

## CURRICULUM VITAE

### Grace C. Smarsh

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### EDUCATION

#### **Ph.D. Biology, Texas A&M University, Aug. 2017**

Advisor: Michael Smotherman

Dissertation: Behavioral ecology of singing in the heart-nosed bat, *Cardioderma cor*

#### **B.S. Zoology, University of New Hampshire, summa cum laude with Honors, May 2010**

Advisor: Michelle Scott

Honors Thesis: Patterns of termite mound use in three habitats in Tanzania

### RESEARCH EXPERIENCE

#### **1. 2014-present, Graduate Student Researcher**

*Texas A&M University, USA*

Wrote custom MATLAB code to process acoustic data collected from field work. Statistically analyze field data using JMP, MATLAB, Geospatial Modeling Environment, and ArcGIS. Address questions related to the song repertoire and functions of singing in *Cardioderma cor*. Currently working on a manuscript addressing the relationship between night range size and location, and singing behavior. Consider factors influencing evolution of song in mammals.

#### **2. 2011-2014, NSF Graduate Research Fellow**

*Texas A&M University, USA/TZ*

Designed a field project in Tanzania to investigate the song repertoire and singing behavior in the heart-nosed bat, *Cardioderma cor*. Acquired research permits, navigated travel logistics, and set up a fieldsite in the village of Kikavuchini in the Kilimanjaro Region. Trained a team of local Tanzanians to assist in field work. 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.

#### **3. 2010-2011, Graduate Student Researcher**

*Texas A&M University, USA*

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.

#### **4. Summers 2008, 2009, Biological Intern**

*Wallkill River National Wildlife Refuge, USA*

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.

**5. Spring 2009, International Student Research***School of International Training Tanzania Program, TZ*

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.

**GRANTS AND FELLOWSHIPS**

- 2017 Zuckerman Postdoctoral Fellow, Israel (2-year stipend)
- 2017 Fulbright Postdoctoral Fellow, Israel (2-year stipend-declined)
- 2014 Student Research Scholarship, Bat Conservation International (\$2,700)
- 2012 Student Research Scholarship, Bat Conservation International (\$9,448)
- 2011 National Science Foundation Graduate Research Fellowship, Texas A&M University (3-year stipend and tuition)

**HONORS AND AWARDS**

- 2016 First place for student talks, International Bat Research Conference, South Africa
- 2016 Student Travel Award, Office of Graduate and Professional Studies, Texas A&M University (\$750)
- 2016 Student Travel Award, Graduate and Professional Student Council, Texas A&M University (\$500)
- 2016 Student Travel Award, Biology Department, Texas A&M University (\$1000)
- 2015 Best Student Paper in Animal Bioacoustics (co-recipient), Acoustical Society of America Fall Meeting, USA
- 2015 Student Travel Award, Biology Department, Texas A&M University (\$1000)
- 2015 Best Graduate Student Poster, Ecological Integration Symposium, Texas A&M University
- 2014 Student Travel Award, Biology Department, Texas A&M University (\$900)
- 2013 William B. Davis Award, Texas Society of Mammalogists Annual Meeting, USA
- 2010 Class Marshall for College of Life Sciences and Agriculture, University of New Hampshire

**PUBLICATIONS**

**Refereed**

1. Smarsh, G.C. and M. Smotherman. 2017. Behavioral response to conspecific songs on foraging territories of the heart-nosed bat. *Behavioral Ecology and Sociobiology*. In review.
2. Smotherman, M., Knornschild, M., Smarsh, G.C., Bohn, K.M. 2016. The origins and diversity of bat songs. *Journal of Comparative Physiology A*. 202(8): 535-554.
3. Smarsh, G. C. and M. Smotherman. 2015. The intra- and interspecific variability of echolocation pulse acoustics in the African megadermatid bats. *Acta Chiropterologica*. 17(2): 429—443.
4. Bohn, K.M., Smarsh, G.C., and M. Smotherman. 2013. Social context evokes rapid change in bat song syntax. *Animal Behaviour*. 85: 1485-1491.

**Un-refereed**

5. Smarsh, G. C and M. Smotherman. 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.

**PRESENTATIONS*****Invited talks***

- 2016 Studying singing in a territorial bat, *Cardioderma cor*, in the shadow of Kilimanjaro. Saturday Morning Biophysics, Texas A&M University, USA.
- 2015 Singing away from home: Song is used to create and defend foraging territories in the African megadermatid bat, *Cardioderma cor*. Acoustical Society of America Meeting, Jacksonville, FL, USA.
- 2015 Singing to maintain foraging territories in the African heart-nosed bat. North American Society for Bat Research Symposium, Monterey, CA, USA.
- 2015 Singing away from home: the heart-nosed bat sings temporally complex songs on foraging territories. Biology Department Seminar, Texas A&M University, USA.
- 2014 *Cardioderma cor*, a unique singer in the heart of Africa. Sable Wildlife College, Arusha, TZ.

