KAREN M. WARKENTIN

CURRICULUM VITAE (2/2018)

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lab website: http://sites.bu.edu/warkentinlab/
orcid.org/0000-0002-7804-800X

PERSONAL

Birth date: September 26, 1962
Citizenship: Canadian
Languages: English, Spanish
Status in USA: Permanent Resident Alien

EDUCATION

PhD, May 1998. Zoology, University of Texas. Advisor: Michael J. Ryan.
MSc, October 1990. Biology, Dalhousie University. Advisor: Richard J. Wassersug.
BSc, February 1985. Biology, University of Guelph.

PROFESSIONAL APPOINTMENTS

Professor, Dept. of Biology *and* Women's, Gender & Sexuality Studies Program, Boston University. 2016–present
Director of Graduate Studies, Dept. of Biology, Boston University. 2016–2017
Associate Chair, Dept. of Biology, Boston University. 2012–2014
Associate Professor, Women's, Gender & Sexuality Studies Program, Boston University. 2011–2016 (secondary appointment)
Associate Professor, Dept. of Biology, Boston University. 2008–2016
Research Associate, Smithsonian Tropical Research Institute. 2004–present
Assistant Professor, Dept. of Biology, Boston University. 2001–2008
Postdoctoral Scholar, Dept. of Biology, University of Kentucky. 1998–2001. Advisor: Andrew Sih.
Postdoctoral Fellow, Smithsonian Tropical Research Institute. 2000–2001.
Advisors: A. Stanley Rand and Mary Jane West-Eberhard.

HONORS

Invited Plenary Speaker

International Society for Behavioral Ecology, 2018 (scheduled)
Colombian Herpetology Congress, 2016
Studying Vibrational Communication: 1st International Symposium on Biotremology, 2016
Brazilian Herpetological Congress, 2015
World Congress of Herpetology, 2012

Finalist for the Metcalf Award for Teaching Excellence, Boston University, 2017
Mentor of the Year Award, Boston University Graduate Women in Science and Engineering, 2015
Nominated for President, American Society of Ichthyologists and Herpetologists (ASIH), 2010
Elected to the Board of Governors, ASIH, 2003

Stoye Award for Best Student Paper in Ecology and Ethology, ASIH meeting, 1993

SCIENTIFIC PUBLICATIONS

Publications with trainees: [U]Undergraduate or intern, [G]Graduate student, [P]Postdoctoral scholar

59. Cohen, K.L.[G], M. L. Piacentino[G] & K.M. Warkentin. 2018. The hatching process and mechanisms of adaptive hatching acceleration in hourglass treefrogs. **J. Comp. Biochem. Physiol. A. 217: 63–74** doi: 10.1016/j.cbpa.2017.10.020

58. Salica, M.J.[G], J.R. Vonesh & K.M. Warkentin. 2017. Egg clutch dehydration induces early hatching in red-eyed treefrogs, *Agalychnis callidryas.* **PeerJ.** 5:e3549. DOI 10.7717/peerj.3549

57. Warkentin, K.M., J. Cuccaro Diaz[U], B.A. Güell[U], J. Jung[G], S.J. Kim[U] & K.L. Cohen[G]. 2017. Developmental onset of escape-hatching responses in red-eyed treefrogs depends on cue type. **Animal Behaviour.** 129: 103–112. doi: 10.1016/j.anbehav.2017.05.008 – *Audio Slides available in English & Spanish.*

56. Delia, J.[G], L. Bravo-Valencia[U] & K.M. Warkentin. 2017. Patterns of parental care in Neotropical glassfrogs: fieldwork alters hypotheses of sex-role evolution. **Journal of Evolutionary Biology.** doi: 10.1111/jeb.13059 – *Highlighted in journal cover photo; media coverage including New York Times.*

55. Rueda Solano, L.A. & K.M. Warkentin. 2016. Foraging behavior with possible use of substrate-borne vibrational cues for prey localization in *Atelopus laetissimus* (Ruiz-Carranza, Ardila-Robayo, and Hernández-Camacho, 1994). **Herpetology Notes.** 9: 191–195.

54. Cohen, K.L.[G], M.A. Seid & K.M. Warkentin. 2016. How embryos escape from danger: the mechanism of rapid, plastic hatching in red-eyed treefrogs. **Journal of Experimental Biology.** 219: 1875–1883. DOI: 10.1242/jeb.139519 – *Highlighted in journal cover photo, Inside JEB, and video abstract; extensive media coverage.*

53. Bouchard, S.S., C. J. O'Leary[U], L.J. Wargelin[U], J.F. Charbonnier & K.M. Warkentin. 2016. Post-metamorphic carryover effects of larval digestive plasticity. **Functional Ecology.** 30: 379–388 DOI: 10.1111/1365-2435.12501 – *Highlighted in journal cover photo.*

52. Bouchard, S.S., C.J. O'Leary[U], L.J. Wargelin[U], W.B. Rodriguez[U], K.X. Jennings[U] & K.M. Warkentin. 2015. Alternative competition-induced digestive strategies yield equal growth but constrain compensatory growth in red-eyed treefrog larvae. **Journal of Experimental Zoology.** 323A: 778–788. DOI: 10.1002/jez.1991

51. McCoy, M.W, S.K. Wheat[U], K.M. Warkentin & J.R. Vonesh. 2015. Risk assessment based on indirect predation cues: Revisiting fine-grained variation. **Ecology and Evolution.** 5: 4523–4528. DOI: 10.1002/ece3.1552

50. Hughey, M.C.[G], J.R. Rogge[U], K. Thomas[U], M.W. McCoy[P] & K.M. Warkentin. 2015. Escape-hatching responses of individual treefrog embryos vary with threat level in wasp attacks: a mechanistic analysis. **Behaviour** 152: 1543–1568. DOI:10.1163/1568539X-00003291

49. Touchon, J.C., M.W. McCoy, T. Landberg[P], J.R. Vonesh & K.M. Warkentin. 2015. Putting μ/g in a new light: plasticity in life-history switch points reflects fine-scale adaptive responses. **Ecology** 96: 2192–2202.

48. Tarvin, R.D.[U], C. Silva Bermúdez[U], V.S. Briggs[P] & K.M. Warkentin. 2015. Carry-over effects of size at metamorphosis in red-eyed treefrogs: higher survival but slower growth of larger metamorphs. **Biotropica** 47:218–226. DOI 10.1111/btp.12198
– *Highlighted in journal cover photo*

47. Willink, B.[U], M.S. Palmer[U], T. Landberg[P], J.R. Vonesh & K.M. Warkentin. 2014. Environmental context shapes immediate and cumulative costs of risk-induced early hatching. **Evolutionary Ecology** 28: 103-116. DOI 10.1007/s10682-013-9661-z

46. Touchon, J.C.[P], R.R. Jiménez[U], S.H. Abinette[U], J.R. Vonesh & K.M. Warkentin. 2013. Behavioral plasticity mitigates risk across environments and predators during anuran metamorphosis. **Oecologia** 173: 801-811. DOI 10.1007/s00442-013-2714-8
– *Highlighted in journal cover photo*

45. Gomez-Mestre, I.[P] & K.M. Warkentin. 2013. Risk-induced hatching timing shows low heritability and evolves independently of spontaneous hatching in red-eyed treefrogs. **Journal of Evolutionary Biology** 26: 1079-1089.

44. Touchon, J.C.[P] M.W. McCoy, J.R. Vonesh & K.M. Warkentin. 2013. Effects of hatching plasticity carry over through metamorphosis in red-eyed treefrogs. **Ecology** 94: 850-860.

43. McCoy, M.W., J.C. Touchon[P], T. Landberg[P], K.M. Warkentin & J.R. Vonesh. 2012. Prey responses to predator chemical cues: Disentangling the importance of the number and biomass of prey consumed by predators. **PLoS ONE** 7: e47495. doi:10.1371/journal.pone.0047495.

42. Hughey, M.C.[G], M.W. McCoy, J.R. Vonesh & K.M. Warkentin. 2012. Spatial contagion shapes colonization dynamics of frogflies (*Megaselia sp. nov.*) on clutches of red-eyed treefrogs (*Agalychnis callidryas*). **Biology Letters** 8: 887-889. doi:10.1098/rsbl.2012.0468

41. Wibowo, E., R. Wassersug, K. Warkentin, L. Walker, J. Robinson, L. Brotto, T. Johnson. 2012. Impact of androgen deprivation therapy on sexual function: A response. **Asian Journal of Andrology** 14: 793-794. doi:10.1038/aja.2012.60

40. Hughey, M.C.[G], A. Nicolás[U], J.R. Vonesh & K.M. Warkentin. 2012. Wasp predation drives the assembly of fungal and fly communities on frog egg masses. **Oecologia** 168: 1057-1068.

39. Warkentin, K.M. 2011. Plasticity of hatching in amphibians: Evolution, trade-offs, cues and mechanisms. **Integrative and Comparative Biology** 51: 111-127.
– *Highlighted in journal cover photo*

38. Warkentin, K.M. 2011. Environmentally cued hatching across taxa: Embryos respond to risk and opportunity. **Integrative and Comparative Biology** 51: 14-25.

37. McCoy, M.W.[P], B.M. Bolker, K.M. Warkentin & J.R. Vonesh. 2011. Predicting predation through prey ontogeny using size-dependent functional response models. **American Naturalist** 177: 752-766.

36. Touchon, J.C.[G], J. Urbina[U] & K.M. Warkentin. 2011. Habitat-specific constraints on induced hatching in a treefrog with reproductive mode plasticity. **Behavioral Ecology** 22: 169-175.
– *Highlighted in journal cover photo*

35. Touchon, J.C.[G] & K.M. Warkentin. 2011. Thermally contingent plasticity: temperature alters expression of predator-induced color and morphology in a Neotropical treefrog tadpole. **Journal of Animal Ecology** 80: 79-88.

