RONAN HART

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EDUCATION

August 2020 – Present

MSc, Ecology
Utah State University (USU), Logan, UT
Thesis: Quantifying the Impacts of Anthropogenic Linear Features on Ungulate Space-Use Patterns in Utah
Advisors: Drs. Simona Picardi & Tal Avgar

August 2018 – May 2019

Graduate Certificate, Geographic Information Systems
University of North Texas (UNT), Denton, TX
Project: Monitoring, Mapping, and Modeling Spatial-Temporal Patterns of PM2.5
Advisor: Dr. Lu Liang

August 2010 – May 2014

BSc, Environmental Science (Biology Emphasis)
Southern Methodist University (SMU), Dallas, TX

RESEARCH EXPERIENCE

March 2022 – Present

Timing of the Green-Up: Integrating Measurements of Forage Quality in Semi-Arid Utah
Advisor: Dr. Tal Avgar

- Goal: develop and calibrate a flexible projection model of forage quantity and quality in central Utah, using a times series of remotely sensed NDVI and weather rasters, coupled with spatially and temporally replicated field measurements of forage quality.
- Designed a field season to collect vegetation samples throughout different points of the growing season to measure how nutrition quality changes over the season and connect nutrition quality with remotely-sensed measurements of greenness.

- Develop a Generalized Additive Model to smooth the multiple peaks in NDVI to find the rates of green-up in the spring, summer, and autumn to fully capture the change in green-up in semi-arid habitats.

August 2020 – Present

Quantifying the Impacts of Anthropogenic Linear Features on Ungulate Space-Use Patterns in Utah

Advisors: Drs. Simona Picardi & Tal Avgar

- Goal: quantify the space-use behavior changes of pronghorn and mule deer in the presence of linear features – roads and fences – and therefore gain a holistic understanding of functional habitat loss.
- Managed large datasets of GPS points and fine temporal scale environmental raster data.
- Wrote data cleaning, manipulation, analysis, GIS, and visualization code in R and Google Earth Engine.
- Performed home range analysis (*k*-LoCoH method) to determine how an individual's selection and use of seasonal home ranges are affected by the presence of linear features.
- Used integrated step-selection analysis (iSSA) to quantify and compare the behavioral responses of pronghorn and mule deer when they are in the proximity of roads.

October 2018 – April 2020

Air Quality Assessment and Spatial Distribution of Particulate Matter (PM) of University of North Texas (UNT)

Advisor: Dr. Lu Liang

- Modeled the spatial and temporal variation in concentration of particulate matter with a diameter of 2.5 μm ($PM_{2.5}$) around UNT campus using ArcGIS.
- Analyzed 3-D landscape effects on $PM_{2.5}$ concentration by modeling with LiDAR.
- Developed the wind-wedge method of analyzing weather impacts on $PM_{2.5}$ concentration by creating cone shapes based on the direction and speed of the wind at any given point and time.
- Collaborated in a team to design research goal and methodology.
- Instructed and mentored undergraduate students to provide data collection
- Designed code in Python to facilitate data analysis and to greatly decrease total man-hours.

May 2014

Air Quality of Southern Methodist University (SMU): Comparison of Outdoor Sites

Mentor: Dr. Troy Stuckey

- Sampled air from outdoor and indoor sites around SMU, compared how sites differed, and analyzed if particulate matter (PM) concentration or speciation would cause any health or environmental concerns.
- Collected data as a group by calibrating a rotameter to 15 liters/minute, collected air samples for 8 minutes, and prepared microscope slides from rotameter for analysis.
- Counted and categorized particulates based on size and species to determine effects on health and environment.

January 2014 – May 2014

Past and Present Vegetation and Ecology of the Great Trinity Forest

Advisor: Dr. Bonnie Jacobs

- Characterized the ecological succession of the Great Trinity Forest in Dallas, TX by mapping the area of the Trinity River Audubon Center in the forest, randomly locating 26 sites, taped off a $100m^2$ area at each site, and identified and measured the diameter-at-breast-height (DBH) of each tree in the area.
- Identified the historical vegetation of the Great Trinity Forest by preparing a soil core for microscopic analysis, collecting carbon samples from the core for evidence of fire and to date the layers of the core, and systematically analyzing microscope slides to count and identify pollen species.
- Informed land-use decision and education efforts of the Trinity River Audubon Center.

