

## **Eben Goodale**

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### Biographical Narrative:

Eben Goodale is an Associate Professor at the Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, working in the Ecology and Evolution of Plant-Animal Interactions Group. He is interested in the connection between three fields of ecology: behavioral ecology, community ecology and conservation biology. His research focusses on how behavior, particularly communication, affects the interactions between species, and how knowledge about such interactions can be integrated into conservation and management plans. He received his Ph.D. from the University of Massachusetts, Amherst (2005), and has held postdoctoral fellowships at the Massachusetts Institute of Technology (2006-2007), the National Science Foundation (USA, 2007-2009) and the University of California, San Diego / University of San Diego (2010-2012). Much of his work has been done on birds and in Sri Lanka, but he has also conducted bird research in India, Papua New Guinea (PNG), and now China, and has also worked on communication in bees. He has published 22 articles in SCI indexed journals (13 first author), including *Trends in Ecology and Evolution*, *Proceedings of the Royal Society*, *Biology Letters*, *Animal Behavior* and *Behavioral Ecology*. He also enjoys teaching, and has taught undergraduate and graduate courses in introductory biology, biodiversity, evolution and ecology at four institutions and organized workshops in experimental design and statistics in Sri Lanka, PNG and China.

### Education:

- **University of Massachusetts, Amherst** (2005), Ph.D. Thesis title: “Interspecific communication in mixed-species bird flocks of a Sri Lankan rainforest.” Major advisors: Bruce E. Byers and Donald E. Kroodsma. 4.0 GPA.
- **Harvard College** (1997), B.A., magna cum laude in Biology.

### Research Positions:

- Associate Professor, **Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences** (9/12-present). Associated with the Ecology and Evolution of Plant-Animal Interactions Group.
- Visiting Scholar, **University of California, San Diego** (1/10-7/12); Research Associate, **University of San Diego** (2/10-6/12). Studied interspecific information transfer among pollinating insects in James Nieh’s lab.
- Postdoctoral Fellow, **National Science Foundation USA (NSF)** International Research Fellowship Program (1/07-4/07; 8/07-8/08; 1/09-4/09; 9/09-12/09).

Studied developmental, cognitive and functional aspects of vocal mimicry in mixed-species bird flocks of Sri Lanka and Papua New Guinea.

- Research Associate, **University of Massachusetts, Amherst** (1/09-12/09). Affiliated with Jeffrey Podos' lab; studied cultural evolution in the songs of Darwin's finches.
- Postdoctoral Fellow, **MIT Media Lab** (8/06–11/06; 5/07-7/07)  
Worked with Dale Joachim on a NSF-sponsored program using cell phone technology to remotely conduct playback experiments
- Consultant, **Yale School Forests** (9/05–7/07).  
Designed and conducted the first bird survey of the actively managed Yale Myers Forest.
- Research Associate, **Field Ornithology Group of Sri Lanka** (FOGSL; 5/05-present).  
Responsible for planning research agenda, finding funding, and supervising students.

### Teaching Positions:

- Lecturer and Senior Seminar Mentor, **University of San Diego** (1/10-6/12). Taught a survey course on the biology of organisms (BIOL 221, lecture and lab), a course in the principles of environmental science (BIOL 102), and a lab in cellular biology (BIOL 225). Also mentored students on their independent research project (BIOL 495).
- Lecturer, **University of San Diego, California** (10/10-12/10; 10/11-12/11). Taught two semesters of UCSD's introductory course in ecology, behavior and evolution (BILD 3).
- Adjunct Faculty, **University of New Haven** (8/08-12/08). Taught an undergraduate course (BIO 320) and a graduate course (ENV 601) in the principles of ecology, with laboratory.
- Lecturer, **University of Massachusetts, Amherst** (8/08-12/08). Presented 13 lectures on evolution for the large introductory lecture class for non-majors, "Social Issues in Biology" (BIO 105).
- Visiting Lecturer, **University of Colombo** (1/07-3/07; 3/08-5/08). Taught 10 hours of lectures on experimental design and statistical analysis and an additional five hours of lectures on behavioral ecology.
- Instructor, **Yale School for Forestry and Environmental Sciences** (8/07).  
Designed and conducted lab demonstration on freshwater ecology and biodiversity for their Masters orientation program.
- Teaching Assistant, **University of Massachusetts, Amherst** (1/05–5/05; 9/02–5/03).  
Designed and taught laboratory curriculum for ornithology (BIO 544) and introductory biology labs (BIO 100 & 101).

