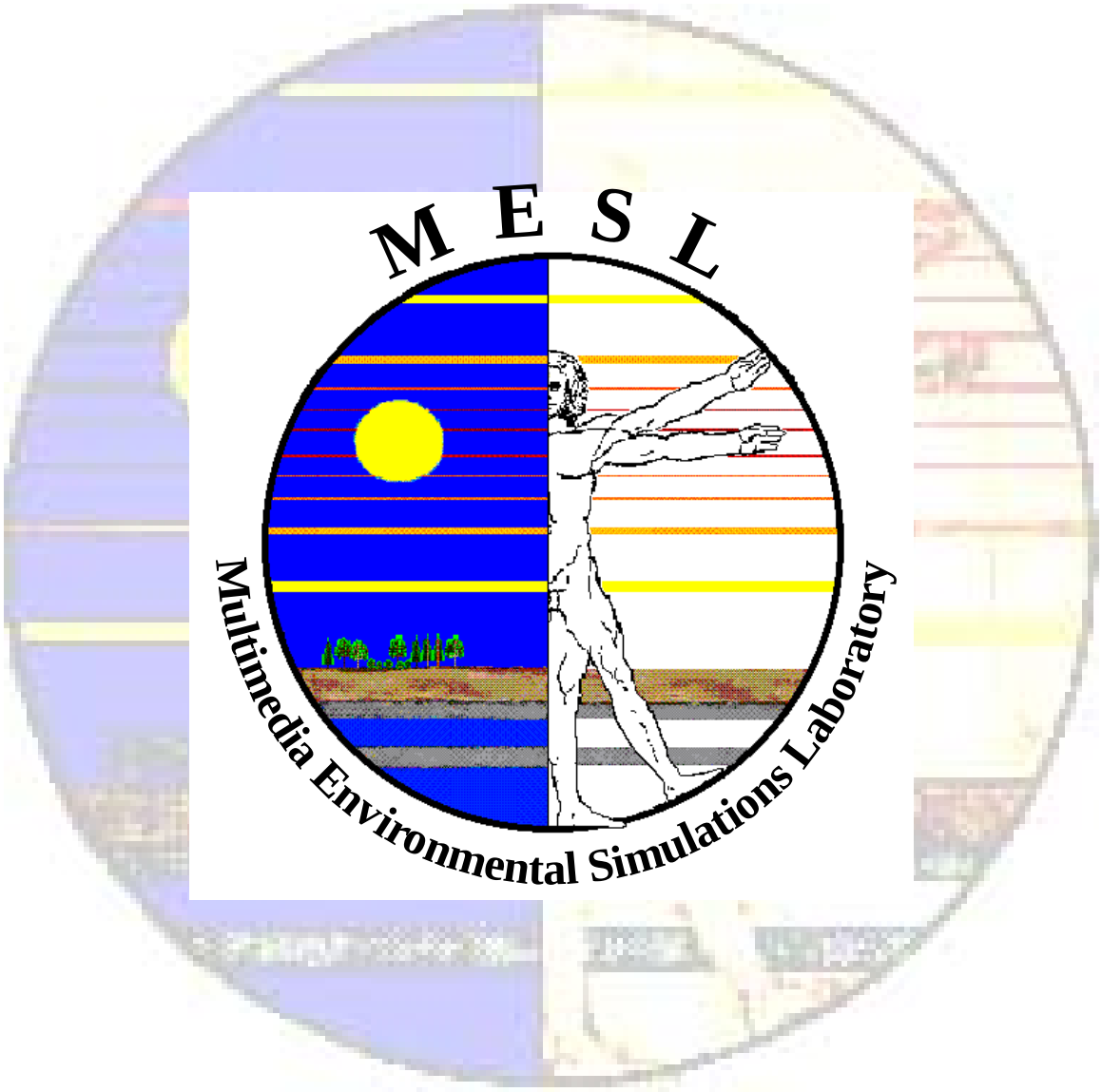

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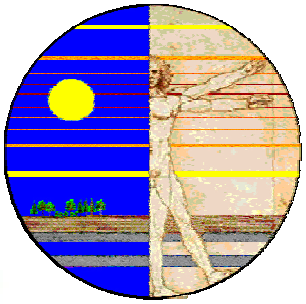
MULTIMEDIA ENVIRONMENTAL SIMULATIONS LABORATORY (MESL)



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MESL MISSION STATEMENT

Multimedia Environmental Simulations Laboratory (**MESL**) was established in 1993 to provide scientific and technical expertise to government, educational and private organizations in the area of environmental simulation and analysis.

