Christian Che-Castaldo

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Employment

Sep 2023 – **Assistant Unit Leader**
Wisconsin Cooperative Wildlife Research Unit, Madison, WI

Sep 2023 – **Research Ecologist**
U.S. Geological Survey, Madison, WI

Sep 2023 – **Visiting Associate Scientist**
Department of Forest and Wildlife Ecology, University of Wisconsin–Madison

2020 – 2023 **IACS Postdoctoral Fellow**
Institute for Advanced Computational Science, Stony Brook University, Stony Brook, NY

2018 – 2020 **Research Scientist**
Mount St. Helens Institute, Amboy, WA
Partnership with USFS Pacific Northwest Research Station

2015 – 2018 **Postdoctoral Associate**
Department of Ecology & Evolution, Stony Brook University, Stony Brook, NY
Advisor: Heather J. Lynch

2014 – 2015 **Postdoctoral Research Associate**
Department of Biology, University of Maryland, College Park, MD
Advisor: William F. Fagan

2004 – 2005 **Howard Hughes Undergraduate Research Fellow**
Department of Entomology, University of Maryland, College Park, MD
Advisor: Galen P. Dively

1998 – 2003 **Consultant**
Law & Economics Consulting Group, Washington, DC

1997 – 1998 **Associate Economist**
Triangle Economic Research Group, Durham, NC

Education

2005 – 2014 **University of Maryland**, College Park, MD
PhD in Behavior, Ecology, Evolution, and Systematics
Thesis: The role of wood-boring insect herbivory in mediating primary succession
Advisor: William F. Fagan

2003 – 2005 **University of Maryland**, College Park, MD
Post-baccalaureate coursework

1993 – 1997 **The College of William and Mary**, Williamsburg, VA
Bachelor of Arts in Public Policy & Environmental Studies, *cum laude*

Grants and Awards

2021 – 2024 NASA Biodiversity (~$728k), *Identifying population tipping points through imagery super-resolution*, PI: H.J. Lynch, coPIs: **C. Che-Castaldo** & D. Samaras (Stony Brook University)

2020 – 2023 IACS Postdoctoral Fellowship ($310k), Stony Brook University

2020 – 2023 NASA Interdisciplinary Research in Earth Sciences (~$1.5m), *Antarctic marine predators in a dynamic climate*, PI: S. Jenouvrier (Woods Hole Oceanographic Institution), Subaward (~$412k) to PI: H.J. Lynch, coPI: **C. Che-Castaldo** (Stony Brook University)

2018 Association of Polar Early Career Scientists Travel Grant ($1,800)

2009 – 2011 NSF REU Supplementals ($34k), *Impacts of insect herbivory on the pace and pattern of primary successional change at Mount St. Helens*, PIs: W.F. Fagan (University of Maryland) & J.G. Bishop (Washington State University). **C. Che-Castaldo** developed and wrote 100% of three supplemental proposals and served as project director and REU student mentor.

2011 Goldhaber Travel Award ($500), University of Maryland

2007 College of Life Science Travel Award ($300), University of Maryland

2007 NSF GRFP (Honorable Mention), University of Maryland

2005 Darwin Graduate Scholarship ($20k), University of Maryland

2005 Cory Scholarship ($1000), University of Maryland

2005 Howard Hughes Undergraduate Research Fellowship ($5k), University of Maryland

Publications

—— **Peer-reviewed Journal Articles** [Citations: 535, H index: 11, I-10 index: 11]

[1] mentored student, [2] joint first authors

J18 **Che-Castaldo, C.**, G.R.W. Humphries, & H.J. Lynch. 2023. Antarctic Penguin Biogeography Project: Database of abundance and distribution for the Adélie, chinstrap, gentoo, emperor, macaroni, and king penguin south of 60 S. *Biodiversity Data Journal*, 11, e101476. [DOI]

J17 Talis, E.[1], **C. Che-Castaldo**, T. Hart, L. McRae, & H.J. Lynch. 2023. Penguindex: A Living Planet Index for *Pygoscelis* species penguins identifies key eras of population change. *Polar Biology*, 46, 707–718. [DOI]

