



Research Assistantship Opportunity in Embankment Erosion Protection

Watershed Systems Concentration, Ole Miss Civil Engineering Graduate Program

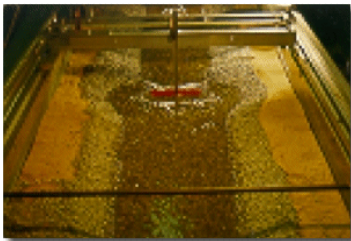
Research Assistantship Opportunity: The Watershed Systems graduate program concentration in the Department of Civil Engineering at the University of Mississippi invites applications for a graduate research assistantship in the area of embankment erosion protection. The selected candidate will pursue a Master of Science in Civil or Environmental Engineering with a specialization in soil and water conservation engineering for watershed and sediment management, and the development of embankment erosion protection techniques for highly erodible soils. The selected applicant will work intricately with Civil Engineering faculty in the Watershed Systems program and with adjunct faculty and scientists at the USDA-ARS National Sedimentation Laboratory located in Oxford, Mississippi.

Research Description: Irrigation storage reservoirs and aquaculture ponds are common hydrologic features in the Mississippi Delta. These reservoirs and ponds are constructed above ground using levees and are pumped to fill. Commercial aquaculture in the region currently employs more than 600 miles of levees. Ground water declines are also increasing reliance on levees for irrigation storage reservoirs. Pond and reservoir levees are undergoing significant to severe embankment erosion by wave action, primarily due to the highly erodible soils from which they are constructed. The objective of this research is to study alternatives for protecting levees from accelerated erosion. Research tasks will include conducting extensive literature searches of applicable control technologies, grouping existing levees into slight, moderate or severe erosion categories, constructing a physical model of typical levees and evaluating the effectiveness of various treatment alternatives, and documenting the outcomes of the research in a thesis report.



Embankment erosion by wind-wave action

Educational Background: The Watershed Systems graduate concentration in Civil Engineering Department provides educational opportunities in surface water hydrology, ground water hydrology, water quality, watershed modeling, and sediment transport/erosion. A unique collaboration exists between the department and the National Sedimentation Laboratory (NSL), a center of excellence in erosion and sedimentation research. The NSL is located two miles from the University campus and currently has eighteen scientists, including agricultural and hydraulic engineers, soil scientists, agronomists, geomorphologists, and ecologists. This research partnership between the Civil Engineering Department and the National Sedimentation Laboratory provides a unique, multi-disciplinary education in soil and water conservation engineering.



Physical modeling basin at the NSL

Eligibility: Applicants must have a bachelor's degree from an ABET-accredited engineering program, course work in the relevant areas, a minimum grade point average of 3.2 on a 4.0 scale, and an interest in a professional career in soil conservation or watershed systems.

To Apply: Submit official application through the university web site. Send copies of supporting information, including current transcripts, three letters of recommendation, and a personal statement summarizing your academic background and career goals to the

Civil Engineering Department address below. The position can be filled as early as January 2004. For fall 2004 enrollment, application deadline for consideration of assistantship is March 15, 2004.

Web Pages

Civil Engineering Department: http://www.olemiss.edu/depts/civil_eng

National Sedimentation Laboratory: <http://www.sedlab.olemiss.edu>

Graduate School (Application): http://www.olemiss.edu/depts/graduate_school/apply.html

Contact information

Watershed Systems Program, Department of Civil Engineering, University of Mississippi, University, MS 38677. Tel: 662-915-7191 Fax: 662-915-5523 Email: acheng@olemiss.edu



Ole Miss Civil Engineering Graduate Program Watershed Systems Concentration

Introduction

The Watershed Systems graduate program concentration in Civil and Environmental Engineering provides educational opportunities in surface water hydrology, ground water hydrology, water quality, watershed modeling, and sediment transport/erosion. This program prepares students for professional careers in governmental agencies, private industry, and academia. Current research interests include flow hydraulics, sediment transport, overland flow erosion, streambank failure, sediment impact on ecological systems, surface/subsurface water interactions, nonpoint source pollution, and remote sensing technologies.

Through collaboration with national and local research agencies, the department is especially well equipped for research in erosion and sediment transport. A unique collaboration exists between the department and the National Sedimentation Laboratory (NSL) of the USDA Agricultural Research Service, a center of excellence in experimental and modeling research in soil erosion, sedimentation, fluvial geomorphology, and environmental engineering, and located in Oxford and just off campus. Other collaborative partners include the National Center for Computational Hydroscience and Engineering, which specializes in the fundamental characteristics of water flow, soil erosion, sediment transport and the resulting effects on water resources and soil conservation, and the National Center for Physical Acoustics, which applies acoustical techniques to measuring sediment characteristics. Special facilities are available for research in watershed systems. The Civil Engineering Department houses a state-of-the-art Computer Graphics Laboratory. Students also have access to open and closed cycle hydraulic flumes, a water tunnel, rainfall simulators, highly specialized soil, chemical and ecological laboratories as well as fully instrument experimental watersheds at the National Sedimentation Laboratory.



