

# GREG A BREED

ASSOCIATE PROFESSOR

INSTITUTE OF ARCTIC BIOLOGY, UNIVERSITY OF ALASKA – FAIRBANKS

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## EDUCATION

- Ph. D., Biology, Dalhousie University** 2009  
Thesis: *State-space analyses indicate experience, prey availability, competition, and reproductive status drive foraging behaviour in a top marine predator.* **Advisors:** Ransom Myers, W. Don Bowen, & Marty Leonard
- M. S., Biological Oceanography, Texas A&M University** 2002  
Thesis: *Ecosystem dynamics in the Mississippi River plume described by inverse analysis.* **Advisor:** George Jackson
- B. S., Ecology, University of Minnesota** 1998  
**Major 1:** Ecology, Evolution and Behavior (EEB); **Major 2:** Plant Biology  
**National Student Exchange** - University of Hawaii Manoa (1996-97)

## APPOINTMENTS

- Associate Professor**, University of Alaska – Fairbanks 2019 –  
**Assistant Professor**, University of Alaska – Fairbanks 2014 – 19  
Institute of Arctic Biology & Department of Biology and Wildlife
- NSERC Banting Postdoctoral Fellow**, University of Alberta 2012 – 14  
Mathematical Biology Lab. Supervisor: Dr. Mark Lewis
- Research Fellow**, Harvard University 2012 – 14  
**Postdoctoral Fellow**, Harvard University 2011 – 12  
Butterfly behavior, ecology, and evolution.
- Postdoctoral Fellow**, UC Santa Cruz 2009 – 11  
Behavioral ecology of marine megafauna. Supervisors: Drs. Dan Costa & Ian Jonsen.
- Research Associate**, Louisiana Universities Marine Consortium 2002 – 03  
Coastal plankton ecology and ecosystem dynamics. Supervisor: Dr. Mike Dagg
- Graduate Research Assistant**, Texas A&M University 2000 – 02  
**Field Technician**, Virginia Tech: Piping plover ecology Summer 2000  
**Research Assistant**, Northern Arizona University: Desert butterfly habitat use Summer 1999  
**Field Technician**, MBL, Woods Hole: Eutrophication of eelgrass ecosystems Summer 1998  
**Field Technician**, University of Minnesota: Insect Ecology Laboratory 1995 – 98

## SCHOLARSHIPS & AWARDS

- Outstanding Graduate Student Mentor & Advisor** 2019  
University of Alaska Fairbanks, College of Natural Sciences and Mathematics
- Banting Postdoctoral Fellowship**, NSERC (\$160,000 CDN) 2012-14
- Dalhousie Scholarship**, Dalhousie University (\$40,000) 2003-07
- Regents Fellowship**, Texas A&M University (\$20,000) 2000-01
- Undergraduate Research Opportunities Grant**, University of Minnesota (\$3000) 1998
- Undergraduate Research Fellowship**, University of Georgia Marine Institute (\$5400) 1997

# REFEREED PUBLICATIONS

Formally mentored undergraduates; Formally mentored grad students; Informally mentored grad students

[Google Citations] Total Cites: 3881 | H-index: 25

## In Review or Revision:

71. **Badger, J. J.**, W. Don Bowen, C. E. den Heyer, **G. A. Breed**. (2021) Natal body size carries over into lifetime reproductive performance in grey seals (*Halichoerus grypus*). *In Review: American Naturalist*.
70. **Badger, J. J.**, W. Don Bowen, C. E. den Heyer, **G. A. Breed**. (2021) A multistate open robust design model for estimation of individual heterogeneity in imperfectly observed mark-recapture systems. *In Review: Methods in Ecology and Evolution*.
69. **Glass, T. W**, **G. A. Breed**, C. R. Laird, A. J. Magoun, M. D. Robards, C. T. Williams, K. Kielland. (2021) Microhabitat characteristics and architecture of wolverine reproductive dens and resting burrows on tundra. *In Revision: J. of Mammology*.
68. **Deane, C. E.**, L. G. Carlson, C. J. Cunningham, P. Doak, K. Kielland, **G. A. Breed**. (2021) Bayesian correlation models and  $\hat{r}$ : A need for caution when modelling additive mortality. *In Review: Ecology*.
67. **Cameron, M. D.**, K. Joly, **G. A. Breed**, C. P. H. Mulder, **Eisaguirre, J. M.**, K. Kielland. (2021) Solving a 100 year mystery: Precise identification of migration triggers in Arctic caribou using mechanistic movement models. *In Review: Ecography*.
66. **Johns, M. E.**, P. Warzybok, J. Jahncke, M. Lindberg, P. Doak, **G. A. Breed**. (2021) Episodes of high recruitment buffer against El Niño-caused disruptions in a North Pacific seabird population. *In Revision: Journal of Animal Ecology*.
65. **Deane, C. E.**, B. Flynn, D. L. Bruning, **G. A. Breed**, and K. A. Jochum. (2021) Partitioning Space and N-mixture model bias; a case study with social ungulates. *Second Review: Ecosphere*.
64. **Badger, J. J.**, W. Don Bowen, C. E. den Heyer, **G. A. Breed**. (2021) Individual robustness and correlation between reproductive performance and survival in marine mammals. *In Revision: American Naturalist*.
63. **Eisaguirre, J. M.**, T. L. Booms, C. P. Barger, S. Goddard, and **G. A. Breed** (2021) Landscape partitioning between territorial and non-territory golden eagles: Analysis using Ornstein-Uhlenbeck step-selection functions. *In Revision: Ecological Applications*.
62. **McDermott, M. T.**, P. Doak, C. M. Handel, **G. A. Breed**. (2021) High diversity in the diets of Arctic passerine nestlings revealed by next-generation sequencing. *In Revision: The Auk*.

## In Press or Published:

61. **Reynolds, M.**, K. Kielland, **G. A. Breed**, and J. Shook. (2021) Diet and reproductive success of Great Horned Owl (*Bubo virginianus*) at its northern breeding limit. *In Press: Canadian Field Naturalist*.
60. Booms, T. L., N. A. Paprocki, **Eisaguirre, J. M.**, C. C. Barger, S. B. Lewis, **G. A. Breed**, D. Oleyar. (2021) Golden eagle abundance in Alaska: Migration counts and movement data generate a conservative population estimate. *In Press: Journal of Raptor Research*.
59. **Beltran, R. S.**, A. M. Kilpatrick, **G. A. Breed**, T. Adachi, A. Takahashi, Y. Naito, P. W. Robinson, W. O. Smith, A. L. Kirkham, J. M. Burns. (2021) Ice break-out, phytoplankton blooms and the vertical foraging behavior of a Southern Ocean top predator. *Proc. Roy. Soc. B* 288(1947): 20202817. [pdf]
58. **Glass, T. W**, **G. A. Breed**, G. E. Liston, A. K. Reinking, M. D. Robards, K. Kielland. (2021) Snow as habitat: Spatiotemporally dynamic snow properties explain subnivean habitat use of an Arctic mesopredator. *Oecologia* 195(4): 887-899. [pdf]
57. **McDermott, M. T.**, P. Doak, C. M. Handel, **G. A. Breed**, C.P.H. Mulder. (2021) Willow drives changes in arthropod communities across tundra-shrub gradients of northwestern Alaska: Ecological implications of shrub expansion. *Ecosphere* 12(5): e03514. [pdf]
56. **Glass, T. W**, **G. A. Breed**, M. D. Robards, C. T. Williams, K. Kielland. (2021) Trade-off between predation risk and behavioral thermoregulation drives resting behavior in a cold-adapted mesocarnivore *Animal Behaviour* 175: 163-174. [pdf]
55. Olnes, J., **G. A. Breed**, G. M. Druckenmiller, J. J. Citta, J. A. Crawford, A. L. Von Duyke, and L. Quakenbush. (2021) Juvenile bearded seal response to a decade of sea ice change in the Bering, Chukchi, and Beaufort Seas. *Marine Ecology Progress Series* 661: 229-242. [pdf]
54. **Eisaguirre, J. M.**, C. P. Barger, S. B. Lewis, T. L. Booms, and **G. A. Breed**. (2021) Multistate Ornstein-Uhlenbeck space use models reveal sex-specific partitioning of the energy landscape in a territorial soaring bird. *Methods in Ecology and*

