Ecology of Lake Superior
9-15 July 2006
Aboard the U.S. EPA Research Vessel Lake Guardian

Sponsors
Michigan Technological University
Departments of Civil & Environmental Engineering, Biological Sciences, Chemistry and Education
Western Upper Peninsula Center for Science, Mathematics and Environmental Education
U.S. Environmental Protection Agency
Great Lakes National Program Office

$1100 Registration includes meals, berth and 3 academic credits!
About the Course
Join faculty and scientists from Michigan Technological University (MTU) and U.S. EPA for a working cruise on Lake Superior in support of bi-national Great Lakes monitoring programs. Course participants will attend lectures and labs led by MTU instructors, providing a comprehensive introduction to the physical, chemical, and biological features of Lake Superior and the ecosystem’s lower food web.

The course is designed for upper level undergraduates, graduate students, and science/math high school teachers. Participants will be engaged in the collection of research data, working alongside Michigan Tech and EPA scientists during the long days and nights characteristic of a scientific cruise. This course will provide a strong foundation in Great Lakes limnology as well as hands-on participation in Lake Superior research unavailable in traditional coursework.

The curriculum will include lectures on limnological principles, demonstrations of sampling and analytical methods, case studies of current research, and group discussions. Cruise-long exposure to lower food web modeling will be offered using EPA’s AQUATOX software. The modeling experience will integrate field/laboratory observations with concepts critical to an understanding of lower food web dynamics. The class will be divided into groups and rotate through laboratory, research and modeling modules to provide the best possible small group experience.

About the Lake Guardian
The 180-foot research vessel (R/V) Lake Guardian is outfitted with state-of-the-art navigational, laboratory, and deck sampling equipment. Facilities supporting the ship’s primary mission in data collection include dedicated biology and chemistry laboratories that support monitoring of pollutant concentrations in the water, sediment, air, fish, and other flora and fauna. A galley, lounge, exercise space and 16 staterooms with bunks, desks, lockers, and computer LAN connections support the personal needs of crew, scientists and guests. To learn more about the ship, visit the website:
http://www.epa.gov/glnpo/monitor.html

Course Credit
Participants will earn 3 semester credit hours from MTU. To receive credit, students must engage in all course activities and complete (by August 1st):

- a cruise journal;
- an analysis of research data;
- a food web modeling exercise; and
- a contribution to the cruise web page.

There will also be a final examination.

Michigan Tech will work with participants to insure that credits earned in this course are transferable to their home institutions. Credits earned from this course can be applied towards an 18 semester-hour planned course of study for teachers working toward their Michigan Professional Certificate or applied towards MTU's Master of Science in Applied Science Education program. For more information, contact Dr. Bradley Baltensperger at 906-487-2460 or brad@mtu.edu.
Instructors

Lead Instructor: Dr. Martin T. Auer, MTU Professor of Civil & Environmental Engineering

Dr. Auer teaches courses in applied limnology and surface water quality modeling. He brings to the cruise a broad knowledge of research activity on Lake Superior. Dr. Auer’s research has included attached algal growth in Lake Huron and trophic dynamics in Green Bay. Dr. Auer will instruct in the area of plankton ecology, bringing aboard a Zeiss Axioscope2 research microscope, and will conduct the AQUATOX ecosystem modeling tutorial.

Dr. Noel R. Urban, MTU Associate Professor of Civil & Environmental Engineering

Dr. Urban is an instructor for courses in applied limnology and biogeochemistry, and has a special interest in biogeochemical aspects of the lower food web. Dr. Urban is a recognized expert on sedimentation and sediment-related phenomena in Lake Superior. His publications on Lake Superior include book chapters on carbon and nutrient cycling. Dr. Urban will direct work on sediment sampling and analysis and will assist with laboratory chemistry.

Dr. Nancy A. Auer, MTU Associate Professor, Department of Biological Sciences

Dr. Auer teaches courses in global water issues, aquatic ecology, fish biology and biodiversity. Her research interests include larval fish ecology, invasive species, and benthic macroinvertebrates. Dr. Auer is internationally known for her work in Lake Superior with the threatened lake sturgeon. She will be responsible for collection, processing and identification/enumeration of benthos and larval fish.

