

Grace C. Smarsh

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EDUCATION

Ph.D. Biology Texas A&M University exp. May 2017
B.S. Zoology University of New Hampshire, *summa cum laude* May 2010

RESEARCH EXPERIENCE

Graduate Student Researcher Texas A&M University 2014–present
College Station, TX

Write MATLAB code to process acoustic data collected from field work. Statistically analyze field data using JMP, MATLAB, and ArcGIS. Address questions related to the song repertoire and functions of singing in *Cardioderma cor*. Consider factors influencing evolution of song in mammals. Currently working on response to song playback experiments and the spatial context of singing on foraging territories.

NSF Graduate Research Fellow Texas A&M University 2011–2014
College Station, TX, and Tanzania

Designed a field project in Tanzania to investigate the song repertoire and singing behavior in the heart-nosed bat, *Cardioderma cor*. Handled research permitting, travel logistics, and the hiring and training of teams of up to 4 Tanzanians. Communicated with local government officials and village resident to set up a fieldsite in the village of Kikavuchini in the Kilimanjaro Region. Led team in execution of field experiments including tracking with VHF telemetry, mistnetting, PIT tagging and banding, playback experiments, and acoustic recording of singing individuals. This work covered three field seasons for a total of 17 months.

Graduate Student Researcher Texas A&M University 2010–2011
College Station, TX

Investigated vocal learning and use of song by Brazilian free-tailed bats in the lab environment. Conducted song and echolocation playback experiments to male bats, and analyzed the results to address whether free-tailed bats respond to each other behaviorally and acoustically.

Biological Intern Wallkill River National Wildlife Refuge Summers 2008–2009
New Jersey

Participated in wildlife management–related projects, including marsh vegetation plots, songbird surveys, invasive plant control, and bog turtle habitat and songbird habitat restoration. Investigated the presence and roosting ecology of the endangered Indiana bat, both independently and as part of a team via acoustic transects, mistnetting, radiotracking, and vegetation plots of roosts. Wrote project reports and created maps in ArcGIS to illustrate the results of our work.

International Student Researcher School of International Training Spring 2009
Director: Reese Matthews

Conducted an independent study project as part of the SIT: Tanzania Wildlife Ecology and Conservation Study Abroad Program based in Northern Tanzania. Investigated the types of animals that use termite mounds and in what way in three different habitats. Collected size metrics of termite mounds in each habitat, sampled and interpreted animal signs on the mounds, and conducted circular vegetation plots of each mound. Additionally, conducted minor group projects on behavior of non-ruminants, and conducted social-based studies with local communities in nearby villages through field classes.

SKILLS

- International project coordination: Independently set up Tanzania bat project involving permit acquisition, speaking with government officials, navigating bureaucratic and logistic challenges, communicating with local people, training others in research from different cultural backgrounds, and maintaining cultural sensitivity.
- Field-based methodology for wildlife studies: mist-netting, PIT-tagging and banding, acoustic monitoring and transects, behavioral experiments, VHF telemetry, vegetation plots, and GPS.
- Programming in MATLAB and statistical analysis, particularly multivariate datasets.
- Acquisition and processing of large acoustic datasets.
- Technical writing: Grant-writing, report-writing, and publications.
- Public speaking: Comfortable and skilled at communicating professionally in conferences, or less formally for public outreach, either in field-based settings or lecture halls.
- Foreign language: Advanced Swahili, intermediate French.

COURSE TAUGHT

- BIOL 467 Integrative Animal Behavior, Texas A&M University
- BIOL 320 Anatomy and Physiology II, Texas A&M University
- BIOL 319 Anatomy and Physiology I, Texas A&M University
- BIOL 112 Introductory Biology, Texas A&M University
- BIOL 107 Zoology, Texas A&M University
- ZOOL 518 Vertebrate Morphology, University of New Hampshire

HONORS AND AWARDS

- Student Travel Award, Office of Grad. and Professional Studies, Texas A&M University, \$750 (2016)
- Student Travel Award, Grad. and Professional Student Council, Texas A&M University, \$500 (2016)
- Student Travel Award, Biology Department, Texas A&M University, \$2,900 (2014, 2015, 2016)
- Best Student Paper in Animal Bioacoustics (co-recipient), Acoustical Society of America Meeting (2015)
- Best Graduate Student Poster, Ecological Integration Symposium, Texas A&M University (2015)
- William B. Davis Award, Texas Society of Mammalogists Annual Meeting (2013)
- Class Marshall for College of Life Sciences and Agriculture, University of New Hampshire (2010)

GRANTS AND FELLOWSHIPS

- Student Research Scholarship, Bat Conservation International, \$2,700 (2014)
- Student Research Scholarship, Bat Conservation International, \$9,882 (2012)
- National Science Foundation Graduate Research Fellowship, Texas A&M University, 3-year stipend plus cost of education (2011–2014)