*Evolution*. 12(3):507-519. [pdf]

53. **Glass, T. W., G. A. Breed**, G. Iwahana, **M. C. Kynoch**, M. D. Robards, C. T. Williams, K. Kielland. (2021) Permafrost ice caves: An unrecognized microhabitat for Arctic wildlife. *Ecology* 102(5):e03276. [pdf]
52. **Reynolds, M.**, J. Shook, **G. A. Breed**, and K. Kielland. (2021) Detection and density of the Great Horned Owl (*Bubo virginianus*) in Arctic Alaska. *Journal of Raptor Research* 55(1): 56-64. [pdf]
51. **Awender, S. A.** , R. Wackerbauer, **G. A. Breed**. (2021) Generalized stability of ecological complex systems. *Chaos* 31 (2): 023106. [pdf]
50. George, J. C., Thewissen, J. G. M., Von Duyke, A., **Breed, G. A.**, Suydam, R., Sformo, T., Person, B., Brower, H. (2021) Chapter 7: Life History, Growth, and Form. *In: The Bowhead Whale: Biology & Human Interactions*. Elsevier, Amsterdam, The Netherlands.
49. **Breed, G. A.** (2021) Chapter 29: Predation and impacts of predators. *In: The Bowhead Whale: Biology & Human Interactions*. Elsevier, Amsterdam, The Netherlands.
48. **Cameron, M. D.**, K. Joly, **G. A. Breed**, C. P. H. Mulder, and K. Kielland. (2020) Role of collective memory in the interannual choice of calving sites by an arctic ungulate. *Frontiers in Ecology and Evolution*. 8: 564567. [pdf]
47. **Eisaguirre, J. M.**, C. P. Barger, S. B. Lewis, T. L. Booms, and **G. A. Breed**. (2020) Novel step selection analyses on energy landscapes reveal how linear features alter migrations of soaring birds. *Journal of Animal Ecology*. 89 (11):2567-2583. [pdf]
46. **Glass, T. W.**, **G. A. Breed**, M. D. Robards, C. T. Williams, K. Kielland (2020) Probabilistic classification of accelerometer data to resolve activity budgets in a cryptic top predator. *Ecological Informatics* 60: 101152. [pdf]
45. **Badger, J. J.**, W. Don Bowen, C. E. den Heyer, **G. A. Breed**. (2020) Variation in individual reproductive performance amplified by population size in a long-lived carnivore. *Ecology* 101 (6): e03024. [pdf]
44. **Johns, M. E.** , P. Warzybok, J. Jahncke, M. Lindberg, **G. A. Breed**. (2020) Oceanographic controls of winter habitat use in Cassin's auklets. *Ecological Applications* 30 (3): e02068. [pdf]
43. Matthews\*, C. J. D., **G. A. Breed\***, B. LeBlanc, and S. H. Ferguson. (2020) Killer whale presence drives bowhead whale selection for sea ice in Arctic seascapes of fear. *Proc Nat Acad Sci* 117 (12): 6590-6598. \*Joint lead authorship. [pdf]
42. **Eisaguirre, J.M.**, M. Auger-Méthé, C.P. Barger, S.B. Lewis, C.L. McIntyre, T.L. Booms, and **G. A. Breed**. (2019) Dynamic-parameter movement models reveal drivers of migratory pace in a soaring bird. *Frontiers in Ecol and Evol* 7:317. [pdf]
41. **Beltran, R. S.**, A. Kirkham, **G. A. Breed**, J. Testa, and J. J. Burns. (2019) Reproductive success delays moult phenology in Weddell seals. *Scientific Reports* (9):5221. [pdf]
40. **Eisaguirre, J.M.**, T. L. Booms , C.P. Barger , C.L. McIntyre , S.B. Lewis, **G. A. Breed**. (2018) Local meteorological conditions reroute a migration. *Proc R. Soc. Lond. B* 285 (1890): 20181464. [pdf]
39. **Johns, M.E.**, P. Warzybok, R.W. Bradley, J. Jahncke, M. Lindberg and **G.A. Breed**. (2018) Increased reproductive investment associated with greater survival and longevity in Cassin's auklets. *Proc R. Soc. Lond. B* 285 (1885): 20181464. [pdf]
38. **Smith, J.**, S Karpovich, **G.A. Breed**, and D M O'Brien. (2018) Morphological characteristics of harbor seal (*Phoca vitulina*) whiskers and their use in dietary reconstruction using stable isotope ratios. *Canadian J. Zoology* 96 (11): 1255-1263. [pdf]
37. **Cameron, M.D.**, K. Joly, **G.A. Breed**, L.S. Parrett, and K Kielland. (2018) Movement-based methods to infer parturition events in migratory ungulates *Canadian J. Zoology* 96 (11): 1187-1195. [pdf]
36. Severns, P.M. and **G.A. Breed**. (2018) Male harassment influences female movements and genetic architecture in a fragmented metapopulation network. *Ecography* 41: 2045-2054. [pdf]
35. **Breed, G.A.**, M.F. Cameron, J.M. Ver Hoef, P.L. Boveng, A. Whiting, and K.J. Frost. (2018) Seasonal sea ice dynamics drive movement and migration of juvenile bearded seals (*Erignathus barbatus*). *Marine Ecology Progress Series* 600:223-237. [pdf]
34. **Beltran, R.S.**, J.M. Burns, and **G.A. Breed**. (2018) Convergence of biannual molting strategies across endothermic vertebrates. *Proc R. Soc. Lond. B* 285(1878):20180318. [pdf]
33. Cameron, M.F., K. J. Frost, J. M. Ver Hoef, **G. A. Breed**, A. V. Whiting, J. Goodwin and P. L. Boveng. (2018) Habitat selection and seasonal movements of young bearded seals (*Erignathus barbatus*) in the Bering Sea. *Plos One*: 13(2):e0192743. [pdf]
32. **Breed, G. A.**, C. J. D. Matthews, M. Marcoux, N. R. Reinhart, J. W. Higdson, B. LeBlanc, S. D. Petersen, J. Orr, and S. H. Ferguson. (2017) Sustained disruption of narwhal habitat use and behavior in the presence of Arctic killer whales. *Proc of the Nat*

*Acad Sci*: 114 (10), 2628-2633. [pdf]