34. Gomez-Mestre, I.[P], V.L. Saccoccio[U], T. Iijima[U], E.M. Collins[U], G.G. Rosenthal & K.M. Warkentin. 2010. The shape of things to come: Linking developmental plasticity to postmetamorphic morphology in anurans. **Journal of Evolutionary Biology** 23: 1364-1373.
– *Highlighted in journal cover photo*

33. Caldwell, M.S.[G], G.R. Johnston, J.G. McDaniel & K.M. Warkentin. 2010. Vibrational signaling in the agonistic interactions of red-eyed treefrogs. **Current Biology** 20: 1012-1017.
– *Highlighted in journal cover photo*
– *Media coverage including ScienceNOW, New York Times, Discover Magazine, Science Friday*

32. Touchon, J.C.[G] & K.M. Warkentin. 2010. Short- and long-term effects of the abiotic egg environment on viability, development and vulnerability to predators of a Neotropical anuran. **Functional Ecology** 24: 566-575.

31. Caldwell, M.S.[G], J.G. McDaniel & K.M. Warkentin. 2010. Is it safe? Red-eyed treefrog embryos assessing predation risk use two features of rain vibrations to avoid false alarms. **Animal Behaviour** 79: 255-260.
– *Editor's "Featured Article in This Month's* Animal Behaviour*"*
– *Media coverage including New Scientist, Smithsonian Science, Bild der Wissenschaft, Daily Planet*

30. Warkentin, K.M. & M.S. Caldwell[G]. 2009. Assessing risk: embryos, information, and escape hatching. *In* R. Dukas & J.M. Ratcliffe (Eds) **Cognitive Ecology II**. University of Chicago Press. pp. 177-200.

29. Touchon, J.C.[G] & K.M. Warkentin. 2009. Negative synergism of rainfall patterns and predators affects frog egg survival. **Journal of Animal Ecology** 78: 715-723.

28. Caldwell, M.S.[G], J.G. McDaniel & K.M. Warkentin. 2009. Frequency information in the vibration-cued escape hatching of red-eyed treefrogs. **Journal of Experimental Biology** 212: 566-575.

27. Rogge, J.R.[U] & K.M. Warkentin. 2008. External gills and adaptive embryo behavior facilitate synchronous development and hatching plasticity under respiratory constraint. **Journal of Experimental Biology** 211: 3627-3635.
– *Highlighted in journal cover photo*
– *Extensive media coverage including the cover story of Science News*

26. Touchon, J.C.[G] & K.M. Warkentin. 2008. Reproductive mode plasticity: aquatic and terrestrial oviposition in a treefrog. **Proceedings of the National Academy of Sciences, USA** 105: 7495-7499.
– *Highlighted in journal cover photo; extensive online media coverage*

25. Gomez-Mestre, I.[P], J.C. Touchon[G], V.L. Saccoccio[U] & K.M. Warkentin. 2008. Genetic variation in pathogen-induced early hatching of toad embryos. **Journal of Evolutionary Biology** 21: 791-800.

24. Touchon, J.C.[G] & K.M. Warkentin. 2008. Fish and dragonfly nymph predators induce opposite shifts in color and morphology of tadpoles. **Oikos** 117: 634-640.

23. Gomez-Mestre, I.[P], J.J. Wiens & K.M. Warkentin. 2008. Evolution of adaptive plasticity: risk-sensitive hatching in neotropical leaf-breeding treefrogs (*Agalychnis*: Hylidae). **Ecological Monographs** 78: 205-224.

22. Warkentin, K.M. 2007. Oxygen, gills, and embryo behavior: mechanisms of adaptive plasticity in hatching. **Comparative Biochemistry and Physiology A** 148: 720-731.

21. Gomez-Mestre I.[P] and K.M. Warkentin. 2007. To hatch and hatch not: similar selective trade-offs but different responses to egg predators in two closely related, syntopic treefrogs. **Oecologia** 153: 197-206.

20. Warkentin, K.M., M.S. Caldwell[G], T.D. Siok[U], A.T. D'Amato[U] & J.G. McDaniel. 2007. Flexible information sampling in vibrational risk assessment by red-eyed treefrog embryos. **Journal of Experimental Biology** 210: 614-619.
– Highlighted in "Inside JEB"

19. Gomez-Mestre, I.[P], J.C. Touchon[G] & K.M. Warkentin. 2006. Amphibian embryo and parental defenses and a larval predator reduce egg mortality from water mold. **Ecology** 87: 2570-2581.
– Highlighted in journal cover photo
– Extensive online media coverage

18. Touchon, J.C.[G], I. Gomez-Mestre[P] & K.M. Warkentin. 2006. Hatching plasticity in two temperate anurans: responses to a pathogen and predation cues. **Canadian Journal of Zoology** 84: 556-563.

17. Warkentin, K.M., M.S. Caldwell[G] & J. G. McDaniel. 2006. Temporal pattern cues in vibrational risk assessment by red-eyed treefrog embryos, *Agalychnis callidryas*. **Journal of Experimental Biology** 209:1376-1384.
– Highlighted in "Inside JEB"
– Media coverage including USA Today

16. Vonesh, J.R.[P] & K.M. Warkentin. 2006. Opposite shifts in size at metamorphosis in response to larval and metamorph predators. **Ecology** 87: 556-562. *– Highlighted in journal cover photo*

15. Warkentin, K.M., C.R. Buckley[U] & K.A. Metcalf[U]. 2006. Development of red-eyed treefrog eggs affects efficiency and choices of egg-foraging wasps. **Animal Behaviour** 71: 417-425.

14. Warkentin, K.M., R.E. Gray & R.J. Wassersug. 2006. Restoration of satisfying sex for a castrated cancer patient with complete impotence: A case study. **Journal of Sex and Marital Therapy** 32: 389-399.

13. Warkentin, K.M., I. Gomez-Mestre[P] & J.G. McDaniel. 2005. Development, surface exposure, and embryo behavior affect oxygen levels in eggs of the red-eyed treefrog, *Agalychnis callidryas*. **Physiological and Biochemical Zoology** 78: 956-966.

12. Warkentin, K.M. 2005. How do embryos assess risk? Vibrational cues in predator-induced hatching of red-eyed treefrogs. **Animal Behaviour** 70: 59-71.
– Extensive media coverage including Nature, Scientific American, Natural History, Boston Globe

11. Warkentin, K.M. 2002. Hatching timing, oxygen availability, and external gill regression in the tree frog, *Agalychnis callidryas*. **Physiological and Biochemical Zoology** 75:155-164.

10. Warkentin, K.M., C.C. Currie & S.A. Rehner. 2001. Egg-killing fungus induces early hatching of red-eyed treefrog eggs. **Ecology**. 2860-2869.

9. Warkentin, K.M. & R.J. Wassersug. 2001. Does prostaglandin regulate external gill loss in anurans? **Journal of Experimental Zoology** 289: 366-373.

8. Warkentin, K.M. 2000. Environmental and developmental effects on external gill loss in the red-eyed treefrog, *Agalychnis callidryas*. **Physiological and Biochemical Zoology** 73: 557-565.

7. Warkentin, K.M. 2000. Wasp predation and wasp-induced hatching of red-eyed treefrog eggs. **Animal Behaviour** 60: 503-510.
   – Extensive media coverage including Science News, National Wildlife, BBC Wildlife, Discovery Channel

6. Warkentin, K.M. 1999. Effects of hatching age on development and hatchling morphology in the red-eyed treefrog, *Agalychnis callidryas*. **Biological Journal of the Linnean Society** 68: 443-470.

5. Warkentin, K.M. 1999. The development of behavioral defenses: a mechanistic analysis of vulnerability in red-eyed tree frog hatchlings. **Behavioral Ecology** 10: 251-262.

4. Warkentin, K.M. 1995. Adaptive plasticity in hatching age: A response to predation risk trade-offs. **Proceedings of the National Academy of Sciences** 92: 3507-3510.
   – Extensive media coverage including Science, New Scientist, Discover, Geo, BBC, CBC and AAAS radio, Discovery Channel

3. Ryan, M.J., K.M. Warkentin, B.E. McClelland & W. Wilczynski. 1995. Fluctuating asymmetries and advertisement call variation in the cricket frog, *Acris crepitans*. **Behavioral Ecology** 6 (2):124-131.

2. Warkentin, K.M. 1992. Microhabitat use and feeding rate variation in green frog tadpoles (*Rana clamitans*). **Copeia** 1992 (3): 731-740.

1. Warkentin, K.M. 1992. Effects of temperature and illumination on feeding rates of green frog tadpoles (*Rana clamitans*). **Copeia** 1992 (3): 725-730.

MANUSCRIPTS SUBMITTED

Warkentin, K.M., J. Jung[G], L.A. Rueda Solano[G] & J.G. McDaniel. Ontogeny of escape-hatching decisions: vibrational cue changes as predicted from costs of sampling and false alarms. (First submitted September 26, 2017; rejected, now in revision for submission **Animal Behavior**.)

POPULAR PUBLICATIONS

Warkentin, K. 1997. Life on the leaf. **Fauna** 1 (2): 8-20.

Schneider, D. & K. Warkentin. 1991. Charming Snakes. **Nature Canada** 20 (3): 22-29.

Schneider, D. & K. Warkentin. 1988. Giant silk moths: exotic creatures of the night. **Canadian Geographic** 108 (4): 58-65.

DISSERTATION AND THESIS

"Phenotypic plasticity at hatching in the red-eyed treefrog, *Agalychnis callidryas*: life history, behavior and development" Ph.D. Dissertation in Zoology, University of Texas, Austin, 1998.

"Feeding rates in *Rana clamitans* larvae (Anura: Ranidae) in relationship to microhabitat use, with an assessment of the effects of temperature and light on tadpole feeding" M.Sc. Thesis in Biology, Dalhousie University, 1990.

