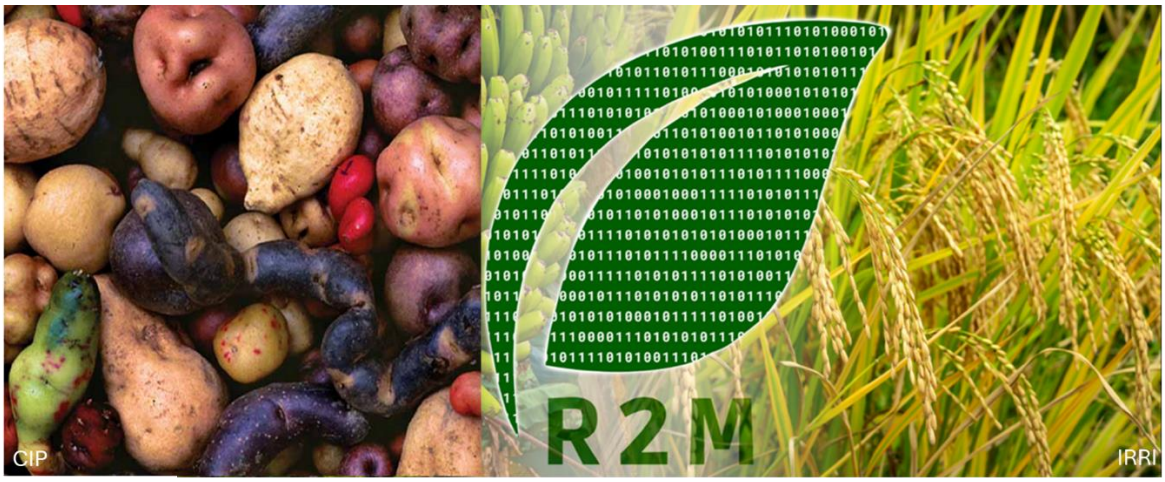

Workshop 2025: R2M rapid risk assessment for potato health in the Andes and rice health in South Asia

PLP 4932

A CURE (Course-based Undergraduate Research Experience) course

Fall Semester 2025

3 credit hours

In this course we will apply tools for rapid disease and pest risk assessment and mitigation planning for crop production systems at the national and regional level (garrettlab.com/r2m). Our focus this semester will be on potato health in the Andes (especially Colombia and Peru) and rice health in South Asia (especially Pakistan and Nepal). The results of these analyses are designed to help countries advance their strategies for effective management of crop disease, as well as invasive pest management, as building blocks in the development of a global surveillance and mitigation system for crop disease. We will develop these analyses in peer-reviewed journal articles in collaboration with scientists in international agricultural research organizations the International Potato Center (CIP; cipotato.org/) and the International Rice Research Institute (IRRI; www.irri.org/).

An example of the product of a previous PLP 4932 workshop is this paper:

Etherton et al. 2024. Translating Ethiopian potato seed networks: identifying strategic intervention points for managing bacterial wilt and other diseases. Agricultural Systems 222:104167. [open access link]

Class meetings

- Workshop laboratory meeting times for the undergraduate course PLP4932 are:
  - **Lab times: TR Period 4** (10:40-11:30 am US Eastern)
  - University of Florida participants meet in a lab space near Fifield Hall
- Course will often meet jointly with PLP6701 (Impact through Networks), which meets as follows:
  Class times: TR Period 5 (11:45 am -12:35 pm US Eastern)
  Classroom for students in Gainesville: 2564 Fifield Hall

For participants outside UF, outside the US: Note that, in the US, Daylight Saving Time ends Sunday, Nov 2, 2025, so the time zone of PLP6701 will change from Greenwich Mean Time minus four (GMT-4) to GMT-5, and the course will effectively be one hour later if your location doesn't change time. For participants in the US Eastern time zone, PLP6701 will continue to be 11:45-12:35.)

Research assistantship: The UF undergraduate participants in the workshop will be selected through a competitive application process and will each receive a $1200 workshop assistantship for the semester. During the second half of the semester, participants are expected to contribute to the workshop projects during at least 10 hr/week work in the lab beyond typical course preparation and participation, as a responsibility associated with the assistantship.

Prerequisites: An accepted application through the process described below. Junior or Senior status. Residence in Gainesville and eligibility to work at least 10 hr/week at University of Florida. Course work and/or experience in at least one of the following areas: biology/agriculture, economics/social science, and coding/modeling.