31. Brown, L. M, **G. A. Breed**, P. M. Severns, E. E. Crone. (2017) Losing a battle but winning the war: moving past preference-performance to understand native herbivore–novel host plant interactions. *Oecologia*: **183**(2):441-453. [pdf]
30. **Johns, M. E.**, P. Warzybok, R. W. Bradley, J. Jahncke, M. Lindberg, **Breed, G. A.** (2017) Age, timing, and a variable environment affect double brooding attempts of a long-lived seabird. *Mar. Eco. Prog. Ser.* **564**:187-197. [pdf]
29. **Breed, G. A.**, **E. A. Golson** and M. T. Tinker. (2017) Predicting animal home-range structure and transitions using a multistate Ornstein-Uhlenbeck correlated random walk. *Ecology* **98**(1):32-47. [pdf]
28. **Sexson, M. G.**, M. R. Petersen, **G. A. Breed**, and A. N. Powell. (2016) Shifts in the distribution of molting Spectacled Eiders (*Somateria fischeri*) as an indicator of ecosystem change in the Arctic. *Condor* **118**(3):463-476. [pdf]
27. **Demars, C.**, **G. A. Breed**, J. R. Potts, and S. Boutin. (2016) Spatial patterning of prey at reproduction to reduce predation risk: what drives dispersion from groups? *American Naturalist*: **187**(5):678-687. [pdf]
26. **Breed, G. A.** and P. M. Severns. (2015) Unexpectedly high precision of consumer-grade GPS units for small-scale animal movement studies. *PeerJ* **3**:e1205. [pdf]
25. **Breed, G. A.**, P. M. Severns, and A. M. Edwards. (2015) Apparent power-law step length distributions can arise from intraspecific interactions. *J. Roy. Soc. Interface* **12**:20140927. [pdf]
24. Luque, S. P., S. H. Ferguson and **G. A. Breed**.\* (2014) Spatial behaviour of a keystone Arctic marine predator and implications of climate warming in Hudson Bay. *J. Exp. Mar. Bio. Ecol.* **461**:504-515. \*Corresponding Author. [pdf]
23. Severns, P. M. and **G. A. Breed**. (2014) Behavioral divergence and life-history consequences after adoption of an exotic host plant (*Plantago lanceolata*) in two *Euphydryas* spp. butterflies. *Behav. Ecol. Sociobiology*, **68** (5), 805-814. [pdf]
22. **Maxwell, S. M.**, E. L. Hazen, S. J. Bograd, B. S. Halpern, **G. A. Breed**, B. Nickel, H. Bailey, M. A. Kappes et al. (2013) Pelagic predator distributions and impacts: implications for effective spatial management of the oceans. *Nature Communications*, **4**:2688. [pdf]
21. **Breed, G. A.**, W. D. Bowen and M. L. Leonard. (2013) Behavioral signature of intraspecific competition and density-dependence in colony breeding marine predators. *Ecology and Evolution*. **3** (11), 3838-3854. [pdf]
20. Fagan, W. F., M. A. Lewis, **M. Auger-Méthé**, T. Avgar, S. Benhamou, **G. A. Breed**, L. LaDage, **U. Schlaegel**, W. Tang, Y. Papatamatiou, J. Forester, and T. Mueller. (2013) Spatial memory and animal movement. *Ecology Letters*, **16** (10), 1316-1329. [pdf]
19. **Breed, G. A.**, S. Stitcher and E. E. Crone. (2013) Climate-driven changes in northeastern US butterfly communities. *Nature: Climate Change* **3**: 142-145. [pdf] *Featured on the cover & widely reported by international media outlets.*
18. Edwards, A. M., M. P. Freeman, **G. A. Breed** and I. D. Jonsen. (2012) Incorrect likelihood methods were used to infer scaling laws of marine predator search behaviour. *PloS One* **7**(10): **e45174**. [pdf] *Recommended by Faculty of 1000.*
17. Costa, D. P, **G. A. Breed** and P. W. Robinson. (2012) New insights into pelagic migrations: implications for ecology and conservation. *Annu. Rev. Ecol. Evol. Syst.* **43**:73-96. [pdf]
16. Harvey, V., M. O. Hammill, D. P. Swain, **G. A. Breed**, C. Lydersen and K.M. Kovacs. (2012) Winter foraging by a top predator, the grey seal, in relation to the distribution of prey. *Mar. Eco. Prog. Ser.* **462**:273-286. [pdf]
15. **Breed, G. A.**, D. P. Costa, P. W. Robinson, I. D. Jonsen and J. Mills-Flemming. (2012) State-space methods for better inference of behavioral dynamics in tracked animals. *Ecol. Modelling* **235-236**:49-58. [pdf]
14. **Maxwell, S. M.**, J. J. Frank, **G. A. Breed**, P. W. Robinson, S. A. Simmons, D. E. Crocker, J. P. Gallo-Reynoso and D. P. Costa. (2012) Benthic foraging on seamounts by a deep diving marine mammal. *Mar. Mamm. Sci.* **28**(3): e333-e344. [pdf]
13. Benoît, H. P., D. P. Swain, W. D. Bowen, **G. A. Breed**, M. O. Hammill and V. Harvey. (2011) Can predation by grey seals explain elevated natural mortality in three fish species in the southern Gulf of St. Lawrence? *Mar. Eco. Prog. Ser.* **442**:149-167. [pdf]
12. **Maxwell, S. M.**, **G. A. Breed**, B. J. Godley, R. J. Parnell, J. Makanga-Bahouna, E. Pemo-Makaya, S. Nguouessono, B. Nickel, A. Formia, D. P. Costa and M. S. Coyne. (2011) Internesting behavior and movements of olive ridley sea turtles (*Lepidochelys olivacea*) in Gabon, Africa. *PloS One* **6**(5):e19905. [pdf]
11. **Breed, G. A.**, W. D. Bowen and M. L. Leonard. (2011) Development of foraging strategies with age in a long-lived marine

predator. *Mar. Eco. Prog. Ser.*, **431**: 267–279. [pdf]

10. Block, B., I. Jonsen, S. Jorgensen, A. Winship, S. Shaffer, S. Bograd, E. Hazen, D. Foley, **G. A. Breed**, A.-L. Harrison, J. Ganong, A. Swithenbank, M. Castleton, H. Dewar, B. Mate and D. Costa. (2011) Tagging of Pacific Pelagics: Tracking apex marine predator movements in a dynamic ocean. *Nature*, **475**:86–90. doi:10.1038/nature10082. [pdf]
9. **Breed, G. A.**, D. P. Costa., M. E. Goebel and P. W. Robinson. (2011) Electronic tracking tag programming is critical to data collection for behavioral time-series analysis. *Ecosphere*, **2**:art10. [pdf]
8. **Breed, G. A.**, I. D. Jonsen, R. A. Myers, W. D. Bowen and M. L. Leonard. (2009) Sex-specific, seasonal foraging tactics of adult grey seals (*Halichoerus grypus*) revealed by state-space analysis. *Ecology* **90**:3209–3221. [pdf]
7. Green, R. E., **G. A. Breed**, M. J. Dagg and T. S. Bianchi. (2008) Modelling ecosystem responses to changing nutrients in the Mississippi River Plume. *Cont. Shelf Res.* **28**:1451–1465. [pdf]
6. **Breed, G. A.**, W. D. Bowen, J. I. McMillan and M. L. Leonard. (2006) Sexual segregation of seasonal foraging habitats in a non-migratory marine mammal. *Proc. R. Soc. B* **273**:2319–2326. [pdf]
5. Green, R. E., T. S. Bianchi, M. J. Dagg, N. D. Walker and **G. A. Breed**. (2006) An organic carbon budget for the Mississippi River turbidity plume and plume contributions to air-sea CO<sub>2</sub> fluxes and bottom water hypoxia. *Estuaries and Coasts* **29**:579–597. [pdf]
4. Dagg, M. J., T. S. Bianchi, **G. A. Breed**, W.-J. Cai., S. Duan, H. Liu, B. M. McKee, R. T. Powell and M. Stewart. (2005) Biogeochemical characteristics of the lower Mississippi River, USA, during June 2003. *Estuaries and Coasts* **28**:664–674. [pdf]
3. **Breed, G. A.**, G. A. Jackson and T. L. Richardson. (2004) Sedimentation, carbon export, and food web structure in the Mississippi River plume described by inverse analysis. *Mar. Eco. Prog. Ser.* **278**:35–51. [pdf]
2. Dagg, M. J., and **G. A. Breed**. (2003) Biological effects of Mississippi River nitrogen on the Northern Gulf of Mexico: A Review and Synthesis. *J. Mar. Sys.* **43**:133–152. [pdf]
1. Buck, T. L., **G. A. Breed**, S. C. Pennings, M. E. Chase, M. Zimmer and T. H. Carefoot. (2003) Diet choice in an omnivorous salt marsh crab: Different food types, claw allometry, and habitat complexity. *J. Exp. Mar. Bio. Ecol.* **292**:103–116. [pdf]