MEDIA COVERAGE

Media reports on research publications (11 papers)

Print and online: *Coverage includes BBC Wildlife Magazine*, *Bild der Wissenschaft, Boston Globe*, *BU Research News, Discover*, *FACTS magazine, Frankfurter Allgemeine Zeitung, Forskning & Framsteg*, *Geo*, *Liberation*, *National Geographic, Nature*, *Nature Australia*, *Natural History*, *New Scientist, New York Times, NSF Discoveries website, Nürnberger Nachrichten, Québec Science*, *Ranger Rick, Sciences et Avenir*, *Science*, *Science News*, *Science Now, Scientific American*, *Smithsonian Science, Spektrum der Wissenschaft*, *Today's Science, Today's Science on File*, *USA Today*, *Wiedza i Zycie*

Radio: AAAS – *Science Update,* BBC – *Science Magazine*, CBC – *Quirks and Quarks*, NPR – *Science Friday,* NSF – *Imagine That*

Television: Discovery Channel – *@discovery.ca*, *Daily Planet*

Selected general research coverage

Wheeling, K. – Escape hatch. *Discover Magazine.* July/August 2015.

Buccini, C.K. (text) and Hahn, D. (video) – Escape hatch. *BU Today*, *BU Research*, and *Bostonia.* June 2015.

Fields, H. – The frog that roared (print) *or* How the tree frog has redefined our view of biology: the world's most charismatic amphibian is upending the conventional wisdom about evolution (online). *Smithsonian Magazine.* January 2013.

Windfall Films, UK – *Easter Eggs Live* series. 2013.

Milius, S. – Smart from the start: animal embryos get some respect for their survival skills. *Science News.* August 15, 2009.

BBC – David Attenborough's series *Life in Cold Blood*. 2008.

Holland, J.S. – It's a frog's life: born on the run, hiding in plain sight. *National Geographic* November 2006.

National Zoological Park exhibit, 2005.

GRANTS AND FELLOWSHIPS

– SINCE JOINING BOSTON UNIVERSITY IN 2001

NSF Research Grant IOS-1354072, "The Development of Adaptive Embryo Behavior" ($915,912, co-PI J.G. McDaniel, BU Mechanical Engineering) 2014–2019

Women In Networks Grant, BU Women in Science and Engineering, Internship support for Argentinean PhD student María José Salica ($2400) 2011

NSF Conference Grant IOS-1036933, "Symposium – Environmentally cued hatching across taxa" ($14,980, PIs K. Martin, K. Warkentin & R. Strathmann, award to Pepperdine) 2011

Women In Networks Grant, BU Women in Science and Engineering "Symposium – Environmentally cued hatching across taxa" ($3000) 2010

Smithsonian Tropical Research Institute Senior Fellowship ($12,000) 2008

NSF Research Grant DEB-0716923, "Fear, death, and life history switch points: cumulative effects of predation and predator-induced plasticity across three life stages" ($409,000 + $106,629 in REU & ROA supplements to BU; $247,000 + ROA & REU supplements to collaborator J. Vonesh at Virginia Commonwealth U.) 2007-2011*

*Includes one-year no cost extension.

NSF Research Grant IBN-0234439, "How embryos assess danger: the role of vibrational cues" ($290,000 + $18,000 in REU supplements, co-PI J.G. McDaniel, Mech. Eng.) 2003-2007*

*Includes one-year no cost extension.

National Geographic Society Research Grant ($24,850) 2003-2006

– POSTDOCTORAL

Postdoctoral Fellowship & Research Grant, Smithsonian Tropical Research Institute (US$16,900; funding for 6 months of field research) 2000-2001

Natural Sciences and Engineering Research Council Postdoctoral Fellowship, "The evolution of hatching stage as an anti-predator defense" (Cdn $70,000) 1999-2001

Postdoctoral Fellowship, University of Kentucky ($21,000) 1998-1999

Short-term Postdoctoral Fellowship, Smithsonian Tropical Research Institute ($3,100) 1998

FUNDING AND AWARDS TO MY GRADUATE STUDENTS

J. C. TOUCHON

Belamarich Award for *Best Biology Dissertation* at BU in 2008-9 ($1000) 2009
BU Graduate School Award for *Most Outstanding Teaching Fellow in Biology* 2009
Gaige Award for *Best Student Presentation*, Joint Meeting of Ichthyologists & Herpetologists 2009
Smithsonian Pre-doctoral Fellowship ($16,500 for stipend, research & travel) 2007-2008
Boston University Graduate Research Abroad Fellowship ($10,000) 2007
Animal Behavior Society Research Grant ($1000) 2006
American Society of Ichthyologists and Herpetologists Travel Award ($250) 2006
NSF Dissertation Improvement Grant ($12,000) 2005-2007
American Society of Ichthyologists and Herpetologists Gaige Award ($500) 2005
Smithsonian Tropical Research Institute Short-term Fellowship ($3,000) 2004
Ecological Society of America Applied Ecology Travel Award ($750) 2004

M. S. CALDWELL

Belamarich Award for *Best Biology Dissertation* at BU 2009-10 ($1000) 2010
NSF Dissertation Improvement Grant ($10,065) 2007
Smithsonian Tropical Research Institute Short-term Fellowship ($4,000) 2006

M. C. HUGHEY

Encyclopedia of Life Fellowship ($22,000) 2009-2010
NSF Dissertation Improvement Grant ($15,000) 2009-2010
Smithsonian Tropical Research Institute Short-term Fellowship ($3,050) 2007
Smithsonian Tropical Research Institute Short-term Fellowship ($3,500) 2006
Lewis and Clark Fund for Exploration and Field Research Grant ($4,000) 2006
American Society of Ichthyologists and Herpetologists Gaige Award ($500) 2006
American Society of Ichthyologists and Herpetologists Travel Award ($250) 2006

K. L. COHEN

BU Graduate School Award for *Most Outstanding Teaching Fellow in Biology* 2015

BU Women's Guild Melville Scholarship ($1000) 2015
Graduate Research Abroad Fellowship, Boston University ($4000) 2014
Marion R. Kramer Award, Boston University ($2500) 2014
Smithsonian Institution Graduate Fellowship ($6,500) 2012
E.E. Williams Graduate Research Award, Herpetologists League ($1000) 2012
Rosemary Grant Graduate Research Award, Society for the Study of Evolution ($1000) 2012
Ernst Mayr Fellowship, Smithsonian Tropical Research Institute ($5,000) 2011

J. DELIA
B.U. Dept. of Biology Thomas H. Kunz Award ($5250) 2016
NSF Dissertation Improvement Grant ($16,380) 2015
American Society of Naturalists Student Research Fellowship ($2000) 2015
B.U. Dept. of Biology Thomas H. Kunz Award ($5125) 2015
Boston University Dean's Graduate Fellowship ($6000) 2014
Lewis and Clark Fund for Exploration and Field Research Grant ($5000) 2014
Animal Behavior Society Research Grant ($1,300) 2014
Society for the Study of Evolution Rosemary Grant Award ($2,070) 2013
A. Stanley Rand Smithsonian Graduate Fellowship ($4,200) 2013
Fulbright Fellowship for research in Colombia ($11,230) 2012
Boston University Dean's Graduate Fellowship (Supplement to Fulbright, $8,100) 2012
A. Stanley Rand Short-term Fellowship, Smithsonian Tropical Research Institute ($3,600) 2012
Grant-in-Herpetology, Society for the Study of Amphibians and Reptiles ($500) 2012

J. MENDEZ NARVÁEZ (Admitted 2015)
Smithsonian Tropical Research Institute Short-term Fellowship ($1000 + in kind support) 2017
Smithsonian Tropical Research Institute, Fellow Status (in kind support) 2016
Fulbright/Colciencias Fellowship supporting 4 years of PhD studies 2015

B.A. GÜELL (Admitted 2017)
NSF Graduate Research Fellowship ($34,000 per year for 3 years) 2017

FUNDING TO MY POSTDOCS

IVAN GOMEZ-MESTRE
Ministry of Education and Science, Spain, Postdoctoral Fellowship ($62,400) 2002-2004

VENETIA BRIGGS
UNESCO-L'Oreal Fellowship for Young Women in Life Sciences ($40,000) 2007-2009

STUDENT ADVISING

POSTDOCTORAL SCHOLARS ADVISED
Ivan Gomez-Mestre (2002–5), now Staff Scientist at Estación Biológica de Doñana, Spain.
James Vonesh (2003–4), now Associate Professor, Virginia Commonwealth University.
Michael McCoy (2008–9), now Assistant Professor, East Carolina University.
Venetia Briggs (2007–9), now Research Associate, University of Florida at Fort Lauderdale
Justin Touchon (2009–2010), now Assistant Professor, Vassar College.
Tobias Landberg (2010–2011), now Assistant Professor, Arcadia University.
Valeria Gómez (2014), now Postdoctoral Fellow, Centro de Ecología Aplicada de Litoral, CONICET, Corrientes, Argentina.

PHD STUDENTS ADVISED: 7 AS FIRST READER; 28 OTHERS (INCLUDING 25 BU STUDENTS, AND STUDENTS AT THE NATIONAL UNIVERSITY OF SINGAPORE, OREGON STATE UNIVERSITY, AND UNIVERSIDAD DE LOS ANDES)

J.C. TOUCHON (2002–2009) *Developmental ecology and reproductive mode plasticity of a Neotropical treefrog: Interacting abiotic and biotic environmental effects over three life stages.* BU Postdoc 2009–2010, STRI Postdoc 2010–2011, NSF International Postdoc 2011–2013, ECU Postdoc 2013–2014, Assistant Professor at Vassar 2014–present.

M.S. CALDWELL (2003–2010) *The use of vibrational information by red-eyed treefrogs for communication and antipredator defense.* STRI Postdoc 2010, UMN Postdoc 2011–2014, STRI Postdoc 2014–2016, Gettysburg College Instructor and Research Associate 2014–2017, Gettysburg College Assistant Professor 2017–present.

M.C. HUGHEY (2005–2011) *Integrating species interactions and spatial dynamics to explain insect distribution and abundance on a patchy resource.* Virginia Tech Postdoc 2012–2015, Adjunct Assistant Professor Vassar College 2015–2016, Visiting Scholar at Vassar 2016–present.