J16 Şen, B.[1,2], **C. Che-Castaldo**[2], K.M. Krumhardt, L. Landrum, M.M. Holland, M.A. LaRue, M.C. Long, S. Jenouvrier, & H.J. Lynch. 2023. Spatio-temporal transferability of environmentally-dependent population models: Insights from the intrinsic predictabilities of Adélie penguin abundance time series. *Ecological Indicators*, 150, 110239. [DOI]

J15 Talis, E.[1], **C. Che-Castaldo**, & H.J. Lynch. 2023. Difficulties in summing distributions for abundance and potential solutions. *PLOS ONE*, 18(1), e0280351. [DOI]

J14 **Che-Castaldo, C.** & C.M. Crisafulli. 2022. Long-term monitoring of Mount St. Helens micrometeorology. *Ecology*, e3950. [DOI]

J13 Talis, E.[1], **C. Che-Castaldo**, B. Şen[1], K.M. Krumhardt, & H.J. Lynch. 2022. Variability, skipped breeding, and heavy-tailed dynamics in an Antarctic seabird. *Journal of Animal Ecology*, 91, 2437–2450. [DOI]

J12 Schrimpf, M.B.[1], **C. Che-Castaldo**, & H.J. Lynch. 2020. Regional breeding bird assessment of the Antarctic Peninsula. *Polar Biology*, 43(2), 111–122. [pdf] [DOI]

J11 **Che-Castaldo, C.**, C.M. Crisafulli, J.G. Bishop, E.F. Zipkin, & W.F. Fagan. 2019. Disentangling herbivore impacts in primary succession by refocusing the plant stress and vigor hypotheses on phenology. *Ecological Monographs*, 89(4), e01389. [data+code] [DOI]

J10 DiRenzo, G. V., **C. Che-Castaldo**, S.P. Saunders, E.H.C. Grant, & E.F. Zipkin. 2019. Disease-structured n-mixture models: A practical guide to model disease dynamics using count data. *Ecology and Evolution*, 9(2), 899–909. [pdf] [DOI]

J09 Che-Castaldo, J.[2], **C. Che-Castaldo**[2], & M.C. Neel. 2018. Predictability of demographic rates based on phylogeny and biological similarity. *Conservation Biology*, 32(6), 1290–1300. [DOI]

J08 DiRenzo, G.V., E.H.C Grant, A.V. Longo, **C. Che-Castaldo**, K.R. Zamudio, & K.R. Lips. 2018. Imperfect pathogen detection from non-invasive skin swabs biases disease inference. *Methods in Ecology & Evolution*, 9(2), 380–389. [pdf] [DOI]

J07 Humphries, G.R.W., **C. Che-Castaldo**, P.J. Bull, G. Lipstein, A. Ravia, B. Carrión, T. Bolton, A. Ganguly, & H.J. Lynch. 2018. Predicting the future is hard and other lessons from a population time series data science competition. *Ecological Informatics*, 48, 1–11. [pdf] [DOI]

J06 **Che-Castaldo, C.**, S. Jenouvrier, C. Youngflesh, K.T. Shoemaker, G.R.W. Humphries, P. McDowall, L. Landrum, M.M. Holland, Y. Li, R. Ji, & H.J. Lynch. 2017. Pan-Antarctic analysis aggregating spatial estimates of Adélie penguin abundance reveals robust dynamics despite stochastic noise. *Nature Communications*, 8(1), 832. [data] [code] [pdf] [DOI]

J05 DiRenzo, G.V.[1], **C. Che-Castaldo**, A. Rugenski, R. Brenes, M.R. Whiles, C.M. Pringle, S.S. Kilham, & K.R. Lips. 2017. Disassembly of a tadpole community by a multi-host fungal pathogen with limited evidence of recovery. *Ecological Applications*, 27(1), 309–320. [DOI]

J04 Humphries, G.R.W., R. Naveen, M. Schwaller, **C. Che-Castaldo**, P. McDowall, M.B. Schrimpf, & H.J. Lynch. 2017. Mapping Application for Penguin Populations and Projected Dynamics (MAPPPD): Data and tools for dynamic management and decision support. *Polar Record*, 53(2), 160–166. [pdf] [DOI]

J03 **Che-Castaldo, C.**, C.M. Crisafulli, J.G. Bishop, & W.F. Fagan. 2015. What causes female bias in the secondary sex ratios of the dioecious woody shrub *Salix Sitchensis* colonizing a primary successional landscape? *American Journal of Botany*, 102(8), 1309–1322. [pdf] [DOI]