***Conference talks and posters***

- 2016 Playback experiments reveal the territorial function of singing in the heart-nosed bat (talk). North American Society for Bat Research Symposium, San Antonio, TX, USA.
- 2016 Territorial singing in the African heart-nosed bat (talk). International Bat Research Conference, Umhlanga, SA.
- 2015 *Cardioderma cor*, the heart-nosed bat, sings temporally complex songs on foraging territories (poster). Ecological Integration Symposium, Texas A&M University, USA.
- 2014 *Cardioderma cor*, the heart-nosed bat, sings temporally complex songs on foraging territories (poster). Student/Post-doctoral Research Conference, Texas A&M University, USA.
- 2014 *Cardioderma cor*, the heart-nosed bat, Single temporally complex songs on foraging territories (talk). Animal Behavior Society meeting, Princeton, NJ, USA.
- 2013 “Singing behavior of an African territorial bat, *Cardioderma cor*.” (talk). Texas Society of Mammalogists meeting, TX, USA.

- 2011 Computational modeling of the relationship between vocal complexity and social complexity (poster). Biology Department Student/Post-doc Research Conference, Texas A&M University, USA.
- 2010 Patterns of visitation and animal use of termite mounds (talk). Undergraduate Research Conference, University of New Hampshire, USA.
- 2009 Adaptive intelligence of the domestic cat (*Felis catus*) (poster). Presented by Heidi Broadley. Undergraduate Research Conference, University of New Hampshire.

### ***Outreach***

- 2015 Zoology Club, Texas A&M University, USA
- 2014 Shop Talk, Biology Department, Texas A&M University, USA.
- 2014 Harroddian School students from the UK, in Kikavuchin Village Kilimanjaro Region, TZ
- 2014 Kikavuchini Primary School students in Swahili in Kikavuchini Village, Kilimanjaro Region, TZ
- 2012 Interpretive Guide Society, Arusha, TZ
- 2011 Zoology Club, Texas A&M University, USA
- 2011 Bio Blitz day at Lick Creek Park, TX, USA.
- 2009 Reverse Scavenger Hunt with local students, Wallkill River NWR, NJ, USA
- 2009 Campfire Nocturnal Life talk with local camp, Wallkill River NWR, NJ, USA
- 2008 Multi-series class for general public: Visually Experiencing Nature in Art, Wallkill River NWR, NJ, USA
- 2008 Stream Health with local middle school, Wallkill River NWR, NJ, USA

## **TEACHING**

### ***Teaching assistantships***

1. BIOL 467 Integrative Animal Behavior, Texas A&M University
2. BIOL 320 Anatomy and Physiology II, Texas A&M University
3. BIOL 319 Anatomy and Physiology I, Texas A&M University
4. BIOL 112 Introductory Biology, Texas A&M University
5. BIOL 107 Zoology, Texas A&M University
6. ZOOL 518 Vertebrate Morphology, University of New Hampshire

### ***Guest lectures***

1. Seminar in Quantitative Biology, MATH/BIOL Departments, Texas A&M University
2. Ethology, WFSC Department. Texas A&M University.
3. Integrative Animal Behavior, BIOL Department, Texas A&M University
4. Introductory Biology, BIOL Department, Texas A&M University

## **SERVICE**

1. Undergraduate Mentor Certification. 2016. Aggie Graduate and Professional Community Club, Texas A&M University.
2. NGO consulting. 2014. Tanzania Elephant Project, TZ.
3. Finalist Judge. 2013. Texas Junior Science Academy, Texas A&M University.

4. Biology Department Representative. 2012-2013. Graduate Student Council, Texas A&M University.
5. Botany/Zoology Judge. 2012. Texas Junior Science Academy, Texas A&M University
6. Judge. 2011. Annual Science Fair, Harmony Science Academy, Texas.

### **INTERVIEWS**

1. Graduate Student Spotlight. Interviewer: Biology Department, Texas A&M University (2017).
2. BCI social media online interview. Interviewer: Winifred Frick, Bat Conservation International (August, 2016).
3. Labors of Lab, episode 6, Interviewer: Chris Williams, Texas A&M University (May, 2015)
4. "When the Bat Sings." *Science* magazine, Interviewer: Virginia Morell (2014).

### **SKILLS**

- International project coordination: Independently set up Tanzania bat project involving permit acquisition, speaking with government officials of different levels, 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.