Cathleen Michelle Balantic

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EDUCATION

University of Vermont 2014-2019
Ph.D., Natural Resources, Certificate in Complex Systems
Dissertation: *Tools for landscape-scale automated acoustic monitoring to characterize wildlife occurrence dynamics*
Advisor: Dr. Therese Donovan, U.S. Geological Survey. GPA: 3.96.

University of Pennsylvania 2012-2014
Master of Environmental Studies, Natural Resource Management
Capstone: *Distribution of breeding forest birds across a single-tree selection timberland in New Hampshire*
Advisors: Dr. Michael Cline, Dr. Sarah Willig. GPA 3.95.

Cornell University 2005-2009
B.S., Biology. GPA 3.55.

PROFESSIONAL APPOINTMENTS

University of Massachusetts-Amherst
- Postdoctoral Fellow, Northeast Climate Adaptation Science Center Feb. 2020-Present

University of Vermont
- Postdoctoral Associate, Vermont Cooperative Fish and Wildlife Research Unit Jan.-Dec. 2019
- Graduate Research Assistant, Vermont Cooperative Fish and Wildlife Research Unit 2017-2019
- National Science Foundation (NSF) Integrative Graduate Education and Research Trainee (IGERT) Smart Grid Fellow 2014-2017

University of Pennsylvania
- Graduate Teaching Assistant, School of Arts and Sciences 2014
- Moelis Access Science Teaching Fellow 2013-2014

PUBLICATIONS

Peer-Reviewed Publications

Balantic, C.M., & Donovan, T.M. 2019. Dynamic wildlife occupancy models using automated acoustic monitoring data. Ecological Applications. DOI: 10.1002/eap.1854.
Accompanying Github Code Repository: https://github.com/cbalantic/dynamic-occupancy-acoustic

Balantic, C.M., & Donovan, T.M. 2019. Statistical learning mitigation of false positives from template-detected data in automated acoustic wildlife monitoring. Bioacoustics. DOI: 10.1080/09524622.2019.1605309
Accompanying Github Code Repository: https://github.com/cbalantic/false-positive-mitigation

Balantic, C.M., & Donovan, T.M. 2019. Temporally adaptive acoustic sampling to optimize detection across a suite of focal species. Ecology and Evolution. DOI: 10.1002/ece3.5579
Accompanying Github Code Repository: https://github.com/cbalantic/temporally-adaptive-sampling

In Review

Balantic, C.M. & Donovan, T.M. AMMonitor: Remote monitoring of biodiversity in an adaptive framework with R.

SOFTWARE AND TOOLS

Balantic, C.M. (author), Donovan, T.M., (author), Katz, J. (contributor), Hines, J.E. (contributor). **AMMonitor: An R package for remote biodiversity monitoring in an adaptive framework**. Available provisionally at: https://code.usgs.gov/vtcfwru/ammonitor

Primary features: (1) an explicit framework for comparing system status and trends against management objectives, (2) tools supporting automated detection of target species sounds using statistical learning, (3) temporally adaptive optimized sampling so that sampling occurs under conditions when species are most likely to be detectable, (4) methodology for translating raw audio data into dynamic wildlife occurrence models that have scientific utility for land managers and decision-makers, and (5) a SQLite database backend for seamless data management.

TEACHING EXPERIENCE

INSTRUCTOR

- ***Remote Ecological Monitoring Lab*** 2019
  University of Vermont (Rubenstein School of Environment and Natural Resources)
  Created and instructed 10-week unofficial lab course for 7 University of Vermont undergraduates to gain hands-on research experience using audio data remotely collected at Indiana Dunes National Lakeshore with the National Park Service. In weekly 3-hour in-person lab sessions, students were introduced to the statistical computing language R, became proficient at identifying focal avian and amphibian species by ear, and learned basic components of bioacoustic monitoring, study design, and statistical analysis, culminating with each student contributing a section to an annual report for the National Park Service.
- ***Modeling Principles for Natural Resources Management*** 2019
  U.S. Fish and Wildlife Service National Conservation Training Center (NCTC)
  Delivered 15-week distance learning course to a mix of 25 graduate students and U.S. DOI agency employees. Concepts included modeling fundamentals, decision analysis, deterministic population models, demographic and environmental stochasticity, and spatial models.
- ***Workshop: Implementing an Adaptive Management Program Using Remote Automated Wildlife Monitoring Methods (with the R Package AMMonitor)***
  Northeast Annual Fish and Wildlife Agencies Conference (Groton, CT) 2019
  Designed and delivered 1-day workshop for agency professionals and university students, covering how to initiate a long-term automated remote wildlife monitoring program from scratch. Workshop included a brief introduction to R, basic hardware and data management set-up, and mini-lectures followed by interactive hands-on coding activities that introduced key methodology.
- ***Introduction to R for Natural Resources*** **(NR 295/395)** 2017
  University of Vermont (Rubenstein School of Environment and Natural Resources)
  Developed and co-instructed a 15-week original course which introduced 22 university students to the R statistical computing language through weekly interactive lectures and labs on data manipulation, plotting, functions, for loops, and debugging. Content developed included 11 original labs, two midterm tests, a code peer review assignment, a final exam, and a semester-long project.

