Curriculum vitae of

Natalie Haydt

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EDUCATION

Arkansas State University **July 2021 – Present**
Jonesboro, Arkansas
Ph.D. Molecular Biosciences • Current GPA 4.0/4.0

Frostburg State University **August 2017 – December 2019**
Frostburg, Maryland
M.S. Applied Ecology and Conservation Biology • GPA 4.0/4.0

Davidson College **August 2013 – May 2017**
Davidson, North Carolina
B.S. Biology and B.S. Music • GPA 3.5/4.0

Mooresville Senior High School **August 2009 – June 2013**
Mooresville, NC
H.S. Diploma • GPA 4.89/5.0 • Salutatorian

Relevant Lab Sections Taught

Biology Courses: Introductory Biology; Anatomy and Physiology II

Relevant Graduate Coursework

Biology Courses:
ASU ~ Molecular Data Analysis, Molecular Genetics and Genomics; Advanced Cell Biology; Biosafety and Ethics in Research; Bioinformatics; Machine Learning in R; Vertebrate Endocrinology
FSU ~ Thesis; Spatial Ecology; Histology; Molecular Biology; R Graphing Seminar; Methods in Biological Research; Quantitative Analysis of Vertebrate Populations; Seminar in Fisheries and Wildlife Biology; Conservation Biology and Reserve Design; Ethics, Politics, and Economics in Conservation Biology; Introduction to GIS

Relevant Undergraduate Coursework

Biology Courses: **Invasion Biology**; Biostatistics; Ecology; Introductory GIS I; Global Change Ecology; Life in the Sea; Amphibian & Reptile Conservation; Genetics; Neuroscience of Exercise; Molecules, Genes & Cells; Organisms, Evolution, & Ecosystems; Spanish II
Chemistry Courses: Introduction to Chemistry; General Chemistry; Organic Chemistry I

AWARDS & GRANTS

November 2024 - Research & Creativity Travel Grant ($2000)
January 2024 – 3rd Place in the Graduate Student Poster Competition at the Society for Integrative and Comparative Biology Annual Conference
April 2023 – Arkansas Audubon Society Research Grant ($750)
April 2023 - National Science Foundation Traineeship/Scholarship, UandI-DEECoDE ($34,000/4 years)
April 2022 – Arkansas State University Dean's Award for Graduate Student Poster Presentation ($250)
April 2018 – Frostburg State University Faculty Development Grant ($1,500)
August 2017 – Frostburg State University Biology Department Teaching Assistantship
May 2017 – Tribeta Biology Honors Society Full Membership
June 2016 – Davidson College Summer Research Initiative ($5,000)
March 2014 – Current Student Music Scholarship ($2,000)
June 2013 – NC Association of Education Office Professionals Scholarship ($1,750)
June 2013 – Mooresville High School Salutatorian for the Class of 2013
June 2013 – AP Scholar with Distinction

SCIENTIFIC PUBLICATIONS

Grant, E., J. Fleming, E. Bastiaans, A. Brand, J. Brooks, C. Devlin, K. Epp, M. Evans, M. C. Fisher-Reid, B. Gratwicke, K. Grayson, **N. Haydt**, R. Hernández-Pacheco, D. Hocking, A. Hyde, M. Losito, M. MacKnight, T. Matlaga , L. Mead, D. Muñoz, W. Peterman, V. Puza, S. Sterrett, C. Sutherland, L. Thompson, A. Warwick, A. Wright, K. Yurewicz, & A. David. 2024. Range-wide salamander densities reveal a key component of terrestrial vertebrate biomass in eastern North American forests. *Biology Letters* 20(8): 20240033.

Haydt, N., D. Hocking, and S. Sterrett. 2022. Spatial capture-recapture derived turtle capture probabilities and densities in the Chesapeake and Ohio Canal. *Journal of Herpetology* 56(2): 203-210. https://doi.org/10.1670/21-026.

Hartzheim, A. M., J. L. Terry, E. K. Field, **N. T. Haydt,** S. Poo, & L. A. Neuman-Lee. 2022. Immune and stress physiology of two captively-housed tortoise species. *Journal of Experimental Zoology Part A: Ecological and Integrative Physiology* 1– 14. https://doi.org/10.1002/jez.2674.

Field, E. K., A. Hartzheim, J. Terry, G. Dawson, **N. Haydt**, and L. A. Neuman-Lee. 2022. Reptilian innate immunology and ecoimmunology: what do we know and where are we going? *Integrative and Comparative Biology* 62(6): 1557–1571. https://doi.org/10.1093/icb/icac116.

Fitzpatrick, M., S. Lachmuth, and **N. Haydt**. 2021. The ODMAP Protocol: a new tool for standardized reporting that could revolutionize species distribution modeling. Journal of Ethology 44(7) 1067-1070. https://doi.org/10.1111/ecog.05700.

