BENJAMIN G. FREEMAN

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CURRENT APPOINTMENT

Assistant Professor, Elizabeth Smithgall-Watts Endowed Faculty **2023 – Present**
Georgia Institute of Technology

PAST APPOINTMENTS

Banting / Biodiversity Research Centre / NSF Postdoctoral Fellow **2016 - 2022**
University of British Columbia
Supervisor: Dr. Dolph Schluter

EDUCATION

PhD — Cornell University, Dept. Ecology and Evolutionary Biology **2010 - 2016**
Advisor: Dr. John Fitzpatrick

BA — Macalester College **2002 - 2006**
Advisor: Dr. Mark Davis

AWARDS

2024 Packard Fellow ($875k/5 years)
2024 Climate Solutions Challenge Seed Grant (15k)
2022 Ned Johnson Early Investigator Award (American Ornithological Society)
2020 “Highest student evaluations” for teaching, UBC x 2
2018 Killam Postdoctoral Fellow Research Prize ($5k)
2014 Lamont C. Cole Award (outstanding graduate paper, Cornell)
2011 Book Award (best graduate student talk, Cornell)
2006 William R. Angell Foundation Prize (outstanding biology student, Macalester College)

PUBLICATIONS

Author indicates undergraduate advisee; Author indicates graduate advisee

Preprints

Shirani F & BG Freeman. Environmental “wiggles” as stabilizers of species range limits set by interspecific competition.
https://www.biorxiv.org/content/10.1101/2024.07.24.605034v1

- 2024 -

64. Billman PD, KA Carroll, DJ Schleicher & **BG Freeman**. Forecasting range shifts using abundance distributions along environmental gradients. Frontiers in Ecology and the Environment. *In press*.

63. **Freeman BG**. Shazam for birds. **PNAS** 121: e2414224121

62. **Freeman BG**, ET Miller & M Strimas-Mackey. Interspecific competition shapes bird species' distributions along tropical precipitation gradients. **Ecology Letters** 27: e14487.

61. Hargreaves AL et al. (33 authors including **BG Freeman**). Latitudinal gradients in seed predation persist in urbanized environments. **Nature Ecology & Evolution** 1-10.

- 2023 -

60. Feeley KJ & **BG Freeman**. Global Warming: Plants and Animals on the Move. **Frontiers for Young Minds** 11.

59. Reijenga BR, **Freeman BG**, DJ Murrell & AL Pigot. Disentangling the historical routes to community assembly in the global epicentre of biodiversity. **Global Ecology and Biogeography** 77: 26-35.

58. **Freeman BG**, GA Montgomery, J Heavyside, AE Moncrieff, O Johnson, BM Winger. On the predictability of phenotypic divergence in geographic isolation. **Evolution** 77: 26-35.

- We can predict divergence in plumage and song in Andean birds given information on how long they have been evolving in isolation (but we can't for morphology, which I find fascinating)

57. Lau GCF, AM Class Freeman, P Pulgarín-R, CD Cadena, RE Ricklefs & **BG Freeman**. Phylogeny and elevation predict infection by avian haemosporidians in a diverse New Guinean bird community. **Journal of Biogeography** 50: 23-31.

56. **Freeman BG**, M Strimas-Mackey & ET Miller. Response to comment on "Interspecific competition limits bird species' ranges in tropical mountains". **Science** 379: eade8043.

- 2022 -

55. **Freeman BG**, M Strimas-Mackey & ET Miller. Interspecific competition limits bird species' ranges in tropical mountains. **Science** 377: 416-420.

- Cover article

- Why do tropical birds live in narrow slices of mountainside? We find that elevational range sizes are explained more by interspecific competition than by climate. Lots going on in this paper, which is over a decade in the making.

54. **Freeman BG**, T Weeks, D Schluter & JA Tobias. The latitudinal gradient in rates of evolution for bird beaks, a species interaction trait. **Ecology Letters**.

- Where is evolution the fastest? It turns out the answer is the temperate zone, not in the species-rich tropics, casting doubt on hypotheses to explain species richness gradients that invoke faster evolution in the tropics.

53. Tobias JA et al. (115 authors including **BG Freeman**). AVONET: morphological, ecological and geographic data for all birds. **Ecology Letters**.

