticity in mate choice. *Animal Behaviour* 69:689-699.
170. Page, R.; Ryan, M.J. 2005. Flexibility in assessment of prey cues: frog-eating bats and frog calls. *Proceedings of the Royal Society, London series B* 272:841-847.
171. Rosenthal, G.G.; Ryan M.J. 2005. Assortative preferences for stripes in danios. *Animal Behaviour* 70:1063-1066.
172. Weigt, L.A.; Crawford, A.J.; Rand, A.S.; Ryan, M.J. 2005. Biogeography of the túngara frog, *Physalaemus pustulosus*: a molecular perspective. *Molecular Ecology* 14:3857–3876 .
173. Witte, K.; Farris, H.E.; Ryan, M.J.; Wilczynski, W. 2005. How cricket frog females deal with a noisy world: habitat-related differences in auditory tuning. *Behavioral Ecology* 16:571-579.
174. Ryan, M.J. 2006. Profile: A. Stanley Rand (1932-2005). *Iguana* 13:43-46
175. Ryan, M.J. 2006. Q&A: Michael Ryan. [self interview]. *Current Biology* 16:1012-1013.
176. Cummings, M.E.; García de León, F.J.; Mollaghan, D.M.; Ryan, M.J. 2006. Is UV ornamentation an amplifier in swordtails? *Zebrafish* 3:91-100.
177. Gridi-Papp, M.; Rand, A.S.; Ryan, M.J. 2006. Complex call production in túngara frogs. *Nature* 441:38.
178. Lynch, K.S.; Crews, D.C.; Ryan, M.J.; Wilczynski, W. 2006. Hormonal state influences aspects of female mate choice in the túngara frog (*Physalaemus pustulosus*). *Hormones and Behavior* 49:450-457.
179. Phelps, S.M.; Rand, A.S.; Ryan, M.J. 2006. A cognitive framework for mate choice and species recognition. *The American Naturalist* 167:28-42.
180. Bernal, X.; Rand, A.S.; Ryan, M.J. 2006. Acoustic preferences and localization performance of blood-sucking flies (*Corethrella* Coquillett). *Behavioral Ecology* 17:709-715.
181. Hill, S.; Ryan, M.J. 2006. The role of female quality in the mate choice copying behaviour of sailfin mollies. *Biology Letters* 2:203-205.
182. Kirkpatrick, M.; Rand, A.S.; Ryan, M.J. 2006. Mate choice rules in animals. *Animal Behaviour* 72:1215-1225.
183. Lampert, K.P.; Bernal, X.; Rand, A.S.; Mueller, U.G.; Ryan, M.J. 2006. No evidence for female mate choice based on genetic similarity in the túngara frog, *Physalaemus pustulosus*. *Behavioral Ecology and Sociobiology* 59:796-804.
184. Page, R.A.; Ryan, M.J. 2006. Social transmission of novel foraging behavior in bats: Frog calls and

