**Bivek Bhusal** | He/Him/His 959-929-2971

Department of Plant Science and Landscape Architecture bivek.bhusal@uconn.edu

University of Connecticut, Unit 4067, Storrs, CT 06269 bivek.bhusal.iaas@gmail.com

www.[linkedin.com/in/bivekbhusal/](https://www.linkedin.com/in/bivekbhusal/)

**EDUCATION**

|  |  |
| --- | --- |
| **Ph.D.** Candidate**,** Plant Science- Remote sensing of crop stress  Department of Plant Science and Landscape Architecture,  University of Connecticut, Storrs, CT  **Dissertation**: Remote sensing of Potato leafhopper infestation and nitrogen deficiency in beans. | Expected completion: May 2025 |
| **B.Sc.** Agriculture  Lamjung Campus, Institute of Agriculture and Animal Science,  Tribhuvan University, Nepal | December 2017 |

**AWARDS AND FELLOWSHIPS**

The National Science Foundation Research Traineeship Program- “Team-TERRA fellowship” at the University of Connecticut for the academic year 2023-2024 and summer 2024: total $38,500.

* Worked on interdisciplinary research projects.
* Received multiple trainings including “Environmental Risk Assessment”, “Stakeholder Engagement”, “Science Communication – Speaking to Public Audience” and “Human Subjects Safety Training for Social/Behavioral Research”.
* Received travel funds for attending multiple conferences.

Clifford R. Burr Memorial Scholarship at the University of Connecticut for the academic years 2019-2020, 2020-2021 and 2023-2024; total $45,000.

Travel awards to attend multiple conferences during PhD studies: total $7,000.

Graduate research/teaching assistantship with tuition waiver throughout PhD studies.

Tuition waiver by Tribhuvan University for undergraduate studies.

**EVENTS, SEMINARS AND CONFERENCES**

**Oral Presentations:**

Bhusal, B., A. Legrand and C. Witharana. 2024. Potato leafhopper (Hemiptera: Cicadellidae) infestation and nitrogen deficiency detection in green beans using drone-based multispectral imaging. Entomology 2024: “Empowering Tomorrow with Insect Science”. Pheonix, AZ. November 10-13, 2024.

Bhusal, B., A. Legrand and C. Witharana. 2024. Detecting Nitrogen deficiency and Potato leafhopper (Hemiptera: Cicadellidae) infestation in green beans using multispectral imagery from unmanned aerial vehicle. 2024 IEEE Systems and Technologies for Remote Sensing Applications Through Unmanned Aerial Systems (STRATUS). Syracuse, NY. May 20-22, 2024.

Bhusal, B., A. Legrand and C. Witharana. 2023. Detection of stress induced by potato leafhopper (Hemiptera: Cicadellidae) in green bean using multispectral imagery from unmanned aerial vehicle. Connecticut GIS Day 2023. Connecticut GIS Network. Waterbury Campus, University of Connecticut. Waterbury, CT. November 15, 2023.

Bhusal, B., A. Legrand and C. Witharana. 2023. Detection of stress induced by potato leafhopper (Hemiptera: Cicadellidae) in green bean using multispectral imagery from unmanned aerial vehicle. Entomology 2023: “Insects and Influence: Advancing entomology’s impact on people and policy.” National Harbor, MD. November 5-8, 2023.

Bhusal, B., A. Legrand and C. Witharana. 2023. Using leaf reflectance to detect infestation by potato leafhopper, *Empoasca fabae* (Hemiptera: Cicadellidae), in beans. 2023 Entomological Society of America Eastern Branch Meeting: “Casting a Wider Net: Entomology for Everyone.” Providence, RI. March 18-20, 2023.

Bhusal, B., A. Legrand and C. Witharana. 2023. Using leaf reflectance to detect infestation by potato leafhopper, *Empoasca fabae* (Hemiptera: Cicadellidae), in beans. 2023 Graduate Student Research Forum. College of Agriculture, Health and Natural Resources, University of Connecticut, CT. April 1, 2023.

Bhusal, B., S. Lamichhane and R.K. Shrestha. 2017. Mapping the soil fertility of Bisankhel catchment of Chitlang VDC using GIS techniques. 2017 Symposium on Undergraduate Practicum Assessment. Research, Development, Training and Extension Centre (RD-TEC), Lamjung Campus, Nepal. August 18, 2017.

**Poster Presentations:**

Bhusal, B., A. Legrand and C. Witharana. 2025. Drone Imaging for detecting Potato leafhopper infestation and Nitrogen deficiency in green beans. 2025 UConn Extension Vegetable and Small Fruit Growers’ Conference. University of Connecticut, Storrs, CT. January 7, 2025.

