

Abhinav Shrestha

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Education

2021-current	M.S. Geography, Dept. of Earth and Spatial Sciences, University of Idaho, Moscow, ID.	<u>GPA</u> : 4.0 <u>Thesis title</u> : <i>Combining multispectral and three-dimensional data from drone imagery to detect forest insect damage: an evaluation of a novel approach in the northern Rocky Mountains.</i> <u>Advisor</u> : Dr. Jeffrey Hicke, Dept. of Earth and Spatial Sciences, University of Idaho
2021-current	GIS Academic Certificate (graduate level) , Dept. of Earth and Spatial Science, University of Idaho, Moscow, ID.	<u>GPA</u> : 4.0
2015-2019	B.A. Biology and Environmental Science, Coe College, Cedar Rapids, IA.	<u>GPA</u> : 3.93 <u>Honors</u> : <i>Magna Cum Laude</i> , Phi Beta Kappa, Phi Kappa Phi <u>Senior Honors Thesis</u> : <i>GIS-based study on topographical preference of common tree species in Palisades-Kepler State Park, IA</i> <u>Advisor</u> : Dr. Paula Sanchini, Dept. of Biology, Coe College

Research Experience

- 2021-current **Graduate student researcher**, Dept. of Earth and Spatial Sciences, University of Idaho.
- Principle investigator, MS thesis project.
Title: *Combining multispectral and three-dimensional data from drone imagery to detect forest insect damage: an evaluation of a novel approach in the northern Rocky Mountains.*
Advisor: Dr. Jeffrey Hicke, Dept. of Earth and Spatial Sciences, University of Idaho.
Responsibilities: develop a novel approach using remote sensing, GIS, image processing, and programming for detecting forest insect damage using drone-acquired point cloud data, conduct field data collection.
 - Collaborative researcher, plant sciences and rangeland research project.
Title: *A comparison and development of methods for estimating sagebrush shrub volume using unmanned aerial systems.*
Principle Investigator: Georgia R. Harrison, Department of Plant Sciences, University of Idaho.
Responsibilities: develop workflow of estimating shrub volume with 3D data from drones, use Git and GitHub for collaborative code sharing.
- 2022-2023 **Graduate Research Assistant**, NASA Commercial SmallSat Data Analysis (CSDA) project. Collaborative research project with the University of Idaho, Washington State University, and US Forest Service
- Project title: *Using commercial satellite imagery to study insect outbreaks in the US: Outbreak characteristics and evaluation of Landsat-based algorithms.*
- Principle Investigator: Dr. Arjan Meddens, School of the Environment, Washington State University, Pullman, WA.
- Responsibilities: conduct collaborative research to develop machine learning image classification algorithms (RF, MLC, NN) that assess forest mortality using high-resolution satellite imagery, assist field crew with forest inventory

data collection (FIA-based), perform logistics mapping by creating and maintain spatial databases, execute drone imagery acquisition missions.

2017-2019 **Undergraduate Researcher**, Dept. of Biology, Coe College.

Principle investigator, senior honors thesis. Title: *GIS-based study on topographical preference of common tree species in Palisades-Kepler State Park, IA*. Advisor: Dr. Paula Sanchini, Dept. of Biology, Coe College.

2018 **GIS Research Technician**, Dept. of Psychology, Coe College.

Project title: *How roadway design affects cyclist-motorist interactions*. Principle Investigators: Kei Yoshida and Dr. Benjamin Chihak, Dept. of Psychology, Coe College.

Professional Experience

2021-
current **Graduate Teaching Assistant**, Dept. of Earth and Spatial Sciences, University of Idaho

Responsibilities: principal instructor for Physical Geography Lab (GEOG 100L), principal instructor for Hydrologic Applications of GIS and Remote Sensing Lab (GEOG 424/524), [online course developer](#) for Intermediate GIS course (GEOG 475) through University of Idaho's [Center for Excellence in Teaching and Learning \(CETL\) department](#)

2019-2021 **Quality Control Lab Analyst**, Archer Daniels Midland (ADM), Cedar Rapids, IA

