

Zachary Merrill M.A.

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Education

PH.D. | JANUARY 2019 – PRESENT | MICHIGAN TECHNOLOGICAL UNIVERSITY

• Major: Forest Science

Specializations: Biogeography, Dendrochronology, Landscape Ecology, Trophic Cascade

Dissertation: Dendrochronological Analyses of the Effects of Moose (*Alces alces*) Herbivory on Forests of Isle Royale National Park, Lake Superior, U.S.A.

PH.D. | AUGUST 2016 – DECEMBER 2018 | UNIVERSITY OF TENNESSEE

• Major: Geography

Related Coursework: Biogeography, Zoogeography, Dendrochronology, Tree Physiology, Quantitative Data Analysis, GIS/Geomorphology, Remote Sensing of the Environment, Climatology

M.A. | MAY 2016 | WESTERN MICHIGAN UNIVERSITY

• Major: Geography

Concentration: Environmental and Resource Analysis

Thesis: The Perceptions of Michigan Hunters Regarding Wolves (*Canis Lupus*) and the Idea of a Wolf-Hunt as a Management Option (In Review)

Related coursework: Biogeography, GIS, Spatial Data Analysis, Environmental Impact Assessment, Water Resources Management, Geographic Methods

B.S. | MAY 2014 | NORTHERN MICHIGAN UNIVERSITY

• Major: Environmental Studies and Sustainability

Minor: Biology

Undergraduate Research: Quantifying Differences in Metacarpal Bones in White-Tailed Deer (*Odocoileus virginianus*) by Location and Average Annual Snowfall Depth

Related coursework: GIS, Quantitative Methods, Molecular Micro-Biology, Environmental Science, Conservation Biology, Ecology, Geographic Research, Environmental Policy and Regulations, Human Impact on Environment

Previous Work Experience

LEAD INSTALLATION TECHNICIAN | CONTRACTOR/PROJECT MANAGER | MAY 2012 – DECEMBER 2013

- Developed a system for documentation of close-out reports for use upon completion of large-scale WIFI and cellular amplification system installation projects
- Maintained a database file and aided in the implementation of a network response system
- Coordinated with local authorities, managers, and community members on installations of broadband networks and cellular boosts, while following building code, policies, inspections, and budget constraints
- Mapping of antenna repeater systems with emphasis on external environmental features

Teaching Experience (Instructor on Record)

- **Adjunct Professor | Walter State Community College | January 2017 – December 2018**
 - World Regional Geography (GEOG 2010) 3 Semesters
 - Designed and implemented course
 - Instructed all class sessions
 - Graded all coursework
- **Graduate Teaching Associate | The University of Tennessee Knoxville | August 2018 – December 2018**
 - People and Environment (GEOG 345) Fall 2018
 - Designed and implemented coursework
 - Held office hour times for students needing extra assistance understanding the course
- **Graduate Teaching Associate | The University of Tennessee Knoxville | January 2018 – May 2018**
 - Landscape/Environmental Change (GEOG 132) Spring 2018
 - Instructor on record
 - Designed and implemented coursework
 - Supervised three teaching assistants
 - Held office hour times for students needing extra assistance understanding the course

Course Preps

- Principles and Applications of Dendrochronology
- GEOG 345 | People and Environment
- GEOG 132 | Landscape Environmental Change
- GEOG 2010 | World Regional Geography
- GEOG 3110 | Geography of Michigan

Teaching Experience (Teaching Assistant and Lab Instructor)

- **Graduate Teaching Assistant | Michigan Technological University | January 2021 – May 2021**
 - Wood Anatomy and Properties (FW 1035)
 - Prepared and implemented lab lectures
 - Graded all coursework
 - Developed remote lab activities
 - Microscope slide preparation
- **Graduate Teaching Assistant | Michigan Technological University | January 2021 – May 2021**
 - Natural Resource Professional (FW 1050)
 - Graded all coursework
 - Aided in development of course material
 - Mentorship
- **Graduate Teaching Assistant | Michigan Technological University | August 2020 – December 2020**
 - Vegetation of North America (FW 2010)
 - Prepared lessons and review activities weekly