Guzy, J. C., M. M. Kern, A. M. Tutterow, **N. T. Haydt**, S. E. Pittman, and M. E. Dorcas. 2014, 2015. Status of Bog Turtles at Friday Bog, Gaston County, NC (Final Report).

SCIENTIFIC PRESENTATIONS

Haydt, N.T., G. Dawson, J. Chamberlain, D. McDermott, and L. Neuman-Lee. Assessing Leukocyte Populations in Snakes Using Flow Cytometry. The Society for Integrative and Comparative Biology. January 2025.

Haydt, N.T., G. Dawson, S. Hernandez, J. Chamberlain, D. McDermott, and L. Neuman-Lee. Using Flow Cytometry to Examine Leukocytes in Three Species of Watersnakes. Oral Presentation. World Congress of Herpetology, Borneo, Sarawak, Malaysia. July 2024.

Haydt, N.T., and L. Neuman-Lee. Augmenting Spatial Predictions of an Emerging Disease in Snakes with Soil Microbiota Data. Oral Presentation. World Congress of Herpetology, Borneo, Sarawak, Malaysia. July 2024.

Haydt, N.T., and L. Neuman-Lee. Skin microbiome and Immune Responses of snakes in Arkansas. Poster presentation. Society for Integrative and Comparative Biology. January 2024.

Haydt, N.T., and L. Neuman-Lee. Skin infections and immune function of snakes in Arkansas. Poster presentation. The UandI-DEECoDE Summer Institute, Arkansas State University. August 2023.

Haydt, N.T., and L. Neuman-Lee. Fungal microbiota and immune function of snakes in Arkansas. Oral presentation. Joint Meeting of Ichthyologists and Herpetologists. July 2023.

Haydt, N.T., L. Neuman-Lee, and E. Bellis. Predicting the distribution of soil microbes associated with snake fungal disease in Arkansas. Poster presentation. Joint Meeting of Ichthyologists and Herpetologists. July 2022. Botany. July 2022. Create@State, Arkansas State University. April 2022.

Haydt, N.T., J.L. Brooks, and D.J. Hocking. Density and movement of turtles in restored and non-restored sections of the Chesapeake and Ohio Canal. Poster presentation. Frostburg State University. May 2018.

Haydt, N.T., E.R. Parker, and S.E. Pittman. Burmese python metabolic responses: variation due to body mass and temperature. Poster presentation. Davidson College. September 2016

Scoccimaro, A.M., **N.T. Haydt**, E.R. Parker, S.E. Pittman, and M.E. Dorcas. Risk taking and defensive behaviors of juvenile Burmese pythons. Poster presentation. Davidson College. September 2015.

Parker, E.R., A.M. Tutterow, **N.T. Haydt**, S.E. Pittman, and M.E. Dorcas. Monitoring a critically-endangered population of bog turtles in North Carolina: Risk-Analysis and mitigation. Poster presentation. Davidson College. September 2015.

Haydt, N.T., E.R. Parker, S.E. Pittman, and M.E. Dorcas. Variations in movement and risk taking behaviors of juvenile Burmese pythons. Poster presentation. Association of Southeastern Biologists. Southeastern Ecology and Evolution Conference. April 2015.

Haydt, N.T., A.M. Tutterow, S.E. Pittman, and M.E. Dorcas. The Status of a piedmont bog turtle population. Poster presentation. Association of Southeastern Biologists. Southeastern Ecology and Evolution Conference. April 2014.

RESEARCH EXPERIENCE

PhD Thesis Research **July 2021 – Present**

Arkansas State University – Biology Department

- Conduct research on the association of microbiota, immune function, and fungal skin infection in snakes in Arkansas
- **Extract DNA** from microbiome swabs to send off for metagenomic sequencing
- Conduct **quantitative PCR** to assess pathogen presence and abundance
- Run **microbial killing assays** using snake plasma to measure immunocompetence
- **Isolate leukocytes** for flow cytometry and conduct quantify leukocyte populations using a **FACSAria Flow Cytometer**
- Develop **species distribution models** and **network models** to predict fungal skin infection risk in snakes
- Help oversee **husbandry** of colony animals
- **Mentor** undergraduates in the Neuman Lee Lab

Master's Thesis Research **August 2017 – December 2019**

Frostburg State University – Hocking Lab of Population Ecology and Conservation

- Conducted spatial capture-recapture on turtles at 12 sites along the Chesapeake and Ohio Canal
- Input, organized, and performed quality control on data
- Analyzed spatial capture-recapture data using Bayesian statistics in Program R to examine distribution of activity centers and population densities across sites