### Scholarships and Fellowships:

- **1000 Plan Recruitment Program of Global Experts**. A national level Chinese grant for recruiting international scientists (awarded 3/13).
- **NSF International Research Postdoctoral Fellowship** (awarded 8/06, for two years).

- **American Institute of Indian Studies**, Senior Fellowship (awarded 10/05, for four months), to study the effect of land-use on mixed-species flocks of India.
- **NSF Graduate Fellowship** (awarded 4/00, for three years).
- **Fulbright Junior Scholarship** (awarded 9/97, for one year).

Grants:

- **1000 Plan Recruitment Program of Global Experts** (\$327,000 in research funds, awarded 3/13)
- **San Diego Foundation Blasker Science and Technology Grant** (\$35,916 awarded 5/11)
- **Conservation, Food & Health Organization** (\$12,935 originally awarded to FOGSL 6/06, for twelve months; \$12,022 funded for a second year 11/07), to study the effect of land-use on flocks of Sri Lanka.
- **NSF International Research Postdoctoral Fellowship** (\$48,100 in research funds, awarded 8/6/06).
- **NSF Doctoral Dissertation Improvement Grant** (\$9,684 awarded 7/03).
- **American Ornithologists Union**, Student Research Grant (\$2,500 awarded 6/03).
- **Sigma-Xi Grant-in-Aid-of-Research** (\$1000 awarded 6/03 and \$500 12/01).
- **Woods Hole Scholarship for Field Research** (\$3,200 awarded 3/02).
- **American Ornithologists Union**, Maria Brady Tucker Travel Award (\$1,200 awarded 6/02).

Peer-Reviewed Scientific Publications:

- 29) Zhang K., Woan, T. S., Jie, L., Goodale, E., Kitajima, K. & Harrison, R. D. 2014. Shifting baselines on a tropical forest frontier: Extirpations drive declines in local ecological knowledge. **PLOS ONE** 9: e86598.
- 28) Goodale, E., Ratnayake, C. P. & Kotagama, S. W. 2014. Vocal mimicry of alarm-associated sounds by a drongo elicits flee and mobbing responses from other species that participate in mixed-species bird flocks. **Ethology** 120: 266-274.
- 27) Goodale, E., Ratnayake, C. P. & Kotagama, S. W. 2014. The frequency of vocal mimicry varies due to proximity to nest and nesting stage in a passerine bird. **Behaviour** 151: 73-88.
- 26) Jayarathna, A., Kotagama, S. W. & Goodale, E. 2013. The seasonality of mixed-species flocking in a Sri Lankan rainforest, in relation to the breeding of the nuclear species, the Orange-billed Babbler *Turdoides rufescens*. **Forktail** 29: 138-139.
- 25) Goodale, E., Kotagama, S. W., Raman, T. R. S., Sidhu, S., Goodale, U. M., Parker, S. & Chen, J. 2013. The response of birds and mixed-species bird flocks to human-modified landscapes in Sri Lanka and southern India. **Forest Ecology and Management**. <http://dx.doi.org/10.1016/j.foreco.2013.08.022>
- 24) Goodale, E. and Nieh, J. C. 2012. Public use of olfactory information associated with predation in two species of social bees. **Animal Behaviour** 84: 919-924.
- 23) Sridhar, H., Srinivasan, U., Askins, R. A., Canales Delgadillo, J. C., Chen, C.-C., Ewert, D. N., Gale, G. A., Goodale, E., Gram, W. K., Hart, P. J., Hobson, K. A., Hutto, R. L., Kotagama, S. W., Knowlton, J., Lee, T. M., Munn, C. A., Nimnuan, S., Nizam, B. Z., Péron, G., Robin, V. V., Rodewald, A. D., Rodewald, P. G., Thomson,