52. **Freeman BG**, J Rolland, GA Montgomery & D Schluter. Faster evolution of a premating reproductive barrier is not associated with faster speciation rates in New World passerine birds. **Proceedings B** 289: 20211514

51. Pujolar JM et al. (16 authors including **BG Freeman**). The formation of avian montane diversity across barriers and along elevational gradients. **Nature Communications** 13: 268.

- 2021 -

50. Linck E, **BG Freeman**, CD Cadena & CK Ghalambor. Evolutionary conservatism will limit responses to climate change in the tropics. **Biology Letters** 17: 20210363.

49. **Freeman BG** & M Pennell. The latitudinal taxonomy gradient. **Trends in Ecology and Evolution** 36: 778-786.

48. **Freeman BG**, Y Song, KJ Feeley & K Zhu. Montane species track rising temperatures better in the tropics. **Ecology Letters** 24: 1697-1708.

- Biogeography predicts how montane species are changing their elevational ranges as temperatures rise. Species are on the move in the tropics but not the temperate zone; the “escalator to extinction” runs faster in the tropics.

47. Srivastava D, et al. (23 authors including **BG Freeman**). Wildcards in climate change biology. **Ecological Monographs** 91: e01471.

- 2020 -

46. Linck E, **BG Freeman** & JP Dumbacher. Speciation and gene flow across an elevational gradient in New Guinea kingfishers. **Journal of Evolutionary Biology** 33: 1643-1652.

45. **Freeman BG**, MN Scholer, MAM Boehm, J Heavyside & D Schluter. Adaptation and latitudinal gradients in species interactions: nest predation in birds. **American Naturalist** 196: E000.

- Species interactions are often thought to be stronger in the tropics, but adaptation to strong interactions could dampen this pattern. Here we provide an example of how adaptation flattens the latitudinal gradient in nest predation.

44. Roesti M, **BG Freeman** et al. Pelagic fish predation is stronger at temperate latitudes than near the equator. **Nature Communications** 11: 1527.
Press coverage in New Scientist, Cosmos Magazine, etc.

43. Pigot AL, C Sheard, ET Miller, TP Bregman, **BG Freeman**, U Roll, N Seddon, CH Trisos, D Swindlehurst, BC Weeks, JA Tobias. Macroevolutionary convergence connects morphological form to ecological function in birds. **Nature Ecology & Evolution** 4: 230-239.

42. **Freeman BG**. Lower elevation animal species do not tend to be better competitors than their upper elevation relatives. **Global Ecology and Biogeography** 29: 171-181.

- 2019 -

41. **Freeman BG**, JA Tobias & D Schluter. Behavior influences range limits and patterns of coexistence across an elevational gradient in tropical bird diversity. **Ecography** 42 1832-1840.

- Cover article
- Competition can explain why related species live in different elevational zones. Here we show that behavior is key: territorial behavior explains which closely related species live side by side and which live in separate elevational zones.

40. Miller ET, GM Leighton, **BG Freeman**, AC Lees & RA Ligon. Climate, habitat, and geographic range overlap drive plumage evolution and mimicry in woodpeckers. **Nature Communications** 10: 1602.
Press coverage in All About Birds, Cornell Chronicle, etc.

39. **Freeman BG**. No evidence for a positive correlation between abundance and range size in birds along a New Guinean elevational gradient. **Emu: Austral Ornithology** 119: 308-316.

- 2018 -

38. **Freeman BG**, MN Scholer, V Ruiz-Gutierrez & JW Fitzpatrick. Climate change causes mountaintop extirpations in a tropical bird community. **Proceedings of the National Academy of Sciences** 115: 11982-11987.
Press coverage in The Atlantic, New York Times, Washington Post, BBC, CBC, Yale e360, etc (>250 popular articles); recommended by Faculty of 1000

- Peruvian birds that formerly lived at the mountaintop have disappeared as a consequence of warming-driven upslope shifts. This is the first evidence that climate change is causing local extinctions in high-elevation communities.

37. **Freeman BG**, JA Lee-Yaw, J Sunday & AL Hargreaves. Expanding, shifting and shrinking: The impact of global warming on species' elevational distributions. **Global Ecology and Biogeography** 27: 1268-1276.
Press coverage in The Vancouver Sun and others

- Globally, high elevation species are shrinking in distributional size as a consequence of warming-driven upslope shifts - the first global-scale evidence that high elevation species are already being threatened by climate change.