Project Co-manager **September 2017 – October 2019**

Frostburg State University – Hocking Lab of Population Ecology and Conservation

- Conducted spatial capture-recapture on salamanders at 6 forested plots
- Organized volunteer effort for sampling sessions and helped oversee volunteers during sampling
- Input data, organized, and performed quality control

Davidson Research Initiative Summer Fellow **July 2016 – August 2016**

Davidson College – Biology Department

- Examined effects of temperature and body mass on sub-adult Burmese python metabolic rates using respirometry equipment
- Helped process and record measurements for snakes and turtles brought in from the community
- Provided animal care for lab animals on assigned days
- Helped radio-track a nearby bog-turtle population for an ongoing movement study

Field Volunteer **October 2013 – May 2016**

Davidson College – Herpetology Lab

- Assisted twice annually with head counting, seining, and processing of Diamondback terrapins on Kiawah Island, SC and around GA island wildlife refuges
- Helped document daily field activities in field notes for Kiawah Island sampling

Herpetological Lab Summer Research Position **July 2015 – August 2015**

Davidson College – Herpetology Lab

- Helped set-up and conduct behavioral trials examining defensive responses in juvenile Burmese pythons
- Processed and entered measurements for snakes brought in from the community
- Helped radio-track bog-turtles at a nearby wetland to provide data for a movement study of the population
- Provided animal care for lab animals on assigned days

Undergraduate Course Research Project **September 2014 – December 2014**

Davidson College – Herpetology Lab: Amphibian and Reptile Conservation Course

- Helped set-up and conduct behavioral trials examining risk taking behaviors in juvenile Burmese pythons

Herpetological Lab Research Fellowship **June 2014 – August 2014**

Davidson College – Herpetology Lab

- Helped monitor a nearby bog turtle population by probing, trapping, and checking cover-boards
- Compared efficiency between detection methods (including camera trapping)
- Compared current and past population estimates

PROFESSIONAL EXPERIENCE

Teaching Assistant **August 2023 – Present**

Arkansas State University – Biology Department
Supervisors: Dr. Virginie Rolland and Dr. Scott Mangan

- Hold office hours for students in Biological Data Analysis and Ecology
- Help assignments

Wildlife Technician **March 2021 - June 2021**

The Great Basin Institute, Las Vegas
Supervisor: James Cash

- Worked with a 4-person field crew to survey and record desert tortoise (*Gopherus agassizii*) locations along 10 km transects
- Received Wilderness First Aid Certification from the American Safety and Health Institute
- Utilized Garmin GPS devices to locate transects and walk 10 km east or west per day

Faculty Research Assistant **September 2019 - February 2021**

University of Maryland Center for Environmental Science (UMCES), Appalachian Laboratory
Supervisor: Dr. Matt Fitzpatrick

- Helped develop species distribution models examining the impact of lidar derived forest metrics on the occurrence of eastern bird species in Pennsylvania.
- Helped collect bud set and growth data from red spruce saplings in a common garden experiment
- Collaborated with the United States Forest Service to obtain a multi-regional nominal effects letter to allow field work on balsam poplar and its hybrids in the western United States.
- Help organize and display data for various projects using Geographic Information Systems software (GIS)
- Helped clean and organize data informing sampling routes for balsam poplar field work.

Bat Acoustics Field Technician **June 2019 – July 2019**

University of Maryland – Appalachian Laboratory

- Conducted driven acoustic surveys recording bat echolocation along routes in western Maryland
- Operated DeLome Street Atlas to locate bat acoustic survey field routes and record driven routes and concurrent time data
- Handled and operated an AR125 microphone (Binary Acoustic Technology) and operated the acoustic software program, SPECTR II to record and download echolocation data.

Lab Teaching Assistant **August 2017 – May 2019**

Frostburg State University – Biology Department
Supervisor: Dr. David Puthoff

- Manage lab sections for Introductory Biology
- Guide students through lab procedures and grade assignments
- Previously presented lectures and managed laboratory sections for Anatomy and Physiology II

Library Information and Research Assistant (LIRA) **August 2015 – August 2017**

Davidson College – E.H. Little Library and Music Library

- Assisted students and faculty with locating books and research articles in both the main library and music library
- Demonstrated how to find research articles through the library's website

- Provided assistance with correctly sourcing literature or other documentation in requested citation style formats
- Check-in and check–out library materials for students and faculty
- Helped improve the quality of library assistance through collaborative projects aimed at increasing efficiency in the various LIRA roles

PROFESSIONAL ORGANIZATIONS

AState Science Graduate Student Association (SGSA)
Current Vice President - began August 2023
AState Data Analysis Networking Group (DANG)
Current President - began August 2023
Society for the Study of Amphibians and Reptiles
Wildlife Disease Association
Society for Integrative and Comparative Biology

