

Troy G. Murphy

Assistant Professor

Trinity University

Dept. Biology

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Education

Ph.D. Cornell University, Neurobiology and Behavior (2005)

B.S. University of Arizona, Ecology and Evolutionary Biology, Cum Laude (1996)

Academic Positions

Assistant Professor, Trinity University (2009 - present)

NSF International Postdoctoral Fellow, Queen's University (2007 - 2009)

Postdoctoral Research Associate, University of Maryland (2006 - 2007)

Personal Information

U.S. Citizen; Born 1973; Languages: English and passable Spanish

Research Interests

- Behavioral Ecology, concentration on animal communication and sexual/social selection

- Evolutionary Biology, concentration on sexual dimorphism and ornamentation

Most of my research focuses on understanding the evolutionary processes that select for ornamental traits in animals, with an emphasis on the evolution of female ornamentation. I combine comparative methods with field- and aviary-based behavioral research to study the selective forces underlying animal signals. I generally work on birds because they are wonderful model organisms.

Research & Teaching Grants, Fellowships, and Awards

Texas Ecolab Research Grant (2012: \$22,000; 2011: \$15,700; 2010: \$11,800)

Northrup Junior Faculty Fellowship, Trinity University (2011 & 2010)

National Science Foundation, International Research Fellowship (2007-2009: \$195,000)

National Science Foundation, Science Inquiry Teaching Fellowship (2004)

National Science Foundation, Dissertation Improvement Grant (2002: \$10,000)

National Institute of Mental Health, Pre-doctoral Fellowship (1998-2001)

Other research awards: Sigma Xi (2004, 2002, 2001, 2000, 1999); Museum of Natural History (2001, 2000, 1999); American Ornithologists' Union (2001, 2000); Cornell Laboratory of Ornithology (2002, 2001, 2000, 1999); Mario Einaudi Center for International Studies (2002, 2001, 2000, 1999); Animal Behavior Society (2000); Andrew W. Mellon (2000); Explorers Club (2000, 1999).

Refereed Publications

- Murphy T. G.**, Pham T. T.* Condition and brightness of structural blue-green: motmot tail-racket brightness is related to speed of feather growth in males, but not in females. (in press), *Biological Journal of the Linnean Society*. In press. *student author
- Hall, Z.*, MacDougall-Shackleton, S.A., Osorio-Beristain M., **Murphy, T.G.** (2010) Male-bias in song-control system despite female-bias in song rate in the streak-backed oriole (*Icterus pustulatus*). *Brain, Behavior and Evolution* 76: 168-175. *student author
- Murphy T. G.**, Rohwer V. G.*, Scholes E. (2010). Breeding biology and longevity of the Russet-crowned Motmot (*Momotus mexicanus*) in central Mexico. *Journal of Field Ornithology* 81: 13-16. *student author
- Murphy T. G.** (2010). Tail-racket removal increases hematocrit in male turquoise-browed motmots. *Journal of Ornithology* 151: 241-245.
- Murphy T. G.**, Rosenthal M. F.*, Montgomerie R., Tarvin K. A. (2009). Female American goldfinches use carotenoid-based bill coloration to signal status. *Behavioral Ecology* 20: 1348-1355. *student author
- Murphy T. G.**, Hernández-Muciño D.*, Osorio-Beristain M., Montgomerie R., Omland, K. E. (2009). Carotenoid-based status signaling by females in the tropical streak-backed oriole. *Behavioral Ecology* 20: 1000-1006. *student author
- Price, J. J., Yunes-Jiménez, L.*, Osorio-Beristain, M., Omland, K. E., **Murphy, T. G.** (2008). Sex-role reversal in song? Females sing more frequently than males in the streak-backed oriole (*Icterus pustulatus*). *Condor* 110: 387-392. *student author
- Murphy, T. G.** (2008). Lack of assortative mating for tail, phenotypic condition, or body-size in the elaborate monomorphic Turquoise-browed Motmot (*Eumomota superciliosa*). *Auk* 125: 11-19. (cover photograph).
- Murphy, T. G.** (2008). Display of an inedible prop as a signal of aggression? Adaptive significance of leaf-display by the turquoise-browed motmot, *Eumomota superciliosa*. *Ethology* 114: 16-21.
- Couri, M. S., **Murphy, T. G.**, Hoebeke E. R. (2007). *Philornis fasciventris* (Wulp) (Diptera: Muscidae): description of the male, larva and puparium, with notes on biology and host association. *Neotropical Entomology* 36: 889-893.
- Murphy, T. G.** (2007). Dishonest 'preemptive' pursuit-deterrent signal? Why the turquoise-browed motmot wags its tail before feeding nestlings. *Animal Behaviour* 73: 965-970.
- Murphy, T. G.** (2007). Racketed-tail of the male and female turquoise-browed motmot: male but not female tail length correlates with pairing success, performance, and reproductive success. *Behavioral Ecology and Sociobiology* 61: 911-918.
- Murphy, T. G.** (2007). Lack of melanized keratin and barbs that fall off: how the racketed tail of the turquoise-browed motmot *Eumomota superciliosa* is formed. *Journal of Avian Biology* 38: 139-143.
- Murphy, T. G.** (2006). Predator-elicited visual signal: why the turquoise-browed motmot wag-displays its racketed tail. *Behavioral Ecology* 17: 547-553.