36. Gulson-Castillo ER, HF Greeney & **BG Freeman**. Cooperative misdirection: a probable anti-nest predation behavior that is widespread in Neotropical birds. **Wilson Journal of Ornithology** 130: 583-590.

35. **Freeman BG** & ET Miller. Why do crows attack ravens? The roles of predation threat, resource competition and social behavior. **The Auk: Ornithological Advances** 135: 857-867**.**
Press coverage in Gizmodo, Quartz, CBC Vancouver, and several others, including many radio interviews – people love crows!

34. **Freeman BG** & BM Beehler. Limited support for the "abundant center" hypothesis in birds along a tropical elevational gradient: implications for the fate of lowland species in a warmer future. **Journal of Biogeography** 45: 1884-1895.

33. Montgomery, GA, F Spooner & **BG Freeman**. Apparent cooperative breeding at a nest of the Silvery-throated Jay (*Cyanolyca argenticula*) and first nest description. **Wilson Journal of Ornithology** 130: 543-547.

32. Van Doren, BM, **BG Freeman,** N Aristizabal, M Alvarez-R, J Perez-Eman, AM Cuervo & GA Bravo. Species limits in the Rusty-breasted Antpitta (*Grallaricula ferrugineipectus*) complex. **Wilson Journal of Ornithology** 130: 152-167.

- 2017 -

31. Miller ET, DN Bonter, C Eldermire, **BG Freeman**, EI Greig, LJ Harmon, C Lisle & WM Hochachka. Fighting over food unites the birds of North America in a continental dominance hierarchy. **Behavioral Ecology** 28: 1454-1463.
Press coverage in All About Birds and others

30. **Freeman BG** & GA Montgomery. Using song playback experiments to measure species recognition between allopatric populations in Neotropical passerine birds: a comparison with acoustic trait analyses. **The Auk: Ornithological Advances** 134: 857-870.
Press coverage in Discover Magazine and others

- We provide experimental evidence that species-level diversity in Neotropical birds is drastically underestimated, with 20+ cases where additional species should be recognized.

29. **Freeman BG**, GA Montgomery & D Schluter. Evolution and plasticity: Divergence of song discrimination is faster in birds with innate song than in song leaners. **Evolution** 71: 2230-2242.
- There is a "downside to learning" for divergence and speciation: learning increases variation within populations, which makes it more difficult for related populations to diverge from one another. This contrasts with the general expectation that plasticity/learning speeds up evolution and speciation.

28. **Freeman BG**. Little evidence for Bergmann's Rule body size clines in passerines along tropical elevational gradients. **Journal of Biogeography** 44: 502-510.

- 2016 -

27. Crisologo TH, RB Rumelt, E Sibbald & **BG Freeman**. Observations on a secondary cavity nest of Yellow-crowned Euphonia (*Euphonia luteicapilla*). **Cotinga** 38: 79-81.

26. **Freeman BG**, AM Class Freeman & W Hochachka. Asymmetric interspecific aggression in New Guinean songbirds that replace one another along an elevational gradient. **Ibis** 158: 726-737.

25. **Freeman BG**. Thermal tolerances to cold do not predict upper elevational limits in New Guinean montane birds. **Diversity and Distributions** 22: 309-317.

24. **Freeman BG**. Strong asymmetric interspecific aggression between two sympatric New Guinean robins. **Ibis** 158: 75-81.

23. **Freeman BG** & G Montgomery. Interspecific aggression by Swainson's Thrush (*Catharus ustulatus*) may limit the distribution of the threatened Bicknell's Thrush (*Catharus bicknelli*) in the Adirondack Mountains**. The Condor: Ornithological Applications** 118: 169-178.

- 2015 -

22. Pegan TM, RB Rumelt, S Dzielski, MM Ferraro, LE Flesher, N Young, AM Class Freeman & **BG Freeman**. Asymmetric response of Costa Rican White-breasted Wood-Wrens (*Henicorhina leucosticta*) to vocalizations from allopatric populations. **PLoS ONE** 10: e0144949.
Press coverage in All About Birds

21. **Freeman BG**. Competitive interactions drive elevational divergence in tropical montane birds. **The American Naturalist** 186: 470-479**.**

- Interspecific competition drives community assembly of tropical montane birds in similar ways in each of three continents.