- Instructed lab sessions in the field and in the classroom
- Graded all coursework
- Implemented virtual tree identification for parallel online course amid Covid-19 pandemic
- **Graduate Teaching Assistant | Michigan Technological University | January 2020 – May 2020**
 - Natural Resource Professional (FW 1050)
 - Graded all coursework
 - Aided in development of course material
 - Assisted with moving course fully-online during Covid-19 pandemic
 - Mentorship
- **Graduate Teaching Assistant | Michigan Technological University | August 2019 – December 2019**
 - Vegetation of North America (FW 2010)
 - Prepared lessons and review activities weekly
 - Instructed lab sessions in the field and in the classroom
 - Graded all coursework
- **Graduate Teaching Assistant | The University of Tennessee Knoxville | August 2016 – December 2017**
 - Weather/Climate (GEOG 131) Fall 2016 & Fall 2017
 - Landscape/Environmental Change (GEOG 132) Spring 2017
 - Instructed lab sessions
 - Aided in development of course material
 - Graded all coursework
- **Graduate Teaching Assistant | Western Michigan University | August 2014 – May 2016**
 - Introduction to Meteorology & Climatology (GEOG 2250) 4 Semesters
 - Instructed lab sessions
 - Aided in development of course material
 - Graded all classwork
- **Co-Instructor | Northern Michigan University | August 2012 – December 2012**
 - First Year Experience (UN100)
 - Instructed course regularly
 - Focused on Teaching based on Experiences
 - Assisted undergraduates to navigate education requirements
 - Developed strategies to maximize student success and retention

Research Assistantship

- **Research Assistant | Michigan Technological University | January 2019 – Present**
 - Wolf-Moose Predator-Prey Relationship Study
 - Photographed moose skulls for 3-D modeling and morphometric analysis
 - Digital archiving of moose skulls
 - Database management and handbook
 - Preparation of moose bones for museum curation and processing
 - Creation of maps for publication and fieldwork

Professional Presentations

- Dendroecological Analysis of Moose-induced Forest Disturbance: Isle Royale National Park, MI, USA
Ecological Society of America Annual Meeting (*Virtual*) August 2020
- Dendroclimatological Reconstruction of Standardized Precipitation Evapotranspiration Index Utilizing Limber Pine (*Pinus flexilis*) from the Greater Yellowstone Ecosystem (1710-2006)
National Association of American Geographers Annual Meeting, Washington, D.C. April, 2019
- Intra-Island Growth Variation between Balsam Fir (*Abies balsamea*) and White Spruce (*Picea glauca*) Trees, Isle Royale National Park, Michigan, USA
National Association of American Geographers Annual Meeting, New Orleans, LA, April 12, 2018
- Intra-Island Growth Variation between Balsam Fir (*Abies balsamea*) and White Spruce (*Picea glauca*) Trees, Isle Royale National Park, Michigan, USA
Geography Research Symposium, Knoxville, TN February 15, 2018
- Quantifying Growth Rates of Balsam Fir for Analyzing a Trophic Relationship: Isle Royale National Park
Southeastern Division of the Association of American Geographers Annual Meeting, Starkville, MS November 21, 2017
- Dendrochronological Analyses on the Effects of Moose (*Alces alces*) Herbivory on Forests of Isle Royale National Park, Lake Superior, U.S.A.
National Association of American Geographers Annual Meeting, Boston, MA, April 8, 2017
- The Perceptions of Michigan Hunters Regarding Wolves and the Idea of a Wolf-hunt as a Management Option
National Association of American Geographers Annual Meeting, San Francisco, CA, March 29, 2016

