Professor Mingchu Zhang in the barley fields at the Fairbanks Experiment Farm.
—UAF photo by Todd Paris
Forest Sciences

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See more about SNRAS faculty and studies at www.uaf.edu/snras/faculty/
David Valentine
Professor of Forest Soils
PhD, Duke Univ. ’90.
Research interests: ecosystem ecology, biogeochemistry, and element cycling in natural and disturbed ecosystems.

Research focuses on how soil moisture governs ecosystem function and carbon balance in boreal forests. He teaches courses in environmental decision making, nutrient cycling, and environmental ethics and actions.

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Research interests include use of GIS technology for resource inventory and climate change studies; integrating remote sensing and GIS for regional analysis, and support for spatial analysis using GIS. He teaches Introduction to GIS, GIS Analysis, GIS programming, and a remote sensing course.

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PhD, Univ. of British Columbia ’78.
Research background in forest nutrient cycling and plant-soil relationships; interests in applying site-specific knowledge to landscape-level problems using modeling and GIS. Courses: forest ecology, silviculture, natural resource measurements, carbon dynamics in the boreal forest. He directs the Forest Soils Laboratory.

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Website: www.uaf.edu/snras/about/departments/forestry/faculty/yarie/

CLIMATE & TREE-RING LABORATORY
The CTRL conducts state-of-the-art tree ring studies at UAF. Much of the scientific consensus about climate change is based on tree ring data. With their annual or seasonal resolution, widespread occurrence, and multiple measurable properties, tree rings are one of the best sources of information about past climates and ecosystem conditions. Many challenging questions remain in the far north in this time of rapid environmental change, such as net boreal forest uptake or release of carbon, reconstruction of past climates, and forest growth. International research groups, federal agencies, and state institutions are increasing their demand for Alaska tree-ring sample preparation, measurement, analysis, and archiving related to climate change issues and to the multiple applications of tree-ring analysis such as the earth sciences and archeology. For more information, see www.uaf.edu/snras/facilities-programs/climate-tree-ring-laborat/.

FOREST DYNAMICS & MANAGEMENT PROGRAM
UAF researchers seek to provide the best scientific information for best-practice forest management by monitoring the growth and change of the northern forests, to help land managers and owners with decision making. Foresters are providing data for growth and yield models through a system of nearly 200 permanent plots for long-term monitoring on the Kenai Peninsula and in the Tanana, Copper River, and Matanuska-Susitna valleys.

The growth models of major tree species define the density and diversity of the forests, and measure site index, growth equations, volume equations, and levels of growing stock. Research is focused on simulation and optimization, forest health, wildland fires, and climate change. In addition to charting the growth and health of forests, the program identifies forest characteristics and regeneration properties. UAF forestry specialists offer free consultations on forest management to all Alaskans, including Native corporations and the forest industry. For more information, please see
FOREST SOILS RESEARCH LABORATORY
Established in 1966, this facility is located in the O’Neill building on West Ridge at the University of Alaska Fairbanks, and includes a laboratory equipped to carry out a wide array of physical, chemical, and biological analyses of soil and plant tissues, a shop, and office space. The lab also maintains three trucks, two ATVs, a snowmachine, and three boats to access field sites. Research conducted at the lab provides information that aids understanding tree growth, forest development, and soil processes in the unique environment of subarctic Alaska. Emphasis is placed on physical, chemical, and biological soil properties and processes in relation to tree growth and forest development.

ONETREE ALASKA
OneTree, a community outreach and research project, explores art and science through connections to a single tree. The project aims to show the unique value of woodlands and wood products by demonstrating the volume and quality of work that can be made from one tree. By focusing on a common goal—full utilization of a single tree—OneTree unleashes the breadth of creativity in its participants. OneTree creates collaborations among area schools, the university, and community artists and artisans. As a curriculum-building project, The Alaska boreal forest is used as the basis for active learning and inquiry investigations into science, social studies, and the arts. For more information, see www.onetreealaska.net.