## POPULAR AND TECHNICAL ARTICLES

2. **Breed, G. A.** and S. Stichter. (2013) Shifting North: Warmer climates are changing the ranges of just about everything. *American Butterflies* **20** (3/4): 4–15. [pdf]
1. Harvey, V., M. O. Hammill, D. P. Swain, **G. A. Breed**, C. Lydersen and K. M. Kovacs. (2010) Winter foraging by a top predator, the grey seal, in relation to the distribution of prey. DFO Can. Sci. Advis. Sec. Res. Doc., 2010/124.

## GRANTS AND CONTRACTS

<b>NSF Biological Oceanography</b> (PI: \$398,000) Title: <i>Predator facilitation across a variable marine environment.</i>	2021-24
<b>US Fish and Wildlife Service</b> (PI: \$86,000) Title: <i>Accounting for reporting bias in Lincoln estimates of Arctic goose abundance with Bayesian Brownie models.</i>	2021-22
<b>US Fish and Wildlife Service</b> (PI: \$53,000) Title: <i>Sea otter spatial ecology in Kachemak Bay, Alaska: Implications for population dynamics and distribution across Alaska.</i>	2021-23
<b>Alaska Department of Fish and Game</b> (coPI: \$1.3M) Title: <i>Impact of social structure collapse on movement, survival, and population stability in an exploited ungulate.</i>	2021-25
<b>NSF</b> (PI: \$38,235) Title: <i>INTERN Supplement to NSF Graduate Research Fellowship for Janelle Badger.</i>	2020
<b>Alaska Department of Fish and Game / BOEM</b> (coPI: \$76,500) Title: <i>Effects of sea ice degradation on winter range and migration of the Bering-Chukchi-Beaufort bowhead whale stock.</i>	2019-20
<b>US Fish and Wildlife Service</b> (PI: \$144,000) Title: <i>Golden Eagle migration ecology.</i>	2016-19

<b>Northwest Arctic Borough</b> (PI: \$31,000)	2015-16
Title: <i>Satellite tagging and behaviour of bearded seals in Kotzebue Sound.</i>	
<b>Banting Postdoctoral Fellowship</b> , NSERC (\$160,000 CDN)	2012-14
Title: <i>Adaptive modelling of animal telemetry data: Building better analyses of animal movement to conserve and protect Canadian wilderness.</i>	

## TEACHING

Data Analysis in Biology (Biol 680)	Instructor - University of Alaska	2015-21
Movement Ecology (Biol 693)	Instructor - University of Alaska	2017, 19
Sampling Design in Ecology (WLF 301)	Instructor - University of Alaska	2015-21
Mathematics of Biological Invasions	T.A. - University of Alberta	2013
Freshman Seminar	Guest Lecturer - Harvard University	2012
Entomology	Lab Instructor - Dalhousie University	2005
Marine Diversity	T.A. - Dalhousie University	2004

## INVITED TALKS

- G. A. Breed** (2021) Georgetown University Biology Departmental Seminar. May 6, 2021. *Considering animal life histories under global change.*
- Matthews C. J. D., **G. A. Breed**, S. H. Ferguson. (2019) Polar Marine Science Gordon Research Conference, Lucca, Italy. March 17-22, 2019. *Killer whales on the move: shifting 'seascapes of fear' in warming Arctic marine ecosystems.*
- Breed, G. A.** (2018) Campbell Creek Science Center Fireside Lecture. Anchorage, AK. 28 Nov 2018. *Emerging predator regimes in the North American Arctic.*
- Breed, G. A.** (2018) DFO Freshwater Institute, Winnipeg, Manitoba. 14 Aug 2018. *Comparing non-consumptive effects of emerging predator regimes in Alaska and the Eastern Canadian Arctic.*
- Breed, G. A.** (2016) International Congress on Entomology. Orlando, Florida, 25 Sept 2016. *Climate change, butterfly conservation, and citizen science in Massachusetts, Alaska, and Minnesota.*
- Breed, G. A.** (2016) Michigan State University, Department of Integrative Biology. 18 Aug 2016.
- Breed, G. A.** (2016) University of Maine, Department of Marine Sciences. 29 Jan 2016. *Marine predators and their impact on ocean ecosystems.*
- Breed, G. A.** (2014) Exploring Public Participation in Scientific Research Under Western Skies Conference, Calgary, AB, 9 Sept 2014. *Analysis challenges in citizen science data.*
- Breed, G. A.** (2014) Florida State University, Department of Biology, 3 Mar. 2014.
- Breed, G. A.** (2014) University of Alaska Fairbanks, Institute of Arctic Biology, 30 Jan. 2014.
- Breed, G. A.** (2014) York University, Department of Biology, Toronto, Canada. 17 Jan. 2014.
- Breed, G. A.** (2013) University of Wyoming, Department of Zoology and Physiology, 25 Nov. 2013. *From Butterflies to Whales: Quantifying human impacts on individuals, populations, and ecosystems.*
- Breed, G. A.** (2013) Moss Landing Marine Lab, 19 Sept. 2013.
- Breed, G. A.** (2013) Sonoma State University, Department of Biology, 10 Sept. 2013.
- Breed, G. A.** (2013) Swansea University, BioScience Department, 14 May 2013. *Understanding the effects of animal movement on individuals, populations, and ecosystems.*
- Breed, G. A.** (2013) Dept. of Ecol., Evol. & Environmental Biology, Columbia University, 30 April 2013. *Missing predators and century long trophic cascades in the Northwest Atlantic Ocean.*
- Breed, G. A.** (2013) The Wildlife Society Annual Meeting, Canmore, AB, 9 March 2013. *Analysis challenges in citizen science data.*
- Breed, G. A.** (2013) Feralia Symposium, University of Alberta. 16 February 2013. *Using multiple sources of observation data to detect expansions and retractions in butterfly ranges.*
- Breed, G. A.** (2013) Marine Institute, Memorial University of Newfoundland. 5 February 2013. *Inferring the status and impact of grey seals in eastern Canadian shelf ecosystems.*
- Breed, G. A.** (2012) Centre for Mathematical Biology, University of Alberta, Edmonton, AB. 26 November 2012. *Detecting changes in butterfly communities from citizen science data.*
- Breed, G. A.** (2012) Department of Biological Sciences, University of Alberta, Edmonton, AB. 16 November 2012. *Understanding*

