

15. Budget Narrative

Provide a brief narrative of the resource requirements included in the Budget Table.
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The proposed doctoral program in Geosciences will be housed in the Department of Geology, and all information on the budget tables reflect resources for the Department of Geology only. Other faculty will participate in the program in departments across campus, but this participation will vary from year to year.

Personnel

Two faculty will be added to support the program, one in the second budget year and one in the fourth budget year. The increase in personnel expenditures reflect the addition of these faculty. The faculty includes the Chair as a half time equivalent (half of the Chair's salary). Other personnel costs reflect the salaries of the Chair (half time administrative), civil service staff and graduate assistants. Two graduate assistants will be added to the program as it grows, one in the third budget year and one in the fourth budget year. We expect that most doctoral students will be supported through external research grants.

All additional funds for the program will come from internal reallocation. No State resources are requested. The Dean of the College will provide a statement regarding the source of funds for the reallocation.

Supplies, Services, Equipment

The supplies, services, equipment line is the current operating budget of the Department of Geology for first and third budget years. In the second and fourth budget years, this amount is augmented by an estimate of start up funds for new faculty. Start up funds are not continuing expenses.

16. Facilities and Equipment

Describe the facilities and equipment available to develop and maintain a quality program including buildings, classrooms, laboratories and equipment, clinical sites, office space, and library resources.

Facilities and Equipment

Geology is the only department housed in Parkinson Laboratory and has adequate facilities for instruction and research. Some of the laboratories have no equal anywhere, and facilities continue to improve with the addition of equipment acquired through external grants. The Department has sufficient space for faculty offices. With some adjustments, the Department will be able to provide space for new faculty. However, space for graduate students is limited. Currently, basement space in Parkinson Lab is not usable because of excess humidity and mold. New air handlers for the building should correct this problem, and provide space for an additional 16 graduate students. New air handlers and new windows for Parkinson Lab rank high on the list of scheduled repairs for the campus.

Library Resources

Morris Library has a total of 2,685,459 volumes (books and journals), currently receives 36,492 journals (print and electronic), and holds 3,627,980 microforms, 344,028 maps, 12,341 videos, and 24,285 audio CDs, LPs, tapes. The library contains over 330,000 volumes in its Science Division and has over 37,500 books and over 132,400 journal volumes in the geosciences. We believe that these resources are more than adequate for the initiation of the doctoral program. The current collection, along with interlibrary loan and online access, should be sufficient to support the program.

17. Faculty and Staff

Describe the personnel resources available to develop and maintain a quality program including faculty (full- and part-time, current and new), staff (full- and part-time, current and new), and the administrative structure that will be in place to oversee the program. Also include a description of faculty qualifications, the faculty evaluation and reward structure, and student support services that will be provided by faculty and staff.

Faculty that will be involved with the program are research active, as indicated in the attachments to this document. All faculty teach and regularly have their courses evaluated by students. In 2006, a member of the faculty was awarded the Outstanding Teacher Award in the College and in 2008, another was awarded the Outstanding Scholar in the College.

Current Faculty

The Department of Geology currently has 11 continuing faculty (counting the Chair) and one lecturer. Four other faculty will actively participate in the program from outside the Department and the proposal calls for the addition of two more, bringing the total active faculty in the program to 17.

All of the continuing faculty in the Department of Geology are active researchers, together publishing over 107 referred publications, including journal articles and book chapters within the last five years (2003 through 2008). External research funding over that same period which involved faculty from the Department of Geology exceeded \$2,775,000. Recent faculty hires, within the last ten years, have been exceptionally productive elevating the research enterprise in the Department and providing a firm basis for proposing a new doctoral program in Geosciences.

The normal teaching load for research active faculty is three courses per year. The Department also has a policy to assign two courses in the first year to new faculty. Each faculty can buy release time from teaching using external funding.

