CHRISTIAN A. STRATTON

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SUMMARY

Post-doctoral researcher in statistics with consulting, research, and teaching experience. Strong analytical skills pertaining to spatial statistics, Bayesian computation, and analysis of ecological data types. Research interests include: Bayesian computation, spatial statistics, species distribution modeling, modeling of wildlife disease, data visualization, and teaching techniques for data science.

EDUCATION

Montana State University — Bozeman, MT
Doctor of Philosophy in Statistics — May 2022
Dissertation: *Bayesian Hierarchical Latent Variable Models for Ecological Data Types*
Advisors: Dr. Andrew Hoegh and Dr. Jennifer Green

Montana State University — Bozeman, MT
Master of Science in Statistics — May 2018

Montana State University — Bozeman, MT
Bachelor of Science with Honors in Mathematics (focus: Statistics) — December 2016

PEER-REVIEWED JOURNAL ARTICLES

PUBLISHED

8) Stratton, C., K.M. Irvine, K.M. Banner, W.J. Wright, C. Lausen, J. Rae. 2022. "Coupling validation effort with *in situ* bioacoustic data improves estimating relative activity and occupancy for multiple species with cross-species misclassifications." *Methods in Ecology and Evolution*, 13(6), p. 1288 – 1303.

7) Khalighifar, A., B.S. Gotthold, E. Adams, J. Barnett, L.O. Beard, E.R. Britzke, P.A. Burger, K. Chase, Z. Cordes, P.M. Cryan, E. Ferrall, C.T. Fill, S.E. Gibson, G.S. Haulton, K.M. Irvine, L.S. Katz, W.L. Kendall, C.A. Long, O.M. Aodha, T. McBurney, S. McCarthy, M.W. McKown, J. O'Keefe, L.D. Patterson, K.A. Pitcher, M. Rustand, J.L. Segers, K. Seppanen, J.L. Simers, **C. Stratton**, B.R. Straw, T.J. Weller, and B.E. Reichert. 2022. "*NABat ML*: Utilizing deep learning to enable crowdsourced development of automated, scalable solutions for documenting North American bat populations." *Journal of Applied Ecology*, 56(11), p. 2849 – 2862.

6) Irvine, K.M., K.M. Banner, **C. Stratton**, W.M. Ford, and B.E. Reichert. 2022. "Statistical assessment on determining local presence of rare bat species." *Ecosphere*, 13(6), p. e4142.

5) Stratton, C., J.L. Green, and A. Hoegh. 2021. "Not just normal: Exploring power with Shiny apps." *Technology Innovations in Statistics Education*, 13(1), p. 1 – 37.

4) Sepulveda, A.J., A. Hoegh, J.A. Gage, S.L Caldwell-Eldridge, J.M. Birch, **C. Stratton**, P.R. Hutchins, E.P. Barnhart. 2021. "Integrating environmental DNA results with diverse data sets to improve biosurveillance of river health." *Frontiers in Ecology and Evolution*, 9, p. 1 – 13.

3) Stratton, C., A.J. Sepulveda, and A. Hoegh. 2020. "`msocc`: Fit and analyze computationally efficient multi-scale occupancy models in `R`." *Methods in Ecology and Evolution*, 11(9), p. 1113 – 1120.

2) Sepulveda, A. J., C. Schmidt, J. Amberg, P. Hutchins, **C. Stratton**, C. Mebane, M. B. Laramie, and D. S. Pilliod. 2019. "Adding invasive species biosurveillance to the U.S. Geological Survey streamgage network." *Ecosphere*, 10(8), p. 1 – 17.

1) Hoegh, A., K. Flagg, and **C. Stratton**. 2018. Contributed comment on Article by Bradley, Holan, and Wikle Invited commentary on "Computationally efficient multivariate spatio-temporal models for high-dimensional count-valued data" by Jonathan R. Bradley, Scott H. Holan, and Christopher K. Wikle. *Bayesian Data Analysis*, 13(1), p. 253 – 310.

IN REVIEW

Stratton, C., A. Hoegh, T.J. Rodhouse, J.L. Green, K.M. Banner, and K.M. Irvine. "Clustering and unconstrained ordination with Dirichlet process mixture models." In review in *Methods in Ecology and*

Evolution.