Dr. Steven W. Effler, Director of Research, Upstate Freshwater Institute, Syracuse, New York.

Dr. Effler is an adjunct faculty member at Syracuse University and SUNY College of Environmental Science and Forestry. A prolific writer, Dr. Effler has published more than 150 papers in the peer-reviewed limnological literature and is the editor and lead author of Limnological and Engineering Analysis of a Polluted Urban Lake: Prelude to the Environmental Management of Onondaga Lake, New York. He has been recognized as the Outstanding Research Limnologist by the North American Lake Management Society. Dr. Effler’s particular research expertise lies in the area of optics. He will bring aboard and demonstrate the deployment of several state-of-the-art optical measurement devices.

Dr. Judith A. Perlinger, MTU Associate Professor, Department of Civil & Environmental Engineering

Dr. Perlinger teaches graduate courses in environmental organic chemistry and applied boundary layer meteorology. Her research interests include the measurement and modeling of fluxes of anthropogenic chemicals between the atmosphere and the biosphere. Judith serves on the Science Advisory Board of the International Joint Commission.

Dr. Sarah A. Green, MTU Associate Professor, Department of Chemistry

Dr. Green teaches courses in environmental chemistry and conducts research on photochemical transformations of natural and anthropogenic organic compounds in the environment. Dr. Green will be responsible for the laboratory chemistry portion of the course.

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Mr. Mark Gleason, MTU Doctoral Student, School of Forest Resources

Mr. Gleason’s doctoral research focuses on educational applications of remotely operated vehicles. His deployment of a VideoRay ROV will bring an exciting visual dimension to our benthic sampling efforts. Mark is a past Director of the Isle Royale Institute and will share his knowledge of Isle Royale National Park, the crown jewel of the Lake Superior ecosystem.
General Information

Cost
The registration fee for the 7-day course is $1100 and includes lab fees, meals, room, and 3 academic credits. Fees are identical for all students, regardless of residency or academic affiliation and must be paid in full by Friday, June 9th. Refunds will be accommodated in cases where the cancelled position can be filled from the wait list.

Financial Aid
Applicants who are K-12 teachers may apply for a scholarship through the COSEE Great Lakes program http://coseegreatlakes.net/ (click on Marine Immersion) administered by the Great Lakes Sea Grant Program by contacting Steve Stewart at: 586-469-7431 or stew@msu.edu

Applications/Information
Application forms may be found on the web at: http://wupcenter.mtu.edu
Submit applications by email or postal mail to:
Joan Schumaker-Chadde, Course Coordinator
Western U.P. Center for Science, Math & Environmental Education
105 Dillman Hall
Michigan Technological University
1400 Townsend Dr., Houghton, MI 49931
Tel: 906-487-3341 Fax: 906-487-1620
Email: jchadde@mtu.edu

All 18 spaces are filled. You may apply for waiting list.

Great trip … great people … energizing … unforgettable
(2004 Cruise Comments)

Location & Accommodations
Lake Superior and the R/V Lake Guardian will provide the ideal scientific and natural setting for this exciting learning opportunity. Participants will live aboard the vessel for the entire course, sharing a double or triple room and bath and eating meals in the ship’s galley. Note that, while the vessel has excellent communications equipment and appropriate emergency protocols, we will not be within immediate reach of medical facilities or cell phone service for much of the cruise.

Transportation
Michigan Technological University is located in Houghton, MI and is served with daily Northwest Airlines (www.nwa.com) flights to its sister city, Hancock, MI (CMX). Taxi service (906-482-5515) is available to Michigan Tech for ~$20 per person.

Websites
Environmental Protection Agency
Great Lakes National Program Office:
www.epa.gov/glnpo/monitor.html

Michigan Technological University:
www.mtu.edu

Tourism information:
www.thekeweenaw.com

Deck and sunset photos by Ed Verhamme