*animal movement through dynamic oceans and warming landscapes.*

- Breed, G. A.** (2012) Alaska Science Center, Anchorage, AK. 9 November 2012. *Practical and ecological lessons learned collecting and analyzing the world's largest animal tracking datasets.*
- Invited panel member. (2012) Banff International Research Station, Banff, AB. 21-28 October 2012. Animal movement and memory focused research group.
- Breed, G. A.** (2012) SESYNC Butterfly Monitoring Workshop. Annapolis, MD. 8 May 2012. *Citizen-scientist data suggest climate-driven population changes in New England butterfly fauna.*
- Breed, G. A.** (2012) Dauphin Island Sea Lab, Dauphin Island, AL. 19 March 2012. *Understanding animal movement through dynamic oceans.*
- Breed, G. A.** (2011) Ecological Modelling Workshop, 19th Biennial Conference on the Biology of Marine Mammals. Tampa FL. 26 November 2011. *Developing better statistical methods for tracking data.*
- Breed, G. A.** (2011) Dept. of Biology, Dalhousie University, Halifax, NS. 21 March 2011. *Practical and ecological lessons learned collecting and analyzing the world's largest animal tracking datasets.*
- Breed, G. A.** (2010) Harvard Forest, Harvard University, Petersham, MA. 13 October 2010. *Using movement models to understand the life history and behaviour of marine predators.*
- Breed, G. A.** (2010) Department of Biology, Dalhousie University, Halifax, NS. 7 October 2010. *Using movement data to understand the life history of grey seals and their impact on the Scotian Shelf ecosystem.*
- Breed, G. A.** (2010) Dept. of Mathematics and Statistics, Dalhousie University, Halifax, NS. 30 Sept 2010. *Estimating parameters of animal movement models using SIR particle filter methods.*
- Breed, G. A.** (2009) Dept. of Ecology and Evolutionary Biology, UC Santa Cruz, Santa Cruz, CA. 29 April 2009. *State-space models as tools to understand movement in marine animals observed by satellite.*
- Breed, G. A.,** I. D. Jonsen, W.D. Bowen, M.L. Leonard, and R. A. Myers (2007) Southwest Fisheries Science Center, La Jolla, CA. 13 August 2007. *State-space models as tools to understand movement in marine animals observed by satellite.*
- Breed, G. A.,** I.D. Jonsen, H.K. Lotze, and B. Worm (2007) 6 June 2007. NOAA Office of Ocean Exploration, Silver Spring, MD. *Future of Marine Animal Populations: Predicting abundance, distribution, and diversity of marine life in the global ocean.*
- Breed, G. A.,** W.D. Bowen, M.L. Leonard, and R. A. Myers (2007) 14 May 2007. Department of Natural Resources, Cornell University, Ithaca, NY. *Getting the most of animal tracking data: State-space models as tools to understand behaviour from satellite telemetry data.*
- Breed, G. A.,** I.D. Jonsen, W.D. Bowen, D. Austin, and R.A. Myers (2005) Ecological Modeling Workshop, 16th Biennial Conference on the Biology of Marine Mammals. December 2005, San Diego, CA. *Using state-space models to discriminate behavioural state from ARGOS satellite telemetry data.*
- Breed, G. A.** (2002) Long-term Estuary Assessment Group (LEAG) workshop, Tulane University. 14 Nov 2002. *Inverse analysis of carbon and nitrogen flow in the Mississippi River plume ecosystem.*

## CONTRIBUTED PRESENTATIONS

**Formally mentored undergraduates; Formally mentored grad students; Informally mentored grad students**

- Awender, S.,** R. Wackerbauer, **G. A. Breed.** Stability Analysis of Abstract Ecological Networks. May 22, 2019. SIAM Conference on Applications of Dynamical Systems. Snowbird, Utah. [Red Sock Award for Best student poster]
- Eisaguirre, J. M.,** T. L. Booms , C. P. Barger, S. B. Lewis, C. L. McIntyre, and **G. A. Breed.** Linear features affect migratory movements of Golden Eagles. March 6, 2019. Alaska Bird Conference, Fairbanks, AK.
- Cameron, M. D.,** K. Joly, **G. A. Breed,** C. P. H. Mulder and K. Kielland. Analysis of calving locations highlights fidelity to core area for migratory caribou herd. November 1, 2018. 17th North American Caribou Workshop, Ottawa, Canada.
- Badger, J. J.,** W. Don Bowen, Nell den Heyer, **G. A. Breed.** Hierarchical multi-state mark-recapture models reveal population density amplifies individual heterogeneity in reproductive success. July 5, 2018. International Statistical Ecology Conference, St. Andrews, Scotland.
- Breed, G. A.,** C. J. D. Matthews, J. W. Higdon, B. LeBlanc, S. D. Petersen, J. Orr, and S. H. Ferguson. (2018) Assessing non-consumptive effects of emerging predator regimes in warming Arctic marine ecosystems. Contributed oral. June 12, 2018. Ecosystem Studies of Subarctic and Arctic Seas Annual Science Meeting. Fairbanks, Alaska.
- Beltran, R. S.,** A. Kirkham, **G. A. Breed,** J. W. Testa, J. Burns. (2018) Molt phenology mediates colony attendance in Weddell seals. June 21, 2018. Student poster. POLAR 2018 Joint Annual Meeting, Davos, Switzerland.
- Eisaguirre, J.M.,** T. L. Booms , C.P. Barger, C.L. McIntyre , S.B. Lewis, **G. A. Breed.** Local meteorological conditions reroute a migration. Student Oral. April 12, 2018. American Ornithological Society Meeting, Tucson, Arizona.
- Johns, M.E.,** P. Warzybok, R. Bradley, J. Jahnke, M. Lindberg, **G. A. Breed.** (2018) Oral presentation. Double brooding associated with higher survival and reproduction in the Cassin's auklet. Feb. 23, 2018. 45th Annual Pacific Seabird Group Meeting. La Paz, Mexico.