J02 Alyokhin, A., G.P. Dively, M. Patterson, **C. Castaldo**, D. Rogers, M. Mahoney, & J. Wollam. 2007. Resistance and cross-resistance to imidacloprid and thiamethoxam in the Colorado potato beetle *Leptinotarsa decemlineata*. *Pest Management Science*, 63(1), 32–41. [pdf] [DOI]

J01 Fernandez-Cornejo, J., & **C. Castaldo**. 1998. The diffusion of IPM techniques among fruit growers in the USA. *Journal of Production Agriculture*, 11(4), 497–506. [DOI]

White Papers

W02 Humphries, G.R.W., R. Naveen, **C. Che-Castaldo**, & H.J. Lynch. 2021. The Mapping Application for Penguin Populations and Projected Dynamics (MAPPPD) database: A tool for helping stakeholders monitor penguin population trends in Antarctica. Report by Oceanites, Inc. submitted to the Conservation of Antarctic Marine Living Resources' Working Group on Ecosystem Monitoring and Management (CCAMLR WG-EMM).

W01 Humphries, G.R.W., R. Naveen, **C. Che-Castaldo**, & H.J. Lynch. 2019. The Mapping Application for Penguin Populations and Projected Dynamics (MAPPPD) database: A tool for helping stakeholders monitor penguin population trends in Antarctica. Report by Oceanites, Inc. submitted to the Conservation of Antarctic Marine Living Resources' Working Group on Ecosystem Monitoring and Management (CCAMLR WG-EMM).

Media Coverage

2018 Why Are NASA Scientists Tracking Penguin Poop From Space?
Marshall Shepherd, *Forbes* [link]

2017 NASA-Funded Competition Rewards Efforts To Predict Penguin Populations
Maria-José Viñas, *NASA Earth Science News* [link]

2017 Penguin Droppings Are Fertile Ground for Science
Adam Voiland, *NASA Earth Observatory* [link]

2016 NASA Collaboration Allows Citizen Scientists to Lend a Hand in Penguin Conservation
Steve Fox, *NASA Earth Science News* [link]

R Packages

2022 – MSHMicroMetR: Mount St. Helens Micrometeorology Data for R
Authors: **C. Che-Castaldo** & C.M. Crisafulli
[github]

2021 – mapppdr: MAPPPD in R
Authors: **C. Che-Castaldo** & H.J. Lynch
[github]

2019 – MCMCvis: Tools to visualize, manipulate, and summarize MCMC output
Authors: C. Youngflesh & **C. Che-Castaldo**
>50k downloads
[cran] [github]

Publicly Available Data Repositories

2016 – APBP: Antarctic Penguin Biogeography Project
PIs: H.J. Lynch & **C. Che-Castaldo**, Webmaster: G.R.W. Humphries
www.penguinmap.com

Presentations

mentored student[1]

—— **Invited Talks**

2022 Automating What Can be Automated, Predicting What Can be Predicted: Assembling a Pan-Antarctic Monitoring System for Penguins, Department of Biological Sciences Spring Colloquium, Fordham University, New York City, NY.

2022 Automating What Can be Automated, Predicting What Can be Predicted: Assembling a Pan-Antarctic Monitoring System for Penguins, Department of Biological Sciences Colloquium, University of Alabama, Tuscaloosa, AL.

2017 The attack dynamics and successional consequences of stem-borer herbivory on sitka willow at Mount St. Helens, Department of Ecology & Evolution Spring Colloquium, Stony Brook University, Stony Brook, NY.

2016 Hierarchical Bayesian modeling of continental-scale Adélie penguin occupancy and abundance, Conservation Science Department Seminar Series, Lincoln Park Zoo, Chicago, IL.

—— **Contributed Conference Talks**

2022 Şen, B.[1], **C. Che-Castaldo**, K.M. Krumhardt, L. Landrum, M.M. Holland, M.A. LaRue, M.C. Long, S. Jenouvrier, & H.J. Lynch. Spatiotemporal predictability of population dynamics: A case study with the Adélie penguins. Population Biology/Annual Cycles session of the American Ornithology & BirdsCaribbean Joint Conference, Puerto Rico, USA.