- their referents. *Current Biology* 16:1201-1205.
185. Pauly, G.B.; Bernal, X.E.; Rand A.S.; Ryan, M.J. 2006. The vocal sac increases call rate in the túngara frog, *Physalaemus pustulosus*. *Comparative Physiology and Biochemistry* 79:708–719.
186. Pfennig, K.S.; Ryan M.J. 2006. Reproductive character displacement generates reproductive isolation among conspecific populations: An artificial neural network study. *Proceedings of the Royal Society, London series B*. 273:1361–1368.
187. Pröhl, H.; Koshy, R.; Mueller, U.; Rand, A.S.; Ryan, M.J. 2006. Geographic variation and behavioral traits in túngara frogs in a zone of secondary contact. *Evolution* 60:1669-1769.
188. Ryan, M.J. 2007. Sensory ecology: See me, hear me. [Dispatch] *Current Biology* 17:1019-1021.
189. Ryan, M.J.; Akre, K.L.; Kirkpatrick. M. 2007. Mate choice [Primer]. *Current Biology* 17:313-316.
190. Ryan, M.J.; Bernal, X.E.; Rand, A.S. 2007. Patterns of mating call preferences in túngara frogs, *Physalaemus pustulosus*. *Journal of Evolutionary Biology* 20:2235-2247.
191. Bernal, X.E.; Page, R.A.; Rand, A.S.; Ryan, M.J. 2007. Cues for eavesdroppers: Do frog calls indicate prey density and quality? *The American Naturalist* 169:412-415.
192. Bernal, X.; A.S. Rand; M.J. Ryan. 2007. Sexual differences in the behavioral response of túngara frogs, *Physalaemus pustulosus*, to cues associated with increased predation risk. *Ethology* 113: 755-763.
193. Bernal, X.; Rand, A.S.; Ryan, M.J. 2007. Sex differences in response to non-conspecific advertisement calls: Receiver permissiveness in male and female túngara frogs. *Animal Behaviour* 73:955-964.
194. Boul, K.E.; Funk, W.C.; Darst, C.R.; Cannatella, D.C.; Ryan, M.J. 2007. Sexual selection drives speciation in an Amazonian frog. *Proceedings of the Royal Society, London series B*. 274:399–406.
195. Engeszer, R.E.; da Barbiano, L.A.; Ryan, M.J.; Parichy, D.M. 2007. Timing and plasticity of shoaling behavior in the zebrafish, *Danio rerio*. *Animal Behaviour* 74: 1269-1275.
196. Hoke, K. L.; Ryan, M.J.; Wilczynski, W. 2007. Integration of sensory and motor processing underlying social behaviour in túngara frogs. *Proceedings of the Royal Society, London series B*. 274:641–649.
197. Hoke, K. L.; Ryan, M.J.; Wilczynski, W. 2007. Functional coupling between substantia nigra and basal ganglia homologs in amphibians. *Behavioral Neuroscience* 121:1393–1399.
198. Lampert, K.P.; Bernal, X.E.; Rand, A.S.; Mueller, U.G.; Ryan, M.J. 2007. Island populations of *Physalaemus pustulosus*: History influences genetic diversity and morphology. *Herpetologica* 63:311-319.

199. Pfennig, K.S.; Ryan, M.J. 2007. Character displacement and the evolution of mate choice: An artificial neural network approach. *Philosophical Transactions of the Royal Society*. 362:411-419.
200. Phelps, S.; Rand, A.S.; Ryan, M.J. 2007. The mixed-species chorus as public information: Túngara frogs eavesdrop on a heterospecific. *Behavioral Ecology* 18:108-114.
201. Schlaepfer, M.A.; Sredl, M.J.; Rosen, P.C.; Ryan, M.J. 2007. High prevalence of *Batrachochytrium dendrobatidis* in wild populations of lowland leopard frogs *Rana yavapaiensis* in Arizona. *EcoHealth* 4:421-427.
202. Baugh, A.T.; Akre, K.L.; Ryan, M.J. 2008. Categorical perception of a natural, multivariate signal: mating call recognition in túngara frogs. *Proceedings of the National Academy of Sciences, USA* 105:8985-8988.
203. Cummings, M.E.; Bernal, X.E.; Reynaga, R.; Rand, A.S.; Ryan, M.J. 2008. Visual sensitivity to a conspicuous male cue varies by reproductive state in *Physalaemus pustulosus* females. *Journal of Experimental Biology* 211:1203-1210.
204. Engeszer, R.E.; Wang, G.; Alberici da Barbiano, L.; Ryan, M.J.; Parichy, D.M. 2008. Sex-specific perceptual spaces for a vertebrate basal social aggregative behavior. *Proceedings of the National Academy of Sciences, USA* 105:929-933.
205. Funk, C.W.; Angulo, A.; Caldwell, J.P.; Ryan, M.J.; Cannatella, D.C. 2008. Comparison of morphology and calls of two cryptic species of *Physaleamus* (Anura: Leptodactylidae). *Herpetologica*. 64:290-304.
206. Heubel, K.U.; Hornhardt, K.; Ollmann, T.; Parzefall, J.; Ryan, M.J.; Schlupp, I. 2008. Geographic variation in female mate-copying in the species complex of a unisexual fish, *Poecilia formosa*. *Behaviour* 148:1041-1064.
207. Hoke, K.L.; Ryan, M.J.; Wilczynski, W. 2008. Candidate neural locus for sex differences in reproductive decisions. *Biology Letters* 4:518-521.
208. McLennan, D.A.; Ryan, M.J. 2008. Female swordtails prefer the scent of heterospecific males (*Xiphophorus continens*: Poeciliidae). *Animal Behaviour* 75:1731-1737.
209. Page, R.; Ryan, M.J. 2008. The effect of signal complexity on localization performance in bats that localize frog calls. *Animal Behaviour* 76:761-769.
210. Taylor, R.C.; Klein, B.A.; Stein, J.; Ryan, M.J. 2008. Faux frogs: Multicomponent signalling and the value of robotics in animal behaviour. *Animal Behaviour* 76:1089-1097.
211. Ryan, M.J. 2009. Communication in frogs and toads. In: L.R. Squire editor. *Encyclopedia of Neuroscience*, volume 2, pp. 1159-1166. Academic Press: Oxford.