K.L. COHEN (2010–2017) *Evolution and plasticity of hatching mechanisms in anurans.* HHMI Postdoctoral Fellow, Brown University, 2018–present.

J. DELIA (2011–present) *Parent-embryo interactions in Neotropical glassfrogs: female mating strategies, paternal effort, and adaptive plasticity in hatching.*

J. JUNG (2015–present) *Embryo information use and behavioral decisions*

J. MÉNDEZ NARVÁEZ (2015–present) *Phenotypic plasticity, developmental physiology, and the evolution of terrestrial reproduction in foam-nesting frogs*

B.A. GÜELL (2017–present) *Evolution of embryo behavior: heterokairy and heterochrony of cued hatching mechanisms*

MA STUDENTS ADVISED: 1 AS FIRST READER

MING GUO (2012–) *Vibration-cued hatching in red-eyed treefrogs: analysis rules for temporal patterns of non-stereotyped cues.* Co-advised with Mark Crovella, Computer Science; now working in software design.

BU UNDERGRADUATES AND STRI RESEARCH INTERNS SUPERVISED (SINCE 2001): 88, OF WHOM AT LEAST 31 HAVE GONE ON TO GRADUATE SCHOOL

SCIENTIFIC SERVICE

Manuscript and grant reviewer for: *Alytes*, *American Naturalist*, *American Zoologist, Amphibia-Reptilia*, *Animal Behaviour*, *Archiv fur Hydrobiologie*, *Behavioral Ecology, Behavioral Ecology and Sociobiology, Biological Journal of the Linnean Society*, *Biology Letters*, *Biotropica*, *Canadian Journal of Zoology*, *Copeia*, *Current Biology*, *Developmental Dynamics, Ecology*, *Ethology, Evolution*, *Evolution and Development, Functional Ecology*, *Herptetologica*, *Herpetological Natural History*, *Hydrobiologia*, *Integrative and Comparative Biology*, *Journal of Applied Ecology*, *Journal of Experimental Zoology B: Molecular and Developmental Evolution*, *Journal of Ethology*, *Journal of Herpetology*, *Journal of Morphology*, *Journal of Tropical Ecology*, *Naturwissenschaften*, *Oecologia*, *Physiological and Biochemical Zoology*, *Proceedings of the National Academy of Sciences (USA), Proceedings of the Royal Society (Lond.) B*, *Zoology, Zoomorphology*, M. J. Murcock Charitable Trust, National Geographic, National Research Foundation (South Africa), Grant Agency of the Academy of Sciences of the Czech Republic, the National Science Foundation (USA), and the Smithsonian Institution.

National Science Foundation Panelist: 2004, 2006, 2009, 2014. [Invited to sit on six additional NSF panels; declined due to time conflicts with teaching responsibilities and field research.]

Associate Editor, *Behavioral Ecology and Sociobiology*: 2011–2015.

SOCIETY MEMBERSHIPS AND SERVICE

Society for Integrative and Comparative Biology
Symposium Organizer for symposium on "Environmentally cued hatching across taxa" at the January 2011 meetings (with co-organizers Karen Martin and Richard Strathmann)

American Society of Ichthyologists and Herpetologists

Candidate for President (nominated and ran, not elected)	2010
Board of Governors (elected)	2003–2008
Resolutions Committee	2005
Long range planning and program committee	2003–2009
Chair, contributed paper session at annual meeting	2002, 2010
Stoye Award judge (Ecology and Ethology)	1999, 2003, 2010
ASIH Equal Participation Committee	1995–1997

Society for Conservation Biology

SCB University of Texas Chapter Secretary	1995–1996
SCB University of Texas Chapter Vice-President	1992–1993

Additional Memberships: Animal Behavior Society, Canadian Association of Herpetologists, Colombian Association of Herpetologists, Sigma Xi, Society for the Study of Evolution

TEACHING

Faculty, Boston University

Phenotypic Plasticity BI506	Fall 2002, 2004–2007, 2009, Spring 2011–2013, 2015, 2017
Gender and Sexuality: An Interdisciplinary Introduction WS101	Fall 2011–2014, 2016
Progress in Ecology, Behavior, Evolution & Marine Biology BI 579	Fall 2017
Herpetology BI416/616	Spring 2014
Sex, Sexes, and Sexual Phenotypes BI581	Fall 2013
Advanced Animal Behavior: Information use and behavioral decisions BI582	Spring 2011
Biodiversity (non-majors) CC106	Spring 2004, 2005, 2006, 2007, 2008, 2010, 2011
The Evolution of Life and Intelligence (non-majors) CC106	Spring 2002, 2003

Guest Lectures since joining BU in 2001

Boston University:

WS Pedagogy Workshop for graduate certificate students	2014, 2016, 2017
BI 225, Behavioral Biology	2014, 2016
WS 801, Theories & Methods in Women's, Gender & Sexuality Studies	2013
BI 224, Behavioral Biology	2010, 2011, 2012, 2013
GRS 671, Graduate Survey of Ecology, Behavior & Evolution	2012
BI 410/610, Development	2010, 2011, 2012
BI 303, Ecology	2005, 2006, 2008, 2010
BI 107 Introductory Biology (honors section)	2001–2009
BI 306, Global Change Biology	2009
BI 508, Behavioral Ecology	2007
CS 107, Computational Systems	2004, 2005

Simon Fraser University: Tropical Biology (undergraduate field course)	2013
McGill University: Tropical Ecology and Conservation (graduate field course)	2009, 2011, 2012
East Carolina University: Tropical Biology (undergraduate field course)	2009, 2012
Butler University: Tropical Biology (undergraduate field course)	2009, 2010

Assistant Instructor, University of Texas

Topics in Biology (non-majors)	Spring 1996 and 1998
Evolution	Spring and Fall 1997
Animal Behavior	Fall 1996
Heredity, Evolution and Society	Fall 1995
Tropical Field Ecology (graduate course)	Summer 1993

Resource Person, Organization for Tropical Studies

Tropical Biology: An Ecological Approach (graduate field course)	Summer 1993

Teaching Assistant, Dalhousie University

Environmental Ecology	Spring 1991
Introductory Biology	Fall 1990
Biological Issues of Our Times (non-majors)	Fall 1988 and 1989, Spring 1989 and 1990
Terrestrial Diversity	Spring 1989

PUBLIC EDUCATION – INVITED LECTURES FOR GENERAL AUDIENCES

Science Writing class, John's Hopkins Program in Saudi Arabia (for gifted teenage girls). Phenotypic plasticity, embryo behavior, and tropical rainforest research. June 2014.

The Education Cooperative, Dedham, MA: Summer Science Institute (for middle and high school science teachers). Phenotypic plasticity, hatching, and eggs as organisms. July 2013.

OUTlook LGBTQ lecture series of Marsh Chapel, Boston University. Evolutionary history, developmental mechanisms, and diversity in human sexuality. November 2012.

Center for Gender, Sexuality and Activism, Boston University. Human sexuality in evolutionary context. 2011.

Management Conference, Boston University. Eggs as organisms: adaptive embryo behavior. 2009.

Centennial Celebration, Boston University Dept. of Biology. Ecology and development in a dangerous world: embryo responses to risk. 2004

Undergraduate Research Symposium, Boston University Parents' Weekend. Keynote address: Ecology and development in a dangerous world: embryo responses to danger. 2004.

Gamboa Rainforest Resort, Panama. Ecología, evolución, y comportamiento de embriones de rana y de renacuajos. 2004

Fundación Neotropica, Centro BOSCOSA, Agua Buena, Costa Rica. Workshop: Anfibios de la Peninsula de Osa. 1994.

RESEARCH PRESENTATIONS

Scientific meetings: Oral presentations (79 + 1 pending)

(*presenter)

Warkentin, K.M. **Pending –** August 2018. ***Plenary Address*** to the International Society for Behavioral Ecology, Minneapolis, MN

Jung, J.[G]*, J.G. McDaniel & K.M. Warkentin. January 2018. Ontogenetic adaptation in information use for escape-hatching decisions: older embryos selectively accept more false alarms. Society for Integrative and Comparative Biology Meeting, San Francisco, CA.

Warkentin, K.M. July 2017. From field observations of *Agalychnis* eggs to integrative and comparative biology of environmentally cued hatching – herpetological research and gender studies insights. ***Invited symposium speaker.*** Simposio: Mujeres herpetólogos en Latinoamérica: logros y desafíos. Congreso Latinoamericano de Herpetología, Quito, Ecuador.

Cohen, K.L.[G]* & K.M. Warkentin. July 2017. Different hatching mechanisms but similar escape-hatching processes in two Neotropical treefrogs. Joint Meeting of Ichthyologists and Herpetologists, Austin, TX.

Delia, J.[G]* & K.M. Warkentin. January 2017. The evolution of parent–embryo interactions in glassfrogs. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Cohen, K.L.[G]*, M.L. Piacentino[G] & K.M. Warkentin. January 2017. Two types of hatching glands facilitate escape-hatching of red-eyed treefrogs across multiple contexts and developmental stages. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Warkentin, K.M. November 2016. Biología integradora y el comportamiento adaptativo en embriones de ranas neotropicales. ***Plenary Address*** to Primer Congreso Colombiano de Herpetología, Medellín, Colombia.

Cohen, K.L.[G]* & K.M. Warkentin. August 2016. The proximate mechanisms of adaptive early hatching in hourglass treefrogs. Animal Behavior Society Meeting, Colombia, MO.

Warkentin, K.M. July 2016. What's shaking? Egg vibrations as risk cues in the escape-hatching decisions of embryos. ***Plenary Address*** to Studying Vibrational Communication: 1st International Symposium on Biotremology. San Michele all'Adige, Italy.

Warkentin, K.M.*, K.L. Cohen[G], J. Cuccaro Diaz[U], B.A. Güell[U] & J. Jung[G]. 2016. Development of embryo behavior: hatching mechanisms, performance, and decisions in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Cohen, K.L.[G]* & K.M. Warkentin. 2016. Mechanism of early hatching of hourglass treefrogs in drying and ant attacks. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Warkentin, K.M. 2015. Environmentally cued hatching: development, information, and adaptive behavior of embryos. ***Plenary Address*** to the Brazilian Herpetological Congress, Gramado, Brazil.