2021 Lynch, H.J. & **C. Che-Castaldo**. Automating what can be automated, doing manually what cannot, and the wisdom to know the difference: Assembling the pieces of a multi-pronged pan-Antarctic monitoring system for penguins. Advances in remote sensing for monitoring biodiversity change: Integrating data and models across scales and technologies session of the American Geophysical Union Annual Meeting, New Orleans, LA.

2021 Lynch, H.J., Şen, B.[1], **Che-Castaldo, C.**, K.M. Krumhardt, M.M. Holland, L. Landrum, M.C. Long, M.A. LaRue, E. Talis[1], & S. Jenouvrier, Penguin dynamics are difficult to forecast: Can climate models help? Phenomena, observations, and synthesis (POS) Panel at US Climate Variability and Predictability Program Annual Worksop, virtual.

2021 **Che-Castaldo, C.**, A. Mosbrucker, C.M. Crisafulli, & C.N. Jones. How the hydrological form and function of Mount St. Helens debris avalanche ponds influences resource partitioning by colonizing amphibian species. Shallow lakes: Ecology, biogeochemistry, and human health session of the Association for the Science of Limnology and Oceanography Annual Meeting, virtual.

2018 **Che-Castaldo, C.**, H.J. Lynch, C. Youngflesh, & M.R. Schwaller. Range-wide Adélie penguin abundance from 30 years of Landsat satellite imagery. Satellite-based remote sensing of wildlife session of the Scientific Committee on Antarctic Research Biennial Meeting, Davos, Switzerland.

2017 Bishop, J.G., W.F. Fagan, **C. Che-Castaldo**, & C.M. Crisafulli. Plant-herbivore interactions impact community dynamics in primary succession at Mount St. Helens. Ecological Society of America, Portland, OR.

2016 **Che-Castaldo, C.**, H.J. Lynch, S. Jenouvrier, & M.R. Schwaller. Hierarchical Bayesian modeling of continental-scale Adélie penguin occupancy and abundance. Diversity and distribution of life in Antarctica session of the Scientific Committee on Antarctic Research Open Science Conference, Kuala Lumpur, Malaysia.

2016 Che-Castaldo, J.P., M.C. Neel, & **C. Che-Castaldo**. Comparative demographic analysis to inform endangered species management. Demography Beyond the Population Symposium, Sheffield, UK.

2015 **Che-Castaldo, C.**, C.M. Crisafulli, J.G. Bishop, & W.F. Fagan. What causes female bias in the secondary sex-ratios of the dioecious woody shrub *Salix sitchensis* colonizing a primary successional landscape? Ecological Society of America, Baltimore, MD.

2015 Che-Castaldo, J., **C. Che-Castaldo**, & M.C. Neel. Testing the use of surrogate demographic information for endangered species management. Ecological Society of America, Baltimore, MD.

2012 **Che-Castaldo, C.**, C.M. Crisafulli, J.G. Bishop, & W.F. Fagan. Secondary sexual dimorphism in willow across a resource gradient: Is gender important in primary succession? Ecological Society of America, Portland, OR.

2010 **Che-Castaldo, C.**, E.H.C. Grant, C.M. Crisafulli, J.G. Bishop, & W.F. Fagan. Using occupancy models to investigate large-scale stem-boring insect herbivory dynamics in a primary successional landscape. Ecological Society of America, Pittsburgh, PA.

2005 **Che-Castaldo, C.** & G.P. Dively. Colorado potato beetle and neonicotinoid resistance management. Entomological Society of America, Harrisburg, PA.

Contributed Conference Posters

2022 Şen, B.[1], **C. Che-Castaldo**, K.M. Krumhardt, L. Landrum, M. M. Holland, M.A. LaRue, M.C. Long, S. Jenouvrier, & H.J. Lynch. Spatiotemporal predictability of population dynamics: A case study with the Adélie Penguin. Scientific Committee on Antarctic Research Open Science Conference, virtual.

2021 **Che-Castaldo, C.**, C.N. Jones, & C.M. Crisafulli. Hydrology of Mount St. Helens debris avalanche ponds influences the ecology of colonizing amphibian species. American Geophysical Union Annual Meeting, New Orleans, LA.