Responsibilities: perform daily analytical tests for process and final samples of products, perform maintenance, calibration, and troubleshooting of all analytical laboratory equipment, perform job cycle checks, blind sample testing, cross lab studies, and review and validate standard operating procedures (SOP)

2016-2019 **Undergraduate Lab Assistant**, Dept. of Biology, Coe College

Responsibilities: prepare samples and solutions for quantitative analysis of genetic, tissue and microbiological experiments for all biology lab courses, maintain and update remote sensing equipment for field courses, maintain

inventory of chemical stockroom, caretake of plants and animals used for lab courses and research

2018 **IT Technician.** Dept. of Information Technology, Coe College
Responsibilities: update and maintain hardware and software of all computers, printers, and servers under Coe College IT supervision, provide technical support via in-person drop-ins and phone/email IT helpline

2018 **Undergraduate Tutor,** Dept. of Biology, Coe College
Responsibilities: help students troubleshoot issues regarding remote sensing and field data integration with ArcGIS, answer any GIS related questions pertaining to the Spatial Ecology course (BIO 290)

Publications & Presentations

Shrestha, A., J. A. Hicke, A. J. H. Meddens, J. W. Karl, A. T. Stahl, Combining multispectral and three-dimensional data from drone imagery to detect forest insect damage: an evaluation of a novel approach in the northern Rocky Mountains. (*publication in prep*)

Shrestha, A., J. A. Hicke, A. J. H. Meddens, J. W. Karl, A. T. Stahl, Evaluating the combination of reflectances and three-dimensional point cloud from drone imagery for detecting forest insect damage, contributed talk, University of Idaho GIS Day, November 2023. (*publication in prep*)

Hicke, J. A., B. C. Bright, R. P. Hanavan, A. T. Hudak, A. J. H. Meddens, **A. Shrestha,** A. T. Stahl, A review of remote sensing of forest insect and disease outbreaks: Bottom-up and top-down considerations for detection and attribution, *Remote Sensing of the Environment (under review)*, 2023

Harrison, G. R., **A. Shrestha,** E. K. Strand, J. W. Karl, “A comparison and development of methods for estimating sagebrush shrub volume using drone imagery-derived point clouds”. *Ecosphere (under review)*, 2023

Harrison, G. R., **A. Shrestha,** J. W. Karl, Seeing shrubs from the sky: an exploration of using drone-based method to estimate shrub canopy volume, contributed talk, Ecological Society of America (ESA) Annual Conference, 6-11 August 2023, Portland, OR.

Hicke, J. A., **A. Shrestha**, A. Meddens, A. Stahl, B. Bright, A. Hudak, R. Hanavan, “Using Remote Sensing to Study Tree Damage from Insects”, keynote speaker, Western Forest Insect Work Conference, 25-27 April 2023, Seattle, WA.

Shrestha, A., GIS-Based Study on Topographical Preference of Common Tree Species in Palisades-Kepler State Park, IA, *honors thesis*, Coe College Department of Biology, Cedar Rapids, IA, 2019.

Shrestha, A., & Sanchini P, “A Geographic Information System (GIS)-based study on topographical preference of common tree species in Palisades-Kepler State Park”, contributed talk, Coe College Student Research Symposium, Coe College, Cedar Rapids, IA, 2019.

Obiesie, C., **Shrestha, A.**, & Sanchini, P., Distribution of Oaks (*Quercus* spp.) in Forests of Palisades-Kepler Park, Linn County, Iowa”, poster presentation, Coe College Student Research Symposium, Coe College, Cedar Rapids, IA, 2019.

Yoshida, K., **Shrestha, A.**, & Chihak, B., “How Roadway Design Affects Cyclist-Motorist Interactions”, poster presentation, Tri-State Undergraduate Psychology Research Conference, Loras College, Dubuque, IA, 2018.