Warkentin, K.M. 2014. Información, desarrollo, y decisiones bajo riesgo: la eclosión de *Agalychnis callidryas*. ***Invited speaker***, Simposio de Evolución de Señales y Comportamientos de Comunicación en Anfibios y Reptiles. Congreso Latinoamericano de Herpetología, Cartagena, Colombia.

Delia, J.[G]* L. Bravo-Valencia[G] & K.M. Warkentin. 2014. Evolución de los interacciones entre los padres y embriones en ranas de cristal. ***Invited symposium speaker***, Simposio del Cuidado Parental en Anuros. Congreso Latinoamericano de Herpetología, Cartagena, Colombia.

Bravo-Valencia, L.[G]*, J. Delia[G], A. Amézquita & K.M. Warkentin. 2014. Evolución del cuidado materno en ranas de cristal (Centrolenidae). ***Invited symposium speaker***, Simposio del Cuidado Parental en Anuros. Congreso Latinoamericano de Herpetología, Cartagena, Colombia.

Cohen, K.L.[G]* & K.M. Warkentin. 2014. El mecanismo de eclosión de *Agalychnis callidryas* varía con la ontogenia y el contexto en respuesta a amenazas ambientales. Congreso Latinoamericano de Herpetología, Cartagena, Colombia.

Touchon, J.C.*, M. McCoy, T. Landberg, J.R. Vonesh & K.M. Warkentin. 2014. Simultaneous evaluation of pre- and post-metamorphic risk determines flexible timing of emergence and duration of metamorphosis in red-eyed treefrogs. Ecological Society of America Meeting, Sacramento, CA.

Landberg, T.[P]*, K. Warkentin, B. Willink[U], K. Mount, E. Clouse, & H. Whiteman. 2013. Larval density affects jumping performance development during metamorphosis in two arboreal frogs. Society for Integrative and Comparative Biology Meeting, San Francisco, CA.

Warkentin, K.M. 2012. Environmentally cued hatching: Integrative and evolutionary biology of a critical life-stage transition. ***Plenary Address*** to World Congress of Herpetology, Vancouver, BC.

Vonesh, J.R.*, M.W. McCoy & K.M. Warkentin. 2012. Consequences of prey size-, density- and dose-dependent responses to predator cues for population size structure. Ecological Society of America Meeting, Portland OR.

Delia, J.R.J.[G]*, & K.M. Warkentin. 2012. Hatching plasticity and the function of parental care in two glassfrogs (Anura: Centrolenidae). Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Cohen, K.L.[G]*, M.A. Seid & K.M. Warkentin. 2012. The mechanism of rapid, plastic hatching in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Landberg, T.[P], B. Willink[U], C.F. Noss[U], R.S Greene[U], J.R. Vonesh & K.M. Warkentin. 2012. Development of climbing performance and behavior during red-eyed treefrog metamorphosis: the effects of larval competition. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

McCoy, M.W.[P]*, J.C. Touchon[P], T. Landberg[P], K.M. Warkentin & J.R. Vonesh. 2011. Determining mechanisms for risk assessment: Disentangling the relative importance of prey number and prey biomass for generating indirect cues of predation risk. Ecological Society of America Meeting, Austin TX.

Hughey, M.C.[G]*, M.W. McCoy[P], J.R. Vonesh & K.M. Warkentin. 2011. Patterns and mechanisms of spatial variation in the abundance of a frog egg mass-infesting fly and its eucoiline parasitoid. Ecological Society of America Meeting, Austin TX.

Warkentin, K.M. 2011. Introduction to the Symposium: Eggs as organisms – environmentally cued hatching and adaptive embryo responses to risk and opportunity. ***Symposium organizer & speaker*** for "Environmentally cued hatching across taxa: Embryos choose a birthday" Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Warkentin, K.M. 2011. Hatching plasticity in amphibians: evolution, trade-offs, cues and mechanisms. ***Symposium organizer & speaker*** for "Environmentally cued hatching across taxa: Embryos choose a birthday" Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Bouchard, S.S.*, C.R. Jenney[U], J.F. Charbonnier[G], & K.M. Warkentin. 2011. Density-dependent digestive plasticity in red-eyed treefrogs before and after metamorphosis. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT. [*NSF–ROA collaborator.]

Landberg, T.*[P], K.L. Cohen[G], B. Willink[U] & K.M. Warkentin. 2011. Effects of hatching age and predator cues on the development of escape swimming performance and survival with dragonfly predators in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Vonesh, J.R.*, M.W. McCoy[P], M.C. Hughey [G] & K.M. Warkentin. 2011. Sequential predator effects across life stages: Predicting phenotypic and density effects of egg predators on larval survival and growth. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Russell, B.R.* [U], K.M. Warkentin & R. Rosengaus. 2010. Temporal and acoustic attributes of the pathogen alarm response and head banging behavior in *Zootermposis angusticollis*. Entomological Society of America Meeting, San Diego, CA.

Hughey, M.C.*[G], M.W. McCoy[P], J.R. Vonesh & K.M. Warkentin. 2010. Disentangling pre- and post-colonization processes operating in a simple insect community associated with a spatially patchy resource. Ecological Society of America Meeting, Pittsburgh, PA.

Vonesh, J.R.*, M.W. McCoy[P], J.C. Touchon[P] & K.M. Warkentin. 2010. Size and density-mediated interactions among sequential predators of different life stages of the red-eyed treefrog. Ecological Society of America Meeting, Pittsburgh, PA.

McCoy, M.W.*[P], J.C. Touchon[P], K.M. Warkentin & J.R. Vonesh. 2010. Influence of resource availability on the outcome of size structured interactions. Ecological Society of America Meeting, Pittsburgh, PA.

Hite, J.L.*, M.C. Hughey[G], M.W. McCoy[P], K.M. Warkentin & J.R. Vonesh. 2010. Terrestrial predators and abiotic conditions affect hatching phenotype and survival of arboreal frog eggs: Implications for aquatic food web dynamics. Ecological Society of America Meeting, Pittsburgh, PA.

Touchon, J.C.*[P], M.W. McCoy[P], J.R. Vonesh & K.M. Warkentin. 2010. Interacting effects of hatching plasticity, larval resources, perceived risk, and predation on phenotypes and recruitment of juvenile red-eyed treefrogs. Ecological Society of America Meeting, Pittsburgh, PA.

Warkentin, K.M.*, J.C. Touchon[P], M.W. McCoy[P], M.C. Hughey[G] & J.R. Vonesh. 2010. Consequences of hatching timing in red-eyed treefrogs: timescale, currency and context-dependence of trade-offs. Joint Meeting of Ichthyologists and Herpetologists, Providence, RI.

McCoy, M.W.*[P], J.R. Vonesh, K.M. Warkentin & B. Bolker. 2009. Using response surface experiments to study consumer–resource interactions. ***Invited speaker*** in symposium on "Transcending tradition to understand and model complex interactions in ecology." Ecological Society of America Meeting, Albuquerque, NM.

Hughey, M.C.*[G], J.R. Rogge[U], M.W. McCoy[P] & K.M. Warkentin. 2009. Deciding when to hatch: Predator and embryo cues in wasp-induced hatching of red-eyed treefrogs. Society of Integrative and Comparative Biology Meeting, Boston, MA.

Touchon, J.C.*[G] & K.M. Warkentin. 2009. Morphological responses to abiotic and biotic factors: Temperature effects on predator-induced phenotypes in a neotropical treefrog tadpole. Society of Integrative and Comparative Biology Meeting, Boston, MA.

Gomez-Mestre, I.*[P], J.C. Touchon[G], V.L. Saccoccio[U] & K.M. Warkentin. 2009. Quantitative genetic analyses of risk-induced hatching reveal limits to plasticity of inducible defenses. Society of Integrative and Comparative Biology meetings, Boston, MA.

McCoy, M.W.*[P], K.M. Warkentin & J.R. Vonesh. 2009. Phenotypic plasticity in metamorphic timing: Understanding the role of size- and density-dependant processes. Society of Integrative and Comparative Biology Meeting, Boston, MA.

Touchon, J.C.*[G] & K.M. Warkentin. 2008. Reproductive mode plasticity in the treefrog *Dendropsophus ebraccatus*. World Congress of Herpetology, Manaus, Brazil.

Hughey, M.C.*[G] & K.M. Warkentin. 2008. Interactions among egg predators of red-eyed treefrogs (*Agalychnis callidryas*) and consequences for both predators and prey. World Congress of Herpetology, Manaus, Brazil.

Warkentin, K.M.*, M.S. Caldwell[G], & J.G. McDaniel. 2008. Vibrational cues in predator-induced hatching of red-eyed treefrogs. ***Invited speaker*** in symposium on "Sensory ecology of anuran communication." World Congress of Herpetology, Manaus, Brazil.

Caldwell, M.S.[G]*, J.G. McDaniel, & K.M. Warkentin. 2008. Vibrational signaling in male-male agonistic interactions of red-eyed treefrogs. ***Invited speaker*** in symposium on "Sensory ecology of anuran communication." World Congress of Herpetology, Manaus, Brazil.

McCoy, M.W.*[P], J.R. Vonesh, & K.M. Warkentin. 2008. Switch point phenotypes and recruitment across complex life cycles: role of size and density-dependent processes. Ecological Society of America Meeting, Milwaukee, WI.

Gomez-Mestre, I.*[P], J.J. Wiens & K.M. Warkentin. 2007. Evolution of risk-sensitive hatching in neotropical leaf-breeding treefrogs (*Agalychnis*: Hylidae). European Herpetological Society Meeting, Porto, Portugal.

Warkentin, K.M.* & M.S. Caldwell[G]. 2007. Information and risk assessment by red-eyed treefrogs embryos. ***Invited speaker*** in symposium on "Evolutionary ecology of learning, memory, and information use" Animal Behavior Society Meeting, Burlington, VT.