20. **Freeman BG** & NA Mason. The Geographic Distribution of a Tropical Montane Bird is Limited by a Tree: Acorn Woodpeckers (*Melanerpes formicivorus*) and Colombian Oaks (*Quercus humboldtii*) in the Northern Andes. **PLoS ONE** 10: e0128675.

19. Boyce A#, **BG Freeman#,** AE Mitchell & TE Martin. Clutch size declines with elevation in tropical birds. **The Auk: Ornithological Advances** 132: 424-432.
# Both authors contributed equally

- 2014 -

18. **Freeman BG** & NA Mason. New Guinean birds have globally small clutch sizes. **Emu – Austral Ornithology** 114: 304-308.

17. **Freeman BG** & AM Class Freeman. Rapid upslope shifts in New Guinean birds illustrate strong distributional responses of tropical montane species to global warming. **Proceedings of the National Academy of Sciences** 111: 4490-4494.
Press coverage in MongaBay, All About Birds and several others

16. **Freeman, BG** & A. M. Class Freeman. The avifauna of Mt. Karimui, Chimbu Province, Papua New Guinea, including evidence for long-term population dynamics in undisturbed tropical forest. **Bulletin of the British Ornithologists' Club** 134: 30-51.

15. **Freeman, BG**. Sexual niche partitioning in two species of New Guinean *Pachycephala* whistlers. **Journal of Field Ornithology** 85: 23-30.

- 2008-2013 -

14. **Freeman BG**, AM Class, J Mandeville, S Tomassi & B Beehler. 2013. Ornithological survey of the mountains of the Huon Peninsula, Papua New Guinea. **Bulletin of the British Ornithologists' Club** 133: 4-18.

13. **Freeman BG**, AM Class, CA Olaciregui & E Botero-Delgadillo. 2012. Breeding biology of the Blue-naped Chlorophonia (*Chlorophonia cyanea*) on Santa Marta Mountain. **Ornitología Colombiana** 12: 10-16.

12. **Freeman BG** & JA Arango. 2012. The nest and egg of the Empress Brilliant (*Heliodoxa imperatrix*) in Western Colombia. **Boletín SAO** 20: 67-71.

11. **Freeman BG**, SL Hilty, D Calderón-F, T Ellery & LE Urueña. 2012. New and noteworthy bird records from central and northern Colombia. **Cotinga** 34: 5-16.

10. Greeney HF, PR Martin, RA Gelis, A Solano-Ugalde, F Bonier, **BG Freeman** &

ET Miller. 2011. Notes on the breeding of high Andean birds in northern Ecuador. **Bulletin of the British Ornithologists' Club** 131: 24-31.

9. Greeney HF, B Suson, RA Gelis, **BG Freeman** & ET Miller. 2011. The nest and eggs of Yellow-throated Bush Tanager *Chlorospingus flavigularis*. **Cotinga** 33: 83-84.

8. **Freeman BG** & JA Arango. 2010. The nest of the Gold-ringed Tanager (*Bangsia aureocincta*), a Colombian endemic. **Ornitología Colombiana** 9: 71-75.

7. Jahn AE, DJ Levey, IP Faria, AM Mamani, Q Vidoz & **BG Freeman**. 2010. Morphological and genetic variation between migratory and non-migratory Tropical Kingbirds during spring migration in central South America. **Wilson Journal of Ornithology** 122: 236-243.

6. **Freeman BG** & CJ Rojas. 2010. The nest and egg of Cinnamon Screech-Owl *Megascops petersoni* in central Colombia. **Cotinga** 32: 107.

5. **Freeman BG** & HF Greeney. 2009. Parental care of the Black-capped Tanager (*Tangara heinei*) in northeastern Ecuador. **Boletín SAO** 19(2): 32-37.

4. Morales-Rozo A, E Rodríguez Ortiz, CD Cadena & **BG Freeman**. 2009. Notas sobre el nido y los pichones del Abanico Colombiano *Myioborus flavivertex*: Parulidae. **Ornitología Neotropical** 20: 19-26.

3. **Freeman BG** & HF Greeney. 2008. Parental care of the Long-tailed Tapaculo (*Scytalopus micropterus*) in northeastern Ecuador. **Ornitología Neotropical** 19: 581-585.

2. **Freeman BG** & HF Greeney. 2008. First description of the nest and eggs of Sharpe's Wren (*Cinnycerthia olivascens*). **Ornitología Colombiana**: 88-92.