Stratton, C., K.M Irvine, K.M. Banner, E.S. Almberg, D. Bachen, and K. Smucker. "Joint spatial modeling bridges the gap between disparate disease surveillance and population monitoring efforts informing conservation of at-risk bat species." In review in the *Journal of Agricultural, Biological, and Environmental Statistics.*

Oram, J., K.M. Banner, **C. Stratton**, and K.M. Irvine. "Verifying species classification labels using stratified-by-species sampling reduces cost of long-term acoustic monitoring." In review in *Methods in Ecology and Evolution.*

Retel, C., A.J. Strien, K.M. Irvine, and **C. Stratton**. "Trends in plant cover derived from vegetation-plot data using ordinal zero-augmented beta regression." In review in the *Journal of Vegetation Science.*

PEER-REVIEWED TECHNICAL REPORTS

7) Udell, B.J., **C. Stratton**, B.R. Straw, K.M. Irvine, J.D. Reichard, S.M. Gaulke, J.T.H. Coleman, F. Tousley, R.D. Inman, A.N. Schuhmann, R. Shively, and B.E. Reichert. 2023. "North American Bat Monitoring Program (NABat) Integrated Summer Species Distribution Model: Predicted Tricolored Bat Occupancy Probabilities: U.S. Geological Survey data release."

6) Stratton, C., B.R. Straw, J.H. Cox, K.M. Irvine, F.C. Tousley, and B.E. Reichert. 2023. "Attributed North American Grid-Based Offshore Sampling Frames: U.S. Geological Survey data release."

5) Stratton, C., K.M. Irvine. 2022. Summertime analysis statistical report for Little Brown, Northern Long-eared, and Tricolored bat species status assessment. Chapter B in Straw, B.R, J. A. Martin, J.D Reichard, and B.E Reichert, editors. "Analytical assessments in support of the U.S. Fish and Wildlife Service 3-Bat species status assessment. Cooperator report prepared in cooperation with the U.S. Geological Survey, United States Fish and Wildlife Service and Bat Conservation International."

4) Udell, B.J., B.R. Straw, T.L. Cheng, K. Enns, W.F. Frick, B. Gotthold, K.M. Irvine, C. Lausen, S. Loeb, J.D. Reichard, T.J. Rodhouse, D. Smith, **C. Stratton**, W.E. Thogmartin, and B.E. Reichert. 2022. "Status and trends of North American bats: Summer occupancy analysis 2010-2019." U.S. Fish and Wildlife Service.

3) Irvine, K.M., and **C. Stratton**. 2021. "Rangewide summertime model predictions for three bat species (*Myotis lucifigus*, *Myotis septentrionalis*, and *Perimyotis subflavus*) from acoustic and mist net data 2010 to 2019: US Geological Survey data release."

2) Wessel, S.A., L. Jones, E. Kramer, **C. Stratton**, L. Shoemaker, and D. Laughlin. 2020. "Predictability and stability of sagebrush-steppe restoration in a changing climate." National Park Service Annual Report Vol. 43.

1) Stratton, C., A. Hoegh, K. M. Irvine, K. Legg, K. McCloskey, E. Shanahan, M. Tercek, and D. Thoma. 2019. "Assessing spatial and temporal patterns in sagebrush steppe vegetation communities, 2012-2018: Grand Teton National Park." Natural Resource Report NPS/GRYN/NRR-2019/2020. National Park Service, Fort Collins, Colorado.

PRESENTATIONS

11) Stratton, C., K.M. Irvine, K.M. Banner, E. Almberg, D. Bachen, and K. Smucker. September 2023. "Joint spatial modeling bridges the gap between disparate disease surveillance and population monitoring efforts informing conservation of at-risk bat species" Invited talk given at the MT Chapter of the ASA annual meeting. Bozeman, MT, USA.

10) Stratton, C., K.M. Irvine, K.M. Banner, E. Almberg, D. Bachen, and K. Smucker. August 2023. "Joint spatial modeling of ecological response and disease processes improves estimator precision." Talk given at the Joint Statistical Meetings. Toronto, Ontario, Canada.

9) Stratton, C., K.M. Irvine, K.M. Banner, E. Almberg, D. Bachen, and K. Smucker. June 2023. "A statistical framework for integrating White-nose syndrome surveillance data and acoustic population monitoring data." Talk given to the U.S. Geological Survey Disease Coordination Group. Virtual.

