

Tony Cannistra

Climate Change Ecologist

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Quantitative climate change ecologist with experience in statistical learning, geospatial analysis, applied conservation, and a passion for examining socio-ecological relationships.

Education

- Sep 2016 - **Ph.D., Biology**, *University of Washington*, Seattle, WA.
June 2020 Advised by Dr. Lauren Buckley (Biology) and Dr. Magda Balazinska (Computer Science)
Supported by an NSF IGERT traineeship in Big Data and Data Science at the eScience Institute, an NSF Graduate Research Fellowship, and other project-specific support. GPA: 3.82/4.0
Sep 2011 - **B.S., Biology and Computer Science**, *Tufts University*, Medford, MA .
May 2015 GPA: 3.55/4.0

Experience

Applied Conservation Research

- June 2018 - **Data Analyst Intern (40h/wk)**, *Vulcan Inc. & Paul G. Allen Family Foundation*, Seattle, WA.
August 2018 Member of Skylight Global (<http://www.skylight.global>) team, working to enhance enforcement and documentation of **illegal, unreported, and unregulated fishing** in our oceans with **remotely-sensed observations, spatial analysis, and statistical learning techniques**.
 - Using **Python and QGIS**, developed a **planetary-scale spatial analysis** of vessel high-seas “rendezvous”—a common source of illegal activity—using real-time vessel location database. Informed domain awareness and satellite resource tasking activities.
 - Leveraged **gridded oceanographic datasets** to complete an analysis of fish movement patterns.
 - Published maps and figures used by global marine resource law enforcement agents in real-time.*Supervisors: Paul Kerstanski and James DePoy. Contact available upon request.*

Scientific Research

- Sep 2016 – **Ph.D. Candidate (40h/wk)**, *Buckley Lab*, University of Washington.
June 2020 Statistical Learning-based spatial prediction of **ecological responses to climate change** for informed decision making.
 - Characterized the influence of species' traits on climate-driven range shifts via nonlinear modeling.
 - Developed **remotely-sensed** snow cover identification method using **high-resolution satellite imagery** (Planet Labs) and airborne lidar (NASA/JPL Airborne Snow Observatory, SnowEx), and **statistical learning** for modeling **climate-induced phenological shifts**.
 - Built a variety of **data visualization tools** for communicating **model-derived, climate-driven thermal stress** in terrestrial and marine organisms, leveraging **large gridded climate datasets**.
 - Coursework**: Public Land Law, Machine Learning, Data Management Systems, Big Data Management Systems, Fundamentals of Climate Change, Knowledge Brokering in Climate Change Research, Snow Hydrology*Supervisors: Dr. Lauren Buckley (lbuckley@uw.edu), Dr. Nicoleta Cristea (cristn@uw.edu), Dr. Magda Balazinska (magda@cs.washington.edu)*

Education and Outreach

- November 2018- **Trailhead Outreach Volunteer (15-20h)**, *Northwest Avalanche Center*, Delivered avalanche forecast information and resources to **winter recreationists** as member of **field-based outreach**
February 2019 and education team for local avalanche forecasting center.

- November **Co-Producer, Editor (Volunteer)**, *Topophilia Podcast*, Seattle, WA.
- 2016-Present **Co-Developed ongoing podcast** covering issues of place at the **landscape scale**.
- Engaged community with relevant stories on **conservation, recreation, public lands, and policy**.
 - Produced both long-form narrative and shorter interview-based content.
 - Managed writing, interviews, website, social media, and audio engineering.
 - Hosted live storytelling event** with outdoor retailer Patagonia at their Seattle location.
- March **Outdoor School Instructor (3h/wk)**, *REI Puget Sound*, Seattle, WA.
- 2017-Present I teach paddling, climbing, snowshoeing, and navigation to diverse participants.
Supervisor: Molly Bayer. mbayer@rei.com. 206.470.4083
- September **Organizer & Instructor (Volunteer, 60h/year)**, *GeoHackWeek UW*.
- 2017-Present Participated in organization and teaching of **geospatial data analysis workshop**. Fall 2017, 2018, and 2019.
Organizing Faculty: Dr. Anthony Arendt. arendta@uw.edu
- June 2015 - **Mentor Naturalist (40h/wk)**, *Aspen Center for Environmental Studies.*, Aspen, CO.
- September **Led daily nature hikes, ski tours, and snowshoe tours** for a diverse range of clients in the Aspen, Colorado area. Trained as a Golden Eagle and Great Horned Owl handler.
- 2016 & June **Independently researched and developed content and delivery strategies** engineered to foster a deep respect and curiosity for place and ecology in a diverse group of participants.
- 2019 **Developed and executed private experiences** for distinguished guests.
Supervisor: Jim Kravitz. jkravitz@aspennature.org. (970) 925-5756.