1. Greeney HF, **BG Freeman**, KC Sheldon, RC Dobbs & RA Gelis. 2008. Notes on the nest architecture and nesting biology of Black-capped Tanager (*Tangara heinei*) in northeastern Ecuador. **Boletín SAO** 18(1).

BOOKS

Cooper M & **BG Freeman**. 2012. Aves en Colombia. Villegas Editores: Bogotá, Colombia.

NON-REVIEWED PUBLICATIONS

Freeman BG & A Class Freeman. 2015. Book Review of *Birds of New Guinea: Second Edition*. **Emu – Austral Ornithology** 115: 86-87.

Freeman BG & AM Class Freeman. 2014. Reply to Rehm: Why rates of upslope shifts in tropical species vary is an open question. **Proceedings of the National Academy of Sciences** 111: E1677-E1677.

TEACHING EXPERIENCE

2024	Science Communication (GT)	Instructor of Record
2024	Scientific Writing (GT)	Instructor of Record
2023	Ecology (GT)	Instructor of Record
2022	Evolutionary Ecology (UBC)	Instructor of Record
2022	Biostatistics (UBC)	Instructor of Record
2020	Evolutionary Ecology (UBC)	Instructor of Record
2020	Biostatistics (UBC)	Instructor of Record
2015	Advanced Tropical Field Ornithology (Cornell)	Instructor of Record
2014	Avian Vocalizations Seminar (Cornell)	Instructor of Record

Guest lecturer: Georgia Tech (ConservationTech VIP), Charles Sturt University, University of Miami (x2), Princess Margaret Secondary School (Surrey BC), University of Florida, Quest University (x2), Ornithology (UBC x2), Conservation Agriculture and Biodiversity Monitoring (UBC x2), Stratford Hall High School (Vancouver BC), Radford College, Cornell University (x3)

UNDERGRADUATE MENTORING

Lily Gowens (GT)	Gowens & Freeman (*in prep*)
Nia Gladden (GT)	
Shreyas Arashanapalli (GT)	Arashanapalli & Freeman (*in prep*)
Robert Ernst (GT)	Ernst & Freeman (*in prep*)
Rayyan Saiyed (UBC)	
Geoff Lau (UBC)	Lau et al. 2023 Journal of Biogeography
Else Mikkelsen (UBC)	
Julian Heavyside (UBC)	Freeman et al. 2023 Evolution
Alex Wiebe (Cornell)	
Benjamin Van Doren (Cornell)	Van Doren et al. 2018 Wilson J Ornithology
Teresa Pegan (Cornell)	Pegan et al. 2015 PLOS ONE
Taylor Crisologo (Cornell)	Crisologo et al. 2016 Cotinga
Reid Rumelt (Cornell)	second author, Pegan et al. 2015 PLOS ONE

	co-author, Crisologo et al. 2016 Cotinga
Eric Gulson-Castillo (Cornell)	Gulson-Castillo et al. 2018 Wilson J Ornithology
Eric Sibbald (Cornell)	co-author, Crisologo et al. 2016 Cotinga
Lauren Flesher (Cornell)	co-author, Pegan et al. 2015 PLOS ONE
Mary Margaret Ferraro (Cornell)	co-author, Pegan et al. 2015 PLOS ONE
Sarah Dzielski (Cornell)	co-author, Pegan et al. 2015 PLOS ONE
Nathaniel Young (Cornell)	co-author, Pegan et al. 2015 PLOS ONE
Graham Montgomery (Cornell)	Freeman & Montgomery 2015 Condor
	Freeman, Montgomery & Schluter 2017 Evolution
	Freeman & Montgomery 2017 The Auk
	Montgomery et al. 2018 Wilson J Ornithology
	Freeman et al. 2022 Proceedings B
	Freeman et al. 2023 Evolution
Omyia Damaj (Cornell)	

FELLOWSHIPS

2018-2020	UBC Biodiversity Postdoctoral Fellow	$108,000
2017-2019	Banting Postdoctoral Fellowship	$140,000
2016-2017	NSF Postdoctoral Research Fellowship	$138,000
2015	Charles Walcott Graduate Fellowship	$12,005
2012-2015	NSF Graduate Research Fellowship	$133,500
2012	Cornell Lab of Ornithology Research Fellowship	$10,900
2010-2011	Cornell Fellowship	$22,500