Faculty Background and Research Interests

Achenbach, Laurie A., Professor, Department of Microbiology and Associate Dean, College of Science

Ph.D., Genetics and Development, University of Illinois-Urbana, 1987

Current Research Interests: Anaerobic microbiology, elemental cycling, bioremediation

Laurie A. Achenbach is an environmental microbiologist who specializes in anaerobic metabolisms important in bioremediative processes. She uses molecular biological methods to

describe the genes and regulatory mechanisms that control a number of anaerobic metabolisms and integrates the genetic information into appropriate bioremediative strategies. She also uses the information gleaned from these studies to assess the biogeochemical parameters that influence key cell-environment interactions. Her current projects include investigations into the enzymatic oxidation of uranium U(IV) by microbial communities and the construction of a molecular bioassay for the environmental contaminant perchlorate. Dr. Achenbach's lab is also studying the role of microbial humics oxidation in soil processes and the effect of humics cycling on critical characteristics in agricultural soils. Finally, her long-term work on the microbial anaerobic oxidation of iron has contributed to our understanding of the iron cycle in subsurface environments and has led to new research areas aimed at exploiting anaerobic oxidative processes in the remediation of heavy metals and radionuclides. Her work is currently funded by grants from the Department of Energy, the Department of Defense, and the Department of Agriculture.

Anderson, Ken B., Professor, Department of Geology
Ph.D., Chemistry, University of Melbourne, 1989

Current Research Interests: Organic geochemistry, Coal chemistry, Coal geology.

Dr. Anderson's research interests focus on investigation of coal and related products and includes both fundamental and applied investigations. Current fundamental research activities are focused on investigations of fossiliferous plant resins (often found in coals) and the use of these for paleochemotaxonomic studies relating to the plant evolution and diversification. He is also involved in fundamental studies of the molecular structural characteristics of coal macerals (components of coals derived from different plant tissues) and in understanding of the changes that occur in the structures of these materials over geologic time. Areas of applied research interests build on information developed from fundamental studies and attempts to exploit understanding of the molecular structure of coals for the development of novel coal utilization strategies. Dr Anderson is also co-PI for a number of projects jointly conducted with faculty in the College of Engineering and the Coal Research Center aimed at improving the efficiency and environmental performance of both conventional coal combustion and coal gasification facilities.

Baer, Sara G., Assistant Professor, Department of Plant Biology
Ph.D., Biology, Kansas State University

Current Research Interests: Changes in plant community structure, ecosystem processes, and biogeochemical cycling during ecological restoration; application of ecological theory to restored systems; consequences of genetic/ecotypic variation for community assembly and ecosystem processes; restored grassland community and ecosystem response to climate change.

Sara G Baer is a soil/restoration/ecosystem ecologist who tests and develops basic hypotheses in ecology, while striving to address applied questions related to improving the structure, function, and sustainability of restored systems. Her research focuses primarily on plant, soil, and ecosystem response to disturbance and subsequent recovery through ecological restoration, with an emphasis on the conversion of cropland to native grassland. In addition to her expertise in plant community, ecosystem and restoration ecology, her research interests bridge many other disciplines including physiology, soil microbiology, and biogeochemistry. Her research approach uses both manipulative studies and natural experiments to address fundamental and practical questions across all levels of ecological organization. Her conviction for understanding community and ecosystem change in response to restoration over the long-term is evident from continuation of research projects initiated over ten years ago, focused on elucidating the role of soil resources in the restoration of plant community structure and ecosystem processes and modeling long term changes in soil structure and function during grassland restoration using space-for-time substitutions or "chronosequences" of restored systems. Her research program has

been supported by the National Science Foundation, United States Department of Agriculture, and the A. W. Mellon Foundation. S Baer is a long standing member of the Ecological Society of America and a Coordinating Editor for the international journal Restoration Ecology.

Conder, James, Assistant Professor, Department of Geology
Ph.D., Geophysics, Brown University, 2001

Current Research Interests: Marine neotectonics, volcanic arc seismic and magmatic processes, Seismology, Geodynamic modeling.

James A. Conder uses various geophysical tools to research dynamic processes of the Earth's lithosphere and mantle. In particular, his research focuses on the geodynamics of active plate boundaries in the world's oceans such as the development and evolution of mid-ocean ridges and volcanic island chains. Much of his work has been closely tied to the NSF MARGINS program which aims to present an integrated understanding of the many geological processes occurring at different oceanic-continental boundaries. He is currently building a research program applying the fields of seismology and numerical methods to further our understanding of mantle dynamics governing plate tectonic processes.