- Eisaguirre, J.M.**, M. Auger-Méthé, C.P. Barger, S.B. Lewis, C.L. McIntyre, T.L. Booms, and **G. A. Breed**. (2017) Complex stopover and migratory behavior revealed using mechanistic movement models with environmentally driven dynamic parameters. Raptor Research Foundation Annual Conference. Salt Lake City, UT USA, November 2017.
- Breed, G. A.**, C. J. D. Matthews, M. Marcoux, N. R. Reinhart, J. W. Higdon, B. LeBlanc, S. D. Petersen, J. Orr, and S. H. Ferguson. (2017) Sustained disruption of narwhal habitat use and behavior in the presence of Arctic killer whales. Oral. 22nd Biennial Conference on the Biology of Marine Mammals, Halifax, NS
- Beltran, R. S.**, T. Adachi, P. W. Robinson, A. Takahashi, Y. Naito, A. L. Kirkham, **G. A. Breed**, J. M. Burns. (2017) Weddell seal dives suggest a vertical ecosystem shift concurrent with seasonal phytoplankton blooms. Student oral. 22nd Biennial Conference on the Biology of Marine Mammals, Halifax, NS
- Badger J. J.**, W. D. Bowen, C. den Heyer, **G. A. Breed**. (2017) Influence of density on the expression of heterogeneity in reproductive traits in a long-lived marine predator, the grey seal (*Halichoerus grypus*) Student oral. 22nd Biennial Conference on the Biology of Marine Mammals, Halifax, NS
- Beltran, R. S.**, A. L. Kirkham, **G. A. Breed**, J. M. Burns. (2017) Reproductive effort affects the annual dive behavior of adult, female Weddell seals. Student oral. Scientific Committee on Antarctic Research Biology, Leuven, Belgium.
- Beltran, R. S.**, T. Adachi, P. W. Robinson, A. Takahashi, Y. Naito, A. L. Kirkham, **G. A. Breed**, J. M. Burns. (2017) Combining time-depth recorders and jaw accelerometers to reconstruct the year-round foraging behavior of adult, female Weddell seals. Student poster. 6th International Bio-Logging Science Symposium, Constance, Germany.
- Beltran, R. S.**, **G. A. Breed**, P. W. Robinson, D. K. Briscoe, E. L. Hazen, S. J. Bograd, D. P. Costa. (2017) Oceanographic drivers of foraging effort and success in the northern elephant seal. Student poster. 6th International Bio-Logging Science Symposium, Constance, Germany.
- Awender, S.**, R. Wackerbauer, **G. A. Breed** (2017) Reconstructing real trophic adaptive networks of the Southern Beaufort. Student poster. 8th Annual Midnight Sun Science Symposium. UAF, Fairbanks, AK.
- Cameron, M. D.**, K. Joly, **G. A. Breed**, L. Parrett, K. Kielland. (2017) Can movement-based methods be used to infer parturition events for migratory caribou? Validation with an Alaskan herd. Student Oral. 8th Annual Midnight Sun Science Symposium. UAF, Fairbanks, AK.
- Beltran, R. S.**, T. Adachi, P. W. Robinson, A. Takahashi, Y. Naito, A. L. Kirkham, **G. A. Breed**, J. M. Burns. (2017) Weddell seal dives suggest a vertical ecosystem shift concurrent with seasonal phytoplankton blooms. Student Oral. 8th Annual Midnight Sun Science Symposium. UAF, Fairbanks, AK.
- Eisaguirre J. M.**, M. Auger-Méthé, C. P. Barger, S. B. Lewis, C. L. McIntyre, T. L. Booms, **G. A. Breed**. (2017) Mechanistic movement model reveals multi-scale behavioral patterns in a soaring bird during migration. Student Oral. 8th Annual Midnight Sun Science Symposium. UAF, Fairbanks, AK.
- Awender, S.**, R. Wackerbauer, **G. A. Breed** (2017) Reconstructing real trophic adaptive networks of the Southern Beaufort. Student poster. The Week of the Arctic Conference. UAF, Fairbanks, AK.
- Cameron, M. D.**, K. Joly, **G. A. Breed**, L. Parrett, K. Kielland. (2017) Can movement-based methods be used to infer parturition events for migratory caribou? Validation with an Alaskan herd. Student Oral. The Wildlife Society Alaska Chapter Meeting, Fairbanks, AK. (**Awarded best student presentation**)
- Eisaguirre J. M.**, M. Auger-Méthé, C. P. Barger, S. B. Lewis, C. L. McIntyre, T. L. Booms, **G. A. Breed**. (2017) Mechanistic movement model reveals multi-scale behavioral patterns in a soaring bird during migration. Student Oral. The Wildlife Society Alaska Chapter Meeting, Fairbanks, AK.
- Johns ME**, P. Warzybok, R. Bradley, J. Jahnke, M. Lindberg, **G. A. Breed**. (2017) Factors that influence double brooding in Cassin's auklets. Student Poster. 44th Pacific Seabird Group meeting, Tacoma, WA. (**Awarded best student poster**)
- Johns M. E.**, P. Warzybok, R. Bradley, J. Jahnke, M. Lindberg, and **G. A. Breed** (2016) Factors that influence double brooding in Cassin's auklets. Student Poster. 17th Alaska Bird Conference, Cordova, AK.
- Eisaguirre, J. M.**, N. Paprocki, S. B. Lewis, C. P. Barger, C. L. McIntyre, D. Oleyar, **G. A. Breed**, T. L. Booms. (2016) Factors that influence double brooding in Cassin's auklets. Student Oral. 17th Alaska Bird Conference, Cordova, AK.
- Cameron, M. D.**, K. Joly, K. Kielland, **G. A. Breed**. (2016) Identifying parturition events for migratory caribou (*Rangifer tarandus*) of the Western Arctic caribou herd. Poster. North American Caribou Workshop May 2016, Thunder Bay Ontario.
- Johns, M. E.**, Warzybok, P., Bradley, R., Jahnke, J., Breed, G., Lindberg, M. (2016) Will she lay again? Double brooding in Cassin's auklets (*Ptychoramphus aleuticus*). (Poster) Pacific Seabird Group 43rd Annual Meeting; 2016 Feb 10-13, Oahu, Hawaii. (**Awarded best MS student poster**)
- Breed, G. A.**, C. J. D. Matthew, J. Orr, M. Marcoux, N. R. Reinhart, J. W. Higdon, B. LeBlanc, S. D. Petersen, S. H. Ferguson (2015) 21th Biennial Conference on the Biology of Marine Mammals, San Francisco, CA. Oral presentation. *Synchronous tracking of predator and prey in the Canadian Arctic Archipelago*
- Breed, G. A.**, M. T. Tinker and **E. A. Golson** (2013) 20th Biennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand. Oral presentation. *An Ornstein-Uhlenbeck BCRW model with switching between multiple home-range centers: Implementa-*



tion for California sea otters.

