

A unique educational experience



The summer soil institute provides a unique opportunity to gain a fundamental and applied understanding of soil biology, chemistry, and physics with world-renowned faculty. Students will gain hands-on experience with lab and field techniques and will gain an enhanced appreciation for the importance of managing our soil resources sustainably.



**Colorado
State
University**



**WARNER COLLEGE OF
NATURAL RESOURCES**



**School of GLOBAL
ENVIRONMENTAL
SUSTAINABILITY**

Funding provided by:



Summer Soil Institute

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The Summer Soil Institute

*Addressing Environmental
Challenges with Current and
Emerging Techniques*



A summer course for graduate students, professionals, faculty, and K-12 teachers.

July 12-24, 2010
Fort Collins, Colorado

**Colorado
State
University**



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This course will provide students with the background to understand and address the sustainability of our soil resources in response to global change and human activities. Our expert faculty will provide students with an introduction to fundamental biological, physical, and chemical aspects of the soil ecosystem through lectures and discussions. Students will learn cutting edge analytical techniques and will utilize our state-of-the-art lab facilities to address a research question that they develop during the course. This basic knowledge will then be applied towards an understanding of critical issues in soil sustainability.

Instructors and topics

Thomas Borch: Environmental Soil Chemistry

Richard Conant: Soil Biogeochemistry

M. Francesca Cotrufo: Soil Organic Matter and Stable Isotope Applications

Eugene Kelly: Pedology and Geochemistry

John Moore: Soil Ecology, Food Web Modeling

Mary Stromberger: Soil Microbiology

Diana Wall: Soil Sustainability, Soil Fauna

Matthew Wallenstein: Soil Microbial Ecology and Molecular Techniques



Location

The course will be based on the campus of Colorado State University (CSU), which is nestled against the foothills of the Rocky Mountains on the western edge of the Great Plains. We will take advantage of the high diversity of soils within a short drive with field trips to the Fraser experimental forest site and the Shortgrass Steppe Long-Term Ecological Research Site. The institute will culminate with student presentations and a banquet at Pingree Park, where students will be able to enjoy the mountain landscape just north of Rocky Mountain National Park.



Techniques

Participants will gain hands-on experience with a range of soil analytical techniques including:

Soil chemistry: Extraction, SOM fractionation, characterization of humic substances, nutrient analysis, and mineral characterization using advanced spectroscopy, diffractometry, and stable isotope biogeochemistry

Pedology: Field characterization, sampling and archiving of soils, physical and elemental analyses, constituent mass balance, soil mineralogy.

Soil Microbiology: DNA extraction, quantitative PCR, DNA fingerprinting, extracellular enzyme activity assays

Soil Ecology: Extraction and identification (microscopy and molecular) of nematodes, protozoa, rotifers, tardigrades, arthropods, and earthworms.



Course Structure

Morning Sessions: Lectures, Demonstrations, and Discussions.

Afternoon Sessions: Lab Activities and Field Trips.

Evening Sessions: Seminars, Modeling, Data Analysis, and Social Events.

Students will be provided with a list of assigned readings and protocols prior to arrival. The readings will be incorporated into the morning lectures. The protocols will be used in the laboratory sessions.



Accommodations

On-campus housing and meals will be available at the state-of-the-art Academic Village at Colorado State University.

How to Apply

Applications will be available in early 2010. The course will be limited to a maximum of 25 students. More information is available on our website:

<http://soilinstitute.nrel.colostate.edu>

email: soil@nrel.colostate.edu

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United States Department of Agriculture