Rogge, J.R.*[U] & K. M. Warkentin. 2007. Embryo behavior, gills and oxygen gradients: how red-eyed treefrogs avoid premature hatching. Animal Behavior Society Meeting, Burlington, VT.

Caldwell, M.S.[G]*, J.G. McDaniel, & K.M. Warkentin. 2007. Vibrational information in two life stages of the red-eyed treefrog: agonistic communication signals and predation risk cues in an arboreal environment. ***Invited speaker*** in symposium on "Seismic communications by animals." Acoustical Society of America Meeting, Salt Lake City, UT.

Warkentin, K.M.*, M.S. Caldwell[G], & J.G. McDaniel. 2007. Vibrational risk assessment as a signal detection problem: escape hatching of red-eyed treefrog eggs. ***Invited speaker*** in symposium on "Seismic communications by animals." Acoustical Society of America Meeting, Salt Lake City, UT.

Warkentin, K.M. 2006. Embryo behavior, oxygen stress, and heterokairy in gill regression: does respiratory plasticity facilitate predation-sensitive hatching timing? ***Invited speaker*** in symposium on "Developmental transitions in respiratory physiology." First International Congress of Respiratory Biology, Bonn, Germany.

Warkentin, K.M.*, M.S. Caldwell[G], T.D. Siok[U], & J.G. McDaniel. 2006. Timing of vibration-cued hatching in red-eyed treefrogs: how much information is enough to assess predation risk? American Society of Ichthyologists and Herpetologists Meeting, New Orleans, LA.

Touchon, J.C.*[G] & K.M. Warkentin. 2006. Long-term effects of short-term variation: how egg environment changes tadpole phenotype and survival. American Society of Ichthyologists and Herpetologists Meeting, New Orleans, LA.

Gomez-Mestre, I.*[P], V.L. Saccoccio[U] & K.M. Warkentin. 2006. The shape of things to come: linking larval plasticity to juvenile morphology in frogs. American Society of Ichthyologists and Herpetologists Meeting, New Orleans, LA.

Warkentin, K.M.*, M.S. Caldwell[G] & J.G. McDaniel. 2006. Vibrational risk assessment by red-eyed treefrog embryos**. ***Invited speaker*** in symposium on "Acoustic interactions in animal groups." Acoustical Society of America Meeting, Providence, RI.

** This presentation was covered by *Science Now*, the AAAS radio show *Science Update*, *Today's Science*, *American Scientist*, and other popular media.

Warkentin, K.M.*, M.S. Caldwell[G], K.C. Wright[U] & J.G. McDaniel. 2005. Wasp-induced hatching of red-eyed treefrogs: are vibrational cues sufficient? American Society of Ichthyologists and Herpetologists Meeting, Tampa FL.

Vonesh, J.R.*[P] and K.M. Warkentin. 2005. Predator-induced shifts in metamorphosis in response to larval and metamorph risk. American Society of Ichthyologists and Herpetologists Meeting, Tampa FL.

Gomez-Mestre, I.*[P], J.C. Touchon[G] & K.M. Warkentin. 2005. Embryos defenses against water mold infection in wood frogs, American toads and spotted salamanders. American Society of Ichthyologists and Herpetologists Meeting, Tampa FL.

Touchon, J.C.*[G] & K.M. Warkentin. 2005. Interacting risks: rainfall reliability and egg predation in the neotropical treefrog, *Hyla ebraccata*. American Society of Ichthyologists and Herpetologists Meeting, Tampa FL.

Gomez-Mestre, I.*[P], K.M. Warkentin, C.J. Schneider & J.J. Wiens. 2005. Phylogenetic analysis of the evolution of hatching plasticity in tropical treefrogs. Society for the Study of Evolution Meeting, Fairbanks AK.

Caldwell, M.S.*[G], J.G. McDaniel & K.M. Warkentin. 2005. Do red-eyed treefrog embryos use frequency cues in distinguishing egg predators from benign disturbances? Society for Integrative and Comparative Biology Meeting, San Diego, CA.

Warkentin, K.M.* & I. Gomez-Mestre[P]. 2004. Effects of development, surface exposure, and embryo behavior on oxygen levels in red-eyed treefrog eggs. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Warkentin, K.M., M. S. Caldwell*[G] & J. G. McDaniel. 2004. The feeling of danger: how red-eyed treefrog embryos use vibrations to assess risk. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Gomez-Mestre, I.*[P] & K. M. Warkentin. 2004. Embryo response to risk varies among species of leaf-breeding treefrogs, genus *Agalychnis.* Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Buckley, C. R.*[U], K. A. Metcalf[U], & K. M. Warkentin. 2003. Effects of egg development on efficiency and choices of wasps foraging on red-eyed treefrog eggs. Society for Integrative and Comparative Biology Meeting. Toronto, ON.

Warkentin, K.M. 2002. Risk assessment by embryos: frequency and temporal pattern of vibrational cues affect escape hatching in red-eyed treefrogs. American Society of Ichthyologists and Herpetologists Meeting, Kansas City, MO.

Buckley, C. R.*[U], K. A. Metcalf[U], & K. M. Warkentin. 2002. Effects of egg development on efficiency and choices of wasps foraging on red-eyed treefrog eggs. American Society of Ichthyologists and Herpetologists Meeting, Kansas City, MO.

Warkentin, K. M. 2001. Hatching as a defense against egg predators: the role of vibrational cues. Society of Integrative and Comparative Biology Meeting, Chicago, IL.

Niedzwiecki, J.* & K.M. Warkentin. 2000. Examining population variation in life history traits of the sister species *Ambystoma texanum* and *Ambystoma barbouri*. Society for the Study of Evolution Meeting, Bloomington, IN.

Warkentin, K.M. 1999. Escape hatching in red-eyed treefrogs: embryos respond to wasp attack and fungus infestation. American Society of Ichthyologists and Herpetologists Meeting, State College, PA.

Warkentin, K.M. 1997. Behavioral correlates of hatchling vulnerability in the red-eyed treefrog: a mechanistic link between morphology and performance. American Society of Ichthyologists and Herpetologists Meeting, Seattle, WA.

Warkentin, K.M. 1996. Plasticity in hatching: a response to predation risk trade-offs. Animal Behavior Society Meeting, Flagstaff, AZ.

Warkentin, K.M. 1996. Size, shape and vulnerability in hatchling red-eyed tree frogs. American Society of Ichthyologists and Herpetologists Meeting, New Orleans, LA.

Warkentin, K.M. 1995. Effects of hatching age on development in the red-eyed treefrog, *Agalychnis callidryas*. American Society of Ichthyologists and Herpetologists Meeting, Edmonton, Alberta.

Warkentin, K.M. 1993. Plasticity in hatching: an adaptation to predation risk trade-offs. American Society of Ichthyologists and Herpetologists Meeting, Austin, TX.*

*Winner of the Stoye Award for best student paper in ecology and ethology.

Warkentin, K.M. 1992. Does hatching time reflect mortality risk trade-offs? American Society of Ichthyologists and Herpetologists Meeting, Champaign, IL.

Warkentin, K.M. 1990. Feeding rate variation and microhabitat use in *Rana clamitans* tadpoles. American Society of Ichthyologists and Herpetologists Meeting, Charleston, SC.

Scientific meetings: Poster and video presentations (50)

Almanzar, A[U] & K.M. Warkentin. January 2018. How development changes escape-hatching success in snake attacks: a video analysis of red-eyed treefrog embryo behavior and performance. Society for Integrative and Comparative Biology Meeting, San Francisco, CA.

Snyder, R.K.[U], A.M. Ospina-Larrea[U] & K.M. Warkentin. January 2018. When does flooding induce hatching? Behavioral decisions of red-eyed treefrog embryos under moderate hypoxia. Society for Integrative and Comparative Biology Meeting, San Francisco, CA.

Güell, B.A.[G] & K.M. Warkentin. January 2018. Does accelerated development impair predator-detection and escape-hatching of phyllomedusid treefrog embryos? Society for Integrative and Comparative Biology Meeting, San Francisco, CA.

Jung, J.[G], B.A. Güell[G] & K.M. Warkentin. January 2018. Inner ear development across onset and improvement of escape-hatching ability in red-eyed treefrogs: a confocal and μCT analysis. Society for Integrative and Comparative Biology Meeting, San Francisco, CA.

Salazar-Nicholls, M.J.[U], K.D. Escobar[U] & K.M. Warkentin. July 2017. Development of hatching ability in red-eyed treefrogs: escape from complications. Congreso Latinoamericano de Herpetología, Quito, Ecuador.

Cohen, K.L.[G] & K.M. Warkentin. June 2017. Different hatching mechanisms but similar escape-hatching processes in two Neotropical treefrogs. Animal Behavior Society Meeting, Toronto, ON.

Warkentin, K.M. January 2017. Development of red-eyed treefrog embryos: a staging table for integrative research on environmentally cued hatching. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Tippett, C.M.[U] & K.M. Warkentin. January 2017. How not to die if its too dry: a comparison of spontaneous and dehydration-induced hatching in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Chaiyasarikul, A.[U] & K.M. Warkentin. January 2017. Escape hatching of red-eyed treefrogs in wasp attacks: how development changes survival. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Salazar-Nicholls, M.J.[U], K.D. Escobar[U] & K.M. Warkentin. January 2017. Development of hatching ability in red-eyed treefrogs: escape from complications. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Rivera-Ordonez, J.M.[U], M.J Salazar-Nicholls[U], K.M. Warkentin & J. Delia[G]. January 2017. The adaptive value of delayed hatching in glassfrogs. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Jung, J.[G], J.G. McDaniel & K.M. Warkentin. January 2017. Ontogeny of vibration-cued escape-hatching in red-eyed treefrogs: two reasons older embryos hatch more. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Méndez-Narváez, J.[G] & K.M. Warkentin. January 2017. Nitrogen excretion plasticity in early life stages of aquatic- and terrestrial-foam-nesting frogs: a potential mechanism facilitating reproductive colonization of land. Society for Integrative and Comparative Biology Meeting, New Orleans, LA.