PUBLICATIONS

- Smarsh, G.C. and Smotherman, M. 2016. Neighborly singing is used to maintain foraging territories by the heart-nosed bat. In prep.
- Smotherman, M., Knornschild, M., Smarsh, G.C., and Bohn, K.M. 2016. The origins and diversity of bat songs. *Journal of Comparative Physiology A*. Accepted.
- Smarsh, G. C. and Smotherman, M. 2015. Singing away from home: Songs are used on foraging territories in the African megadermatid bat, *Cardioderma cor*. *Proceedings of the Meetings on Acoustics*. 25: 010002.
- Smarsh, G. C. and Smotherman, M. 2015. The intra- and interspecific variability of echolocation pulse acoustics in the African megadermatid bats. *Acta Chiropterologica*. 17(2): 429–443.

Bohn, K.M., Smarsh, G.C., and Smotherman, M. 2013. Social context evokes rapid change in bat song syntax. *Animal Behaviour*. 85: 1485-1491.

CONFERENCE TALKS AND POSTERS

- “Singing away from home: Song is used to create and defend foraging territories in the African megadermatid bat, *Cardioderma cor*.”** 2015. Oral presentation for the Acoustical Society of America Fall Meeting.
- “Singing to maintain foraging territories in the African heart-nosed bat.”** 2015. Oral presentation for the North American Society for Bat Research Symposium.
- “*Cardioderma cor*, the heart-nosed bat, sings temporally complex songs on foraging territories.”** 2015. Updated poster presented at the annual Ecological Integration Symposium, Texas A&M University.
- “*Cardioderma cor*, the heart-nosed bat, sings temporally complex songs on foraging territories.”** 2014. Poster presented at the annual Student/Post-doctoral Research Conference, Texas A&M University.
- “*Cardioderma cor*, the heart-nosed bat, sing temporally complex songs on foraging territories.”** 2014. Oral presentation for the annual Animal Behavior Society meeting.
- “Singing behavior of an African territorial bat, *Cardioderma cor*.”** 2013. Oral presentation for the annual Texas Society of Mammalogists meeting.
- “Computational modeling of the relationship between vocal complexity and social complexity.”** 2011. Poster presented at the annual Student/Post-doc Research Conference, Texas A&M University.
- “Patterns of visitation and animal use of termite mounds.”** 2010. Selected talk for the annual Undergraduate Research Conference, University of New Hampshire
- “Adaptive intelligence of the domestic cat (*Felis catus*).”** 2009. Poster presented by Heidi Broadley at the Undergraduate Research Conference, University of New Hampshire.

INVITED TALKS AND OUTREACH

- Undergraduate Mentor.** 2016. Aggie Graduate and Professional Community Club, Texas A&M University.
- “*Cardioderma cor*, a unique singer in the heart of Africa.”** 2015. Presentation on doctoral research, bat behavior and ecology, and bioacoustics for the Zoology Club, Texas A&M University.
- “Singing away from home: the heart-nosed bat sings temporally complex songs on foraging territories.”** 2015. Invited seminar speaker for the Biology Department. Texas A&M University.
- “Singing away from home: the heart-nosed bat sings temporally complex songs on foraging territories.”** 2015. Guest lecture for Ethology, WFSC Department. Texas A&M University.
- “*Cardioderma cor*, a unique singer in the heart of Africa.”** 2014. Presentation on doctoral research and basic bat behavior and ecology for Sable Wildlife College, Arusha, Tanzania.
- Harrodian School field presentation.** 2014. Presentation conducted at various bat roosts on research, Tanzanian bat species richness and diversity, and Tanzanian wildlife conservation and ecology for a highschool-age group from the Harrodian School, UK, in the Kilimanjaro Region, Tanzania.
- Kikavuchini School presentation.** 2014. Presentation conducted in Swahili on bat diversity, behavior, and ecology for Primary students at the Kikavuchini Primary School, Kilimanjaro Region, Tanzania.
- Finalist Judge.** 2013. Texas Junior Science Academy, Texas A&M University.
- Biology Department Representative.** 2012-2013. Graduate Student Council, Texas A&M University.
- “What’s a Bat? A Synopsis of a Fascinating Nocturnal Mammal.”** 2012. Guest lecture on doctoral research and Tanzanian bats for the Interpretive Guide Society, Arusha, Tanzania.
- Botany/Zoology Judge.** 2012. Texas Junior Science Academy, Texas A&M University.
- “Bats and Bioacoustics: A Brief Synopsis by a Passionate Researcher.”** 2011. Presentation on bat behavior, communication, and ecology for the Zoology Club, Texas A&M University.
- Judge.** 2011. Annual Science Fair, Harmony Science Academy, Texas.

BioBlitz. 2011. Presentation with live bats on bat diversity, behavior, ecology, and our research at Texas A&M University, conducted for Bio Blitz day at Lick Creek Park, TX, USA.