
GRADUATE RESEARCH OPPORTUNITIES AT THE UNIVERSITY OF WISCONSIN, MADISON

ENVIRONMENTAL PROCESSES

Faculty in this group have diverse interests with a common concern for environmental processes. Our hydrogeologists concentrate on groundwater and contaminant movement, using field based methods and computer modeling. Faculty in Environmental Geochemistry and Biogeochemistry focus on the fundamental mechanisms underlying geological processes such as contaminant retardation, organic-mineral interactions, mineral-weathering and biomineralization. Our program in Quaternary geology includes consideration of the hydrogeologic properties of glacial deposits, glacial history and its impact on climate, glacial processes and interpretation of paleoenvironments from pollen and oceanic records. Faculty in Structural geology and geomechanics focus on deformation of porous granular media and its impact on fluid flow and contaminant transport. Our research programs are strengthened by interaction with scientists from the Wisconsin Geological and Natural History Survey and the U.S. Geological Survey (both located in the Madison area) as well as with the Departments of Geography, Soil Science, Chemistry, Civil & Environmental Engineering, and the Center for Limnology, the Geological Engineering Program and the Nelson Institute for Environmental Studies.

Mary P. Anderson HYDROGEOLOGY

Emerita Numerical modeling of groundwater systems and history of hydrogeology. Phone: (608) 262-2396; Email: andy@geology.wisc.edu

Jean M. Bahr HYDROGEOLOGY

Research interests include interactions between physical and biogeochemical processes in groundwater, effects of heterogeneity on solute transport, groundwater-surface water interactions, and paleohydrogeology. Phone: (608) 262-5513; Email: jmbahr@geology.wisc.edu

Anders Carlson GLACIAL & QUATERNARY GEOLOGY/PALEOCLIMATOLOGY

Research interests include the interactions of ice sheets, oceans and the climate system on multiple time scales; and subglacial processes with their attendant effects on ice motion and climate. Techniques include basic field mapping and observations, reconstructing ice sheet chronologies, ice sheet, groundwater, atmospheric and oceanic numerical models, geochemical proxy application, geotechnical testing. Phone: 608-262-1921; Email: acarlson@geology.wisc.edu

Kurt Feigl TECTONIC APPLICATIONS OF GEODESY

Research includes measuring and modeling crustal deformation from earthquake faults, volcano activity, glacier loads, and fluid extraction. Geodetic measurement techniques include Global Positioning System (GPS) surveying, satellite radar interferometry (INSAR), and other remote-sensing schemes. Numerical modeling approaches include the finite-element method, parameter estimation by inversion, and analytic elastic solutions. Phone: (608) 262-0176; Email: feigl@geology.wisc.edu

Laurel Goodwin STRUCTURAL GEOLOGY, FLUID-FAULT INTERACTIONS

Research in New Mexico, California, and Australia includes: localization of deformation at all crustal levels; faulting of granular porous media and its impact on multi-phase fluid flow above and below the water table; the geophysical signature of fault-zone structures; length scales of fault and shear-zone heterogeneities. Phone: 608-262-265-4234; Email: laurel@geology.wisc.edu

*David Mickelson
Emeritus*

GLACIAL, QUATERNARY, AND ENVIRONMENTAL GEOLOGY

Research includes origin of glacial landforms and sediments in Alaska and the midwest including reconstructing ice thickness and subglacial conditions. Also basic Quaternary geology mapping, shore erosion and slope stability problems on the Great Lakes and hydrogeologic properties of glacial sediments. Phone: (608) 262-7863; Email: mickelson@geology.wisc.edu

Eric E. Roden

GEOMICROBIOLOGY, BIOGEOCHEMISTRY, MICROBIAL ECOLOGY

Biogeochemistry of aquatic environments, emphasizing in situ rates of and controls on microbial metabolism in anaerobic soils and sediments; role of anaerobic microbial processes in geochemical cycling and energy flow in sedimentary systems; physiology and ecology of anaerobic respiratory bacteria; influence of anaerobic microbial processes on the mobility and fate of metals and organic contaminants in soils/surface sediments and groundwater aquifer sediments. Phone: (608) 890-0724; Email: eroden@geology.wisc.edu

Nita Sahai

ENVIRONMENTAL GEOCHEMISTRY AND BIOGEOCHEMISTRY, BIOMATERIALS

Thermodynamics and kinetics of reactions (sorption, precipitation, dissolution) at the mineral-water surface, mineral-organic interactions, mineral precipitation by organisms (biomineralization), chemistry of biomaterials (clinical-medical applications). Approaches include theoretical modeling (classical and quantum) and experimental techniques (spectroscopies and analytical chemistry). Phone: (608) 262-4972; Email: sahai@geology.wisc.edu

Brad Singer

GEOCHRONOLOGY and QUATERNARY GLACIATION

Research includes: evolution of Pleistocene to Recent volcanoes--mainly in circum-Pacific subduction zones, reconstructing climate evolution in the Southern Hemisphere using the Pleistocene to Holocene record of glaciation, and development of a global geomagnetic instability timescale (GITS) for the Quaternary. Problems are approached using methods that include $40\text{Ar}/39\text{Ar}$ and U-Th isotopic dating of lava flows or ash deposits, and cosmogenic surface exposure dating using Be and Al isotopes. Phone: (608) 265-8650; Email: bsinger@geology.wisc.edu

Herbert F. Wang

GEOMECHANICS

Laboratory rock physics, numerical modeling of poroelastic phenomena in hydrogeology and earthquake mechanics, thermal modeling of tectonic events. Phone: (608) 262-5932; Email: wang@geology.wisc.edu

Huifang Xu

MINERAL SCIENCE, NANO-GEOSCIENCE, AND ELECTRON MICROSCOPY

My research focuses on interdisciplinary study of (1) crystal chemistry of clays and rock-forming minerals; (2) geochemical reactions in nanopores and nanotubes; (3) biomimetic growth of minerals/crystals and self-assembled nano-structured minerals; (4) nano-porous and nanostructured materials/minerals for waste management (such as immobilization of toxic metals and organic pollutants); (5) trace metal partitioning between mineral crystals and aqueous solutions; and (6) mineral proxies for paleo-environment changes. Phone: (608) 265-5887; Email: hfxu@geology.wisc.edu