GRADUATE TEACHING ASSISTANT

- ***Modeling Geographic Space*** **(ENVS 681)** 2014
  University of Pennsylvania (School of Arts and Sciences)

Provided twice weekly office hours and course support to 50+ undergraduate and graduate students learning how to model and map data using ArcGIS software.

GUEST LECTURER

- WFB 130: Ornithology (University of Vermont) 2019
- WFB 074: Wildlife Conservation (University of Vermont) 2018

MENTORING

- Tin Mountain Conservation Center Avian Ecology Projects (3 students) 2014, 2016
- University of Vermont Rubenstein Mentoring Program (4 undergraduate students) 2014 - 2016

TEACHING EXPERIENCE OUTSIDE OF ACADEMIA

- ***Moelis Access Science Teaching Fellow and Fellow Coordinator*** 2013-2014
  West Philadelphia High School Biology & Environmental Science Classes
  University of Pennsylvania, Netter Center for Community Partnerships
  Developed and delivered twice-weekly interactive lab content to Environmental Sciences and Biology classes at West Philadelphia High School. Appointed to leadership position alongside fellowship position. Coordinated 37 Teaching Fellows for the Access Science program through oral/written communications, organization of meetings, management of teaching placements, interviews, and hiring of new fellows.
- ***Lead Naturalist and Program Coordinator*** 2010-2012
  Discovery Southeast (Juneau, AK)
  Created and facilitated place-based nature education programming for southeast Alaskans through guided hikes, day camps, in-school and afterschool activities, website publications, and media outreach.
- ***AmeriCorps Service Team Member*** 2009-2010
  Outward Bound Atlanta (Atlanta, GA)
  Developed and taught weekly environmental elementary school lessons; tutored 20+ students grades K-8 at three Atlanta public schools; coordinated community service events for two middle school Outward Bound Service Clubs; presented weekly educational programs at Zoo Atlanta.

TRAINING

- ***Software and Data Carpentry Instructor Training*** 2019
  2-day teacher training to become certified to lead workshops in software development and data analysis.
- ***University Teaching*** (University of Vermont) 2015
  15-week course to fulfill teaching-track requirement covering concepts including Universal Design for Learning (UDL) principles, development of syllabi and semester plans, lesson planning, teaching statements, learning objectives, and evaluation of student learning.
- ***The Art of Teaching*** (Cornell University) 2008
  14-week course on teaching principles, including field work at a local elementary school.

GRANTS, AWARDS, AND LEADERSHIP

- National Science Foundation, Integrative Graduate Education and Research Traineeship Smart Grid Program ($78,000) 2014-2017
- National Science Foundation, Integrative Graduate Education and Research Traineeship Competitive Innovation Initiative Grant ($1,600) 2016
- Frederick N. Scatena Award for Excellence in Research (U. of Pennsylvania) 2014
- NCAA Division I Varsity Women's Rowing Captain (Cornell University) 2008-2009

- National Scholar-Athlete, Collegiate Rowing Coaches Association 2009
- Courtney Award "for outstanding scholastic work, integrity, discipline, and consideration for fellow oarswomen" (Cornell University Rowing) 2009
- Liane Ritter Memorial award "for best exemplifying the pursuit of excellence in the sport of rowing, scholarship, and leadership" (Cornell University Rowing) 2008

PRESENTATIONS AND INVITED TALKS (*)

Balantic. C.M. Tools for landscape-scale automated monitoring of wildlife. Faculty Lightning Talks, Departmental Seminar Series. Department of Environmental Conservation. University of Massachusetts-Amherst. Amherst, MA, January 2020.

Balantic, C.M. Landscape-scale Monitoring with Smartphones and the R Package AMMonitor. 75th Annual Northeast Fish & Wildlife Research Conference. Groton, CT, April 2019.

***Balantic, C.M.,** Donovan, T.M. AMMonitor software to support landscape scale acoustic monitoring of wildlife. Webinar for National Park Service Inventory and Monitoring Division. Available at: https://www.youtube.com/watch?reload=9&v=UvpriRxUkjc (accessed 2019-06-26), July 2018.

Balantic, C.M. Temporally-adaptive acoustic sampling to maximize detection across a suite of focal wildlife species with the R package AMMonitor. 74th Annual Northeast Fish & Wildlife Research Conference. Burlington, VT, April 2018.

Balantic, C.M. Machine learning mitigation of false positives in automated acoustic wildlife monitoring with the R package AMMonitor. 74th Annual Northeast Fish & Wildlife Research Conference. Burlington, VT, April 2018.

***Balantic, C.M.** Tools for long-term, landscape-scale acoustic wildlife monitoring to investigate wildlife responses to land use. Tin Mountain Conservation Center Eco-Forum, Albany, NH, June 2017.