June 2013

Identifying the Species of *Ranunculaceae* of North-Central New Mexico

Advisor: Dr. John Ubelaker

- Identified and characterized all the species of the family *Ranunculaceae* that can be found in the north-central region of New Mexico and recorded the historical uses of these plants.
- Completed initial survey using *A Flora of New Mexico* (1980) and *Flora Neomexicana* (2012), examined historical and cultural use of these plants using *Native American Ethnobotany* (1998), and examined specimens in the SMU-in-Taos herbarium to obtain records of plants in the area.
- Collected and pressed samples found in the local area to be catalogued in the herbarium.
- Wrote a monograph compiling the genus and species of the *Ranunculaceae* family located in the area, how to identify them, and historical uses of them.

September 2012 – May 2013

Soil Analysis for Environmental Archaeology Research

Advisor: Dr. Christopher Roos

- Collected data for research on historical presence and archeological use of fire in the Southwest region of the United States.

- Searched for charcoal samples in soil collected from the southwest region to date the soil and find evidence of fire; measured pH and magnetic susceptibility of soil.
- Work assisted in environmental anthropological research to understand how fire use by an ancient indigenous community affects climate variability and fire regimes.

June 2011 – August 2011

Effects of Herbicide on Invasive Aquatic Plants at Lewisville Aquatic Ecosystem Research Facility (LAERF)

Advisor: LeeAnn Glomski

- Measured the effectiveness of herbicide as a control measure against the spread of invasive aquatic plants in Lewisville Lake.
- Made herbicide solution and applied to study plants; measured dry weight, pH, and chlorophyll levels of plants that had been tested with herbicide
- Informed best practices for controlling invasive aquatic plants for the Army Corps of Engineers.

PUBLICATIONS

PEER-REVIEWED

1. Berger, D. J., German, D. W., John, C., **Hart, R.**, Stephenson, T. R., & Avgar, T. (2022). Seeing Is Be-Leaving: Perception Informs Migratory Decisions in Sierra Nevada Bighorn Sheep (Ovis canadensis sierrae). *Frontiers in Ecology and Evolution*, *10*. https://doi.org/10.3389/fevo.2022.742275
2. **Hart, R.***, Smith, B. J. *, Winter, V. *, & Avgar, T. (2021). Book Review: Habitat Ecology and Analysis. Joseph A. Veech. 2021. Oxford University Press, Oxford, United Kingdom. 215 pp. $49.95 paperback. ISBN: 978-0-19-882941-6. *The Journal of Wildlife Management*, *85*(8), 1744–1745. https://doi.org/10.1002/jwmg.22121
   (* Denotes equal author contribution)
3. **Hart, R.**, Liang, L., & Dong, P. (2020). Monitoring, Mapping, and Modeling Spatial–Temporal Patterns of PM2.5 for Improved Understanding of Air Pollution Dynamics Using Portable Sensing Technologies. *International Journal of Environmental Research and Public Health*, *17*(14). https://doi.org/10.3390/ijerph17144914
4. Lipps E., Jacobs, B., **Hart S.** (2015). Trekking Through the Trees: Forest Succession at the Trinity River Audubon Center. *SMU Journal of Research.*

IN-PREPARATION (manuscript available upon request)

1. **Hart, R.**, Avgar, T., Picardi, S. The Impacts of Anthropogenic Linear Features on Home Range Shape, Size, and Selection. Target journal: *Journal of Applied Ecology*

SELECT KNOWLEDGE & SKILLS

TECHNICAL SKILLS
R and RStudio
ArcGIS
Python and PyCharm
Adobe Illustrator
Google Earth Engine
LiDAR
SQL
Git and GitHub