Rueda Solano, L.A.[G] & K.M. Warkentin. November 2016. Comportamiento de forrajeo con posible uso de pistas vibracionales para la localización de presas en *Atelopus laetissimus* (Anura: Bufonidae). Primer Congreso Colombiano de Herpetologia, Medellín, Colombia.

Kim, S.J.[U], J. Jung[G], S.M. Pérez Arias[U], J.G. McDaniel & K.M. Warkentin. August 2016. Is ear function necessary for vibration-cued hatching in red-eyed treefrogs? Animal Behavior Society Meeting, Colombia, MO.

Güell, B.A.[U] & K.M. Warkentin. 2016. When and where to hatch: red-eyed treefrog embryos use light cues. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Jung, J.[G], S.J. Kim[U], B.A. Güell[U], K.L. Cohen[G] & K.M. Warkentin. 2016. Ontogeny of escape hatching in red-eyed treefrogs: onset of response to flooding and attack cues. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Kim, S.J.[U], J. Jung[G], S.M. Pérez Arias[U], J.G. McDaniel & K.M. Warkentin. 2016. Shake and roll: testing the ontogenetic correlation of vibration-cued hatching and otic mechanoreception in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Moskowitz, N.A[U], A.M. Vásquez[U] & K.M. Warkentin. 2016. Embryo decisions and developmental changes in metabolism across the plastic hatching period of red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Vázquez, A.M.[U], N.A. Moskowitz[U] & K.M. Warkentin. 2016. Embryo decisions, metabolism, and development when arboreal eggs are flooded. Society for Integrative and Comparative Biology Meeting, Portland, OR.

Gómez, V.I.[P] & K.M. Warkentin. 2015. Metamorphic plasticity: an aquatic predator affects timing of and morphology at emergence in red-eyed treefrogs. Brazilian Herpetological Congress, Gramado, Brazil.

Cuccaro Diaz, J.[U], K.L. Cohen[G] & K.M. Warkentin. 2014. El desafío de salir del huevo: La eclosión más temprana y desarrollo del desempeño de eclosión en *Agalychnis callidryas* Congreso Latinoamericano de Herpetología, Cartagena, Colombia. [Video presentation.]

Pérez Arias, S.[U], A. Tanner[U], J.G. McDaniel & K.M. Warkentin. 2014. ¿Funciona el sistema vestibular de los embriones de *Agalychnis callidryas* como sensor para vibraciones de serpientes? Congreso Latinoamericano de Herpetología, Cartagena, Colombia. [Video presentation.]

Warkentin, K.M., C.J. Addis[U] & K.L. Cohen[G]. 2014. Ear development and function in red-eyed treefrog embryos: a sensor for egg-predator cues? Society for Integrative and Comparative Biology Meeting, Austin, TX.

Cohen, K.L.[G] & K.M. Warkentin 2014. Do distinct types of hatching glands mediate hatching at different ontogenetic stages in red-eyed treefrogs? Society for Integrative and Comparative Biology Meeting, Austin, TX.

Rodriguez, W.[U], K.X. Jennings[U], S.B. Bouchard & K.M. Warkentin. 2014. Competition-induced gut length plasticity, food intake and growth in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Austin, TX.

Delia, J.[G] & K. Warkentin. 2012. Parental care and hatching plasticity in two glassfrogs (Centrolenidae): Interspecific and geographic comparisons. World Congress of Herpetology, Vancouver, BC.

Jenney, C.R.[U], S.S. Bouchard & K.M. Warkentin. 2012. Carryover effects of larval digestive plasticity in postmetamorphic red-eyed treefrogs, *Agalychis callidryas*. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Wargelin, L.J.[U], S.S. Bouchard & K.M. Warkentin. 2012. Metabolic carryover effects in postmetamorphic red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Jimenez, R.R.[U], S.H. Abinette[U], J.C. Touchon, J.R. Vonesh & K.M. Warkentin. 2012. Ontogeny of risk across the aquatic-terrestrial interface: how changing behavior and morphology affect predation through anuran metamorphosis. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Salica, M.J.[G], J.R. Vonesh & K.M. Warkentin. 2012. Egg clutch dehydration induces early hatching in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Wheat, S.K.[U], E. Cayron[U], J.R. Vonesh & K.M. Warkentin. 2012. How do tadpoles use chemical cues to assess risk? Cue concentration versus pulse frequency. Society for Integrative and Comparative Biology Meeting, Charleston, SC.

Cohen, K.L.[G], M.A. Seid, C.M. Rouben[U] & K.M. Warkentin. 2011. The mechanism of rapid, plastic hatching in red-eyed treefrogs, *Agalychnis callidryas.* Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Willink, B.[U], T. Landberg[P], J.R. Vonesh & K.M. Warkentin. 2011. Effect of hatching timing on red-eyed treefrog tadpoles: relative vulnerability varies among predators but not with hatchling age-structure, growth varies with the presence of more vulnerable tadpoles. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Palmer, M.S.[U], B. Willink[U], T. Landberg[P], J.R. Vonesh & K.M. Warkentin. 2011. Costs of hatching early: vulnerability and period of exposure to predators. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Schleier Hernandez, S.L.[U] & K.M. Warkentin. 2011. Effects of hatching age and predator cues on the onset of feeding in red-eyed treefrogs. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Greene, R.S.[U], C.F. Noss[U], T. Landberg[P], J.R. Vonesh & K.M. Warkentin. 2011. Behavior of red-eyed treefrogs during metamorphosis. Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT.

Warkentin, K.M., C.M. Rouben[U] & M.A. Seid. 2010. Highspeed video analysis of the hatching process in red-eyed treefrogs, *Agalychnis callidryas*. Joint Meeting of Ichthyologists and

Herpetologists, Providence, RI.

Lebron, A.M.[U] & K.M. Warkentin. 2010. Induction, acclimation, and behavioral phenotypes: Predator cues change flight initiation distance in hatchling red-eyed treefrogs. Joint Meeting of Ichthyologists and Herpetologists, Providence, RI.

Lebron, A.M.[U] & K.M. Warkentin. 2010. Induction, acclimation, and behavioral phenotypes: Predator cues change flight initiation distance in hatchling red-eyed treefrogs. Ecological Society of America Meeting, Pittsurgh, PA.

Gomez-Mestre, I.[P], J.C. Touchon [G], V.L. Saccoccio [U] & K.M. Warkentin. 2009. Probing the limits of plasticity: quantitative genetic analyses of risk induced hatching. European Society for Evolutionary Biology 12th Congress, Torino, Italy.

Gonyer, K.M.[U], M.W. McCoy[P], J.R. Vonesh & K.M. Warkentin. 2009. Effects of habitat structure on predation of *Agalychnis callidryas* tadpoles by giant water bugs (Belostomatidae). Society for Integrative and Comparative Biology Meeting, Boston, MA.

Hughey, M.C.[G] & K.M. Warkentin. 2006. Phorid fly predation of red-eyed treefrog eggs: do maggots induce hatching? American Society of Ichthyologists and Herpetologists Meeting, New Orleans, LA.

D'Amato, A.T.[U] & K.M. Warkentin. 2006. Snake predation on red-eyed treefrog eggs: feeding behavior and egg hatching induced by four colubrids. American Society of Ichthyologists and Herpetologists Meeting, New Orleans, LA.

Touchon, J.C.[G] & K.M. Warkentin. 2006. Reproductive mode variation in a Neotropical treefrog: the leaf-breeding *Hyla ebraccata* lays eggs in water. American Society of Ichthyologists and Herpetologists Meetings, New Orleans, LA.

Touchon, J.C.[G], J.R. Vonesh[P] & K.M. Warkentin. 2005. Variation in larval predation risk across breeding sites of two hylid frogs. American Society of Ichthyologists and Herpetologists Meeting, Tampa FL.

Caldwell, M.S.[G], K.M. Warkentin & J.G. McDaniel. 2004. Clutch vibrations and risk perception in red-eyed treefrog embryos: a mechanical engineering analysis. American Society of Ichthyologists and Herpetologists Meeting, Norman, OK.

Warkentin, K.M. & I. Gomez-Mestre[P]. 2003. Effects of development, surface exposure, and embryo behavior on oxygen levels in red-eyed treefrog eggs. American Society of Ichthyologists and Herpetologists Meeting, Manaus, Brazil.

Gomez-Mestre, I.[P] & K.M. Warkentin. 2003. Embryo response to risk varies among species of leaf-breeding treefrogs, genus *Agalychnis.* American Society of Ichthyologists and Herpetologists Meeting, Manaus, Brazil.

Warkentin, K.M. 2002. Risk assessment by embryos: frequency and temporal pattern of vibrational cues affect escape hatching in red-eyed treefrogs. International Society for Behavioral Ecology Meeting, Montreal, Quebec.

Invited speaker–professional seminars (74 + 1 pending)

Clark University, Worcester, MA, Dept. of Biology. Graduate student invited speaker. How and why development changes behavior: ontogenetic adaptation, developmental constraints, and embryo self-defense. **Pending –** April 2018.

Smithsonian Tropical Research Institute, Gamboa, Panama. From field observations of *Agalychnis* eggs to integrative & comparative biology of environmentally cued hatching – herpetological research & gender studies insights (presented in Spanish). July 2017.

Smithsonian Tropical Research Institute, Gamboa, Panama. Integrative biology and adaptive embryo behavior of Neotropical frogs. June 2017.

Universidad del Magdalena, Santa Marta, Colombia. Evolución, desarrollo, y la diversidad de comportamiento sexual no reproductivo. November 2016.

Smithsonian Tropical Research Institute, Panama. What's shaking? Egg vibrations as risk cues in the escape-hatching decisions of embryos. Gamboa – July 2016, Panama City – August 2016.

Marine Biological Laboratory, Woods Hole, MA. Environmentally cued hatching: development, information, and the adaptive behavior of embryos. April 2016.

