Matthew E. Boone

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Education

M.S in Wildlife Ecology, *May 2016* (GPA - 3.90)
University of Delaware *Department of Entomology and Wildlife Ecology*
Dr. Jeffrey J. Buler

B.S in Biology - Ecology, Evolution, and Behavior *May 2009* (GPA - 3.48)
University of Texas, Austin, TX

Data Experience

Data Mananger and Biologist *August 9, 2018 - Present*
University of Florida Research and Education Center - Ft. Lauderdale, FL

- Manage multiple spatial PostgreSQL databases in lab including database creation, SQL query building, and analysis using PostGIS extensions.
- Analyze data sets and create high-quality publication quality maps and graphics using R and QGIS for lab projects.
- Creation, consulting, and managing of multiple software packages in R (detailed below).
- Manage IT workload for multiple computers running Ubuntu and lab server running Debian builds.

Data Science Consultant *August, 2017 - August 2019*
Porzana Solutions LLC, IL

- Acted as an independent data consultant for mainly academic clients looking for complex data solutions.

- Consulted with clients on their research and data questions. Created in depth quotes of costs and deliverables for clients. Met biweekly with clients updating them on status of projects.

- Taught data best practices to clients ontop of standard outputs, including best practices for data managment, file naming, and data structures.

- Finished projects involved one published package (refsplitr) and two published papers. Details in software and publications.

Data Analyst and Database Manager *April 15, 2016 – April 13, 2017*
Kauai Endangered Seabird Recovery Project, HI

- Analyzed field data and created maps using R and ArcGis. Interfaced with and analyzed data from a myriad of technologies including Audio Recording Units, satellite and geolocator tags, Recoynx Field Cameras, and LiDAR. Fixed, maintained, and expanded two current databases using Microsoft Access and SQL.

- Prepared 12 annual scientific reports, helped write manuscripts, and lead outreach events for public.

- Managed nine technicians in office, monitored their data entry, and created projects tailored to each technician's strengths. Helped with field logistics, helicopter flights, and schedules.

- Created a habitat model for the endangered Band-rumped Storm-Petrel using ten years of auditory survey and Audio Recorded Unit data using boosted regression trees in R

- Created an algorithm to calculate exposure height of powerline wires across the island of Kauai using LiDAR and Photogrammetry data in R. Required dynamically creating 100,000 geospatial polygons tailored to individual vectors analyzed entirely in an R environment.

- Analyzed movement and wintering range of 12 satellite tagged juvenile Newell's Shearwaters using dynamic Brownian Bridge Movement Model in R.

Software

sftrack

Boone, M., Joo, R., Calenge, C., Pebesma, E., Basille, M. *sftrack - A movement class for analyzing and visulilizing spatial movement data that incorporates the sf package* **R** (2019)
github.com/mablab/sftrack

- Lead coder on project.

- Sftrack is a new package defining a central class for movement data that fully incorporates the `sf` package, written in S3 as an upgrade to the `ltraj` class in `AdehabitatLT`. Defines a new standard for movement data in R, incorporating x,y,z,t and a dynamic grouping category.

- Funded by a grant from the RConsortium (see more information in Grants).

- Over 70 unit tests written with the `testthat` package.

- Beta version available on Github, although development is ongoing.

Tracking - CRAN Task View

Joo, R., Boone, M., Sumner, M., Basille, M. *CRAN Task View: Processing and Analysis of Tracking Data* **R** (created 2019)
https://cran.r-project.org/web/views/Tracking.html
repository for code & checks on github

- Maintainer of Task View - evaluating new tracking packages for addition to taskview.

- Wrote code to automatically check if packages pass CRAN checks including those on novel platforms (Github, r-forge, etc).

nestR

Picardi, S., Smith, B., Boone, M. *NestR - Estimation of Bird Nesting from Tracking Data* **R** (created 2018)
github.com/picardis/nestR

- Helped build spatial site selection algorithm that selects recursive site visits and chooses most likely nest sites.
- Helped write Shiny interface to visualuze recursive site visits.
- Compendium published in Journal of Movement Ecology (doi: 10.1186/s40462-020-00201-1)

refsplitr

Fournier, A.M.V., Boone, M.E., Stevens, F.R., Bruna, E.E. *refsplitr: Author name disambiguation, author georeferencing, and mapping of coauthorship networks with Web of Science data.* **R** (created 2018)
ropensci/refsplitr
– Accepted on rOpenSci –

- Wrote code to split reference files into perspective parts as well as partition out author and address information.
- Created algorithm to group author name based on similar name participles, address proximity, and assorted information.
- Helped write code to map network analysis and spatial plotting of global author/co-author connections.