In the present day earth adverse toxic perturbations introduced to the environment by mankind has raised fundamental questions about our understanding of various processes in environmental, geochemical and biological cycles, and fate of these toxic substances in multimedia environments. More and more, scientists are recognizing that the environment must be considered as a whole, and scientific and regulatory approaches alike must take into account the complex interactions between multimedia and intermedia pathways. These observations have added impetus to the general quest among environmental engineers, geohydrologists, health scientists and other members of the scientific community for understanding the interactions between these cycles and their effect on **environment and ultimately on human health**. Research activities within this field are closely linked with activities in subsurface, surface and atmospheric sciences and lie in the interfaces of two disciplines. These disciplines are the environmental sciences and toxicology and epidemiology fields of health sciences.

Pollutants released to the environment are distributed among environmental media such as air, water, soil, and vegetation, as a result of complex physical, chemical and biological processes. Thus, environmental pollution is a **multimedia problem**, and environmental assessment, exposure assessment and the design of appropriate environmental remediation and exposure evaluation methods require that we carefully consider the transport, fate, and accumulation of pollutants in the environment as a whole. Methods proposed to evaluate environmental or exposure characterization in this envirosphere must consider all pathways, and also the interactions between these pathways. In the scientific literature, the multimedia approach to environmental analysis is identified as **Total Environmental Characterization (TEC)**.

MESL Vision: *The vision for the **MESL** is delivering on the promise of excellence in environmental health research, education and outreach activities for the benefit of all people.*

MESL Mission: *The mission of the **MESL** is to provide a focused, interdisciplinary and self-sustaining structure that acts as a forum for creating new and integrating research,*

*education and outreach programs for U.S. locally and for the environmental health community globally to respond to the environmental health issues of our present day societies. As a result of these efforts, the **MESL** will act as a catalyst for integrating the environmental engineering sciences and health sciences fields yielding a conduit for exchange of information and for the creation of partnerships on a local and global level for the improvement of life standards of populations.*

Personnel of **MESL** are dedicated to be at the forefront of this scientific field. To support environmental risk-based decisions, **MESL** develops, tests, applies, and provides technical support to government, educational and private organizations in the area of environmental simulations, exposure and ecosystem response modeling, health risk and uncertainty analysis, and site specific evaluations . In this context a wide variety of analysis techniques are provided, ranging from simple desk-top techniques suitable for screening analysis, to sophisticated, state-of-the-art, GIS integrated continuous simulation models to assess and manage environmental risks to humans and ecosystems.

MESL EXTERNALLY FUNDED PROJECTS (representative)

- **Exposure Dose reconstruction Project**
  Dr. M. Aral, Principal investigator of the Project titled,
  Exposure-Dose Reconstruction at Graton Massachusetts, (1st phase)
  (Funded by: U.S. DHHS), 1992.
- Dr. M. Aral, Director, **NATO Advanced Study Institute**,
  Recent Advances in Groundwater Pollution Control, Remediation and Health Effects (NATO - Directorate of Environmental Programs), 1994.
- **Exposure Dose reconstruction Project**.
  Dr. M. Aral, Principal investigator of the Cooperative Agreement titled,
  Research Program on Exposure-Dose Reconstruction,
  (Funded by: ATSDR/CDC), 1993-2008.
- **Georgia Sea Grant Program**
  Dr. M. Aral, Principal investigator of the research program titled, *Analysis of Coastal Georgia Ecosystem Stressors Using GIS Integrated Remotely Sensed Imagery and Modeling: A Pilot Study for the Lower Altamaha River Basin*,
  (Funded by: UGA/ Georgia Sea Grant), 2000-2003.
- **Potential n-Nitrosodimethylamine (NDMA) Formation at Water and Waste water Treatment Plants and Exposure Pathway Analysis**.
  Dr. M. Aral and Dr. Ching-Hua Huang are the Co-Principal investigators of the Research Program.
  (Funded by: SNF Floreger France), 2003-2006.
- **WMD-R Research Program**.
  Dr. M. Aral, Principal investigator.
  (Funded by: CDC), 2004-2006.

MESL ACTIVE FUNDED PROJECTS (representative)

- Risk based exp. assessment tools in multi pathway env. analysis;
- GIS integrated exposure assessment;

- Flow and cont. trans. sim. in open channel networks and exposure;
- GIS integrated flow and cont. transport in water distribution systems;
- Dissolution by-products in water distribution systems and health eff.;
- Multi-pathway exposure analysis, modeling and risk analysis;
- Optimal design of remediation systems using genetic algorithms;
- Use of optimization models to determine sources of pollutants;
- Flow and contaminant transport analysis in fractured subsurface media;
- Aquifer parameter prediction using genetic algorithms;
- Natural attenuation and health issues in brown fields;
- Exp. investigation of LNAPL movement in heterogeneous aquifers;
- Numerical simulation of LNAPL movement in heterogeneous aquifers;
- Numerical and experimental investigation of immiscible fluids in aquifers;
- Exposure-Dose reconstruction; and,
- Development of risk based multimedia environmental simulation models.