Relevant Courses & Skills

University of Idaho, Moscow, ID (2021-current)

Courses: Hydrologic Applications of GIS and Remote Sensing Lab (Lab Instructor), GIS Programming (ArcPy/Python programming), Remote Sensing with UAS, Remote Sensing/GIS Integration, Data Wizardry in Environmental Science (R-programming), Global Climate Change, Advanced Forest Entomology, Fire Ecology, Statistical Analysis

Certificates: [Geographic Information Systems \(GIS\) Graduate Academic Certificate](#) (Department of Earth & Spatial Sciences), [Graduate Online Course Development Institute](#) (Center for Excellence in Teaching and Learning (CETL))

Coe College, Cedar Rapids, IA (2015-2019)

Courses: Urban Ecology, Environmental Microbiology, Analytical Chemistry, Behavior and Ecology of Vertebrates, Field Botany

Programming Languages & Software

R, RMarkdown, RShiny, Python, Git, GitHub, ArcGIS Pro, ArcPy, ArcGIS Notebooks, QGIS, ERDAS Imagine, Agisoft Metashape, CloudCompare, Emlid Studio, Forest Vegetation Simulator (FVS), VSCode, RStudio, VIM, Jupyter Notebooks

Instruments

Trimble GeoX7 GPS receiver, ProMark 220 GPS receiver, TruPulse Laser Rangefinder, High Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Combustion Analyzer, Ion Chromatography (IC)

Languages

English (Native), Nepali (Native), Hindi (Native), Urdu (Intermediate)

Honors & Awards

2021-current	Graduate Assistantship , Dept. of Earth and Spatial Sciences, University of Idaho, Moscow, ID (\$94,389)
2023	Outstanding Graduate Student M.S. , Dept. of Earth and Spatial Sciences, University of Idaho, Moscow, ID
2015-2019	Global Leadership Full-tuition Scholarship , Coe College, Cedar Rapids, IA (\$155,000)
2019	DeJong Biology Research Award for outstanding honors research in biology, Dept. of Biology, Coe College, Cedar Rapids, IA
2019	Phi Beta Kappa , National Honors Society
2019	Phi Kappa Phi , National Honors Society

Involvement, Service & Engagement

- 2016-2019 **Executive Board Member**, International Club, Coe College
Roles: President (2018-2019), Vice President (2017-2018), and Public Relations Officer (2016-2017)
Responsibilities: organize events that promote cultural diversity within the general student body and local community, act as liaisons that represent the international student body to work with the Office of International Student Affairs and the Office of Student Development at Coe College
- 2017-2019 **International student representative**, Diversity and Inclusion Collaboration Committee, Coe College
Responsibilities: organize collaborative events with student leaders from identity-based student organizations at Coe College advocating for cultural diversity and minority representation
- 2016-2017 **Public Relations Officer**, Multicultural Fusion Club, Coe College
Responsibilities: coordinate communications between members, general student body, and local communities to promote participation for events organized by the club
- 2016 **International Student Orientation Leader**, Office of International Student Affairs, Coe College
Responsibilities: coordinate and oversee events that comprise of the International Student Orientation, mentor international students to ease their transition into a new environment

Professional References

Dr. Jeffrey Hicke, Professor (Advisor), Department of Earth and Spatial Sciences, University of Idaho, Moscow, ID. Email: jhicke@uidaho.edu. Phone: (+1) 208-885-6240

Dr. Jason Karl, Associate Professor of Rangeland Ecology and Harold F. and Ruth M. Heady Endowed Chair of Rangeland Ecology, Department of Forestry, Rangeland, and Fire Sciences, University of Idaho, Moscow, ID. Email: jkarl@uidaho.edu. Phone: (+1) 208-885-0255

Dr. Arjan Meddens, Assistant Professor, School of the Environment, Washington State University, Pullman, WA. Email: arjan.meddens@wsu.edu. Phone: (+1) 509-335-8570

Dr. Karen Humes, Professor, Department of Earth and Spatial Sciences, University of Idaho, Moscow, ID. Email: khumes@uidaho.edu. Phone: (+1) 208-596-5725

Christine Bielema, Laboratory Supervisor, Archer Daniels Midland (ADM) Carbohydrate Solutions, Cedar Rapids, Email: Christine.Bielema@adm.com, Tel: (319)-398-4343

Dr. Paula Sanchini, Henry and Margaret Haegg Professor of Biology and Environmental Science Administrative Coordinator, Department of Biology, Coe College, Cedar Rapids, IA. Email: psanchin@coe.edu