COMMUNICATION SKILLS
Scientific writing
Presentation of research
Mentoring
Supervising
Science communication
Technical writing
Conceptual figure design

FIELD & RESEARCH SKILLS
Data Collection & Management
- GPS tracking & cleaning
- Vegetation sampling

Data analysis
- Linear mixed models
- Home range analysis
- Integrated Step Selection Analysis

Project management
Data visualization

GRANTS, SCHOLARSHIPS, AND AWARDS

- 2022. **Timing of the Green-Up: Integrating Measurements of Forage Quality in Semi-Arid Utah.** USU Ecology Center Graduate Research Award – $ 2,000
- 2014. **Dorothy Amann Leadership Award**
- 2011. **Alpha Lambda Delta, National Honor Society for First Year Students**
- 2010. **Hilltop Scholar**

PRESENTATIONS

August 2022

Ecological Society of America + Canadian Society for Ecology and Evolution Joint Meeting. The Impacts of Anthropogenic Movement Barriers on Home Range Shape, Size, and Selection. Montréal, Québec, Canada.

March 2022

Utah Chapter of the Wildlife Society 2022 Annual Conference. The Impacts of Anthropogenic Movement Barriers on Home Range Shape, Size, and Selection. Virtual Presentation.

April 2021

Wildland Resources Graduate Research Symposium. Quantifying the Impacts of Anthropogenic Movement Barriers on Ungulate Space-Use Patterns and Functional Connectivity in Utah. Virtual Presentation.

March 2021

Utah Chapter of the Wildlife Society 2022 Annual Conference. Quantifying the Impacts of Anthropogenic Movement Barriers on Ungulate Space-Use Patterns and Functional Connectivity in Utah. Virtual Presentation.

February 2020

Perot Museum of Nature and Science: Science in the News. Monitoring, Mapping, and Modeling Spatial-Temporal Patterns of $PM_{2.5}$ for Improved Understanding of Air Pollution Dynamics Using Portable Sensing Technologies. Dallas, TX.

November 2019

University of North Texas GIS Day. Monitoring, Mapping, and Modeling Spatial-Temporal Patterns of $PM_{2.5}$ for Improved Understanding of Air Pollution Dynamics Using Portable Sensing Technologies. Poster. Denton, TX.

April 2019

University of North Texas Flash Talk. Air Quality Assessment of Particulate Matter (PM) of UNT campus. Denton, TX.

TEACHING

Ecology of our World (WILD 2200). Undergraduate course, Fall 2022. Utah State University. Role: teaching assistant. Responsible for classroom assistance and grading.

Spatial Analysis in R. Ecology Center Workshop Series, Spring & Fall 2022. Utah State University. Role: instructor. Designed and taught a 2-hr workshop on GIS basics and how to apply them using R.

Outreach Science Educator. February 2017 – June 2020. Perot Museum of Nature and Science, Dallas, TX. Taught interactive and engaging interdisciplinary STEM programs to students in grade K-12 at the Perot Museum or outreach to the Dallas/Ft. Worth area.

Outdoor Environmental Educator. Summers of 2014 & 2015. Nature Camp, Vesuvius, VA. Designed and taught outdoor environmental science and art classes to campers age 8-18.

Collegiate Math Tutor. August 2011 – May 2014. Altshuler Learning Enhancement Center, Southern Methodist University. Tutored students at Southern Methodist University in Algebra, Business Calculus, Calculus I, and Calculus II

ACTIVITIES AND LEADERSHIP

- **Volunteer Crisis Counselor, The Trevor Project: Suicide Prevention and Crisis Intervention Organization for LGBTQ Youth.** August 2022 – Present.
- **Member of the Justice, Equity, Diversity, and Inclusion (JEDI) Committee for the USU Natural Resources College**. Fall 2021 – Present.
- **Social Media Coordinator, Space-Use Ecology Lab**. Fall 2020 – Present.
- **Volunteer, Blackland Prairie Raptor Center.** October 2017 – June 2020.
- **Co-President, SPECTRUM (LGBT Student Organization), Southern Methodist University.** August 2012 – May 2014.