MESL FACILITIES

Location: MESL is located on the second floor of the Sustainable Education Building (SEB - Room 215 – 3000 sq. ft. floor space), Georgia Institute of Technology. SEB is located on Atlantic Dr., across the School of Civil and Environmental Engineering building, known otherwise as the Mason Building. The space in this laboratory is used to house eight Ph.D. students. In addition to this space, a research engineer and other faculty, affiliated with MESL and the Environmental Engineering program, has other office space in the SEB building.

Computational Facilities: Twenty 900MgHz high end IBM/PC compatible workstations and desk top computers. Two UNIX based high end Indigo Impact R10000 SGI workstations. One SGI Origin 2000, R10000 super computer. These networked computational facilities are dedicated to modeling activities of MESL personnel. Other than this equipment, the computational laboratory has several scanners, high end black and white / color printers and digitizers.

Software: The MESL productivity software library include most recent versions of GIS ARC/INFO, GIS ARC/VIEW, GISPlus, EVS, ENVI, NAMMU, AUTO CAD, Fortran, C++, Visual C++, Visual J++, Visual Basic compiler software. Simulation software available to MESL researchers include ACTS, SAINTS, SLAM, ULAM, CLAM, RiverNET, PGA, OPTIM/PT, SOURCE, which are all developed by MESL researchers. In addition to these software, MESL researchers have access to numerous multi-pathway simulation software packages such as MODFLOW, MODPATH, SUTRA, CHEMFLO, EFDC, HSPF, AQUATOX, BASINS etc., which are in the public domain. MESL is housed in the School of Civil and Environmental Engineering, Georgia Institute of Technology.

Chemistry Laboratories: Please visit or web site for details on these sites.

MESL SPONSORS (representative)

- National Science Foundation.
- Scientific and Environmental Affairs Division, NATO.
- Agency for Toxic Substances and Disease Registry, U. S. DHHS.
- U. S. Environmental Protection Agency.
- Georgia Sea Grant Program.
- School of Civil Engineering, Georgia Institute of Technology.
- SNF Floerger

MESL RESEARCH and ADVISORY FACULTY

Georgia Institute of Technology

Prof. Mustafa Aral, School of Civil and Environmental Engineering.
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Prof. Suzan Cozzens, School of Public Policy.
Dr. Jiabao Guan, School of Civil and Environmental Engineering.
Prof. Nolan Hertel, School of Mechanical Engineering.
Dr. Wonyong Jang, School of Civil and Environmental Engineering.
Prof. Ching-Hua Huang, School of Civil and Environmental Engineering.
Prof. Jaehong Kim, School of Civil and Environmental Engineering.
Prof. Spyros G. Pavlostathis, School of Civil and Environmental Engineering.
Prof. Boris Mizaikoff, Applied Sensors Lab., School of Chem. and Biochemistry.
Prof. Ronald Shonkwiler, School of Mathematics.
Prof. Patricia Sobecky, School of Biology.
Prof. Turgay Uzer, School of Physics.
Prof. Paul Work, School of Civil and Environmental Engineering.

Other Institutions

Dr. John Abraham, HLM Consultants, Atlanta, GA.
Dr. Orhan Gunduz, Dukuz Eylul University, Izmir, Turkey.
Morris Maslia, **P.E., DDE**, ATSDR, CDC, USDHHS.
Juan Reyes, **P.E.**, Director, Office of Safety and Env., Dept. of Homeland Sec.
Dr. Lewis Rossman, National Risk Man. Laboratory, Cincinnati, USEPA.
Dr. Mansour Zakikhani, Waterways Experiment Station, US ACE.

MESL STAFF SCIENTISTS AND ENGINEERS

Ms. Elcin Kentel, B.S. CE, M.S. CEE. (Grad. Student)
Ms. Sinem Gokgoz, B.S. CE, M.S. CEE, Ph.D. CEE. (Grad. Student)
Mr. Wonyong Jang, B.S. CE, M.S. CEE. (Grad. Student)

Mr. Kijin Nam, B.S. CE, M.S. CEE. (Grad. Student)
Mr. Scott Rogers, B.S. CE. (Grad. Student)
Mr. Jinjun Wang, BS CE. (Grad. Student)
Mr. Recep Göktaş, BS CE. (Grad. Student)

Please contact MESL offices for availability of graduate student research positions.

CONTACT

For further information on active projects, copies of publications or other information, please contact the Director of MESL at the following address:

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