- Over 30 unit tests written with the `testthat` package.

- Further compendium published in the Journal of Open Source Software (doi: 10.21105/joss.02028)

radaR

Boone, M.E., Smolinsky, J.A., Buler, J.J. *radaR - A package to analyze Level II WSR-88D Weather Data for avian stop-over mapping* **R** (created 2016)
github.com/birderboone/radar
– Now deprecated. Contact Dr. Jeff Buler (jbuler@udel.edu) for an updated version –

- Translated and updated pre-existing SAS code to R then built code into a package frame work with a workable interface.
- Package takes raw WSR-88D outputs, creates VADS, summarizes radar returns, and calculates bird densities for use in stopover mapping analysis.

- Created novel nightly sampling method that fit flexible non-linear curves to temporal radar densities to calculate approximate sampling moment for stop-over mapping.

Computer Skills

R/RStudio *Expert* - Programming, data analysis, spatial analysis, and package creation.

ArcGIS/QGIS *Expert* - Spatial analysis and map making

SQL - POSTGRES/MYSQL/Access *Expert* - Creating and maintaining databases, building complex queries, creating workable forms for users, maintaining data integrity via standardized QA/QC.

Markdown/Latek/rPres/Hugo *Expert* - Typesetting and creating reports, website creation, and presentation creation in markdown and rmarkdown.

Microsoft Office *Expert* - Writing reports, entering data, analyzing data, making graphs

Linux/UNIX language *Intermediate* - Administrative duties on Debian based server. Troubleshooting user issues in Ubuntu. Writing bin/bash script and scripting commands.

HTML/CSS *Intermediate* - Website coding and styling with cascading style sheets.

Academic Work

Graduate Researcher *November 2013 - May 2016*
Univeristy of Delaware, DE

- Assessing the effects of Hurricane Sandy on fall migration in the North East United States using Weather Surveillance Radar.
- Created stopover maps of passerines in the Northeast United States using Level II weather radar to assess the change in stopover distribution of migrants after Hurricane Sandy. Modeled changes in bird density before and after the storm to changes in wind fields, storm surge, and NDVI at 6 radar stations across the Atlantic coast.
- Ground truthed radar returns by sky sampling for birds taking off at six sites across New Jersey and Delaware. Created methodology for determining when birds take off at night and when they can be sampled on the radar in R.

- Wrote laboratory protocols and methods for processing Level II WSR-88D data in R and calculating exodus timing of migrants via radar that is still being used at the University of Delaware and Patuxent Wildlife Research Center. Created a Package in R summarizing these methods with over 20 different functions.

- You can view the thesis online

Peer-Reviewed Publications

(In review) **Joo, R., Picardi, S., Boone, M., Clay, T., Patrick, S., Romero-Romero, V., Basille, M.** *A decade of Movement Ecology* abs/2006.00110v1
Methods for this package can be found in the online bookdown

Moore, J., Pine, W, III., Fredrick, P., Beck, S., Moreno, M., Dodrill, M., Boone, M., Sturmer, L., Yurek, S. *Trends in Oyster Populations in the Northeastern Gulf of Mexico: An Assessment of River Discharge and Fishing Effects over Time and Space* **Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science** (2020) 12:191–204. 10.1002/mcf2.10117

Hochmair, H., Scheffrahn, R., Basille, M., Boone, M. *Evaluating the data quality of iNaturalist termite records.* **PLoSONE** (2020) 15.5: e0226534. 10.1371/journal.pone.0226534

Picardi, S., Smith, B.J., Boone, M.E., Frederick, P.C., Cecere, J.G., Rubolini, D., Lorenzo, S., Pirrello, S., Borkhataria, R.R., Basille, M. *Analysis of movement recursions to detect reproductive events and estimate their fate in central place foragers* **Movement Ecology** (2019) 8.24. 10.1186/s40462-020-00201-1