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High Latitude Agriculture

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AGRICULTURAL SOILS RESEARCH LABORATORY
The Agricultural Soils Research Laboratory (ASRL) is located in the O’Neill Building on West Ridge at the University of Alaska Fairbanks. ASRL is used to conduct plant and soil sample analyses for studies that are primarily in the areas of 1) biofuels using oilseed crops such as canola, camelina, sunflowers, and other plants, and biomass research on woody and grass plants; 2) nitrogen and phosphorus cycling in cold soil; 3) evaluating traditional soil laboratory procedures and developing new and more accurate nutrient analysis better suited for colder high latitude soils; 4) analysis of Alaska sources of organic nutrient amendments for organic food production; and 5) developing new diagnostic tools for peony nutrition. The laboratory has use of an Astoria Pacific rapid flow analyzer, a Shimadzu organic carbon analyzer, spectrophotometers, a Horiba fluorometer, Ankom fiber analyzers, pH meters, incubators, and other laboratory equipment. ASRL has the capacity for soil and plant sample preparation as well as analysis.

BOB: RESEARCH BLIMP
Floating silently over fields and streams, the SNRAS bi-camera observation blimp (BOB) takes photographs that aid the school’s
scientific researchers in a way that nothing else can. The high-resolution photographs produced by BOB give scientists detailed information on invasive weeds, forage production, riverbank ecosystems, erosion patterns, mapping, and permafrost. BOB’s specifications include one digital camera, one 35mm camera for use with infrared film, and remote control trigger, all attached to a gondola that hangs from the bottom of the blimp. One method of analysis using the blimp is to record locations of one-meter-square white PVC and metal targets with a global positioning system or GPS. When the blimp is pulled across the sky, the scientists can use the target points on the ground to line up multiple images for analysis. Based in Palmer, BOB is transported across the state for research efforts. It is used for range management, soils carbon studies, and myriad other research requiring landscape mapping and photography. For more information, e-mail Dr. Norman Harris at rharris@alaska.edu.

CONTROLLED ENVIRONMENT AGRICULTURE LABORATORY
Simple to highly advanced controlled environment systems—from temporary cold frames and high tunnels to facilities using technology developed for space exploration and missions to Mars—can be adapted to Alaska’s regional conditions to improve production of vegetables, berries, and floral crops. Ongoing research at the Controlled Environment Agriculture Laboratory (CEAL) investigates plant requirements, varieties, and treatments to maximize productivity for growers. Unlike a greenhouse, the closed laboratory allows for precise control of lighting, temperature, humidity, and nutrients, so that different varieties and various treatments can be tested.

GEORGESON BOTANICAL GARDEN
This nationally recognized botanical garden is part of the Fairbanks Experiment Farm, and is a member of a national network of educational and research institutions dedicated to plant culture and conservation. In 2006 the GBG was the recipient of the All-America Selections Display Garden Exemplary Education Award. The GBG is one of five botanical gardens in the nation to be a satellite test garden for the International Hardy Fern Foundation. Garden staff test more than 1,000 trees, shrubs, and herbaceous perennials for hardiness each year, including Alaska native plants and those collected from China, Russia, and Iceland. The garden serves as a location for variety trials of annual flowers, vegetables, herbs, and fruits, where researchers conduct experiments on new horticultural crops for Alaska’s conditions, such as peonies. For more information see www.georgesonbg.org.

REINDEER RESEARCH PROGRAM
The Reindeer Research Program takes an active role in developing and promoting the reindeer industry in Alaska through research and collaboration with producers and local communities. Researchers work with reindeer producers to increase the production of their operations or value of their products through improvements in range management, animal nutrition and health, animal handling and husbandry, and quality of meat. Program staff give presentations at Alaska schools and provide tours of the animal facility at the Fairbanks Experiment Farm for local area classes. For more information go to http://reindeer.salrm.uaf.edu