- R. L., Trivedi, P., Van Wilgenburg, S. L., and Shanker, K. 2012. Positive relationships between association strength and phenotypic similarity characterize the assembly of mixed-species bird flocks globally. **American Naturalist** 180: 777-790.
- 22) Goodale, E., Goodale, U. and Mana, R. 2012. The role of toxic pitohuis in mixed-species flocks of lowland forest in Papua New Guinea. **Emu – Austral Ornithology** 112: 9-16.
- 21) Beauchamp, G. and Goodale, E. 2011. Plumage mimicry in avian mixed-species flocks: more or less than meet the eye? **Auk** 128: 487-496.
- 20) Sidhu, S., Raman, T. R. S. & Goodale, E. 2010. Effects of plantations and home-gardens on tropical forest bird communities and mixed-species bird flocks in the southern Western Ghats. **Journal of the Bombay Natural History Society** 107: 91-108
- 19) Goodale, E. & Ruxton, G. D. 2010. Antipredator benefits from heterospecifics. In: **Encyclopedia of Animal Behavior** (Breed, M and Moore, J., editors). Academic Press, Oxford.
- 18) Goodale, E. and Podos, J. 2010. Persistence of song types in Darwin’s finches, *Geospiza fortis*, over four decades. **Biology Letters** 6: 589-592.
- 17) Goodale, E., Beauchamp, G., Magrath, R. D., Nieh, J. C. & Ruxton, G. D. 2010. Interspecific information transfer influences animal community structure. **Trends in Ecology and Evolution** 25: 354-361.
- 16) Satischandra, S. H. K., Kodituwakku, P., Kotagama, S. W. & Goodale, E. 2010. Assessing “false” alarm calls by a drongo (*Dicrurus paradiseus*) in mixed-species bird flocks. **Behavioral Ecology** 21: 396-403.
- 15) Goodale, E & Beauchamp, G. 2010. The relationship between leadership and gregariousness in mixed-species bird flocks. **Journal of Avian Biology** 41: 99-103.
- 14) Ratnayake, C. P., Goodale, E. & Kotagama, S. W. 2010. Two sympatric species of passerine birds imitate the same raptor calls in alarm contexts. **Naturwissenschaften** 97: 103-108.
- 13) Goodale, E., Nizam, B. Z., Robin, V. V., Sridhar, H., Trivedi, P., Kotagama, S. W., Padmalal, U. K. G. K., Perera, R., Pramod, P. & Vijayan, L. 2009. Regional variation in structure and composition of mixed-species bird flocks of the Western Ghats and Sri Lanka: a review. **Current Science** 97: 648-663.
- 12) Goodale, E., Lalbhai, P., Goodale, U. M., & Ashton, P. M. S. 2009. The effect of shelterwood cuts and crown thinnings on the abundance and distribution of birds in a southern New England forest. **Forest Ecology and Management** 258: 314-322.
- 11) Goodale, E. & Kotagama, S.W. 2008. Responses to conspecific and heterospecific alarm calls in mixed-species bird flocks of a Sri Lanka rainforest. **Behavioral Ecology** 19: 887-894.
- 10) Goodale, E. & Kotagama, S.W. 2007. Some observations on the geographic variation of mixed-species bird flocks in Sri Lanka. **Journal of the Bombay Natural History Society** 104: 96-98.
- 9) Joachim, D. & Goodale, E. 2007. On the use of cellular telephony for audio interaction with animals. **Biology Letters** 3: 603-606.