212. Ryan, M.J.; Akre, K.L.; Kirkpatrick, M. 2009. Cognitive mate choice. In: R. Dukas, J. Ratcliffe editors. *Cognitive Ecology II*. pp. 137-155. University of Chicago Press, Chicago.
213. Bernal, X.; Akre, K.L.; Baugh, A.T.; Rand, A.S.; Ryan, M.J. 2009. Female and male behavioral response to advertisement calls of variable complexity in túngara frogs, *Physalaemus pustulosus*. *Behavioral Ecology and Sociobiology*. 63 1269-1279.
214. Bernal, X.E.; Rand, A.S.; Ryan, M.J. 2009. Task differences underlie sexual dimorphism in mating behaviour in túngara frogs, *Physalaemus pustulosus*. *Proceedings of the Royal Society, London Series B*. 276, 1323–1329.
215. Bernal, X.E.; Page, R.A.; Argo, T.F. IV; Ryan, M.J.; Wilson, P.S. 2009. Acoustic radiation patterns of the túngara frog (*Physalaemus pustulosus*): Implications for multiple receivers. *Journal of the Acoustical Society of America* 126:2757-2767.
216. Dawson, B.; Ryan, M.J. 2009. Early experience leads to changes in the advertisement calls of male *Physalaemus pustulosus*. *Copeia* 2009:221-226.
217. Funk, C.; Ryan, M.J.; Cannatella, D.C. 2009. Genetic divergence is more tightly related to call variation than landscape features in the Amazonian frogs *Physalaemus petersi* and *P. freibergi*. *Journal of Evolutionary Biology* 22:1839-1853.
218. Rendall, D.; Owren, M.J.; Ryan, M.J. 2009. What do animal signals mean? *Animal Behaviour* 78:233-240.
219. Romero-Carvajal, A.; Saenz-Ponce, N.; Venegas-Ferrin, M.; Almedia-Reinoso, D.; Lee, C.; Bond, J.; Ryan, M.J.; Wallingford, J.B.; Delpino, E.M. 2009. Embryogenesis and laboratory maintenance of the foam-nesting túngara frogs, genus *Engystomops* (= *Physalaemus*). *Developmental Dynamics* 238:1444-1454.
220. Sosa, J.A.; Ryan, M.J.; Schlaepfer, M.A. 2009. Induced morphological plasticity in Lowland Leopard Frog larvae (*Rana yavapaiensis*) does not confer a survival advantage against Green Sunfish (*Lepomis cyanellus*). *Journal of Herpetology* 43:460-468.
221. Summers, K.; Roney, K.; da Silva, J.; Capraro, G.; Cuthbertson, B.J.; Kazianis, S.; Rosenthal, G.G.; Ryan, M.J.; McConell, T.J. 2009. Divergent patterns of selection on the *DAB* and *DXB* MHC class II loci in *Xiphophorus* fishes. *Genetica* 135:379-390.
222. Baugh, A. T. & Ryan, M. J. 2009. Female túngara frogs vary in commitment to mate choice decisions. *Behavioral Ecology*. 20:1153-1159.
223. Ryan, M.J. 2010. An improbable path. In: L. Drickamer, D. Dewsbury editors. *Leaders in Animal Behavior, The Second Generation*. pp. 465-496. Cambridge University Press, Cambridge.
224. Ryan, M.J. 2010. The family that works together stays together. [Dispatch] *Current Biology* 20:R403-R404.