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ALASKA RESIDENTS STATISTICS PROGRAM
This program seeks to identify common recreation management information needs among federal and state agencies, using surveys in an ongoing effort to gather data, with a core set of questions remaining consistent over time and additional questions regarding specific issues asked on a rotating basis. The goals are to decrease redundancy in data gathering efforts and develop a shared database on recreation trends in Alaska. Data sought to date includes information on travel patterns, participation in outdoor recreation activities, and broad measures of benefits received from recreation on public lands in Alaska. Possible future surveys may gather data on detailed use information for specific sites, economic impacts, attitudes toward land management issues, and value orientations held by Alaskans on natural resource issues. For more information, go to www.uaf.edu/snras/research/alaska-resident-statistic/

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Michael Kunz •

Professor Todd went to Namibia for her sabbatical to study wildlife conservancies, which provide income for rural villages there. She is looking into the factors which lead to success, and if Alaska might use their example.

Gemsbok, largest of the Oryx genus. Photo by Channon Price.
Department of Forest Sciences

Our curriculum illustrates the standard principles of natural resources management applicable to a forested landscape anywhere in the world. We pay particular attention to boreal forest systems and conditions unique to the circumpolar north. Our research focuses on developing environmentally sound methods to diversify local and state economies by producing sustainable, high yields of quality wood and nontimber products. Our faculty foster healthy debate, interchange of ideas, and problem solving in teaching, research, and outreach programs that incorporate fieldwork and trips, internships with management and research organizations, and studies at Long-Term Ecological Research network sites. We offer graduate and undergraduate degrees in Natural Resources Management with an emphasis in forest sciences, preparing students to work as professional foresters. Our programs are accredited by the Society of American Foresters.

Department of Geography

Geography provides an organized view of the earth as a whole and of its regions and human activities. Geography serves as a bridge between the natural and social sciences by studying the interrelationships between the earth’s physical and biological systems, and how these environmental systems provide a natural resource base for human societies. Geographers are interested in the patterns of human settlement; natural resource distribution, use, and conservation; and the sense of place among the peoples of the world. Geographic methodologies include observation, measurement, description, and analysis of places or areas, including their likenesses, differences, interdependence, and importance.

Department of High Latitude Agriculture

HLA provides statewide education, research and outreach in agriculture, soils, and revegetation through the University of Alaska Fairbanks at the Fairbanks and Palmer research centers. Our faculty provide instruction both in Fairbanks and Palmer for undergraduate and graduate degrees in Natural Resources Management with an emphasis in plant, animal, and soil sciences. We also offer noncredit short courses through the Georgeson Botanical Garden.

Department of Humans and the Environment

Alaska depends on its natural resources for wealth and quality of life. The Department of Humans and the Environment provides leadership in research, education, and outreach emphasizing natural resources management to benefit Alaskans and their environment. Our research, education, and outreach programs reflect the interest of our diverse clientele: Native people, rural communities, industry, environmental organizations, state and federal agencies, farmers, foresters, tourists, fishers, and sports enthusiasts.

The Boreal Alaska—Learning, Adaptation, and Production program incorporates OneTree, wood biomass energy research, and other projects. At right is an example of pupil artwork from a OneTree project in Nicky Eisemnan’s second-grade class.
**Degrees Offered**

**Bachelor of Arts in Geography**

**Bachelor of Science in Geography**
- Environmental Studies
- Geographic Information Science & Technology
- Landscape Analysis & Climate Change Studies

**Bachelor of Science in Natural Resources Management**
- Forest Sciences
- High Latitude Agriculture
- Humans and the Environment

**Master’s in Natural Resources Management and Geography**

**Master of Science in Natural Resources Management**

**PhD in Natural Resources & Sustainability**

Online undergraduate admission application: [www.uaf.edu/admissions/apply/undergrad_app.pdf](http://www.uaf.edu/admissions/apply/undergrad_app.pdf)

Online graduate application for admission: [www.uaf.edu/admissions/apply/grad_app.pdf](http://www.uaf.edu/admissions/apply/grad_app.pdf)

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The Fairbanks Experiment Farm, operated by the Agricultural & Forestry Experiment Station.

—UAF photo by Todd Paris