Joo, R., Boone, M., Clay, T., Patrick, S., Clusella-Trullas, S., Basille, M. *Navigating through the R packages for movement.* **Journal of Animal Ecology** (2020) 89: 248–267. 10.1111/1365-2656.13116

McLaren, J.D., Buler, J.J., Schreckengost, T.D., Smolinsky, J.A., Boone, M.E., Dawson, D.K., Walters, E.L. *Artificial light confounds broad-scale habitat selection by migrating birds.* **Ecology Letters** (2018) 21: 356-364. 10.1111/ele.12902

Raine, A.F., Boone, M., Mckown, M., Holmes, N. *The breeding phenology and distribution of the Band-rumped Storm-petrel Oceanodroma castro on Kaua'i and Lehua Islet, Hawaiian Islands.* **Marine Ornithology** (2017) 45: 73-82 Online PDF

Raine, A.F., McFarland, B., Banfield, N., Boone, M. *An Updated Avifauna of Moku'ae'ae Rock Islet, Kaua'i.* **Pacific Science** (2017) 71.1 : 67-76. 10.2984/71.1.6

Book Chapters

Buler, J., Barrow, C., Boone, M., Dawson, D., Diehl, R., Moore, F., Randall, L., Schreckengost, T., Smolinsky, J. (2018). *Linking Animals Aloft with the Terrestrial Landscape.* **In Aeroecology** (P. Chilson, F. Winifred, J. Kelly, F. Liechti, Editors). Springer Press. 10.1007/978-3-319-68576-2_14

Technical and Outreach Publications

Boone, M.E (2019) *Being a better programmer and scientist with rOpenSci*. **Online Article**. University of Florida. https://mablab.org/post/ropensci/

Boone, M.E,. Basille, M. (2019) *Using iNaturalist to Contribute your Nature Observations to Science*. **EDIS Publication**. University of Florida. EDIS Document link

Buler, J.J., Boone, M.E., McLaren, J.E., Dawson, D.K. (2016) *Hurricane Sandy's impact on migrating landbirds: insight via radar, field observations and modeling*. **Final Report**. USGS

Grants

Co-PI *2020* ($5000) - R Consortium (For outreach and development of `sftrack`)
Co-PI *2019* ($10000) - R Consortium (For 1st stage development of `sftrack`)

Presentations

Boone, M., Joo, R., Basille, M., *Introducing sftrack: A framework for Movement data in R*

- Ecological Society of America - Virtual (2020)

Boone, M. *How Citizen Scientists are contributing to Science*

- Broward County Master Gardeners Class 2020 - Davie, FL, US (2020)

Boone, M.E., Hochmair, H., Basille, M. *Evaluating Citizen Science Data for Biodiversity Research*

- University of Florida Biodiversity Institute Seminar - Gainesville, FL, US (2019)

Boone, M.E., Buler, J.J., Dawson, D.K., *Assessing the effects of Hurricane Sandy on migratory bird stopover using weather surveillance radar.*

- AFO/SCO/WOS Joint Annual Meeting - Wolfville, NS, CA (2015) **AFO Travel Award $850**
- AOU/COS Joint Meeting - Norman, OK, US (2015) **AOU Travel Award $400**

Posters

Boone, M.E., Hochmair, H., Basille, M. *Evaluating Citizen Science Data for Biodiversity Research*

- Greater Everglades Ecosystem Restoration Conference - Ft. Lauderdale, FL, US (2019)
- Florida chapter of The Wildlife Society - Melbourne, FL, US (2019)

Boone, M.E., Buler, J.J., Dawson, D.K. *Using Weather Surveillance Radar to assess the impacts of Hurricane Sandy on migratory birds.*

- The Delaware Wetlands Conference - Wilmington, DE, US (2015)
- The Wildlife Society National Conference - Pittsburgh, PA, US (2014)