Invited Lectures

- Wood Anatomy and Properties | MTU | February 2021
Dendrochronology Applications
- Gratiot Lake Conservancy | Conservancy Webinar Series | May 2021
Presentation for Conservancy members on the status of conservancy lands
- Wood Anatomy and Properties | MTU | January 2020
What is a tree ring?
- Vegetation of North America | MTU | December 2019
Introduction to Dendrochronology Principles and Applications
- Environmental Issues National Parks | UTK | February 2018
Case Study Isle Royale: Lava flow to Today's Environmental Issues and Biodiversity
- Dendrochronological Methods History of the Environment Through Tree Rings | UTK | November 2017
The Technical Side to Study Design and Implementation: Case Study Dissertation Techniques on Isle Royale National Park
- Introduction to Meteorology and Climatology | UTK | October 2017
Global Energy Balance
- Plants/People/Climate in North America
Environmental History in the Sierra Nevada | UTK | September 2017
- Landscape and Environmental Change | UTK | April 2017

The Physiographic Regions of Tennessee

- Policy and Regulation | NMU | March 2016

The Changing Status of the Grey Wolf in Michigan: Settlement to Today

- Practicing Geography | NMU | November 2015

A Story of Transition: Navigating the Road to Graduate School

- Geography of Michigan | WMU | October 2015

The Flora and Fauna of Michigan with an Emphasis on the Wolf Situation

Grants (\$9,528)

- Ecosystem Science Center (\$750) | May 2020
- Ecosystem Science Center (\$750) | April 2019
- Pope & Young Club (\$2000) | June 2018
- National Park Service In-kind (\$908) | Summer 2018
- Graduate Student Senate Travel Grant (\$850) | April 2018
- Stewart R. McCroskey Memorial Fellowship (\$500) | November 2017
- National Park Service In-kind (\$830) | May 2017
- Graduate Student Senate Travel Grant (\$690) | April 2017
- Stewart R. McCroskey Memorial Fellowship (\$500) | April 2017
- Lucia Harrison Endowment Research and Travel Grant (\$2,500) | April 2015

Honors and Awards (\$13,000)

- Michigan Forest Foundation Scholarship (\$500) | Michigan Technological University 2020
- NSF Fellowship (\$3000) | North American Dendroecological Field School 2018
- Chancellors Fellowship (\$9000) | University of Tennessee 2016-2018
- Teaching Effectiveness University-Wide Nominee (\$500) | Western Michigan University 2016
- Gamma Theta Upsilon | Member since 2014

Publications

- Rochner, M. L., **Merrill, Z. A.**, & Smith, L. G. (2019). Dendrochronological investigation of the Knob Creek Cabin at President Abraham Lincoln's Boyhood Home, Hodgenville, Kentucky, USA (**Accepted April 2019**: *Journal of Archaeological Science: Reports*).
- **Merrill, Zachary A.** (2016). The perceptions of Michigan Hunters Regarding Wolves (*Canis lupus*) and the Idea of a Wolf-Hunt as a Management Option *Thesis*. https://scholarworks.wmich.edu/masters_theses/697/
- **(Non-Refereed)** Brasher, J.P., M. Thomas, B. Hinger, H. Gunderman, E. Bottone, and **Z. Merrill**. *Regarding AAG President Glen MacDonald's official AAG press release about President Trump's Travel Ban*. Annual Newsletter of the AAG's Graduate Student Affinity Group. Spring 2017.

Research and Projects (In Progress)

- Standardized Precipitation Evaporation Index (SPEI) Reconstruction of the Greater Yellowstone Region using Limber Pine (*Pinus flexilis*) from a Low Elevation Ridge. *Manuscript in Progress*

I was recently awarded a prestigious National Science Foundation (NSF) fellowship for my work during the North American Dendroecological Fieldweek (NADEF) to complete this project and submit a manuscript for publication (Project almost complete).

- Estivant Pines

Recently had a proposal accepted to sample the Estivant Pines in Copper Harbor, MI. This stand is believed to be one of the last intact virgin timber stands remaining in Michigan. (Project initiated, sample collection has begun).