Ebbs, Stephen D., Associate Professor, Department of Plant Biology
Ph.D., Environmental Toxicology, Cornell University

Current Research Interests: Ecotoxicology, contaminant biogeochemistry, transport of contaminants in soil and water systems, phytoremediation and green roof technology, plant toxicology, biological fate of contaminants, trophic transfer of contaminants

Stephen Ebbs is an environmental biologist whose primary interest is in anthropogenic contaminants and their movement through water-soil-plant systems. His research focuses on the processes that influence contaminant solubility and mobility in soils and waters as well as the biological processes that influence the accumulation of these contaminants in plants. In addition to empirical research on biogeochemical processes at the soil-plant interface and the influence of environmental contaminants on plant biochemistry and physiology, Dr. Ebbs also extends his work to consider more applied topics, such as the application of phytoremediation to the remediation of contaminated soils, the use of plants for phytomining, the improvement of urban water quality using green roofs, and the agronomic impact of environmental contaminants. His work has focused primarily upon inorganic contaminants, including heavy metals, metalloids, radionuclides, uranium, and cyanide and his research on these contaminants has ranged from field studies to laboratory work at the molecular level. His research has been supported by the National Science Foundation, and the United States Department of Energy, the University of Melbourne, and various industry sources. Dr. Ebbs is a member of the International Phytotechnology Society and has served on the editorial board of Environmental Pollution and the International Journal of Phytoremediation. He has held an adjunct position in the Department of Civil and Environmental Engineering at Carnegie Mellon University and has been a visiting professor at Purdue University, Cornell University, and the University of Melbourne.

Esling, Steven, Associate Professor and Chair, Department of Geology
Ph.D., Geology, University of Iowa, 1984

Current Research Interests: Groundwater hydrology, Groundwater modeling, Quaternary stratigraphy.

Steven P. Esling blends his background in mathematics and geology with his interests in hydrogeology and Quaternary stratigraphy. His past efforts have led to studies quantifying erosion rates in strip mine spoils, assessing the impact of agricultural drainage wells on shallow

bedrock aquifers, determining the effect of underground refuse disposal on regional groundwater flow systems, and investigating the migration of contaminant plumes through shallow aquifers. More recent research includes improving methods for defining capture zones around community groundwater wells, determining how mining or reclamation alter groundwater flow, and characterizing the material properties of surficial deposits, including hydraulic conductivity. Esling is also active in developing innovative, interactive, simulations of physical systems including a quasi-three-dimensional cylindrical finite-difference groundwater flow model, as well as particle tracking and random walk transport models. Dr. Esling has considerable experience delineating capture zones for community water supply wells as part of the State's Source Water Assessment Program, having supervised delineation studies for 28 southern Illinois communities under a grant from the Illinois Environmental Protection Agency. He also developed Graphic Groundwater, a 3-D pre-/post-processor for MODFLOW and MODPATH, with special features specifically tailored for capture zone delineation studies.

Eric C. Ferré, Associate Professor, Department of Geology
Ph.D., Geology, University of Toulouse, France, 1989

Current Research Interests: Structural geology and tectonics, geomagnetics

Eric C. Ferré's main research interest is the deformation of the lithosphere. He uses and develops new magnetic methods to quantify anisotropy, mineral fabrics and finite strain in rocks at all scales. Current projects cover a broad spectrum from seismic deformation and coseismic electric currents during frictional melting to ductile flow and kinematics in the lower partially molten continental crust or in the upper mantle. Most of these projects address problems of mechanical coupling between different lithospheric layers (clutch tectonics). His students and himself enjoy both research in the field (in California, the Italian Alps, SW Japan, New Caledonia, Minnesota, Montana and South Africa) and in the laboratory. Ferré has also developed a new research program on physical processes in mafic magma chambers combining image analysis and magnetic techniques. The rock magnetism laboratory that Ferré has developed at SIU is still growing with recent equipment acquisitions funded by the NSF and has acquired national recognition. This laboratory regularly attracts collaborators from other research institutions.

Fifarek, Richard H., Associate Professor, Department of Geology
Ph.D., Geology, Oregon State University, 1985

Current Research Interests: Economic Geology, Isotope Geochemistry, Fluid Inclusion Geochemistry

Richard Fifarek conducts research in Economic Geology with a particular focus on the origin of hydrothermal deposits related to continental and seafloor geothermal systems. He and his graduate students combine field studies (mapping, core logging, sampling) and laboratory analysis (petrography, X-ray diffraction, mineral and rock geochemistry, fluid inclusion analysis, stable isotope geochemistry, radiometric dating) to investigate specific ore-forming processes and deposits. Past research includes the evolution of ore fluids in volcanogenic massive sulfide systems, modeling fluid-rock isotopic exchange, origin of bonanza-grade gold-silver occurrences in epithermal deposits, role of oxidizing fluids in gold remobilization, and influence of hydrodynamics on sulfate-sulfide S-isotopic exchange. On-going studies include the use of δ - δ diagrams to interpret sulfate-sulfide isotopic data, transition of magmatic fluids from the porphyry Cu-Au to the epithermal Au-Ag environment, and origin of amagmatic epithermal Au-Ag deposits. These studies routinely involve extensive collaboration with colleagues in the USGS, academia and mining industry. Funding has been provided by state and federal government agencies and the mining companies.