Balantic, C.M. Adventures in large-scale, long-term bioacoustic monitoring: eavesdropping on vocal wildlife in a solar energy zone. Student Research Conference, University of Vermont, Burlington, VT, April 2017.

***Balantic, C.M.** Tools for long-term, landscape-scale acoustic wildlife monitoring to investigate wildlife responses to land use. Rubenstein School of Environment and Natural Resources Fall Seminar Series, University of Vermont, Burlington, VT, September 2016.

***Balantic, C.M.** Rapid prototype of a landscape-scale bioacoustics monitoring system to inform siting of utility-scale solar energy in the U.S. BLM Riverside East Solar Energy Zone. IEEE meeting on secure, efficient, and sustainable power systems for the future, Burlington, VT, April 2016.

Balantic, C.M., Fredman, D., Clement, C. Our interconnected world: Energy, Land, and Lifestyles. Mount Mansfield Union High School, Jericho, VT, November 2014.

Balantic, C.M. Changes in bird distribution are linked to changing vegetation characteristics on Bear Paw Timberland. Tin Mountain Conservation Center Eco-Forum, Albany, NH, August 2014.

Balantic, C.M. Distribution of breeding forest birds across a single tree selection timberland. Graduate Research Symposium, University of Pennsylvania, Philadelphia, PA, May 2014.

***Balantic, C.M.** Distribution of breeding forest birds across a single tree selection timberland. Willistown Conservation Trust Annual Meeting, West Chester, PA, March 2014.

Balantic, C.M. Abundance, distribution, and breeding activity of forest birds at Bear Paw Timberland and Rockwell Sanctuary. Tin Mountain Conservation Center Eco-Forum, Albany, NH, August 2013.

POSTERS

Balantic, C.M., Donovan, T.M., Katz., J, Massar, M. Temporally-adaptive acoustic sampling to maximize detection of multiple species. Northeast Regional Environmental Acoustics Symposium, University of New Hampshire, Durham, NH, March 2018.

Balantic, C.M., Donovan, T.M. Methodology for landscape-scale bioacoustics monitoring. IEEE meeting on secure, efficient, and sustainable power systems for the future, Burlington, VT, April 2016.

Balantic, C.M., Donovan, T.M. Acoustic monitoring and wildlife occupancy modeling. Graduate Research Symposium, Rubenstein School of Environment and Natural Resources, University of Vermont, Burlington, VT, October 2015.

Balantic, C.M. Distribution of breeding forest birds across a single tree selection timberland. Graduate Research Symposium, University of Pennsylvania, Philadelphia, PA, May 2014.

ADDITIONAL FIELD AND LABORATORY EXPERIENCE

Avian Ecology Field Research Leader 2014, 2016
Tin Mountain Conservation Center (Albany, NH)
Managed a team of 5 interns in collecting field data to determine the responses of breeding bird communities to land management practices in working timberlands. Mentored interns in ArcGIS and R, and trained them to identify 80+ North American bird species and 40+ species of trees and other plants.

Avian Ecology Field Research Intern 2013
Tin Mountain Conservation Center (Albany, NH)
Mist-netted, banded, and nest-searched for migratory breeding birds; performed timber cruises and timber stand improvement; monitored fish species for Eastern Brook Trout conservation project.

Ecological Research Intern 2008
Dominion-Millstone Nuclear Power Plant (Waterford, CT)
Trawling, seining, lobster PIT tagging, osprey banding, ichthyoplankton sample processing for surveillance of wildlife and ecology in marine environmental monitoring program examining impacts of nuclear power plant.

Cell Culture Cancer Research Assistant 2006
LifePharms, Inc. (Groton, CT)
Cell culture of four cancer cell lines for pharmaceutical research.

OUTREACH AND SERVICE

AmeriCorps Volunteer Service Terms

Discovery Southeast (Juneau, AK) 2010-2011
Outward Bound Atlanta (Atlanta, GA) 2009-2010

Community Volunteering

Christmas Bird Count Citizen Scientist (Conway, NH and Burlington, VT) 2013-Present
C.P. Smith Elementary School Science & Engineering Fair (Burlington, VT) 2017
Bird Banding Volunteer at Rushton Farm (West Chester, PA) 2013-2014
Girls on the Run Coach, Parkside Elementary School (Atlanta, GA) 2009-2010

Peer Review

Freshwater Biology, Landscape Ecology, Northeastern Naturalist, Natural Sciences and Engineering Research Council of Canada Discovery Grant

ADDITIONAL PROFESSIONAL DEVELOPMENT

Conservation Leaders for Tomorrow Workshop, Kehoe, VT 2014
5-day professional development workshop introducing natural resource university students to the role of hunting, fishing, and trapping in conservation.

TECHNICAL SKILLS

R Statistical Computing Language (including R package development, R Markdown, and R Shiny), SQL, Git, ArcGIS, MATLAB, basic soldering and electronics