225. Ryan, M.J. 2010. The túngara frog: A model for sexual selection and communication. In: M.D. Breed, J. Moore, eds., *Encyclopedia of Animal Behavior*. volume 3, pp. 453-461. Academic Press, Oxford.
226. Ryan, M.J.; Bernal, X.E.; Rand, A.S. 2010. Female mate choice and the potential for ornament evolution in the túngara frog *Physalaemus pustulosus*. *Current Zoology* 56:343-357.
227. Akre, K.A.; Ryan, M.J. 2010. Complexity increases working memory for mating signals. *Current Biology* 20:502-505.
228. Akre, K.L.; Ryan, M.J. 2010. Proximity-dependent response to variably complex mating signals in túngara frogs (*Physalaemus pustulosus*). *Ethology* 116:1138-1145.
229. Baugh, A.T. & Ryan, M. J. 2010. Ambient light alters temporal updating behaviour during mate choice in a Neotropical frog. *Canadian Journal of Zoology* 88:448–453.
230. Baugh, A.T.; Ryan, M.J. 2010. The relative value of call embellishment in túngara frogs. *Behavioral Ecology and Sociobiology* 65:359-367.
231. Baugh, A.T. & Ryan, M. J. 2010. Temporal updating during phonotaxis in male túngara frogs (*Physalaemus pustulosus*). *Amphibia Reptilia* 31:449-454
232. Baugh, A.T. & Ryan, M.J. 2010. Mate choice in response to dynamic presentation of male advertisement signals in túngara frogs. *Animal Behaviour* 79:145-152.
233. Baugh, A.T. & Ryan, M. J. 2010. The development of sexual behavior in túngara frogs. *Journal of Comparative Psychology* 124:60–88.
234. Goutee, S.; Kime, N.M.; Argo, T.F. IV; Ryan, M.J. 2010. Calling strategies of male túngara frogs in response to dynamic playback. *Behaviour* 147:65-83.
235. Hoke, K.L.; Ryan, M.J.; Wilczynski, W. 2010. Sexually dimorphic sensory gating drives behavioral differences in túngara frogs. *Journal of Experimental Biology* 213:3463-3472.
236. Kime, N.M.; Whitney, T.K.; Ryan, M.J.; Rand, A.S.; Marler, C.A. 2010. Treatment with arginine vasotocin alters mating calls and decreases attractiveness in male túngara frogs. *General and Comparative Endocrinology* 165:221-228.
237. Owren, M.J.; Rendall, D.; Ryan, M.J. 2010. Redefining animal signaling: Influence versus information in communication. *Biology and Philosophy* 25:755–780.
238. Pfennig, K.S; Ryan, M.J. 2010. Evolutionary diversification of mating behaviour: using artificial neural networks to study reproductive character displacement and speciation. pp. 187-214. In: C. Tosh and G. Ruxton, editors, *Modeling Perception with Artificial Neural Networks*, Cambridge University Press, Cambridge, UK.
239. Pröhl, H.; Ron, S.R.; Ryan, M.J. 2010. Ecological and genetic divergence between two lineages

- of Middle American túngara frogs *Physalaemus* (= *Engystomops*) *pustulosus*. *BMC Evolutionary Biology* 10:146 (18 pp)
240. Lampert, K.P.; Schmidt, C.; Fischer, P.; Volff, J.-N.; Hoffmann, C.; Muck, J.; Lohse, M.J.; Ryan, M.J.; Manfred Scharl, M. 2010. Determination of onset of sexual maturation and mating behavior by melanocortin receptor 4 polymorphisms. *Current Biology* 20:1729-1734.
241. Shah, A.A.; Ryan, M.J.; Bevilaqua, E.; Schlaepfer, M.A. 2010. Prior experience alters the behavioral response of prey to a nonnative predator. *Journal of Herpetology* 44:185-192.
242. Smith, C.C.; Ryan, M.J. 2010. Evolution of sperm quality but not quantity in the internally fertilized fish *Xiphophorus nigrensis*. *Journal of Evolutionary Biology* 23:1759-1771.
243. Wilczynski, W.; Ryan, M.J. 2010. The behavioral neuroscience of anuran social signal processing. *Current Opinion in Neurobiology* 20:754-763.
244. Ryan, M.J. 2011. The brain as a source of selection on the social niche: Examples from the psychophysics of mate choice in túngara frogs. *Integrative and Comparative Biology* 51:756-770.
245. Ryan, M.J. 2011. Replication in field biology: The case of the frog-eating bat. *Science* 334:1229-1230.
246. Ryan, M.J. 2011. Sexual selection. In: *Grzimek's Animal Life Encyclopedia*. Pp. 179-185. Van Nostrand Reinhold Co., New York.
247. Ryan, M.J. 2011. Sexual selection: A tutorial from the túngara frog. In: Losos, J.B., ed. *In Light of Evolution, Essays from the Laboratory and Field*. pp. 185-203. Roberts and Company, Greenwood Village CO. A
248. Akre, K.L.; Farris, H.E.; Lea, A.M.; Page, R.A.; Ryan, M.J. 2011. Signal perception in frogs and bats and the evolution of mating signals. *Science* 333:752-753.
249. Akre, K.L.; Ryan, M.J. 2011. Female túngara frogs elicit more complex mating signals from males. *Behavioral Ecology* 22: 846-853.
250. Baugh, A.T.; Ryan, M.J. 2011. The relative value of call embellishment in túngara frogs. *Behavioral Ecology and Sociobiology* 65:359-367.
251. Bonochea, L.A.; Ryan, M.J. 2011. Localization error and search costs during mate choice in túngara frogs, *Physalameus pustulosus*. *Ethology* 116:56-62.
252. Bonochea, L.A.; Ryan, M.J. 2011. Predation risk increases permissiveness for heterospecific advertisement calls in túngara frogs, *Physalaemus pustulosus*. *Animal Behaviour* 82 347e352 .
253. Bonochea, L.A.; Ryan, M.J. 2011. Simulated predation risk influences female choice in túngara frogs, *Physalaemus pustulosus*. *Ethology* 117:400-407.