2021 Feng, M.L[1], S. Sherman, T. Schafer, **C. Che-Castaldo**, R. Cousin, D. Matteson & J.P. Che-Castaldo. Novel indicators of biodiversity status based on financial portfolio metrics. American Geophysical Union Annual Meeting, New Orleans, LA.

2013 **Che-Castaldo, C.**, C.M. Crisafulli, J.G. Bishop, & W.F. Fagan. Using multi-season occupancy models to investigate insect herbivory dynamics in a primary successional landscape. Gordon Research Conference: Plant-herbivore interactions, Ventura Beach, CA.

2008 **Che-Castaldo, C.**, T. Hinds, & J.G. Bishop. Local maladaptation in the aphid *Macrosiphum albifrons* to its host plant *Lupinus lepidus* var. *lobbii* in a primary successional landscape. Ecological Society of America, Milwaukee, WI.

2006 **Che-Castaldo, C.** & G.P. Dively. Integrating fitness costs due to insecticide resistance using matrix population models. Ecological Society of America, Memphis, TN.

Teaching Experience

2015 – 2020 Bayesian Modeling for Socio-Environmental Data Short Course (graduate-level)
National Socio-Environmental Synthesis Center, Annapolis, MD
Instructor, 6 short courses
I developed course materials for and co-taught with N.T. Hobbs and M. Collins an 11-day applied statistics workshop, equivalent to a full semester course in content and contact hours.
[course website] [course materials]

2009, 2012 BSCI708T, Theoretical Ecology (graduate-level)
University of Maryland, College Park, MD
Graduate Teaching Assistant, 2 semesters
I was responsible for all lab curriculum development and independently taught the lab section.

2005 – 2013 BSCI207 Organismal Biology (undergraduate-level)
University of Maryland, College Park, MD
Graduate Teaching Assistant, 4 semesters

2006 BSCI222 Principles of Genetics (undergraduate-level)
University of Maryland, College Park, MD
Graduate Teaching Assistant, 1 semester

Student Mentoring & Community Outreach

2005 – 2021 I have mentored 1 postdoctoral student, 6 graduate students, and 17 undergraduate or post-baccalaureate researchers, including 7 REU students, at Stony Brook University, University of Maryland, Washington State University, Lincoln Park Zoo, and Mount St. Helens Institute.

2020 – 2021 Invited guest lectures: IACS Professional Development Program, Stony Brook University

2012 – 2013 Public lectures: Mount St. Helens Institute public tours

Service

2014 – 2021 Manuscript referee: *Journal of Applied Ecology*, *Ecosphere*, *Scientific Reports*, *Diversity & Distributions*, *Nature Communications*, *Ecological Monographs*, *Journal of Animal Ecology*, *Journal of Ecology*, *Oikos*

2018 Grant proposal referee: NSF, ad-hoc reviewer

2018 Co-organizer: Software Carpentry and High Performance Computing Course
Scientific Committee on Antarctic Research Biennial Meeting, Davos, Switzerland

2015 External book reviewer: Hobbs, N. T. and M. B. Hooten, 2015. Bayesian models: A statistical primer for ecologists. Princeton University Press, Princeton, NJ

2013 Graduate student representative: Faculty search committee
Department of Biology, University of Maryland

2012 Co-organizer: Mount St. Helens: Lessons from 31 years of post-eruption ecological research
Ecological Society of America Field Trip, Portland, OR

2010 Public lecture: Mount St. Helens 30th Anniversary Science Pulse
USFS Pacific Northwest Research Station, Randle, WA

Advanced Courses and Workshops

2023 Computer Vision for Ecology Summer Workshop
California Institute of Technology, Pasadena, CA

2018 Ecological Forecasting Summer Course
Boston University, Boston, MA

2014 Bayesian Modeling for Ecological and Social Scientists Workshop
National Socio-Environmental Synthesis Center, Annapolis, MD

2011 Modeling Patterns and Dynamics of Species Occurrence Workshop
USGS Patuxent Wildlife Research Center, Laurel, MD

2010 Bayesian Population Analysis using WinBUGS Workshop
USGS Patuxent Wildlife Research Center, Laurel, MD

2010 LI-6400XT Portable Photosynthesis Training Course
LI-COR Biosciences, Lincoln, NE

2008 Introduction to Bayesian Linear Models for Ecologists Using WinBUGS
Smithsonian National Zoo, Washington, DC