Concentration Areas

- Flow Hydraulics
- Sediment Transport
- Soil Erosion by Overland Flow
- Streambank Failure and Stream Channel Stabilization
- Sedimentation of Flood Control Structures
- Sediment Impact on Ecological Systems
- Acoustical Applications to Sediment Measurement
- Surface/Subsurface Water Interaction
- Watershed Scale Modeling



NSL Sediment transport laboratory

Degrees

Master of Science in Engineering Science with Emphasis in Civil Engineering
Master of Science in Engineering Science with Emphasis in Environmental Engineering
Doctor of Philosophy in Engineering Science with Emphasis in Civil Engineering
Doctor of Philosophy in Engineering Science with Emphasis in Environmental Engineering

Faculty

Alexander Cheng, Ph.D. (Cornell), Professor and Chair, water resources, groundwater, poromechanics.

Garey Fox, Ph.D. (Colorado State), Assistant Professor, water resources, stream-aquifer interaction, erosion by subsurface flow, environmental engineering.

Shyam Prasad, Professor, Ph.D. (Northwestern), sediment transport, solid mechanics.

Waheed Uddin, Ph.D. (Texas), Associate Professor, Director CAIT, air quality, LIDAR and remote sensing technologies.

Affiliated and Adjunct Faculty

Carlos Alonso, Ph.D. (Iowa), Supervisory Research Hydraulic Engineer and Research Leader, USDA-ARS National Sedimentation Laboratory, sedimentary fluid mechanics, erosion by concentrated flows, and analysis of alluvial stream processes.

Mustafa Altinakar, Ph.D. (Laboratoire de Recherches Hydrauliques, Switzerland), Research Professor, National Center for Computational Science and Engineering, flow hydraulics and sediment transport modeling.

Gregg Davidson, Ph.D. (Arizona), Associate Professor, Department of Geology and Geological Engineering, trace element contamination and cycling in lake and wetland sediments, isotope analysis, surface water/groundwater interaction.

Jon Huey, Ph.D. (Iowa), Adjunct Professor, Mississippi Department of Environmental Quality, environmental engineering.

Roger Kuhnle, Ph.D. (M.I.T.), Adjunct Professor, USDA-ARS National Sedimentation Laboratory, sediment transport mechanics, bed forms and flow resistance, local scour.

*Matt Römken*s, Ph.D. (Cornell), Supervisory Soil Scientist, Research Leader, and Laboratory Director, USDA-ARS National Sedimentation Laboratory, erosion and sediment delivery processes from agricultural lands, soil erosion predictions.

Douglas Shields, Ph.D. (Colorado State), Adjunct Professor, National Sedimentation Laboratory, stream restoration design, impacts of channel incision on warm water stream ecosystems, sediment transport.

Daniel Wren, Ph.D. (Mississippi), Research Assistant Professor, National Physical Acoustic Laboratory, environmental engineering, acoustics.

Degree Requirements

Master of Science

Thesis Option: 24 hours of course work and 6 hours of thesis credit. Course work includes 6 hours of mathematics, 3 hours of mechanics, and 3 hours of numerical methods. A final examination is required.

Doctor of Philosophy

24 hours of course work past the M.S. degree and 18 hours of dissertation credit. Course work includes 6 hours of mathematics, 3 hours of mechanics, and 3 hours of numerical method. Preliminary, comprehensive and final examinations are required.

Courses in Stream Channel and Watershed Processes

Flow in Open Channels (CE541, 3 credits): Uniform and nonuniform flow; gradually varying flow, rapidly varying flow controls; subcritical and supercritical transitions; unsteady flow; level-pool routing; flood waves.

Flow in Porous Media (CE542, 3 credits): Steady, homogeneous flow; prediction of transport properties; wells, seepage, drainage, recharge; nonhomogeneous flow.

Sediment Transport (CE543, 3 credits): Fall velocity, particle size analysis, incipient motion, bed form mechanics, suspended loads; stream flows, natural river processes; transport of liquid-solid mixtures in pipelines.

Contaminant Transport Modeling (ENGR597, 3 credits): Physical and chemical processes that describe behavior of materials in natural and engineered environmental systems.

Fluid Mechanics (ENGR603, 3 credits): Equations of motion, potential and stream function; complex variable application, conformal transformation; flow-past cylinders, Schwartz-Christofel transform, vortex motion.

Stream and Estuarine Analysis (ENGR640, 3 credits): Extensive coverage of the fundamentals of stream, estuarine, and ocean interactions.

Advanced Geomorphology (ENGR643, 3 credits): Surface processes associated with specific physiographic districts.

Finite Element Analysis of Fluid Flows (ENGR702, 3 credits): Applications of finite element methods for fluid flow simulation; discussion on current developments; research on individual projects.

Special Projects (ENGR597, ENGR699): Special topics taught on demand by regular and adjunct faculty.



Stream bank stability research in NSL experimental watersheds

Civil Engineering Web Page

http://www.olemiss.edu/depts/civil_eng/

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