254. Dapper, A.L.; Baugh, A.T.; Ryan, M.J. 2011. The sounds of silence as an alarm cue in túngara frogs. *Biotropica* 43: 380–385.
255. Farris, H.E.; Ryan, M.J. 2011. Relative comparisons enable auditory grouping in frogs. *Nature Communications* 2:410 DOI:10.1038/ncoms1470|www.nature.com/naturecommunications.
256. O’Connell, L.A.; Matthews, B.J.; Ryan, M.J.; Hoffman, H.A. 2011. Characterization of the dopamine system in brain of the túngara frog, *Physalameus pustulosus*. *Brain, Behavior and Evolution*. DOI 10.1159/000321725
257. O’Connell, L.A.; Ding, J.H.; Ryan, M.J.; Hofmann, H.A. 2011. Neural distribution of the nuclear progesterone receptor in the túngara frog, *Physalaemus pustulosus*. *Journal of Chemical Neuroanatomy*. 41:137–147.
258. Rosenthal, G.G.; Ryan, M.J. 2011. Conflicting preferences within females: sexual selection versus species recognition. *Biology Letters* doi:10.1098/rsbl.2011.0027
259. Smith, C.C.; Ryan, M.J. 2011. Tactic-dependent plasticity in ejaculate traits in the swordtail *Xiphophorus nigrensis*. *Biology Letters* 7:733-735.
260. Taylor, R.C.; Klein, B.A.; Stein, J.; Ryan, M.J. 2011. Multimodal signal variation in space and time: How important is matching a signal with its signaler? *Journal of Experimental Biology* 214:815-820.
261. Taylor, R.C.; Klein, B.A.; Ryan, M.J. 2011. Inter-signal interaction and uncertain information in anuran multimodal signals. *Current Zoology* 57: 153–161.
262. Willis, P.; Ryan, M.J.; Rosenthal G.G. 2011. Encounter rates with conspecific males influence female mate choice in a naturally hybridizing fish. *Behavioral Ecology* 22:1234-1240.
263. Dawson, B.; Ryan, M.J. 2012. Evoked vocal responses change with experience in male *Physalaemus pustulosus*. *Copeia* 2012:678-682.
264. Dawson B, Ryan MJ. 2012. Female preferences are not altered by early acoustic experience in the neotropical frog *Physalaemus pustulosus*. *Journal of Herpetology* 46: 535-38
265. Duarte-Guterman, P.; Ryan, M.J.; Trudeau, V.L. 2012. Developmental expression of sex steroid- and thyroid hormone-related genes and their regulation by triiodothyronine in the gonad-mesonephros of a Neotropical frog, *Physalaemus pustulosus*. *General and Comparative Endocrinology* 177:195-204.
266. Duarte-Guterman, P.; Ryan, M.J.; Hogan, N.S.; Trudeau, V.L. 2012. Developmental profiles and thyroid hormone regulation of brain transcripts in frogs: a species comparison with emphasis on *Physalaemus pustulosus*. *Brain, Behavior and Evolution* 79:98-112. doi: 10.1159/000331265.
267. Baugh, A.; Hoke, K.; Ryan, M.J. 2012. Development of communication behaviour: Receiver ontogeny in túngara frogs and a prospectus for a behavioural evolutionary development. *The*

Scientific World Journal doi10.1100/2012/680132.

