Global migration of Phytophthora ramorum.

3D spore dispersion from a turbulence-resolving numerical simulation of a vineyard (Baily et al. 2012).

Verticillium dahliae, a diverse genus that includes plant pathogens, such as V. dahliae, V. longisporum, and V. albo-atrum. Verticillium is a major pathogen of many plants, causing root and crown rots, and vascular necrosis, leading to stunting, chlorosis, and death of plants.

The mission of the Horticultural Crops Research Unit is to develop fundamental information on pathology, insect pests, physiology, genetics, and production of horticultural crops. Our emphasis is on small fruit and nursery crops grown in the Pacific Northwest of the United States. Our research focuses on (1) biology and management of plant diseases and insect pests; (2) plant growth and physiology; (3) germplasm evaluation and genetic improvement; and (4) development of improved horticultural practices.

Bob Martin, Research Leader, Research Plant Pathologist. Contact: (541) 738-4041, bob.martin@ars.usda.gov
Bob's research focus is on the characterization, development, diagnostics, and control of virus diseases of small fruit crops. In many cases, virus diseases of berry crops are caused by virus complexes rather than by individual viruses. It is often not necessary to control all the viruses in a complex to control the disease. Identification of the critical viruses that lead to disease, the viruses in a complex that are easiest to manage and epidemiological studies of each virus are required to control disease in the field. Control strategies include production of virus-tested plants, identification and management of the vectors for one or more of the critical viruses in a complex that lead to disease. In nurseries all viruses need to be controlled.

Niklaus Gunwalld, Research Plant Pathologist. Contact: (541) 738-4049, nik.gunwald@ars.usda.gov
Nik's research focus is on the biology and control of Phytophthora diseases affecting horticultural crops, with particular emphasis on the Sudden Oak Death pathogen, Phytophthora ramorum. P. ramorum is a devastating exotic pathogen of many forest and horticultural crops. Specific research objectives include: 1. Characterize epidemiology and genetics of Phytophthora species affecting nursery, ornamental, and forest crops; 2. Functional genomics of P. ramorum; and 3. Integrate cultural, biological, and chemical control methods for management of Phytophthora diseases.

Joyce Loper, Research Plant Pathologist. Contact: (541) 738-4057, joyce.loper@ars.usda.gov
Joyce's research group works on two plant disease groups of bacteria: those that cause diseases of horticultural crops and those that suppress plant disease. We focus on Pseudomonas, a diverse genus that includes plant pathogens, such as Pseudomonas syringae, and many other species including some strains that function as biological control agents. We use a combination of approaches from genomics, molecular biology, population biology, ecology, and field research to identify management strategies for horticultural disease management.

Walter Mahaffee, Research Plant Pathologist. Contact: (541) 738-4036, walt.mahaffee@ars.usda.gov
The foliar pathogen group is focused on improving the economic and environmental sustainability of horticultural crop production systems. Projects include the development of methods for assessing inoculum presence and quantity in grower fields and correlation to disease levels, disease forecasting of powdery mildews, cultural management of disease and modelling particle dispersion. We address these projects through collaborations with mechanical engineers, meteorologists, horticulturists, entomologists, and other pathologists.

Inga Zasada, Research Plant Pathologist. Contact: (541) 738-4051, inga.zasada@ars.usda.gov
The nematology research program is focused on the development of management strategies for plant-parasitic nematodes affecting grape, strawberry, raspberry, and Vaccinium species. Development and evaluation of chemical and non-chemical management options is a goal of this research. Management strategies being investigated include modified cultural practices that promote root health and encourage the establishment of plant-parasitic nematode suppressive environments (crop rotation, green manures, and soil amendments) and the identification of genotypes with host plant resistance.

Jerry Weiland, Research Plant Pathologist. Contact: (541) 738-4062, jerry.weiland@ars.usda.gov
Jerry's research program is focused on soilborne pathogens of the woody ornamental nursery industry. The overall goal is to integrate pathogen biology, epidemiology, and ecology in order to develop and refine disease management strategies. Current projects include quantification and characterization of Verticillium dahliae and Pythium species in nursery field soils and the influence of environment on pathogen populations.

Jana Lee, Research Entomologist. Contact: (541) 738-4110, jana.lee@ars.usda.gov
Jana's goal is to improve pest management methods for pest management of foliar pests and invasive pests. Research focuses on the ecology, physiology, feeding and dispersion of pests and natural enemies. Understanding pest-natural enemy dynamics will enable us to develop cultural, biological, habitat manipulation, or augmentative methods for growers.

Chad Finn, Research Geneticist. Contact: (541) 738-4037, chad.finn@ars.usda.gov
Chad's research focuses on cultivar development and germplasm research in blackberry, red and black raspberry, blueberry and strawberry.

David Bryla, Research Horticulturist. Contact: (541) 738-4094, david.bryla@ars.usda.gov
David's research focuses on irrigation and nutrient management in small fruit crops. The goal is to identify practices that increase plant growth and yield potential; enhance fruit quality and food safety; promote efficient use of water, fertilizer, reduced soil salinity. A few current projects include: 1) Irrigation methods for reducing Phytophthora root rot in red raspberry; 2) Advanced and novel management practices for organic blackberry production; design and management of fertigation systems for highbush blueberry; and sprinkler frost protection in cranberry.

Carolyn Scalapino, Research Plant Physiologist. Contact: (541) 738-4032, carolyn.scalapino@ars.usda.gov
Carolyn's program investigates the effects of fertility, nutrition, and disease on root systems. She characterizes plants using a combination of techniques, including horticultural and physiological rules of mycorrhizalfung disease progression on root initiation and growth, and nutrient use efficiency.

Paul Schreiner, Research Plant Physiologist. Contact: (541) 738-4084, paul.schreiner@ars.usda.gov
Paul's research focuses on the physiological responses of grapevines and small fruit crops to irrigation and nutrient management.

Jungmin Lee, Research Food Technologist. Contact: (208)-722-6701 ext 282, jungmin.lee@ars.usda.gov
Jungmin Lee's research focuses on plant secondary metabolites. Her research program focuses on plant secondary metabolites, and her work focuses on understanding and defining the quality of fruit and fruit products by analytical methods, development, compositional analysis, and its relationship to improving quality. Current projects examine the management of polyphenolics, evolution of tannins, and investigate the influence of climate, cultivar, vine physiology, cultural practices, plant diseases, and nutrients on the chemical components of food.

Julie Tarara, Research Horticulturist. Contact: (509) 786-9392, julie.tarara@ars.usda.gov
Julie's current projects examine the management of polyphenolics, evolution of tannins, and investigate the influence of climate, cultivar, vine physiology, cultural practices, plant diseases, and nutrients on the chemical components of food.

Krista Shellie, Research Horticulturist. Contact: (541) 738-7601, krista.shellie@ars.usda.gov
Krista's research is to identify viticultural practices that optimize vine grape productivity & fruit quality. Her program addresses vine grape production physiology under warm, short-season environments, and limits the risk of frost injury. Current projects include: 1) improve irrigation strategies that optimize water use efficiency, 2) film application for alleviation of heat stress, and 3) genotype evaluation.