Moran, N. A., Kaplan, M. E., Gelsey, M. J., **Murphy, T. G.**, Scholes, E. (1999).
Phylogenetics and evolution of the aphid genus *Uroleucon* based on mitochondrial and nuclear
DNA sequences. *Systematic Entomology* 24: 85-93.

Publications in Review

- Rosenthal M.F. *, **Murphy T.G.**, Darling N., Tarvin K.A. Ornamental bill color rapidly signals
changing condition. In review, *Journal of Avian Biology*. *student author
- Revells C.E. *, Beresin G.A. *, **Murphy T. G.**, Tarvin K.A. Hatching asynchrony occurs
independently of the onset of incubation in American Goldfinches. In review, *Journal of
Ornithology*. *student author
- Kelly, R. J.*^, **Murphy T. G.**^, Tarvin K. A., and Burness, G. Carotenoid-based ornamentation of
female and male American goldfinches (*Spinus tristis*) signals different components of immune
function and metabolic rate. In review, *Physiological and Biochemical Zoology*. *student author
(^authors contributed equally)

Papers Presented at Meetings

co-authored with student (^), presented by: student (*), collaborator(**)

- Society for the Integrative and Comparative Biology, Charleston, SC (2012)
- Highly-parasitized Caribbean lizards exhibit less colorful, less frequent social displays (*)
- No evidence of female eavesdropping, but females associate with winners (*)
- International Ethological Conference and Animal Behavior Society, Bloomington, IN (2011)
- Same trait, different signals: female goldfinches signal status with bill color, but males do not (^)
- The loss of female ornamentation: does the cost of migration favor sexual dichromatism in warblers? (*)
- American Ornithologists' Union, Jacksonville, FL (2011)
- Variation in a dynamic signal is related to initial trait value in American goldfinches (**)
- Society for Behavioural Neuroendocrinology, Toronto, Ontario (2010)
- Male-biased sex differences in song-control brain regions of a songbird with female-biased singing (*)
- Southwest Association of Naturalists, Junction, TX (2010)
- Female status signaling in a tropical elaborate monomorphic oriole
- Sexual dichromatism of tail color in the elaborate monomorphic turquoise-browed motmot (*)
- American Ornithologists' Union, San Diego, CA (2010)
- Female American goldfinches use carotenoid-based bill coloration to signal status (^)
- Animal Behaviour Society, Pirenópolis, Brazil (2009)
- Female status signaling via carotenoid-based bill coloration in the American goldfinch (^)
- Does ornamentation of female goldfinches increase male parental investment? (**)
- Canadian Society for Ecology and Evolution, Halifax, Nova Scotia (2009)
- Does ornamentation of female American goldfinches signal immune function and metabolic rate? (*)
- Wilson Ornithological Society, Pittsburgh, PA (2009)
- Effects of acute immune response on American goldfinch bill color (*)
- Effect of female bill color on male parental contribution in the American Goldfinch (*)
- Female bill color, differential male investment, and hatching synchrony in American Goldfinches (*)
- Congreso Mexicano de Ecología, Merida, Yucatan, Mexico (2008)
- Sexual differences in territorial behavior of the Streak-backed Oriole (*)
- International Society for Behavioral Ecology, Ithaca, NY (2008)
- Female carotenoid based status signaling in a tropical elaborate-monomorphic oriole
- Animal Behaviour Society, Snowbird, UT (2008)
- Does bill color of female American goldfinches influence male parental investment? **
- American Ornithologists' Union, Portland, OR (2008)
- Female carotenoid based status signaling in a tropical elaborate-monomorphic oriole