Teaching

2020 **Instructor** 'Intro to R for Academia' **Workshop for Faculty at Hendrix College** (Conway, AR)
2019 **Instructor** 'Data Management with SQL for Ecologists' **Workshop at Tropical REC - UF** (Homested, FL)
2019 **Instructor** 'Intro to R for Ecologists' **Workshop at Florida Atlantic University** (Boca Raton, FL)
2018 **Instructor** 'Taking the Next Step with R: Data Management, Publication Quality Graphics and Function Building' **Workshop AOS meeting** (Tuscon, AZ)
2017 **Instructor** 'Graphing and Programming in R' **Workshop at AOSSCO meeting** (East Lansing, MI)
2015 **Instructor** 'Taking R to the Next Level' **Workshop at AOU/COS meeting** (Norman, OK)
2015 **Guest Lecturer** 'Programming and Data Processing in R' (University of Delaware)
2014 **Guest Lecturer** Wetland policy and management in the United States **Habitat Management class** (University of Delaware)

Volunteer/Service

2014 - Present **eBird Regional Editor** *eBird.org* – Comal and Guadalupe TX counties
2015 **Co-leader and Founder** *R Club University of Delaware* – Setting up agenda for weekly meetings, solving graduate student problems in R, creating/teaching lessons.
2015 **Department Seminar Coordinator** *University of Delaware* – Contact potential speakers, coordinate weekly seminar series, and organize refreshments.

Awards/Honors

2009 **University Honors** University of Texas
2008 **University Honors** University of Texas
2007 **Deans List** University of Texas

Memberships (since)

2020 **Ecological Society of America**
2013 **The Wildlife Society**
2015 **Association of Field Ornithologists**
2015 **Wilson Ornithological Society**
2015 **American Ornithologists Society**

Field Experience

Woodpecker Crew Leader *May 1, 2018 – August 9, 2018*
Rocky Mountain Research Station - USFS, ID

Black Rail Technician *January 14 - March 31,2018*
Texas State University, TX

Avian Crew Leader *May 1, 2017 – September 30, 2017*
National Council for Air and Stream Improvement, OR

Marshbird Field Technician *May 1 – August 15, 2014*
University of Delaware, DE

Migratory Rail Field Technician *August 7 - October 21, 2012/2013*
Arkansas Cooperative Fish and Wildlife Research Unit, AR

Willow Flycatcher Field Technician *May 7 – August 15, 2013*
SWCA Consulting, NV

Yellow Rail Field Technician *December 7, 2012 - March 31, 2013*
Mississippi State University, MS

Yellow-billed Cuckoo Field Surveyor *July 7 - August 21, 2012*
Great Basin Bird Observatory, NV

Avian Field Research Assistant *February 1 - June 30, 2012*
Maui Forest Bird Recovery Project, HI

Field Technician *July 14 - October 21, 2011*
Curry and Kerlinger, LLC, NY

Golden-winged Warbler Field Technician *April 21- July 7, 2011*
University of Tennessee, TN

Field Investigator *January 3 - March 21, 2011*
Louisiana State University, LA

Freshwater Mussel Field Technician *July 7 - September 14, 2010*
Texas Agrilife Extensions Service, TX

Golden-cheeked Warbler Field Technician *March 14 - July 7, 2010*
Texas A&M University, TX

Professional Licenses and Certifications

Rabies Vaccine (8/2018)
Wilderness First Aid/CPR *NOLS* (5/2017)
B3 Helicopter/Airplane Safety *Interagency Aviation Training* (5/2016)
NSC Defensive Driving II *National Safety Council* (8/2013)
ATV Rider Certification *Safety Institute* (6/2013)
Open Water Scuba Diver Certification *PADI* (3/2012)
24hr HAZWOPER *Occupational Safety and Health Administration* (1/2011)
Louisiana Boaters License *Louisiana DOTD* (1/2011)

References

Dr. Mathieu Basille, Assistant Professor, *University of Florida Research and Education Center - Ft. Lauderdale, FL*

- basille@ufl.edu, (786.516.4973)

John Dudley, Ecologist, *US Forest Service (Rocky Mountain Research Station) - Boise, ID*

- jdudley@fs.fed.us, (928.853.7242)

Dr. Jake Verschuyl, Director of Forestry Research, *National Council for Air and Stream Improvement - Anacortes, WA*

- jverschuyl@ncasi.org, (360.391.4988)

Dr. Jeff Buler, Associate Professor of Wildlife Ecology, *University of Delaware - Newark, DE*

- jbuler@udel.edu, (302.831.1306)