University of California, Riverside, Dept. of Biology. Environmentally cued hatching: development, information, and the adaptive behavior of embryos. April 2016.

University of California, Los Angeles, Dept. of Ecology and Evolutionary Biology. Environmentally cued hatching: development, information, and the adaptive behavior of embryos. April 2016.

Smithsonian Tropical Research Institute, Panama City, Panama. Environmentally cued hatching: development, information, and the adaptive behavior of embryos. October 2015.

Smithsonian Tropical Research Institute, Gamboa, Panama. Adaptive embryo behavior and the integrative biology of early life stages. June 2015.

Boston University Center for the Philosophy and History of Science. Development, evolution, and the diversity of non-reproductive sexual behavior: an introduction. *In colloquium on: Diversity, Plasticity, and the Science of Sexuality*. April 2015. (Video available at http://www.bu.edu/cphs/colloquium/archives-2014-2015/ - sexuality)

Smithsonian Tropical Research Institute, Panama City, Panama. Behavior, development, and adaptive plasticity at life history switch points: hatching and metamorphosis. June 2014. (Webcast available at http://www.stri.si.edu/english/webcast/recent_webcasts.php; search for Warkentin)

Smithsonian Tropical Research Institute, Gamboa, Panama. Behavior, mortality, and plasticity at metamorphosis: critical missing information. 2013.

Brown University, Multisensory Lab – Dept. of Cognitive, Linguistic and Pyschological Sciences and Dept. of Neuroscience. Environmentally cued hatching: "eco-devo" and the integrative organismal biology of embryos. 2013.

Oklahoma State University, Dept. of Zoology. Plasticity, predation, and trade-offs across hatching and metamorphosis. 2013.

Boston University Medical School. Evolutionary history, developmental mechanisms, and diversity in human sexuality. Invited by the Medical Gay and Lesbian Organization and the American Medical Women's Association. 2012.

Tufts University, Dept. of Biology, Medford, MA. Environmentally cued hatching: Integrative and evolutionary biology of a critical life-stage transition. 2012.

Smithsonian Tropical Research Institute, Gamboa, Panama. Egg vibrations as cues to risk: what do we know and where are we going? 2012.

University of North Texas, Denton, Developmental Integrative Biology Cluster. Mechanisms of plasticity in hatching: integrative biology of red-eyed treefrog embryos. 2012.

University of Texas at Austin, Section of Integrative Biology. How do egg vibrations cue escape hatching? 2012.

University of Texas at Austin, Section of Integrative Biology. Environmentally cued hatching across taxa. 2012.

Smithsonian Tropical Research Institute, Panama City, Panama. Environmentally cued hatching across taxa. 2011.

University of Guelph, Guelph, ON, Canada. Environmentally cued hatching in red-eyed treefrogs: the integrative biology of early life stages. 2010.

Bennington College, Bennington VT. Adaptive embryo behavior: risk-cued hatching and responses to the environment *in ovo*. 2010.

Smithsonian Tropical Research Institute, Gamboa, Panama. Adaptive embryo behavior: risk-cued hatching and responses to the environment *in ovo*. 2009.

Clark University, Dept. of Biology, Worcester, MA. Adaptive embryo behavior: risk-cued hatching and responses to the environment *in ovo*. 2009.

University of Minnesota, Dept. of Ecology, Evolution and Behavior, St. Paul, MN. Adaptive embryo behavior: risk-cued hatching and responses to the environment *in ovo*. January 2009.

Smithsonian Tropical Research Institute, Gamboa, Panama. Phenotypic plasticity in red-eyed treefrogs. 2008.

Harvard University, Dept of Organismic and Evolutionary Biology, Boston, MA. Phenotypic plasticity in complex life cycles: lessons from amphibians. 2008.

Virginia Commonwealth University, Dept. of Biology, Richmond VA. Phenotypic plasticity in complex life cycles: lessons from amphibians. 2007.

Smithsonian Tropical Research Institute, Panama City, Panama. Phenotypic plasticity in complex life cycles: lessons from amphibians. 2007.

University of Rhode Island, Dept. of Biol. Sci., Kingston RI. Adaptive plasticity in hatching: ecology, evolution and mechanisms. 2007.

Queen's University, Dept. of Biology, Kingston, ON. Adaptive plasticity in hatching: ecology, evolution and mechanisms. 2006.

State University of New York, Stonybrook, Dept. of Ecology and Evolution. Inducible defenses of embryos: mechanisms and evolution of hatching plasticity. 2006.

Smithsonian Tropical Research Institute, Panama City, Panama. Embryo behavior, oxygen stress, and heterokairy in gill regression: does respiratory plasticity facilitate predation-sensitive hatching timing? 2006.

Cornell University, Dept. of Ecology and Evolutionary Biology, Ithaca, NY. Adaptive plasticity in hatching: ecology, evolution and mechanisms. 2005.

Boston University, Dept. of Aerospace and Mechanical Engineering. How animals use vibrational information: risk assessment in red-eyed treefrog eggs. 2005.

Smithsonian Tropical Research Institute, Gamboa, Panama. Eggs as organisms: the integrative biology of embryos. 2005.

Yale University, Dept. of Ecology and Evolutionary Biology, New Haven, CT. Eco-devo in a dangerous world: adaptive plastic responses of embryos to risk. 2005.

Rhode Island College, Dept. of Biology, Providence, RI. Ecological developmental biology in a dangerous world: adaptive responses of embryos to risk. 2004.

Smithsonian Tropical Research Institute, Panama City, Panama. Eco-devo in a dangerous world: adaptive responses of embryos. STRI Science Symposium, 2004.

Marine Biological Laboratory, Woods Hole, MA. Mechanisms of adaptive plasticity: risk-induced hatching in red-eyed treefrogs. 2004.

Smithsonian Tropical Research Institute, Gamboa, Panama. Hatching plasticity as an embryo defense in red-eyed treefrogs. 2003.

State University of New York, Binghamton, Dept. of Biology. Multiple risks, multiple cues: how treefrog embryos assess danger. 2003.

University of Massachusetts, Program in Organismic and Evolutionary Biology, Amherst, MA. Multiple risks, multiple cues: how treefrog embryos assess danger. 2003.

Northeastern University, Dept. of Biology, Boston, MA. Multiple risks, multiple cues: how treefrog embryos assess danger. 2003.

University of Florida, Dept. of Zoology, Gainesville, FL. Multiple risks, multiple cues: how treefrog embryos assess danger. 2002.

Skidmore College, Dept. of Biology, Saratoga Springs, NY. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2002.

Tufts University, Dept. of Biology, Boston MA. Embryonic defenses and the behavioral ecology of hatching. 2002.

Pepperdine University, Dept. of Biology, Malibu CA. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2002; NSF visiting scientist.

Boston Behavior Club, Boston MA. Embryonic anti-predator defenses and the behavioral ecology of hatching in amphibians. 2002.

Colby College, Dept. of Biology, Waterville ME. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2002.

University of Maine, Dept. of Biological Sciences, Orono. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2002.

University of Connecticut, Dept. of Ecology and Evolutionary Biology, Storrs. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2002.

Smithsonian Tropical Research Institute, Panama City, Panama. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2001.

University of Western Ontario, Dept. of Zoology, London, ON. Embryonic anti-predator defenses and the evolutionary ecology of hatching. 2001.

Clemson University, Dept. of Biology, Clemson, SC. Embryonic anti-predator defenses and the evolutionary ecology of hatching. 2001.

University of Texas at Austin, Section of Integrative Biology. How do embryos assess danger? Patterns and cues in risk-sensitive hatching. 2001.

Texas A & M University, Dept. of Biology, College Station. Embryonic anti-predator defenses and the integrative biology of hatching. 2001.

Boston University, Dept. of Biology, Boston, MA. Embryonic anti-predator defenses and the evolutionary ecology of hatching. 2001.

University of California at Davis, Division of Biology, Section of Ecology and Evolution. Embryonic anti-predator behavior and the evolutionary ecology of hatching. 2000.

McGill University, Dept. of Biology, Montreal, PQ. Embryonic anti-predator defenses and the evolutionary ecology of hatching. 2000.

Carleton University, Dept. of Biology, Ottawa, ON. Embryonic anti-predator defenses and the evolutionary ecology of hatching. 2000.

University of Wisconsin, Madison, Dept. of Psychology. Embryo decisions under predation risk: the behavioral ecology of hatching in red-eyed treefrogs. 2000.

University of Wisconsin, Madison, Dept. of Entomology. Wasp-frog interactions: predation by *Polybia rejecta* on arboreal frog eggs. 2000.

Smithsonian Tropical Research Institute, Panama City and Barro Colorado Island, Panama. Phenotypic plasticity in hatching of red-eyed treefrog eggs. 1998.

University of California at Berkeley, Museum of Vertebrate Zoology. Phenotypic plasticity in hatching as a response to selection. 1998.

University of California at Davis, Center for Population Biology. Phenotypic plasticity in hatching of red-eyed treefrogs: a response to predation risk trade-offs. 1998.

University of Kentucky, Center for Ecology, Evolution and Behavior; Workshop on Multiple Prey Responses to Multiple Predators, Lexington, KY. Multiple responses of tropical treefrogs to predators: behavior, life history and morphology. 1996.

Western State College, Dept. of Sciences, Gunnison, CO. Escape hatching in red-eyed treefrogs in Costa Rica: from snake jaws to shrimp claws. 1996.

Dalhousie University, Dept. of Anatomy & Neurobiology, Faculty of Medicine, Halifax, NS. Sex and death in the rainforest: treefrog eggs, snakes and shrimp. 1994.

University of Guelph, Dept. of Zoology, Guelph, ON. Plasticity in hatching: a response to predation risk trade-offs. 1994.

Universidad de Costa Rica, Escuela de Biologia, San José, Costa Rica. Plasticidad en el tiempo de la eclosión: una respuesta a trueques en riesgos de depredación. 1993.

Dalhousie University, Dept. of Biology, Halifax, NS. Does hatching time reflect mortality risk trade-offs? 1992.