Marzolf, John E., Associate Professor, Department of Geology
Ph.D., Geology, University of California, Los Angeles, 1970

Current Research Interests: Stratigraphy & Sedimentology, Sequence Stratigraphy, and Tectonostratigraphy

Dr. Marzolf's main area of research focuses on the Triassic and Jurassic tectonic evolution of southwestern North America. Dr. Marzolf has applied basic principles of sequence stratigraphy to the reconstruction of tectonically dismembered Triassic and Jurassic sedimentary basins of southwestern United States and northwestern Mexico. He has subdivided the Triassic and Jurassic stratigraphy of the Colorado Plateau into seven tectonosequences. An eighth tectonosequence has been added from his studies in Nevada, California, and Sonora, Mexico. The stratigraphic predictability of the sequence-stratigraphic paradigm provides reliable regional correlation of dissimilar tectonostratigraphic assemblages; identification of paracratonic terranes of the Cordilleran margin and restoration of terranes to their pre-Cretaceous geographies. Also recorded in the Triassic and Jurassic tectonostratigraphy are two of the five major extinction events of the Phanerozoic; the Permo-Triassic and Triassic-Jurassic. Dr. Marzolf, in collaboration with other researchers, is involved in research into the long-duration recovery from the Permo-Triassic event and documentation of the Triassic-Jurassic event in terrestrial sedimentary rocks. Insights gained from the tectonostratigraphy of southwestern North America are being applied to the Kaskaskia sequence of the Illinois Basin.

Means, Jay, Professor of Toxicology and Chemistry, Department of Chemistry and Biochemistry,
Professor of Toxicology, SIU Medical School, and Dean, College of Science
Ph.D., Chemistry, University of Illinois, 1976

Current Research Interests: Environmental chemistry of trace organics, trace metals and organometallics in sediment-water systems; organic geochemistry; aquatic toxicology; chemical carcinogenesis; small fish tumor models.

Dr. Jay Means, Dean of the College of Science and Professor of Toxicology and Chemistry in the Department of Chemistry at SIUC, and also Professor of Toxicology in the Department of Pharmacology at the SIU Medical School, came to SIUC in 2007. Over the course of his career, Dr. Means has been involved in the development and application of trace analytical methodology to the analysis of environmental media including water, sediments, biological tissues, colloidal materials and air using state-of-the-art instrumentation, including high resolution gas chromatography (HRGC), high performance liquid chromatography (HPLC) and gas chromatography/mass spectrometry (GC/MS), LC/MS/MS and ICP/MS and has published over 110 papers in the area of analytical chemistry, environmental chemistry and toxicology of hydrophobic organic chemicals in aquatic systems including groundwater, major river systems, estuaries and coastal marine regions. He has been the principal investigator of dozens of grants and contracts totaling over \$15 million dollars dealing specifically with the biogeochemistry, fate & transport, and toxicological and of trace metals, organic and organo-metallic substances in aquatic organisms, mammals and man. Dr. Means has an established research and publication record concerning chemodynamic processes which govern the fate and distribution of hydrophobic organics in aquatic environments with special emphasis on soils/sediments and colloidal organic matter and has worked with herbicides, hydrocarbons, PCBs and pesticides in these studies for over 30 years. He is currently serving as Dean of the College of Science at SIUC where his efforts are devoted to expanding and strengthening the academic programs and research productivity of the College. In total, Dr. Means has advised or is currently advising 26 doctoral students and 12 Masters student in the fields of toxicology, and environmental chemistry.

Ishman, Scott E, Associate Professor, Department of Geology
Ph.D., Geology, The Ohio State University, 1990

Current Research Interests: Cenozoic foraminiferal paleobiology, Paleoclimate reconstruction, Climate change, Ecosystem history.