Technologies + Tools

- Python** pytorch, tensorflow, pandas/geopandas, rasterio, shapely, cartopy, dask, xarray, subprocess, scipy, numpy, scikit-learn, matplotlib, anaconda, multiprocessing
- R** dplyr, raster, parallel, ggplot2, ecological modeling, population modeling
- QGIS** Vector and raster processing, report preparation, cartographic design
- Javascript** React, npm, deployment
- Amazon Web Services** EC2, RDS, S3, Lambda, SageMaker
- Unix** bash, fish, shell scripting, system configuration
- Tableau** data analytics, dashboards, interactive visualization, geospatial visualization.

Publications

2019

Cannistra, A.F., Cristea, N. 2019. Leveraging CubeSat imagery for snow cover identification at ecologically-relevant scales. *In Prep*.

Cannistra, A.F., Buckley, L.B. 2019. Improving range shift predictions: enhancing the power of traits. *Ecology. In Review.*

2018

Buckley, L.B., **Cannistra, A.F.**, John, P.A. 2018. Leveraging organismal biology to forecast the effects of climate change. *Integrative and Comparative Biology*. DOI: **10.1093/icb/icy018**

2017

Buckley, L.B., Arakaki, A.J., **Cannistra, A.F.**, Kharouba, H.M., Kingsolver, J.G. 2017. Insect Development, Thermal Plasticity and Fitness Implications in Changing, Seasonal Environments. *Integrative and Comparative Biology* icx032. DOI: **10.1093/icb/icx032**

Presentations (§ = award)

- Invited Talk **Cannistra, A.F.** 2019. Welcoming Ecology into the Big Data Age. MIDAS Data Science Consortium, University of Michigan, Ann Arbor, MI.
- Talk/Poster **Cannistra, A.F.** 2019. Assessing High-Resolution CubeSat Imagery to Infer Detailed Snow-Covered Areas for Studying Changes in Mountain Ecosystems. International Mountain Conference, University of Innsbruck, Innsbruck, Austria.
- Lightning Talk (§) **Cannistra, A.F.** 2018. Assessing High-Resolution Satellite Imagery for Detailed Snow Cover Estimation: An Ecological Perspective. UW Data Science Summit. Honorable Mention.
- Tutorial **Cannistra, A.F.,** Levesque, R.J. 2017 and 2018. Tools for Visualizing Geospatial Data in Python: A Hands-On Tutorial. GeoHackWeek, eScience Institute, University of Washington, Seattle, WA.
- Poster **Cannistra, A.F.,** Buckley, L.B. 2017. Improving range shift predictions: Enhancing the power of traits. Ecological Society of America Meeting, Portland, OR.

Grants and Awards

- 2019 **Incubator Program Grant**, *Earth Science Information Partners, Boulder, CO*, Project funding for high resolution remotely-sensed snow-covered area project for phenological forecasting. **\$9,000**.
- 2018-2020 **NSF Graduate Research Fellowship**, *National Science Foundation*, Three years of tuition, stipend, and research support.
- 2016-2018 **Big Data and Data Science IGERT Ph.D. Fellowship**, *eScience Institute, University of Washington*, Two years of tuition, stipend, and research support.
NSF IGERT DGE-1258485.