Application process: Review of applications will begin August 14, 2025, and continue until the successful applicants are identified. A subset of applicants will be contacted for brief interviews shortly thereafter. All applicants who submitted a complete application will learn the outcome of their application by August 19, 2025. Information about the application process is available at garrettlab.com/r2m-workshop-2025-plp4932/.
(Note that course registration in Fall 2025 should be complete by Aug 27 to avoid added fees, according to catalog.ufl.edu/UGRD/dates-deadlines/2025-2026/#fall25text)

Instructors

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Course materials access: invitation to Teams will be provided to participants

Office hours: To be arranged based on participants' schedules

Course overview

In this course we will apply R2M tools for rapid risk assessment for mitigation of crop diseases and pests (garrettlab.com/r2m) and publish the resulting analyses in peer-reviewed scientific journals. Our focus for Fall 2025 will be potato health in the Andes and rice health in South Asia. These analyses will help countries develop their strategies for effective management of crop diseases and pests, as building blocks in the development of a global surveillance and mitigation system for crop disease.

As an interdisciplinary team, students will contribute to these analyses. Based on students' experience and interests, they may take the roles of biologists/agriculturalists, economists/social scientists, and/or coders/modelers in contributing to the projects. Students will gain experience using the R programming environment, though not every student will need to work on the code for the projects. Students will collaborate with more experienced research mentors in the Garrett Lab.

The project will be developed in collaboration with scientists in the National University of Colombia (unal.edu.co/) and University of Agriculture Faisalabad (web.uaf.edu.pk/), and with scientists in the CGIAR (cgiar.org/) in the International Potato Center (CIP; cipotato.org/) and the International Rice Research Institute (IRRI; irri.org/).

We will also work on improving these rapid risk assessment tools in collaboration with scientists in USDA APHIS (https://www.aphis.usda.gov/aphis/home/) working on protecting food production in the US from new pathogens and pests.

We will be applying and building on earlier versions of risk and mitigation assessment tools in projects such as the following:

Andersen et al. 2019. Modeling epidemics in seed systems and landscapes to guide management strategies: The case of sweetpotato in Northern Uganda. Phytopathology 109:1519-1532. [open access link]

Andersen Onofre et al. 2021. An integrated seed health strategy and phytosanitary risk assessment: potato in the Republic of Georgia. Agricultural Systems 191:103144. [open access link]

Andersen Onofre et al. 2025. Decision support for managing an invasive pathogen through efficient clean seed systems: Cassava mosaic disease in Southeast Asia. Agricultural Systems 229:104435. [open access link]

Buddenhagen et al. 2022. Where to invest project efforts for greater benefit: A framework for management performance mapping with examples for potato seed health. Phytopathology. [open access link]

Carvajal-Yepes et al. 2019. A global surveillance system for crop diseases. Science 364:1237-1239. [link]

Etherton et al. 2023. Are avocados toast? A framework to analyze decision-making for emerging epidemics, applied to laurel wilt. Agricultural Systems 206:103615. [open access link]
Etherton et al. 2024. Disaster plant pathology: Smart solutions for threats to global plant health from natural and human-driven disasters. Phytopathology 114:855-868. [open access link].
Etherton et al. 2024. Translating Ethiopian potato seed networks: identifying strategic intervention points for managing bacterial wilt and other diseases. Agricultural Systems 222:104167. [open access link]
Garrett. 2021. Impact network analysis and the INA R package: Decision support for regional management interventions. Methods in Ecology and Evolution 12:1634-1647. [open access link]
Garrett et al. 2022. Climate change effects on pathogen emergence: artificial intelligence to translate big data for mitigation. Annual Review of Phytopathology. [link]
Thomas-Sharma et al. 2017. A risk assessment framework for seed degeneration: Informing an integrated seed health strategy for vegetatively-propagated crops. Phytopathology 107:1123-1135. [open access link] [Interactive interface for exploring model behavior]
Xing et al. 2020. Global cropland connectivity: A risk factor for invasion and saturation by emerging pathogens and pests. BioScience 70:744-758. [open access link]

Course learning objectives

Participants who have completed this course will be able to …

- ***Prepare a scientific manuscript for future submission to a peer-reviewed journal***
- Prepare annotated bibliographies as part of the process of developing scientific manuscripts
- Use the R programming environment for data analysis and presentation of results
- Provide feedback on the development of scientific manuscripts to collaborators
- Work in an interdisciplinary team

Course outline (***as of 10 August 2025 – subject to minor changes***)

Course assignments to be turned in or presented by students are indicated in bold

Note that this course often meets simultaneously with PLP 6701, Impact through networks, ***but has different assignments***. PLP 6701 will provide background in network analysis that will be used in the projects in PLP 4932.