- Golson, E. A.**, M. T. Tinker, J. T. Harvey, and **Breed, G. A.** (2013) 20th Biennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand. Poster. *Simulations and application of sea otter (*Enhydra lutris nereis*) biased correlated random walk model to understand oiling risk.*
- James, A. R. M., G. A. Breed**, and E. E. Crone (2013) Ecological Society of America annual meeting, Minneapolis, MN, USA. *You are what you eat: the effect of *Euphydryas phaeton*'s novel host plant use on its morphology.*
- Breed, G. A.**, P. M. Severns, **A. R. M. James**, E. E. Crone (2013) Oral presentation. Ecological Society of America annual meeting, Minneapolis, MN, USA. *Demographic consequences to a specialist herbivore (*Euphydryas phaeton*) following the adoption of the weedy exotic host-plant *Plantago lanceolata*.*
- Breed, G. A.**, P. M. Severns, E. E. Crone (2013) Poster. Gordon Conference on Plant-Herbivore Interaction, Ventura, CA. *Demographic consequences to a specialist herbivore (*Euphydryas phaeton*) following the adoption of the weedy exotic host-plant *Plantago lanceolata*.*
- Maxwell, S. M.**, E. L. Hazen, S. J. Bograd, B. S. Halpern, B. Nickel, **G. A. Breed**, B. A. Block, H. Bailey, M. A. Kappes and D. P. Costa (2013) Southern California Marine Mammal Workshop. Newport Beach, CA. *Pelagic predator distributions and anthropogenic impacts: implications for effective spatial management in the California Current.*
- Breed, G. A.**, S. Stichter and E. E. Crone (2012) Oral presentation. Ecological Society of America annual meeting, Portland, OR, USA. *Citizen-scientist data suggest climate-driven population changes in New England butterfly fauna.*
- Ries, L., D. Taron, A. Caldas, J. Daniels, K. Oberhauser, N. Brockman, K. Wilson, P. Allen, **G. A. Breed**, B. Fagan, J. Glassberg et al. (2012) Poster. Ecological Society of America annual meeting, Portland, OR, USA. *The North American Butterfly Monitoring Network: Supporting butterfly research, scientific discovery, and education.*
- Breed, G. A.**, D. P. Costa, I. D. Jonsen, P. W. Robinson, and J. E. Mills-Flemming (2011) Oral Presentation. 19th Biennial Conference on the Biology of Marine Mammals. Tampa Florida, USA. *Particle filter methods for better inference of behaviour in tracking data.*
- Goetsch, C.**, P. W. Robinson, **G. A. Breed**, **S. M. Maxwell**, M. Fowler, N. Teutschel, S. Simmons, D. P. Costa and D. Crocker (2011) Biologging 4, Hobart, Tasmania. *When is *El Niño* too hot to handle? Evidence of a tolerance threshold in a marine top predator.*
- Breed, G. A.**, J. E. Mills-Flemming, D. P. Costa and I. D. Jonsen (2011) Poster. Biologging 4, Hobart, Tasmania. *State-space estimation of time-varying movement parameters from animal tracking data.*
- Maxwell, S. M.**, E. L. Hazen, S. J. Bograd, B. S. Halpern, B. Nickel, **G. A. Breed**, B. A. Block, H. Bailey, M. A. Kappes and D. P. Costa. (2011) International Marine Conservation Congress 2, Victoria BC. *The Role of Top Predators in Coastal and Marine Spatial Planning.*
- Maxwell, S. M.**, **G. A. Breed**, B. J. Godley, R. J. Parnell, J. Makanga-Bahouna, E. Pemo-Makaya, S. Ngouesso, B. Nickel, A. Formia, D. P. Costa and M. S. Coyne. (2011) International Sea Turtle Symposium, San Diego. *Internesting Habitat and Behavior of Olive Ridley Sea Turtles: Implications for West African Sea Turtle Conservation.*
- Winship, A. J., I. D. Jonsen, S. Jorgensen, **G. A. Breed**, A.-L. Harrison, J. E. Ganong, S. A. Shaffer, D. P. Costa and B. A. Block (2010) The J. Frederick Grassle Science Symposium on the Census of Marine Life. London, 5 Oct 2010. *Statistical methods for synthesizing the world's largest tracking dataset.*
- Harvey, V., **G. A. Breed**, M. O. Hammill and D. Swain. (2009) Poster. 18th Biennial conference on the Biology of Marine Mammals. Quebec, Canada. *Spatial overlap between grey seals and fish in the Cabot Strait area in winter.*
- Breed, G. A.**, W. D. Bowen, M. L. Leonard and I. D. Jonsen. (2009) Oral presentation. Ecological Society of America, Albuquerque, NM, USA & 18th Biennial conference on the Biology of Marine Mammals. *Evidence for displacement of juveniles by intraspecific competition in a large population of marine mammals.*
- Breed, G. A.**, J. Mills Flemming, M. Dowd, C. Field and D. P. Costa (2009) Poster. Statistical Society of Canada Conference, Vancouver, BC, Canada. *Parameter augmented particle filter/smoothing methods for animal tracking data.*
- Breed, G.A.**, I. D. Jonsen, W.D. Bowen, M.L. Leonard and R. A. Myers (2008) Oral presentation. *Sex- and age-specific foraging tactics in grey seals (*Halichoerus grypus*) revealed by behaviour discriminating state-space models.* ICES 2008, Halifax, NS, Canada.
- Breed, G.A.**, W.D. Bowen and M.L. Leonard (2007) Oral presentation. Ecological Society of America, San Jose, CA, USA. *Development of movement and foraging strategies in young of year grey seals elucidated by behaviour discriminating state-space modeling.*
- Breed, G.A.**, I.D. Jonsen, W.D. Bowen, D. Austin and R.A. Myers (2005) Oral presentation. 16th Biennial conference on the Biology of Marine Mammals. San Diego, CA, USA. *Using state-space models to discriminate behavioural state from ARGOS satellite telemetry data.*
- Breed, G.A.**, W.D. Bowen and J.M. McMillian (2005) Oral presentation. Ecological Society of America, August 2005, Montreal, Canada. *Seasonal segregation of foraging areas by sex in a size dimorphic marine mammal.*
- Breed, G.A.**, M.J. Daggs and G.A. Jackson. (2004) Poster. American Geophysical Union winter meeting, Portland, Oregon. *Dynamical modeling of phytoplankton size structure in the Gulf of Alaska: Do copepods relieve grazing pressure on nano- and picophytoplankton?*
- Breed, G.A.**, T. L. Richardson and G. A. Jackson (2002) Oral presentation. ASLO 2002, Victoria, Canada. *Planktonic food web dynamics of the Mississippi River plume inferred by inverse analysis.*

## REFEREE SERVICE

**Journals:** American Naturalist (3), Animal Behaviour (2), Animal Conservation (1), Arctic, Antarctic, and Alpine Research (1), Behavioural Ecology (3), Behavioural Ecology and Sociobiology (1), Biology Letters (1), Continental Shelf Research (2), Deep Sea Research II (1), Diversity and Distributions (1), Ecological Applications (2), Ecological Informatics (2), Ecological Modelling (1), Ecological Monographs (2), Ecology (9), Ecology and Evolution (5), Ecology Letters (3), Ecosphere (2), Ecosystems (1), Endangered Species Research (5), Environmental Modelling and Software (1), Estuarine, Coastal & Shelf Science (2), Fisheries Oceanography (1), Functional Ecology (2), Global Ecology and Biogeography (1), ICES Journal of Marine Science (1), International Journal of Biometeorology (2), Journal of Animal Ecology (4), Journal of Applied Ecology (1), J. Applied Statistics (1), Journal of Experimental Marine Biology and Ecology (1), Journal of Mammalogy (1), Journal of Marine Systems (3), Journal of Mathematical Biology (1), J. R. Soc. Open Science (2), Journal of Theoretical Biology (1), Journal of Theoretical Ecology (1), Landscape Ecology (1), Limnology & Oceanography (1), Mammalian Biology (1), Marine Biology (2), Marine Ecology Progress Series (9), Marine Mammal Science (5), Methods in Ecology and Evolution (11), Movement Ecology (8), Nature Communications (1), Oikos (2), PeerJ (2), Philosophical Transactions of the R Soc B (1), Plos One (11), Proc. R. Soc. B (9), Proc. R. Soc. Interface (18)

**Publishers:** University of Chicago Press (1), Capstone Publishing (1)

**Funding Agencies:** Mitacs Canada (4), NSERC (1), Australian Antarctic Division (1), Netherlands Organisation for Scientific Research (1), Government of Quebec (1), NSF (ad hoc 11; 2018 BIO-OCE Panel Service), NPRB (7), NERC (1)

**Conference Abstracts:** 2015 & 2017 Society for Marine Mammalogy

## MEDIA COVERAGE

Nov. 2019. The Nature of Things: The Seals of Sable. CBC documentary on our grey seal research.

Feb. 2017. Coverage in US and Canadian newspapers of my work on non-consumptive predator effects of Arctic killer whales.