Scott E Ishman is a foraminiferal micropaleontologist who applies quantitative applications to identify spatial and temporal variability in foraminiferal populations and assemblages in order to reconstruct marine paleoclimatic/paleoceanographic conditions. As a research geologist with the United States Geological Survey he investigated late Pliocene paleoclimate as a proxy for future climatic warming. There he also used foraminiferal data to provide historical environmental reconstructions for Everglades restoration. His more recent research on late Cenozoic paleoenvironmental reconstruction is focused on sea level and ice volume variability of the last 20 million years as recorded in Southern Hemisphere sediments and sedimentary rocks. Dr. Ishman has received and is currently funded on grants from the National Science Foundation to investigating climate change in northern Chile, Ross Sea and Larsen Ice Shelf margins of Antarctica. He was recently chief scientist on two marine geology cruises to the Antarctic Peninsula investigating the impact of productivity on foraminiferal populations and geochemistry and is part of a multinational/multidisciplinary International Polar Year research project funded by the National Science Foundation investigating the impact of climate change on the cryo-geo-biosphere. Dr Ishman is an active member of several professional organizations. He has served on several search committees including the DOS Dean search committee, is a past-president of the SIUC Chapter of Sigma Xi, and a member of the SIUC Graduate Council.

Lefticariu, Liliana, Assistant Professor, Department of Geology
Ph.D., Geochemistry, Northern Illinois University, 2004

Current Research Interests: Isotope Geochemistry, Aqueous Geochemistry, Trace Elements in Coal.

Dr. Liliana Lefticariu is a broadly trained geochemist with cross-disciplinary links to several areas of geology such as biogeochemistry, economic geology, and radiation chemistry. Her specialty is low-temperature and aqueous geochemistry with emphasis on the stable isotope systematic of elements that play key roles in biogeochemical processes. Research is primarily devoted to solving diverse theoretical and practical problems with application in the geological and environmental sciences. Research program includes: chemical and isotopic tracers in sedimentary sequences, chemistry and cycling of sulfur in coal and sediments, and low temperature geochemistry of aqueous systems. More recent research includes the study of mercury and other trace elements distribution in coal and coal combustion products. A new and very exciting line of research examines the origin of sulfate on Mars. The intrinsic association of sulfate minerals with water made the understanding of sulfate formation more fascinating because of the possible association with life form. Since sulfate minerals are an archive of past and recent processes on Mars, deciphering the fundamental aspects of their formation is the first step in the geochemical cycling and ultimately the history of water and the potential presence of life during evolution of other potentially habitable bodies such as Mars and Europa.

Pinter, Nicholas, Professor, Department of Geology
Ph.D., Geology, University of California at Santa Barbara, 1992

Current Research Interests: Geomorphology, river processes and hydrology, flooding, floodplain management.

Nicholas Pinter works in the areas of earth-surface processes and surface-water hydrology applied to a broad range of problems. His research requires extensive collaboration outside of his

geological base, including academic collaborators in engineering, geography, anthropology, etc., and external work with numerous U.S. agencies (e.g., Army Corps of Engineers, FEMA), international bodies (e.g., International Commission for the Hydrology of the Rhine River), and NGOs (e.g., The Nature Conservancy).

One of Pinter's current projects involves GIS-based modeling of natural-hazard risk and facilitating the development of mitigation plans for 17 southern Illinois counties, with funding from the Federal Emergency Management Agency (FEMA). Other current projects focus on rivers and flooding in particular. One NSF-funded project focuses on construction and degradation of man-made levees over time and the impacts of levees on flood levels. Another NSF project is looking at the evolution of channel morphology and flood frequencies on the Tisza River in Hungary. A third NSF-funded project involves more traditional geomorphology and Quaternary geology -- documenting the geomorphic, hydrological, and paleo-botanical changes in coastal southern California in the latest Pleistocene, coeval with the arrival of the first migrants to the New World. A common theme to all of Pinter's projects is the use of the geomorphic record - - including the surface and near-surface of the earth and the most recent intervals of geologic time -- applied to a broad range of scientific problems.

Rimmer, Sue M., Professor, Department of Geology
Ph.D., Geology, Penn State University, 1985

Current Research Interests: Trace metal and organic carbon accumulation in petroleum source rocks, especially black shales; organic petrology of coals and shales; trace metals and mineralogy of coals and coal-bearing sequences; organic maturation studies.