Society of Canadian Ornithologists, Lake Opinicon, Ontario (2007)
 ~ Display of an inedible prop as a signal of aggression? Adaptive significance of motmot's leaf-display

Animal Behaviour Society, Burlington, VT (2007)
 ~ Wag of the motmot: honest signaling in one context, dishonest in another

North American Ornithological Council, Veracruz, Mexico (2006)
 ~ Predator-elicited visual signal: why the turquoise-browed motmot wag-displays its racketed tail

American Ornithologists' Union, Santa Barbara, CA (2005)
 ~ Motmots do not pluck their tail-wires

Animal Behaviour Society, Snowbird, UT (2005)
 ~ Combined effects of sexual and natural selection on the racketed-tail of the turquoise-browed motmot

American Ornithologists' Union, Quebec City, CA (2004)
 ~ Function of elaborate male and female plumage in the turquoise-browed motmot

Animal Behaviour Society, Oaxaca, Mexico (2004)
 ~ Function of elaborate male and female plumage in the turquoise-browed motmot

American Ornithologists' Union, Champaign Urbana, IL (2003)
 ~ The function of elaborate male and female plumage in the turquoise-browed motmot

Animal Behaviour Society, Boise, ID (2003)
 ~ Sexual ornamentation in the near-monomorphic turquoise-browed motmot

Invited Presentations

University of Oklahoma, Norman, OK (2011)

University of Texas at Austin, Austin, TX (2011)

Special session on animal coloration, Animal Behaviour Society, Pirenópolis, Brazil (2009)

University of Colorado Colorado Springs, Colorado Springs, CO (2009)

Trinity University, San Antonio, TX (2008)

University of Windsor, Windsor, ON, Canada (2008)

North Dakota State University, Fargo, ND (2008)

Trent University, Peterborough, ON, Canada (2008)

Queen's University, Kingston, ON, Canada (2007)

Smithsonian National Zoological Park, Washington D.C. (2006)

Universidad Autónoma del Estado Morelos, Mexico (2006)

University of Maryland Baltimore County, Baltimore, MD (2006)

Professional Service

University Service

Institutional animal care and use committee (IACUC) (2011-present)

Beckman scholar committee (2011-present)

Darwin Day planning committee (2009-present)

Scientific Community Service

Member of editorial board, Condor Ornithological Journal (2011-present)

Chair for student awards committee for the Society of Canadian Ornithologists (2007)

Committee member of Student Presentation Awards (2010) for the Southwest Naturalist Association

Committee member for Student Travel Awards (2011, 2010, 2009) and Presentation Awards (2010, 2006) for the American Ornithologists' Union

Review papers for: *Animal Behaviour*, *Ardia*, *Auk*, *Behavioral Ecology*, *Behavioral Ecology and Sociobiology*, *Behavioural Processes*, *Canadian Journal of Zoology*, *Condor*, *Current Biology*, *Current Zoology*, *Ethology*, *Functional Ecology*, *Ibis*, *Journal of Avian Biology*, *Journal of Field Ornithology*, *Journal of Ornithology*, *Naturwissenschaften*, *Oikos*, *Physiological and Biochemical Zoology*, *Wilson Journal of Ornithology*