Week	**Content in PLP 6701**	**PLP 4932 workshop activities**
Aug 21	Introduction: network analysis and PLP 6701	Introduction to the workshop in PLP 4932

Aug 26, 28	Introduction to R programming environment and course projects	**Weekly update** on concepts and plans: overview of potato health in the Andes and rice health in South Asia, part 1
Sept 2, 4	Epidemic and invasion networks, and habitat connectivity (cropland connectivity)	**Weekly update** on concepts and plans: overview of potato health in the Andes and rice health in South Asia, part 2
Sept 9, 11	Epidemic and invasion networks, and risk from trade networks	**Weekly update** on concepts and plans
Sept 16, 18	Visualizing and describing networks	**Weekly update** on concepts and plans
Sept 23, 25	Impact network analysis **Update about PLP4932 results in PLP6701**	**Weekly update** on concepts and plans
Sept 30, Oct 2	Ecological networks	**Weekly update** on drafts of text and code
Oct 7, 9	Gene networks and social networks	**Present draft of undergraduate research symposium presentations**
Oct 14, 16	Microbiome networks	**Weekly update** on concepts and plans
Oct 21, 23	Mathematical models of networks	**Weekly update** on concepts and plans
Oct 28, 30	**Update about PLP4932 results in PLP6905**	**Weekly update** on drafts of text and code
Nov 4, 6	Networks and meta-populations in landscapes	**Weekly update** on concepts and plans
Nov 11, 13	Bayesian networks	***Nov 11: Veteran's Day, no classes*** **Weekly update** on drafts of text and code

Nov 18, 20	Exponential random graph models (ERGMs)	**Weekly update** on drafts of text and code
Nov 25, 27	***--- Thanksgiving vacation, no classes***	***--- Thanksgiving vacation, no classes***
Dec 2	Scientific paper discussions **Update about PLP4932 results in PLP6701**	****Project results presented to project stakeholders in the Andes and South Asia** ***Dec 4: Reading days, no classes***
Finals week	PLP6701 final presentations (optional for PLP4932)	**Finalize manuscript drafts**

Weekly updates, including a 3-minute update per person in the weekly meeting: Each student will provide a weekly report outlining their contributions to the project.

Workshop team structure: The team will include students working on biology/agriculture, economics/social sciences, and/or coding/modeling.

Authorship: The workshop is designed to give students experience in being an author on a scientific paper. Students will not automatically be granted authorship; authorship criteria will be discussed in the class. The order of authorship will be determined based on the level of contributions of the authors, including their contributions through finalizing the manuscript for submission to a journal and through the revisions of the manuscript after the workshop is over.

Grading

10% Workshop discussions
30% Weekly updates to project
10% Feedback provided to colleagues for improving their components
20% Contributions to first complete draft of project materials
30% Contributions to final version of project materials

Workshop discussions. When discussing the workshop projects, all participants are expected to contribute questions and ideas, and feedback for others' ideas. Discussions are evaluated based on a course rubric for contributing to discussions.

Weekly updates. Participants will prepare a weekly update to the group based on their contributions that week to the project draft materials. For example, early in the semester these updates might be outlines and concepts, and later in the semester the updates would be iterative improvements to more refined text, illustrations, and analyses.

Contributions to final version of projects. Participants will revise the sections of the project material for which they are responsible, based on feedback from the group. At this stage, all the project components should be in final shape.

If the grade on an assignment appears incorrect, the process for requesting reconsideration of the grade is to prepare a written statement describing where the error lies, to be turned into the instructor within one week of receiving the grade.

Grades and Grade Points: For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/.

Grading scale: 94-100 A; 90-93.99 A-; 87-89.99 B+; 84-86.99 B; 80-83.99 B-; 77-79.99 C+; 74-76.99 C; 70-73.99 C-; 67-69.99 D+; 64-66.99 D; 60-63.99 D-; 0-59.99 E

Required course materials

There is no required textbook for this course. Materials for discussion will be provided to the class, such as the open access publications linked above.

Attendance and make-up policies

This is a synchronous course, to make the most of interactions among participants. Discussion among course participants is an important part of the learning experience, so attendance is required. Three course meetings can be missed without explanation (with the exception of dates when the participant has a particular responsibility, such as leading discussions or presenting). Please alert the instructor if there is a serious health problem or other emergency.

Academic Policies and Resources

Please see this link for additional information:
UF Syllabus Policy Links - Online Course Syllabi - University of Florida