Sue M. Rimmer joined the faculty in the department of Geology at SIUC in January 2009 following 25 years on the faculty at the University of Kentucky. Her research focuses on four main areas: 1) biogeochemical cycles in organic-rich sediments; 2) controls on stable isotope composition of organic matter and interpretation of C and N isotope records in organic-rich sediments and coals; 3) linkages between organic matter and past atmospheric composition; and 4) coal maturation and the role of heating rate (contact metamorphism vs. burial maturation). Other work has focused on applied aspects of coal geology, including controls on the mineralogy and trace element composition of coals and properties of underclays. Much of her research funding in recent years has come from the National Science Foundation, including funding for current work in Antarctica with colleagues at Ohio State University. Student research projects have also been funded by The Society for Organic Petrology, the Geological Society of America, and the American Association of Petroleum Geologists. She is currently involved in research projects with collaborators from the U.S., England, and South Africa in several locales ranging from the Appalachian, Illinois, Fort Worth, and Raton basins in the U.S., to South Africa and Antarctica. She has also received funding for mentoring projects to increase the representation of women in graduate school in geology and was awarded the 2007 Outstanding Educator Award by the Association of Women Geoscientists (AWG).

Sexton, John, Professor, Department of Geology
Ph.D., Geophysics and Seismology, Indiana University, 1974

Current Research Interests: Exploration geophysics, Seismology

Dr. Sexton conducts research in the application of geophysical methods to study geological structures that may be related to earthquake activity in the New Madrid and Wabash Valley seismic zones. These methods include seismic reflection and refraction, georadar, and gravity and magnetic studies. Seismic reflection studies are also being conducted for faulting associated with coal seams and 3-D seismic exploration for oil in the Wabash Valley area. Other areas of research

include use of georadar, magnetic, electromagnetic, and electrical resistivity methods at archaeological sites in Italy, Jamaica, Barbados, and at Cahokia Mounds in Illinois. Past research has included geophysical studies of the crust and upper mantle in the Wabash Valley and in the Lake Superior area of the Midcontinent rift. Dr. Sexton had one student complete a PhD in the previous Geology Doctoral degree program. That study was the development of a mathematical and computer seismic modeling ray tracing method and was applied to reflection and refraction data from the Lake Superior area.

Vitt, Dale H., Professor, Department of Plant Biology
Ph.D., Botany, University of Michigan, 1970

Current Research Interests: 1) Responses of communities to disturbance in boreal peatland ecosystems, including natural disturbances such as fire, permafrost melt, and autogenic succession, as well as man-made disturbances as nitrogen deposition, oil and gas production facilities, and oil sands open-pit mining. 2) Understanding how to utilize natural successional regimes in reclamation of current disturbances. And 3) using historical ecology to develop hypotheses about how plants will respond to climatic change.

Dale H. Vitt is a boreal ecologist and specialist in the ecology of bryophytes, plants that dominate boreal ecosystems. Over the past 38 years, Dale Vitt has published over 250 peer-reviewed articles on aspects of plant ecology and plant taxonomy. His work has included a variety of fundamental ideas in both ecology and taxonomy. In the 1970's he explored the subantarctic islands of New Zealand and the arctic islands of Canada developing ideas on polar adaptations of bryophytes. In the 1980's he wrote the first totally revised familial classification of mosses since the turn of the century that revitalized the field and led to new hypotheses in moss classification that continue today. In the 1990's his team mapped and described peatlands across western Canada and in the process discovered the melting of permafrost across a 200 km wide band that spans the western half of the continent. During the early 2000's he and his graduate students provided the basis for our understanding of how bryophyte distributions are patterned on the landscape and provided a framework for the next generation of community ecology of bryophytes. Most recently he and his students have developed procedures for reclamation of disturbed peatlands, and currently they are working on reclamation of a variety of disturbances from oil and gas exploration and production. Dale Vitt is also interested in the fundamental processes of nutrient cycling and carbon sequestration in organic soils and through this understanding working to develop with the oil industry monitoring programs to help understand the effects of these inputs.

Faculty Reward

Faculty salary is periodically increased based on the quality of research, teaching, and service to the Department and University following provisions of the collective bargaining agreement between the University and the Faculty Association.

Support Staff, Equipment, and Other Resources

Presently, the Department has an Office Manager and Office Systems Specialist and a quarter time Research Project Specialist. These individuals facilitate the research and teaching activities of faculty and graduate students. The Research Project Specialist provides support for the instructional and research activities of the Department, mainly by maintaining the computing resources in the Department.