Bhusal, B., S. Lamichhane and R.K. Shrestha. 2018. Comparisons of interpolation techniques in mapping soil fertility. 2018 First Science, Information and Technology National Youth Conference. National Youth Council, Ministry of Youth and Sports, Nepal. June 15-17, 2018.

**Event Talks and Demonstrations:**

Demonstrated drone flight, provided research updates and talk on the plant reflectance and use of remote sensing in IPM scouting and plant nutrient status determination at the Vegetable IPM Field Workshop held at UConn Plant Science Research and Education Facility on August 8, 2023, and August 1, 2024.

Demonstrated drone flight and provided talk on the importance of remote sensing of plant response in detecting plant health conditions in fruit trees at the Connecticut Pomological Society Twilight Meeting and Field Day held at Holmberg Orchards in Gales Ferry, CT on June 4, 2024.

**Other Events Attended:**

2024 American Water Resources Association (AWRA), the Universities Council on Water Resources (UCOWR), and the National Institutes for Water Resources (NIWR) Joint Water Resources Conference. St. Louis, MO; September 30- October 02, 2024.

2024 New England Vegetable & Fruit Conference. Manchester, NH; December 17-19, 2024.

**WORK EXPERIENCE**

**Graduate Research Assistant,** University of Connecticut August 2019–Present

• Led research projects, overseeing all stages from inception to completion, including defining research questions, conducting literature reviews, assisting with writings, providing reports on research updates, designing methodologies, and analyzing data.

• Regularly planted different cultivars of beans in the greenhouse, maintained insect colonies in growth chambers, executed greenhouse experiments and collected spectral data using hyperspectral spectrometer.

• Analyzed the field collected multispectral data including creating ortho raster, digitizing, extracting reflectance values, preprocessing, and modeling.

• Developed a scoring method to grade the type and severity of Potato leafhopper damage in beans and related them to the collected hyperspectral data being able to identify specific wavelengths and simulated spectral bands that could differentiate among the levels of infestation.

**Graduate Student Technician,** University of Connecticut2019-2023 (each summer)

• Executed caged and open-plot field experimental trials which included field preparation, calculating inputs required, designing experimental layouts and treatment designs.

• Collected multispectral images using drones and hyperspectral data using a handheld spectrometer from beans under varying fertilizer and infestation treatments.

• Trained research interns in experimental designs, data collection and preprocessing including collecting plant and insect samples, handling insect, rearing insect colony in controlled environment, collecting leaf and canopy reflectance data, creating raster images in Agisoft Metashape Pro. and digitizing for the target plants in ArcGIS Pro.

• Assisted setting up and running of IPM workshops.

**Research Intern,** Advanced Remote Sensing Imaging & Analytics Lab (ARIAL),University of ConnecticutJune-August 2024

• Visited (bi-weekly) multiple fruit orchards in Connecticut to collect plant samples, drone images and hyperspectral leaf data from commercially grown fruit trees.

• Assisted in analysis of hyperspectral and multispectral data collected from multiple fruit trees with varying nutrient status.

• Used accurate GPS device to locate different ground control points and create new ones to identify the focus areas within large orchards.

**Agriculture Technical Officer**

Shelter (Aashraya) Nepal, Nepal January- November 2018

Brihat Agro Farm Pvt. Ltd., Nepal November 2018- June 2019

• Trained farmers and farmer groups in agricultural practices including organic cultivation, integrated pest management techniques, utilization of local resources to create bio pesticides and bio fertilizers, drip irrigation, vermiculture, and greenhouse cultivation.

• Supervised and trained technicians in project planning and execution, documentation, experimental designs and field layouts.

• Trained technicians in using MS Office and R-stat for data analysis subsequently guiding them through ArcMap for creating presentable maps for research documentation.

**Teaching Experience**

**Teaching Assistant**, Principles of Biology II, Department of Ecology and Evolutionary Biology, University of Connecticut, Fall 2023.

**Department head**, Department of B.Sc. Agriculture Enrolment Exams Perpetration, Vie Institute, Nepal, 2015-2017.

**Part-time Lecturer**, Department of B.Sc. Agriculture Enrolment Exams Perpetration, Vie Institute, Nepal, 2013-2017.

**RESEARCH ACTIVITIES**

**Remote sensing of Potato leafhopper stress and Nitrogen deficiency in beans using multispectral drone imagery.**

This study focuses on integrating drone-based remote sensing technologies to detect and quantify stress factors affecting crop health. By leveraging high-resolution multispectral imagery and advanced image processing techniques, I aim to distinguish the spectral signatures associated with biotic stress from *Empoasca fabae* (Potato leafhopper) and abiotic stress caused by nitrogen deficiency. My research involves experimental field trials, statistical and spatial analyses, and statistical approaches to enhance early stress detection and improve precision agriculture practices.