RESEARCH GRANTS

2016	American Ornithologist's Union Research Grant	$2,500
2015	Kieckhefer Adirondacks Fellowship	$2,110
2014	Kieckhefer Adirondacks Fellowship	$5,000
2013	Athena Fund	$1,182
2013	AMNH Collection Study Grant	$500
2012	Athena Fund	$5,000
2011	National Geographic Research & Exploration (co-PI)	$23,500
2011	Explorer's Fund	$2,500
2011	Athena Fund	$8,200

2011	Atkinson Center Sustainable Biodiversity Fund	$4,200
2010	Athena Fund	$1,500

SELECTED RECENT PRESENTATIONS

INVITED

2024 American Ornithological Society
2024 University of Georgia
2024 Kent State University
2022 Queen's University
2022 Oregon State University
2022 Western Washington University
2022 American Ornithological Society (Plenary; Young Investigator's award)
2022 Florida International University
2022 Georgia Tech
2022 Louisiana State University
2022 Cal Poly Pomona
2022 University of Houston
2021 McGill University
2021 Congreso Peruano de Ornitología (Plenary, in Spanish)
2021 University of Toronto
2021 Carleton University
2021 Kansas State University
2020 Humboldt Day online conference
2020 North American Ornithological conference
2020 York University
2020 Simon Fraser University
2019 American Ornithological Society conference
2019 UCSB
2018 Congreso Colombiano Zoología. Bogotá, Colombia (Plenary, in Spanish)

CONTRIBUTED

2023 Species on the Move

2021 American Naturalist Virtual Asilomar conference

2020 American Naturalist Asilomar conference

2018 International Ornithological Congress

PUBLIC

2024 Tropical montane birds and the escalator to extinction: stories from the field (3x: for Georgia Ornithological Society, Birds Georgia, and Agnes Scott College)

2021 A day in the life of a crow. Stanley Park Ecological Society (2x; also given for Brock Society, Vancouver retired professionals).

2019 Ravens and crows in the Vancouver area. Lynn Canyon Regional Park.

2019 The “Escalator to Extinction”. Vancouver Public Library

2018 Crows and ravens are way cool because... Beaty Biodiversity Museum, Vancouver. Way Cool Series of public science talks

PROFESSIONAL ACTIVITIES

ORGANIZER

2024 Mountain Birds in the Anthropocene symposium at AOS

2024- Eco-Evo Discussion Group GT.

2023- EcoLunch. GT.

2018-20 Biodiversity Discussion Group. UBC.

2017-19 Eco-evo retreat. Brackendale, BC. (~125 participants for weekend retreat)

2017 BLISS seminar series. UBC.

2016 Community ecology reading group. UBC.

2013-14 Professional development (December symposium). Cornell University.

2012 Darwin reading group. Cornell University.

2010-11 Ornithology Seminar. Cornell University.

OUTREACH

I am regularly quoted in local media biodiversity stories. Recent appearances include: CBC Radio, 102.7 FM, Vancouver Courier, and Vancouver Sun.

MISC

2024 Champion, Faculty vs. Students Soccer game

2018-20 Floor warden, 2nd floor Biodiversity Research Centre.

MEMBER

Society for the Study of Evolution, American Society of Naturalists, Ecological Society of America, American Ornithologists' Union (Elective Member)

REVIEWER

Manuscripts: Nature, PNAS, Nature Climate Change, Ecology Letters, Global Change Biology, Global Ecology & Biogeography, American Naturalist, Proceedings B, Conservation Biology, Evolution, Ecography, Ecology, Journal of Biogeography, Animal Behavior, The Auk: Ornithological Advances, Ibis, etc. (~ 20 / year)

Grants: NSF DEB (ad hoc x3), Czech Science Foundation (ad hoc x5), Conicyt (Chile; ad hoc x1), Atkinson Sustainable Biodiversity Fund, UBC Hesse Research Award (x3), Graduate Women in Science (ad hoc x1)

SKILLS

LANGUAGES

English (fluent), Spanish (good)

REFERENCES

Dr. Dolph Schluter, University of British Columbia | schluter@zoology.ubc.ca

Dr. John Fitzpatrick, Cornell University | jwf7@cornell.edu

Dr. Irby Lovette, Cornell University | ijl2@cornell.edu

Dr. Monica Geber, Cornell University | mag9@cornell.edu