268. Willis, P.M.; Rosenthal, G.G.; Ryan, M.J. 2012. An indirect cue of predation risk counteracts female preference for conspecifics in a naturally hybridizing fish *Xiphophorus birchmanni*. *PLoS ONE* 7: e34802. doi:10.1371/journal.pone.0034802.
269. Ryan, M.J. 2013. The importance of integrative biology to sexual selection and communication. pp. 233-255. In: U. Stegmann, editor, *Animal Communication Theory: Information and Influence*. Cambridge University Press.
270. Ryan, M.J.; Cummings, M.E. 2013. Perceptual biases and mate choice. *Annual Review of Ecology, Evolution and Systematics* 45:XXX-XXX.
271. Jones, P.L.; Farris, H.E.; Ryan, M.J.; Page, R.A. 2013. Do frog-eating bats perceptually bind the complex components of frog calls? *Journal of Comparative Physiology*. 199:279-283.
272. Kime, N.M.; Ryan, M.J.; Wilson, P.S. 2013. A bond graph approach to modeling the anuran vocal production system. *Journal of the Acoustical Society of America* 133:4133-4144
273. Page, R.A; Ryan, M.J.; Bernal, X.E. 2013. Be loved, be prey, be eaten. pp. 123-154. In: *Animal Behavior, vol 3. Case Studies: Integration and Application of Animal Behavior* (ed., K. Yasukawa), New York: Praeger.
274. Rog, S.; Ryan, M.J.; Mueller, U.; Lampert, K.P. 2013. Evidence for morphological and genetic diversification of túngara frog populations on islands. *Herpetological Conservation and Biology* 8:228-239.
275. Taylor, R.C.; Ryan, M.J. 2013. Unique interactions of multisensory components perceptually rescue túngara frog mating signals. *Science* 341:273-274.
276. Guerra, M.; Ryan, M.J.; Cannatella, D.C. in press. Ontogeny of sexual dimorphism in the larynx of the túngara frog: *Physalaemus pustulosus*. *Copeia*.
277. Halfwerk, W. Jones, P.L.; Taylor, R.C.; Ryan, M.J.; Page, R.A. in press. Risky ripples allow eavesdrop on a multisensory sexual display. *Science*
278. Jones, P.L.; Ryan, M.J.; Flores, V.; Page, R.A. in press. When to approach novel prey cues? Social learning strategies in frog-eating bats. *Proceedings of the Royal Society*.

Books:

279. Ryan, M.J. 1985. *The Túngara Frog, A Study in Sexual Selection and Communication*. University of Chicago Press, Chicago. 230 pp.
280. Frittsch, B.; Ryan, M.; Wilczynski, W.; Hetherington, T.; Walkowiak, W. (editors). 1988. *The Evolution of the Amphibian Auditory System*. John Wiley and Sons, New York.

281. Ryan, M.J. (editor). 2001. *Anuran Communication*. Smithsonian Institution Press, Washington D.C.
282. Ryan, M.J.; Wilczynski, W. 2011. *An Introduction to Animal Behavior, An Integrative Approach*. Cold Springs Harbor Laboratory Press, Cold Springs Harbor, New York.
- Book Reviews:*
283. Ryan, M.J. 1986. Amphibians (review of *Biology of Amphibians*). *Science* 232:271.
284. Ryan, M.J. 1992. Sexy males and sterile females (review of *The Peacock and the Ant*). *Cell* 71:367-368.
285. Ryan, M.J. 1995. Offsetting advantages (review of *Sexual Selection*). *Science* 267:712-713.
286. Ryan, M.J. 1996. Speciation and the recognition concept, theory and application (review of *Speciation and the Recognition Concept, Theory and Application*). *Quarterly Review of Biology* 71:274-275.
287. Ryan, M.J. 1996. A natural history of amphibians (review of *A Natural History of Amphibians*). *Animal Behaviour* 52:1058.
288. Ryan, M.J. 1997. Animal communication and evolution (review of *Evolution and Communication*). *Evolution* 51:1333-1337.
289. Ryan, M.J. 1998. A model fish (review of *Sex, Color and Mate Choice in Guppies*). *Trends in Ecology and Evolution* 13:294.
290. Ryan, M.J. 1998. Principle with a handicap (review of *The Handicap Principle*). *Quarterly Review of Biology* 73:477-479.
291. Ryan, M.J.; Cummings, M.E. 2005. Animal signals and the overlooked costs of efficacy (review of *Animal Signals*). *Evolution*. 59:1160-1161.
292. Ryan, M.J. 2009. Diverse views of communication (review of *The Sociobiology of Communication*). *Trends in Ecology and Evolution*. 24:68-69.

(updated, October 2013)