**Hyperspectral leaf-level sensing of stress induced by Potato leafhopper in beans.**

This research investigates the narrow band spectral responses of different bean cultivar to *Empoasca fabae* infestation. By utilizing hyperspectral sensors, I aim to characterize early biochemical and physiological changes in leaf reflectance associated with pest-induced stress. This research integrates spectroradiometer data collection in a greenhouse setup and field trials, spectral feature selection for differential levels of infestation severity and durations, and statistical modeling to enhance stress detection accuracy. The findings identify potential wavelengths and derived indices that could successfully detect stress and contribute to precision agriculture management strategies.

**Assessment of Risk from Invasive Insects to the Apple Orchards in Connecticut.**

This study was performed as a part of my research fellowship as a Team TERRA fellow at the University of Connecticut. It examines the potential threats posed by invasive insect species to orchard health and productivity. Through a combination of remote sensing, ecological modeling, and stakeholder engagement, my research team aims to assess infestation risks, identify indicators of stress, analyze the future distribution of the pests, and develop management strategies for mitigating economic losses. This interdisciplinary research integrates spatial analysis, entomological surveys, and risk communication to support sustainable apple production in Connecticut.

**Mapping the Soil Fertility of Bisankhel Catchment of Chitlang Vdc and Comparison of Different Geo-Spatial Interpolation Techniques**. <https://doi.org/10.3126/jiaas.v35i1.22519>

This research study, conducted as part of my undergraduate thesis in collaboration with research scientists at the Nepal Agricultural Research Council (NARC), focuses on assessing and visualizing soil nutrient variability to support data-driven farm management. By integrating geospatial data, satellite imagery, and soil sampling results, I developed fertility maps of a watershed to identify spatial patterns in key soil properties. The study employs multiple GIS-based interpolation methods to predict soil nutrient status across the study area and evaluates their performance. The findings contribute to optimizing fertilizer application, promoting sustainable agricultural practices, and aiding in the development of accurate fertility maps.

**Projects executed during undergraduate study:**

Effect of different levels of Boron on growth and yield of cabbage; November 2016- March 2017.

Evaluation of Effective Microorganisms (EM) and Probiotics treatment on poultry. May 2016- June 2016.

Analysis of cropping system pattern (sole, inter) on cowpea and maize on different fertilizer management practices. December 2015- February 2016.

**TECHNICAL SKILLS**

Using drone-based sensors to collect and analyze biotic and abiotic responses from plants.

Using handheld spectroradiometers and analyzing extracted spectral data.

Image processing (ENVI, Agisoft Metashape Pro, Pix4D).

Spatial analysis with ESRI software (ArcGIS Pro, ArcGIS Online).

Experienced with accurate GPS device- Leica Viva GS14 GNSS.

Lab rearing of insect colonies.

**Programming Skills**: R, SAS, Python; Parametric and non-parametric approaches.

**Certification**: FAA Part 107 UAS (Remote Pilot) certificate.

**Language Ability:** English (fluent), Nepali (native), Hindi (conversational).

Laboratory skills gained through multiple practical classes including plant protection, soil science, agronomy, horticulture, biochemistry, animal science, poultry and aquaculture.

**LEADERSHIP EXPERENCE**

**Nepalese Graduate Student’s Association**, University of Connecticut, Storrs, CT

President, 2021-2022.

Founder Member and Secretary, 2020-2021.

**Technical Students’ Association of Nepal,** Tribhuvan University, Nepal

College president- Lamjung Campus, 2015-2016.

National board member, 2016-2017.

**PUBLIC SERVICES & VOLUNTEER WORK**

Actively Participated in earthquake relief program and relief-fund collection during the destructive earthquake of 2015 in Lamjung district, Nepal.

Blood donation campaigns during the post-earthquake period in Lamjung Campus organized by Technical Students Association of Nepal (TSAN), Lamjung Campus and Red Cross society, Chitwan.

I hereby declare that the information provided above is true and accurate to the best of my knowledge. I understand that any misrepresentation or false statement may result in my disqualification or dismissal if engaged.

**Reference**

|  |  |
| --- | --- |
| Dr. Ana Legrand  Assistant Extension Professor  Department of Plant Science and Landscape Architecture, University of Connecticut  Email: [ana.legrand@uconn.edu](mailto:ana.legrand@uconn.edu) | Dr. Chandi Witharana  Assistant Professor  Department of Natural Resources and the Environment, University of Connecticut  Email: [chandi.witharana@uconn.edu](mailto:chandi.witharana@uconn.edu) |