SKILLS AND TECHNIQUES

Computer:
Program R Statistical Software
Species Distribution Models
Hierarchical Mixed Models
BUGS and JAGS Bayesian Analysis Packages
Geographic Information Systems
Microsoft Suite (Word, Excel, PowerPoint)
Website development (WordPress, Weebly)
Field:
Handling of herpetological species (including snapping turtles and snakes)
Safe handling of venomous snakes (tubing)
Mark-recapture techniques (turtles and salamanders)
Scute notching (turtles)
Hoop net trapping (turtles)
Injecting visual implant elastomer (salamanders)
Morphometric data collection (turtles, snakes, crustaceans)
Pit-tagging (turtles)
Radio-telemetry (turtles)
Blood collection (snakes and turtles)
Lab
DNA extraction (tissue, blood, microbiome swabs)
PCR, qPCR, Gel electrophoresis
Microbial killing assay
Flow cytometry (leukocyte isolation, machine utilization) - Certificate from BD Biosciences
Blood cell identification and quantification
Lab animal care (snakes)
ELISAs (detecting corticosterone)
Other:
Wilderness survival skills - Wilderness Leadership Survival Course
Swimming (Masters Swim Club)

SELECTED OUTREACH EXPERIENCE

Data Bootcamp Student Planning Committee Member (2023, 2024)
National Science Foundation Traineeship/Scholarship, UandI-DEECoDE

- Help plan the annual UandI-DEECoDE winter data bootcamp for UandI-DEECoDE trainees and faculty

Summer Conference Student Planning Committee Member (2023)
National Science Foundation Traineeship/Scholarship, UandI-DEECoDE

- Help plan the annual UandI-DEECoDE summer conference for UandI-DEECoDE trainees and faculty

President
Science Graduate Student Organization @ ASU

- Organize meetings for SGSA
- Help plan SGSA actions and events
- Maintain and disseminate SGSA resources

President
AState R User Group (RUG) @ ASU

- Organize meetings of RUG officers
- Help schedule and organize RUG sessions for all RUG members
- Update the RUG website with information from each RUG session
- Apply for RUG to be an officially registered student organization
- Maintain a folder with shared RUG resources

Website Manager
Neuman-Lee Lab @ ASU

- Maintain the Neuman-Lee Lab website
- Update website with news and information about Neuman-Lee Lab members

Outreach Volunteer
Neuman-Lee Lab @ ASU

- Assisted with presenting a turtle research activity at the ASU Museum's FrankenSTEM event
- Assisted with presenting an activity about turtle research at a nearby highschool

Founding PR Officer
Mountain Maryland Chapter of the Society for Conservation Biology @ Frostburg State University

- Managed the Mountain Maryland Chapter's Facebook page
- Posted information about upcoming speakers, meetings, and workshops on social media outlets
- Created flyers and other advertisements for upcoming events

Volunteer Guest Lecturer
ACE hardware in Davidson, NC; Run for the Green in Davidson, NC; Reptile Day at the Museum of Natural Sciences in Raleigh, NC; Etc.

- Presented information to the public on outreach animals and current Burmese python research
- Co-presented a lecture describing amphibian and reptile characteristics to AP Environmental Science Class

Volunteer Multimedia Designer
Herpetology Lab @ Davidson College

- Helped build a website to increase awareness of invasive Burmese pythons in Southern Florida.

- Gathered current research and known characteristics of Burmese pythons and created power-points intended for high school presentation

Peer Reviewer

- Assistant peer reviewer for the journals *Biological Conservation*, *Ethology*, *Biological Invasions*, and *Journal of Wildlife Diseases.*
- Reviewed chapters of *Snakes of the Southeast* for its revised 2015 edition

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REFERENCES

Lori Neuman-Lee, PhD Co-Mentor, Assistant Professor of Physiology at Arkansas State University, Jonesboro, AR; lneumanlee@astate.edu, 870-972-3111.

Emily Bellis, PhD Co-Mentor, Research Assistant Professor of Bioinformatics at Arkansas State University, Jonesboro, AR; ebellis@astate.edu, 870-680-3979.

Daniel Hocking, Master's Mentor, Statistician with National Oceanic & Atmospheric Association (NOAA), Gloucester, MA; daniel.hocking@noaa.gov, 978-281-9324.

Matt Fitzpatrick, UMCES Supervisor, University of Maryland Center for Environmental Science, Frostburg, MD; mfitzpatrick@umces.edu; 301-689-7131.

Thomas Serfass, Graduate Program Coordinator, Frostburg State University, Frostburg, MD; tserfass@frostburg.edu, 301-687-4171.