- Gratiot Lake

Currently working with Gratiot Lake Conservancy to establish a northern white cedar and eastern hemlock chronology across the Gratiot Lake Property. This includes creating interpretive signs for the Bear Paw Path. (Project initiated, sample collection has begun).

- Abraham Lincoln's boyhood home

The National Park Service invited our lab to use dendroarchaeological methods to analyze Abraham Lincoln's boyhood home in Knob Creek for authenticity (**Published**).

- Fort Wilkins State Park

Currently in the progress of using dendroarchaeological methods to date original northern white cedar (*Thuja occidentalis*) stockade poles from Fort Wilkins, which is believed to be constructed in 1844 with local materials. (Publication expected).

- Copper Cowboys on Isle Royale

Working with several collaborators to better understand mining prospecting timeline on Isle Royale utilizing jack pine establishment (Manuscript in progress).

- Double Brescian Bass

Assisted in evaluating a double bass brought to the lab for dendrochronological analysis to determine possible creator and origin of instrument. Currently for sale \$335,000 (not published).

- The Tamarack House

Currently in the progress of using dendroarchaeological methods to date what is thought to be the only remaining original mining company home moved from Phoenix, MI to Tamarack, MI between the 1850s and 1880s (Publication expected).

- Ottawa National Forest Logging Camp

Working with landowners to date a historic logging camp (now privately owned, waiting on extraction tool).

- Davis Cabin

Completed project using dendroarchaeological methods to date a family home believed to be built prior to the American Revolution (Project complete).

- Cliff Mine Stamp Mill

Recently received a sample to perform dendroarchaeological dating on to determine when the Cliffs Mine Stamp Mill was constructed and from where the wood originated in constructing this site (Project almost complete).

- Delaware Mine

Proposal in progress with the NPS to date the timbers within the Delaware mine to investigate the ambiguity surrounding the construction of the mine (Proposal in progress).

- Quincy Mine

Proposal in progress with the NPS to date the timbers within the Delaware mine to investigate the ambiguity surrounding the construction of the mine (Proposal in progress).

- Adventure Mine

Proposal in progress with the NPS to date the timbers within the Delaware mine to investigate the ambiguity surrounding the construction of the mine (Proposal in progress).

Outreach and Service

- Mentorship

Hired two separate field assistants to assist in data collection on Isle Royale National Park (Summer 2017-18, 20). During this time, I taught them field methods for dendrochronology.

Since 2016, I have mentored and supervised three undergraduate students in the Laboratory of Tree-Ring Science. During this time, I was responsible for teaching dendrochronology lab methods.

Since 2019, I have supervised/mentored 10 undergraduate students at MTU on a variety of projects related to the wolf-moose research on ISRO and locally-based dendrochronology projects.

- Graduate Student Representative to faculty meetings

Attended and participated in weekly faculty meetings representing the graduate students interests (March 2019-Present).

- Graduate Student Social Coordinator

Arranged events to foster a better community and encourage scientific collaboration (2017-2018 UTK)

- Graduate Student Senate

Graduate Student Council Chair 2016 – 2017. I initiated the new council position as chair while developing the mission of this council (UTK).

- Geography Awareness Event MUSE children's Museum (November 2016-2018)

In November of each year, myself and at least one other graduate student, created interactive science activities for children during Science Saturdays at the local STEM based children's museum.

- Dendroarchaeology Workshop

Each year the graduate students in the Laboratory of Tree-Ring Science have held an interactive workshop on dendroarchaeological dating. This workshop is performed at the Historic Blount Mansion.

- Dendrochronology Workshop

Geo-Tech Club at Vine Magnet School After School Program 2017

- College and Career Fair Morgan County Schools (2017)

UTK Geography Exhibit

- Graduate Outreach Committee Western Michigan University 2014 – 2016

Responsible for aiding graduate student recruitment

- Academic Integrity Committee Graduate Student Representative Western Michigan University 2014 – 2016

Responsible for hearing trials of possible graduate student plagiarism as a graduate student representative