- 8) Sathischandra, S.H.K., Kudavidanage, E.P., Kotagama, S.W. & Goodale, E. 2007. The benefits of joining mixed-species flocks for a sentinel nuclear species, the Greater Racket-tailed Drongo *Dicrurus paradiseus*. **Forktail** 23: 145-148.
- 7) Goodale, E. & Kotagama, S.W. 2006. Vocal mimicry by a passerine bird attracts other species involved in mixed-species flocks. **Animal Behaviour** 72: 471-477.
- 6) Goodale, E. & Kotagama, S.W. 2006. Context-dependent mimicry by a passerine bird. **Proceedings of the Royal Society London B, Biological Sciences** 273: 875-880.
- 5) Goodale, E. & Kotagama, S.W. 2005. Alarm calling in Sri Lankan mixed-species bird flocks. **Auk** 122: 108-120.
- 4) Goodale, E. & Kotagama, S.W. 2005. Testing the roles of species in mixed-species bird flocks of a Sri Lankan rainforest. **Journal of Tropical Ecology** 21: 669-676.
- 3) Jayarathna, A., Caldera, P. & Goodale, E. 2005. Observations on the nesting and parental behaviour of the Ashy-headed Laughing Thrush (*Garrulax cinereifrons*). **Forktail** 21: 163-164.
- 2) Kotagama, S.W. & Goodale, E. 2004. The composition and spatial organization of mixed-species flocks in a Sri Lankan rainforest. **Forktail** 20: 63-70.
- 1) Kroodsma, D.E., Byers, B.E., Goodale, E., Johnson, S. & Liu, W. 2001. Pseudoreplication in playback experiments, revisited a decade later. **Animal Behaviour** 61: 1029-1033.

#### Manuscripts in Revision / Review:

- Duan, Q., Goodale, E., and Quan R.-C. In revision. Bird fruit preferences reflect the frequency of fruit colours in tropical Asia. **Scientific Reports**.
- Sreekar, R., Srinivasan, U., Mammides, C., Chen, J., Goodale, U., Kotagama, S. W., Raman, T. R. S., Sidhu, S. and Goodale, E. In review. The effect of land-use on the diversity, abundance, and mass-abundance relationships of understory avian insectivores in Sri Lanka and southern India. **Biological Conservation**.
- Goodale, E., Kim, E., Nabors, A., Henrichon, S., and Nieh, J. C. In review. A misdirecting nectar guide: an experiment examining the innate responses of bumblebees to flower patterns. **Naturwissenschaften**.

#### Selected Popular Publications:

- Goodale, E. 2013. Birds of South Asia (Book Review). **Emu – Austral Ornithology** 113: 397-398.
- Ratnayake, C. P., Goodale, E. and Kotagama, S. W. 2013. Differential ‘crack’ calls in a tropical magpie: Sri Lanka magpie (*Urocissa ornata*). **Siyoth** 3: 41-49.
- Robinson, J. W., Nieh, J. C. and Goodale, E. 2012. Testing honey bee avoidance of predators: teaching the scientific process through an engaging field experiment. **American Biology Teacher** 74: 452-457.
- Goodale, E. and Sridhar, H. 2010-2014. Mixed-species bird flocks: a bibliography. Internet database at <https://sites.google.com/site/mixedspeciesbirdflocks/>.
- Goodale, E., Salgado, A. & Kotagama, S. W. 2008. Birds of a different feather. **Natural History** 117: 24-28.

- Goodale, E., Caldera, P. & Kotagama, S. W. 2006. Twenty-five years of research on the mixed-species bird flocks of Sri Lanka. **Siyoth** 1: 22-28.
- Goodale, E., Caldera, P. & Jayarathna, A. 2004. The sounds of Sinharaja. Audio CD. **Field Ornithology Group of Sri Lanka**, Colombo, Sri Lanka.
- Goodale, E. 2002. A journey by bus. Pp. 207–210 in: Excursions and explorations, cultural encounters between Sri Lanka and the United States (Jayatilaka, T., ed.). **The United States – Sri Lanka Fulbright Commission**, Colombo, Sri Lanka.

#### Publicity in Popular Press about Research:

- **New York Times** (2010): “For some birds it’s not always the same old song”. <http://www.nytimes.com/2010/04/20/science/20obsong.html>
- **Conservation Magazine** (2008): “Collect calls: cell phones eavesdrop on birds”. <http://www.conservationmagazine.org/2008/07/collect-calls/>
- **American Scientist** (2006): “Bird mimics other species in the Sri Lankan rainforest”. <http://www.sigmaxi.org/about/news/archive.71.shtml> (also published as *American Scientist*, 94: 289).