Sept. 11, 2012. NBC Nightly News Television Interview: Butterflies & Global Warming.

August 22, 2012. WAMC - New England Public Radio Radio Interview: Butterflies & Global Warming.

August 21, 2012. Connecticut Public Radio / NPR Radio Interview: Butterflies & Global Warming.

August 20, 2012. WBUR / NPR Radio Interview: Butterflies & Global Warming.

August 13, 2010. CBC Main street Radio Interview: Seals & Fisheries Conflicts.

Other interviews: Boston Globe, Associated Press, Reuters. Other coverage: Huffington Post, Discover Magazine, Smithsonian Blog, CBC, Chicago Tribune, Minneapolis Star Tribune, Time Magazine, Harvard Gazette, and at least 40 other publications.

## MENTORING – CURRENT

Person	Position	Supervisory Role	Time	Institution	Thesis or Project title
<b>Scott Chandler</b>	M.S. Student	Committee Chair	2021 -	University of Alaska - Fairbanks	Stellar Sea Lion - Fisheries Interactions
<b>Luke Porter</b>	Ph.D. Student	Committee Chair	2021 -	University of Alaska - Fairbanks	Sea Otter Life History
<b>Jessica Richart</b>	Ph.D. Student	Committee Chair	2021 -	University of Alaska - Fairbanks	Caribou Isotope Ecology
<b>Ben Legasse</b>	Ph.D. Student	Committee Chair	2021 -	University of Alaska - Fairbanks	Migration Ecology of Dunlin
<b>Stefan Awender</b>	Ph.D. Student (Physics)	Committee co-Chair	2016 -	University of Alaska - Fairbanks	Non-linear dynamics of Arctic Marine Foodwebs
<b>Cody Deane</b>	Ph.D. Student	Committee Chair	2019 -	University of Alaska - Fairbanks	Demographic Modelling of Harvested Populations
<b>Abigail Schiffmiller</b>	M.S. Student	Committee Chair	2019-	University of Alaska - Fairbanks	Demography and Behavior of Arctic Seals
<b>Katie Rubin</b>	Ph.D. Student (NSF GRF)	Committee Member	2018 -	University of Alaska - Fairbanks	Hibernation Biology of Hoary Marmots
<b>Tom Glass</b>	Ph.D. Student (NSF GRF)	Committee Member	2018 -	University of Alaska - Fairbanks	Wolverine Physiological Ecology & Behavior
<b>Matt Cameron</b>	Ph.D. Student	Committee Member	2015 -	University of Alaska - Fairbanks	Movement ecology of caribou
<b>Matt Kynock</b>	M.S. Student	Committee Member	2018 -	University of Alaska - Fairbanks	Movement Ecology of Lynx
<b>Derek Arnold</b>	Ph.D. Student	Committee Member	2019 -	University of Alaska - Fairbanks	Movement Ecology of Lynx
<b>Chris Barger</b>	M.S. Student	Committee Member	2019 -	University of Alaska - Fairbanks	Behavioral Ecology of Arctic Hare
<b>Audrey Rowe</b>	Ph.D. Student	Committee Member	2019 -	University of Alaska - Fairbanks	Isotope ecology of caribou
<b>Vaughn Shirley</b>	Ph.D. Student (NSF GRF)	Committee Member	2020 -	Georgetown University	Arctic Butterfly Communities and Global Change
<b>Hannah Meyers</b>	Ph.D. Student (NSF GRF)	Committee Member	2020 -	University of Alaska - Fairbanks	Social Structure and Acoustic Signaling in Killer Whales
<b>Akashia Martinez</b>	M.S. Student	Committee Member	2020 -	University of Alaska - Fairbanks	Maternal Care in Canadian Lynx

## MENTORING – COMPLETED

Person	Degree	Supervisory Role	Time	Institution	Thesis or Project title
<b>Janelle Badger</b>	Ph.D. Biology (NSF GRF)	Committee Chair	2015 - 21	University of Alaska - Fairbanks	Grey seal demography & behaviour
<b>Michael Johns</b>	Ph.D.	Committee Chair	2015 – 20	University of Alaska - Fairbanks	Demography and Reproductive Trade-Offs in Cassin’s Auklet
<b>Joe Eisaguirre</b>	Ph.D.	Committee Chair	2015 – 20	University of Alaska - Fairbanks	Migratory behavior of Golden Eagles
<b>Roxanne Beltran</b>	Ph.D. (NSF GRF)	Committee Co-Chair	2015–18	University of Alaska - Fairbanks	Physiology and foraging ecology of Weddell Seals
<b>Kathryn Daly</b>	M.S.	Committee Chair	2015–18	University of Alaska - Fairbanks	Climate Change and Alaskan Butterflies
<b>Janelle Badger</b>	M.S. (Statistics)	Committee Member	2017-20	University of Alaska - Fairbanks	Implementation of MSORD Random Effects Models
<b>Devin Johnson</b>	Ph.D.	Committee Member	2017 - 21	University of Alaska - Fairbanks	Gyrfalcon ecology
<b>Stephanie Crawford</b>	M.S. Student	Committee Member	2015 -	University of Alaska - Fairbanks	Physiological Ecology of Stellar Sea Lions
<b>Giovanni Tundo</b>	M.S. Student	Committee Member	2019 -	University of Alaska - Fairbanks	Population dynamics of Aspen Leaf Miner
<b>Alexis Will</b>	Ph.D.	Committee Member	2014–17	University of Alaska - Fairbanks	Connecting Physiology and Oceanography in seabirds
<b>Molly McDermott</b>	M.S.	Committee Member	2014–17	University of Alaska - Fairbanks	Foraging Ecology of Arctic Passerines
<b>Jeremy Mizel</b>	Ph.D.	Committee Member	2014–17	University of Alaska - Fairbanks	Population dynamics of passerines in Denali National Park
<b>Matt Sexton</b>	M.S. Student	Committee Member	2014–19	University of Alaska - Fairbanks	Effects of climate change on Spectacled Eider populations
<b>Madison McConnell</b>	M.S.	Committee Member	2016–19	University of Alaska - Fairbanks	Predator-Prey dynamics of Great-horned Owls & Snowshoe Hares
<b>Claire Mont-gomerie</b>	M.S.	Committee Member	2017 - 20	University of Alaska - Fairbanks	Snowshoe hare physiological ecology
<b>Justin Smith</b>	M.S.	Committee Member	2014–17	University of Alaska - Fairbanks	Foraging ecology of Arctic seals
<b>Emily Golson</b>	M.S.	Co-supervising collaborator	2011–14	Moss Landing Marine Lab	Predicting southern sea otter movements using a mechanistic movement model
<b>Aubrie James</b>	REU Fellow	Supervisor	Summer 2012	Harvard University	Host plant related morphological changes in native butterflies
<b>Aidan Hunter</b>	Under- graduate	Capstone Mentor	2019 - 20	University of Alaska - Fairbanks	Butterfly Population Ecology
<b>Vivian Kimball</b>	Undergrad Research Assistant	Supervisor	Summer 2011	Harvard University	Development of a regional butterfly program and larval growth experiments
<b>Carolyn Kilgore</b>	Undergrad Research Assistant	Supervisor	Summer 2012	Harvard University	Butterfly tracking, butterfly morphology, and larval growth experiments
<b>Beth Ziemba</b>	Undergrad Research Assistant	Supervisor	Summer 2012	Harvard University	Butterfly tracking, butterfly morphology, and larval growth experiments