Public Service and Outreach

Public lectures: San Antonio Audubon Society (2011), Queen's University Biological Station (2010, 2008), Kingston Field Naturalists (2009), Saint Mary's College of Maryland (2006)
Science fair presentations, Queen's University Biological Station (2011, 2010, 2008, 2007)
Instruct overnight field trip for grade school students with Trinity University Science Academy (2011, 2010)
Instruct hands on bird banding with grade school students with the Purple Martin Research Center (2011)
Instruct high school and grade school science literacy (>15 classrooms visited). Guided teachers and students through hands-on hypothesis based research projects (2004-2005)
Participate in interdisciplinary courses to refine teaching skills: (i) Inquiry science outreach: teaching high school students to think by asking questions (2004); (ii) Writing in the majors: teaching logic through composition. (2003)
Panel member for 'How to gain more interdisciplinary and outreach experience', offered through the Cornell University Graduate School. (2004)
Co-organizer and keynote speaker at Yucatan Bird Festival (2004, 2003, 2002)
Instruct Mexican school children through projects on conservation, in collaboration with Niños y Crias (NGO dedicated to conservation and education in Yucatan). (2001-2003)
Scientific guide, interviewee, and co-producer of 30min video documentary: *The Maya Keeper of Time: The Mysticism, Biology, and Conservation of the Turquoise-browed Motmot*, which won the 2002 Mexican National Independent Film Award for 'best documentary'. (2002)
Coordinate and instruct four-week public lecture series on ornithology at Tijuana Estuarine state park, California. (1995)

Teaching

Animal Behavior, Trinity University (2011, 2010, 2009)
Integrative Biology (co-taught with K. Livingstone), Trinity University (2011, 2010)
Methods for Biological Problem Solving, Trinity University (2011, 2010)
Animal Communication, Queen's University (2008)
Evolution of Animal Coloration (co-taught with R. Montgomerie), Queen's University (2007)
Advanced Topics in Animal Behavior, Cornell University (Graduate teaching assistant) (2003)
Introduction to Biology, Cornell University (Graduate teaching assistant) (2002)
Animal Behavior, Cornell University (Graduate teaching assistant) (2003, 2001, 1997)

Student Mentoring

Research Students Mentored at Trinity University

Jordan West (undergraduate thesis), 2009-present
Tiffany Pham (undergraduate research), 2009-present

Natasha Kopecky (undergraduate research), 2010-present
Richard Simpson (undergraduate thesis; co-supervised by David Ribble), 2010-present
Elle Cook (undergraduate thesis; co-supervised by Michele Johnson), 2010-present
Timothy Knoedler (summer research experience), Summer, 2010
Aparna Gomes (undergraduate research), 2011-present
Lucy Cevallos (undergraduate research), 2011-present
Aaron Rosenblatt (summer research experience), Summer, 2011
Gus Hoff (neuroscience research experience), Spring, 2011
Lindsey Breier (undergraduate research), 2011-present
Philip Queller (undergraduate research), 2011-present
Lee Wright (undergraduate research), 2012-present

Research Students Mentored at International Institutions

Co-mentor with Marcela Osorio-Beristain to América P. García-Muñoz (undergraduate thesis, underway; Universidad Autónoma del Estado Morelos) Project: Motmot leaf-display: agonistic signaling with inedible props during territorial defense in the russet-crowned motmot
Co-mentor with Marcela Osorio-Beristain to Laila Yunes-Jiménez (undergraduate thesis, 2008; Universidad Nacional Autónoma de México) Project: Why females sing more than males: an analysis of female song in the elaborate monomorphic streak-backed oriole. *Research resulted in published paper.*
Co-mentor with Marcela Osorio-Beristain to Diego Hernández-Muciño (undergraduate thesis 2008; Universidad Nacional Autónoma de México) Project: Sexual differences in territorial defense in the elaborate monomorphic streak-backed oriole. *Research resulted in published paper.*

Research Students Mentored at other Universities in USA

Co-mentor with Keith Tarvin to Malcolm Rosenthal (undergraduate thesis, 2009; Oberlin College) Project: Female bill color and immuno-response in the American goldfinch. *Research resulted in paper in review.*
Co-mentor with Gary Burness to Ryan Kelly (undergraduate thesis, 2009; Trent University) Project: Colorful bills of the American goldfinch reflect different immunological function in the sexes. *Research resulted in paper in review.*

Affiliations

American Ornithologists' Union
Animal Behaviour Society
Cooper Ornithological Society
International Society for Behavioral Ecology

References

Stephen T. Emlen (Ph.D. advisor) Cornell University, ste1@cornell.edu
Paul W. Sherman (Ph.D. advisor) Cornell University, pws6@cornell.edu
Robert D. Montgomerie (Postdoctoral advisor) Queen's University, mont@queensu.ca