#### Presentations at Scientific Meetings:

From 2006-2013, 18 invited talks at the following venues:

Barnard College • Central Connecticut State Univ. • Environmental Leadership and Training Initiative (moderator; international conference held in Sri Lanka) • Fifth Symposium on Tropical Forest Ecology (keynote speaker for conference held in Hainan, China) • Indian Inst. of Science • Natl. Centre for Biol. Sciences (India) • Natl. Univ. of Singapore • Natl. Forestry Symposium (Sri Lanka) • Nature Conservation Fnd. (India) • San Diego State Univ. • School of Natural Resources and Environment, Univ. of Michigan • Texas Tech Univ. • Univ. of California, San Diego • Univ. of San Diego • Univ. of New England • Xishuangbanna Tropical Botanical Garden • Yale Forest Lecture Series (2 talks)

From 1998-2013, 12 presentations and 4 posters at the following meetings:

American Ornithological Union (3 talks, moderator once, 1 poster) • Animal Behavior Soc. (1 talk, 2 posters) • Association for Tropical Biology and Conservation, Asian Chapter (1 talk) • Center for Tropical Forest Science (1 talk) • Chinese Ornithological Conference • International Soc. for Behavioral Ecology (1 talk, moderator once, 1 poster) • Rockefeller Univ. Bird Song Workshop (2 talks) • Soc. for Conservation Biology (1 talk) • Soc. for Integrative and Comparative Biology (1 talk)

#### Membership in Scientific Organizations:

Ecological Soc. of America (since 2010) • Soc. of Conservation Biology (since 2008) • Oriental Bird Club (since 2004) • Sigma-Xi (since 2003) • American Ornithologists

Union (since 2000) • Animal Behavior Soc. (since 2000) • FOGSL (life member, since 1996)

### Reviews for and Service to Journals:

- Associate Editor, Forktail (5/07 – present).
- Journals reviewed for (# of reviews): Acta Ethologica (1) • Animal Behaviour (8) • Auk (1) • Behaviour (1) • Behavioral Ecology (5) • Behavioral Ecology and Sociobiology (5) • Bioacoustics (1) • Biodiversity and Conservation (1) • Biological Reviews (1) • Biology Letters (2) • Condor (2) • Ecology (2) • Emu – Austral Ornithology (1) • Ethology (2) • Florida Field Naturalist (1) • Forest Ecology and Management (1) • Forktail (4) • J. of Animal Ecology (2) • J. of Avian Biology (1) • J. of Comparative Psychology (1) • J. of Field Ornithology (4) • J. of Ornithology (1) • J. of Sustainable Forestry (1) • J. of Tropical Ecology (2) • Mammalia (1) • Naturwissenschaften (1) • Ornis Fennica (1) • Proceedings of the Royal Society (3) • Wilson J. of Ornithology (1)
- Grants reviewed for (# of reviews): National Science Foundation International Research Postdoctoral Program (1).

### Voluntary Educational Activities:

- Lecturer and student advisor (10/12-12/12, 10/13-11/13) for Advanced Fieldcourse in Ecology and Conservation, run by the Program for Field Studies in Tropical Asia. Conducted lectures on statistics and bird ecology and supervised student projects.
- Project leader (8/11-12/11), high school outreach program, entitled “Pollinators and predators” funded by the San Diego Foundation. Introduced students to the scientific process through field trips, lectures, dissections and small experiments with bees.
- Workshop organizer, with Uromi M. Goodale, and lecturer for: two-session program introducing R (Divine Word University, 9/09), two-day program on the research process (the National Research Institute, Papua New Guinea, 9/09, and the Binatang Research Center, 12/09), two-day program on statistics (University of Colombo, 3/09), one-day program on career development (Port Moresby, PNG, 12/07), one-day program on proposal writing (University of Colombo, 9/07), and a four-day program on scientific analysis and writing (FOGSL, 1/07).
- Project leader and lecturer (12/06 – 1/09), for secondary school education program by the Field Ornithology Group of Sri Lanka, and funded by the Conservation, Food and Health Foundation, that visited 23 schools and took them on visits to nearby rainforests.
- Participant (1/08-3/08) in the project “Empowering Students in Ecology, Music, and Computer Science through Active Participation in an Elementary Bird Song Curriculum”, funded by the Lindbergh Foundation; prepared podcasts for elementary grade school children to get them interested in birds and animal behavior.
- Guest lectures given: FOGSL general meeting (3/07, 10/04), Sri Lanka Fulbright Commission (9/04), Biology 521 / Community Ecology, University of Massachusetts, Amherst (5/03); Undergraduate Ornithology, University of Colombo (3/07, 2/07,