8) Stratton, C., K.M. Irvine, K.M. Banner, E. Almberg, D. Bachen, and K. Smucker. June 2023. "Leveraging WNS surveillance and NABat data improves estimation of disease spread and bat activity."

Poster presented at the Whitenose Syndrome National Meeting. Palm Springs, California, USA.

7) Stratton, C., K.M. Irvine, E. Almberg, K. Smucker, and J. Gude. October 2022. "Joint spatial modeling of relative activity and disease processes." Poster presented at the ENVR 2022 Workshop: Environmental and Ecological Statistical Research and Applications with Societal Impacts. Provo, Utah, USA.

6) Stratton, C., K.M. Irvine, E. Almberg, K. Smucker, and J. Gude. October 2022. "Bats & Stats: Assessing Impacts of White-nose Syndrome on Western Bat Species." Talk given at the Northern Rocky Mountain Science Center. Bozeman, Montana, USA.

5) Stratton, C., A. Hoegh, K.M. Irvine, K.M. Banner. August 2021. "Clustering and ordination with Dirichlet process mixture models." Invited talk given at the Joint Statistical Meetings. Virtual.

4) Stratton, C., J.L. Green. June 2021. "Beyond normal: Understanding power through `R` Shiny." Poster presented at the United States Conference on Teaching Statistics. Virtual.

3) Stratton, C., A. Hoegh, and J.L. Green. August 2018. "Predicting pitch type: A case study in Bayesian hierarchical multinomial regression." Invited talk given at the Joint Statistical Meetings. Vancouver, Canada.

2) Stratton, C., A. Hoegh, and J.L. Green. August 2018. "Unraveling Kershaw's dominance." Poster presented at The Cascadia Symposium on Statistics in Sports. Vancouver, Canada.

1) Stratton, C. and J.L. Green. May 2018. "The power of technology: A Shiny applet assisted approach to teaching statistical power." Poster presented at the Electronic Conference on Teaching Statistics. Virtual.

Peer-reviewed Science Software

Stratton, C., A. Hoegh, A. Sepulveda, and K.M. Banner. 2020. "`msocc`." `R` package to support computationally efficient implementation of Bayesian multi-scale occupancy models.

Research and Collaboration Experience

Montana State University   Bozeman, MT
Post-doctoral researcher   July 2022 - Present
Advisors: Dr. Kathryn Irvine (USGS) and Dr. Katharine Banner (MSU)

- Developed statistical modeling frameworks for ecological data structures
- Authored multiple peer-reviewed journal articles and technical reports
- Communicated complicated statistical models to domain experts from multiple agencies
- Co-mentored a graduate-level statistician in support of research and analyses

U.S. Geological Survey   Bozeman, MT
Student contractor   August 2020 - July 2022
Supervisor: Dr. Kathryn Irvine (USGS)

- Provided analyses for Endangered Species Act listing decisions
- Authored peer-review journal articles and technical reports
- Collaborated with scientists from multiple domains

Montana State University   Bozeman, MT
Graduate Research Assistant   January 2019 - August 2020

- Resolved a wide scope of ecological problems using various techniques
- Collaborated and communicated with domain experts in ecology and land-resource management
- Developed models and tools to aid collaborators
- Authored papers, web applications, and R packages

Montana State University   Bozeman, MT
Statistical Consultant   August 2017 - May 2018

- Communicated with clients
- Identified solutions to a wide scope of problems
- Successfully collaborated across departments to resolve problems

Teaching Experience

Guest Lecturer   Bozeman, MT
STAT 408: Statistical Computing and Graphics Analysis   S22
Provided guest lectures on data visualization with the `tidyverse` and implementing version control
software in statistical analyses to undergraduate-level statistics students.

Supervisor   Bozeman, MT
Math and Stat Learning Center   F19
Supervised undergraduate and graduate tutors in the Mathematics and Statistics Learning Center.
Responsibilities included coordinating monthly meeting, proposing and implementing logistical
improvements, instructing tutors on how to effectively communicate mathematics and statistics, and
tutoring undergraduate students in a variety of courses, including Calculus I-III, Linear Algebra,
Introduction to Statistics, and Intermediate Statistical Concepts.

Guest Lecturer   Bozeman, MT
STAT 402/502: Intermediate Mathematical Statistics   S19
Provided guest lecture on interpreting statistical power to undergraduate-level and graduate-level
mathematical statistics students using `R Shiny`.

Graduate Teaching Assistant   Bozeman, MT
STAT 411/511: Methods for Data Analysis I   S19
Teaching assistant responsibilities included: grading homeworks and exams, writing and leading
interactive lab assignments, and providing intermittent lectures on coding in `R` with an emphasis on
data visualization.

Instructor of Record   Bozeman, MT
STAT 217: Intermediate Statistical Concepts   F18
Lead instructor responsibilities included: leading lectures, writing lecture notes, writing and grading
homeworks and exams, writing lab assignments, and supervising teaching assistants.

Instructor of Record   Bozeman, MT
STAT 216: Introduction to Statistics   S17, F17, S18
Lead instructor responsibilities included: implementing active learning teaching strategies in class,
planning and preparing course materials, holding office hours for students.

Undergraduate Teaching Assistant   Bozeman, MT
STAT 216: Introduction to Statistics   F15, S16, F16
Teaching responsibilities included: facilitating discussion during in-class activities and holding office
hours for students.

Tutor   Bozeman, MT
Math and Stat Learning Center   F14, S15, F15, S16, F16
Tutored undergraduate students in the Mathematics and Statistics Learning Center in a wide variety of
courses, including: College Algebra, Calculus I-III, Linear Algebra, Introduction to Statistics, and
Intermediate Statistical Concepts.

Service

Montana Chapter of the American Statistical Association   Bozeman, MT
Chapter Secretary and Council of Chapters Representative   Sept 2022 - Present
Responsibilities included facilitating coordination of annual meetings, keeping meeting notes, and
attending the Council of Chapters session at the Joint Statistical Meetings.

Bozeman Environmental and Ecological Statistics (BEES)   Bozeman, MT
Co-President   Sept 2022 - Present
The BEES research group is a group focused on mentoring graduate students with interest in statistical
research motivated by environmental and ecological applications. Responsibilities as co-president
include coordinating bi-weekly meetings, mentoring graduate students, providing papers for literature
review sessions, maintaining the group website, and coordinating invited speaker presentations.

Annals of Applied Statistics
Referee   2023
Refereed papers for the *Annals of Applied Statistics* journal.

Montana State University STEAM Day   Bozeman, MT
Workshop Presenter   April 2023

MSU STEAM Day is a one-day conference that includes hands-on workshops in the STEAM fields of science, technology, engineering, art and math for girls in grades six, seven, and eight. Responsibilities included presenting an interactive activity introducing statistical inference using the dice game Pass the Pigs.

DataFest   Bozeman, MT
Volunteer judge   April 2019, April 2022
Volunteer responsibilities included providing guidance to undergraduate-level and graduate-level students competing in DataFest competition.

Awards

Three Minute Thesis Competition Finalist	Bozeman, MT
Finalist for the Three Minute Thesis competition	February 2020
Dr. William A. Stannard Award for Excellence	Bozeman, MT
Recognition of outstanding graduate student teaching	May 2018
Outstanding Graduate Student Award	Bozeman, MT
Recognition of superior academic achievement among graduate students	May 2017
John L. Magaret Math/Science Scholarship	Bozeman, MT
Recipient of scholarship for outstanding academic achievement	January 2017
Milton-Chauner Math Scholarship	Bozeman, MT
Recipient of scholarship for outstanding academic achievement	August 2016
Outstanding Undergraduate Student Award	Bozeman, MT
Recognition of superior academic achievement among undergraduate students	May 2016
Outstanding Scholar Award	Bozeman, MT
Recognition of superior academic performance	May 2016
Montana State University System Award	Bozeman, MT
Scholarship for outstanding academic performance	December 2015
Phi Kappa Phi	Bozeman, MT
Member of Phi Kappa Phi, a national multi-disciplinary honor society	March 2015
Pi Mu Epsilon	Bozeman, MT
Member of Pi Mu Epsilon, a national mathematics honor society	December 2014

Skills

Statistical computing languages:	R, Julia, SAS
Other programming languages:	HTML, Markdown, Quarto, R Shiny, Tableau
Probabilistic programming languages:	BUGS, JAGS, NIMBLE, Stan
Database management systems:	SQL, SQLite, Microsoft Excel
Operating systems:	Windows, Mac OS