8/02); Masters Program in Wildlife Ecology, University of Peradeniya (7/01 and 9/98).

- New Haven Science Fair Mentor, for two high-school students (10/05–5/06). The students won the first prize from the New Haven Bird Club and were Finalists and Medalists at the Connecticut Science Fair.
- Fieldtrip organizer and demonstrator of research activities on mixed-species bird flocks in the Sinharaja World Heritage Reserve: FOGSL (9/04, 8/03, and 7/03), Masters Program in Wildlife Ecology, University of Colombo (7/04 and 7/02), Undergraduate Ornithology, University of Colombo (8/03).

### Advisor on Student Theses:

- Currently advising one XTBG Masters student, Gu Hao, on his project “A network perspective: do super-generalists speciate less than generalists and specialists?”
- A postdoctoral fellow, Christos Mammides, will begin in October, 2013.
- Two Masters students, Salindra Dayananda and Kasun Abeysinghe, will begin January 2014.
- External Advisor to S. Harsha K. Satischandra, University of Sabaragamuwa, Masters in Science program. Thesis title: “Evaluating false alarm calls in the Greater Racket-tailed Drongo (*Dicrurus paradiseus*).” Graduated 2009.
- Informal External Advisor to Chaminda P. Ratnayake, University of Colombo, Ph.D. program. Thesis title: “Ecology and behaviour of the Sri Lanka Blue Magpie (*Urocissa ornata*).” Graduated 2010.
- Informal External Advisor to Punit Lalbhai, Yale School of Forestry and Environmental Science. Thesis title: “The effect of shelterwood cuts and crown thinnings on the abundance and distribution of birds in a southern New England forest.” Graduated 2007.
- External Advisor to S. Harsha K. Satischandra, University of Sabaragamuwa, Undergraduate thesis. Thesis title: “The foraging ecology of the Greater Racket-tailed Drongo (*Dicrurus paradiseus*).” Graduated 2006.

### Technical Skills:

- Bird identification / banding. Three years of experience using mist nets in Sri Lanka with over 150 birds captured. Twenty years experience with bird identification in the field.
- Sound recording. Fourteen years of using shotgun and parabolic microphones, and mono and stereo tape recorders, both analog and digital.
- Sound analysis. Extensive experience using Signal, Avisoft and Raven.
- Radio-telemetry. Tracked five Greater Racket-tailed Drongos (*Dicrurus paradiseus*) over a period of four months in the Sinharaja World Heritage Reserve, Sri Lanka.
- Experience in a bee communication lab. Four semesters experience of running olfactory choice experiments with honeybees (*Apis mellifera*) and bumblebees (*Bombus impatiens*), in James Nieh’s lab at UCSD.
- Statistics. Two semesters of 500 level classes in the Department of Statistics, University of Massachusetts, Amherst. Extensive experience using R, SAS, and SYSTAT.



- Experience with other computer programs. Moderate experience with ArcView GIS software and C++ programming.
- Experience with teaching technology: Two semesters' experience with WebCT / Blackboard web technology as well as with clickers (specifically, iclickers).
- Languages. Fluent in English; conversant in Sinhala and Tok Pisin. Limited experience in French, Italian, Tamil, Mandarin and Latin.