# GLOBE Watershed Dynamics

**Principal Investigator:** Dr. Kemi Jona
**Co-Investigators:** Dr. Daniel Edelson, Dr. David Maidment
**Performing Institution:** Northwestern University

**Description:** Where does your water come from? Do you always have enough or is the supply limited where you live? What factors affect the quantity of the water where you live? The GLOBE Watershed Dynamics Project offers students the opportunity to conduct scientific investigations on watershed behavior on local, regional, and national scales, using real-time and archival data from the large-scale scientific observatory being constructed by the Consortium of Universities for Advancement of Hydrologic Science (CUAHSI - www.cuahsi.org). Of particular relevance to this project, CUAHSI is developing a Hydrologic Information System (HIS) that combines easy access to geographic data and hydrologic data, including USGS stream gages, stream flow and land cover data. In the Watershed Dynamics curriculum, students use My World GIS™ (www.myworldgis.org) to access this data and analyze it. The first module has students study the water cycle by comparing rates of precipitation, evaporation, and surface runoff to see how they measure up to one another in different parts of the country. In the second module, students look at land use data and stream gage data to see if they can find a relationship between surface type and stream flow. Each module is approximately 10-15 days long.

These lessons and GIS tools will enable GLOBE students to investigate their own watershed in order to understand the flow of water through the watershed, how human activities within the watershed have been shaped by its hydrology, and how human land use is impacting the hydrology of the watershed.

**Science Content Focus:** Basic hydrology including water cycle; watersheds and their interaction with people (floods, land use, etc.).
**Intended Audience:** Grade 7-12 students and teachers with activities for different grade levels.
**Geographic Scope:** Currently, CUAHSI data sets are focused on the continental United States; however, conversations are underway with international partners to provide access to similar data. Opportunities for U.S. and international involvement will be vigorously pursued.
**Type of Project:** Students will use GIS to access and analyze existing data sets from CUAHSI & GLOBE. Teachers will have the options to use one of three GIS tools to suit their goals and situations: My World GIS™, a sophisticated yet easy-to-use GIS developed by the project team at Northwestern University, a browser-based GIS environment built using ArcGIS® server technologies, or ArcGIS®, the most widely used desktop GIS among professionals.

**Web Link to Existing Project Information and How to Get Involved: www.globe.gov/watersheds**
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**Watersheds Project contact: Colleen Buzby,c-buzby@northwestern.edu**
**GLOBE Project Leader: Mr. Gary Randolph, randolph@globe.gov**

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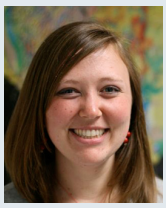
## Meet the Team

**Principal Investigator: Dr. Kemi Jona**, Research Associate Professor of Learning Sciences and Computer Science at Northwestern University, is responsible for day-to-day management of the project. He supervises the team at Northwestern including a curriculum development specialist and programmer and is excited for this opportunity to bring authentic scientific tools and data into classrooms. Kemi received his PhD from Northwestern University in 1995.

**Co-Investigator: Dr. Daniel Edelson,** is Vice President for Education and Children's Programs at National Geographic Society and executive director of the Society's Education Foundation. He oversees the Geographic Information Systems (GIS) components of the Watershed Dynamics project.

**Co-Investigator: Dr. David Maidment** is the chief scientist on the project, leading CUAHSI's participation. Dr. Maidment is the Engineering Foundation Professor of Engineering and Director of the Center for Research in Water Resources at the University of Texas at Austin. Dr Maidment is a specialist in the application of GIS to hydrology, the principal designer of the Arc Hydro data model, and guides a team of scientists as consultants to the project.



**Curriculum Development Specialist: Ms. Colleen Buzby** is a curriculum developer in the School of Education and Social Policy at Northwestern University. She writes student activities and facilitates teacher professional development workshops for the Watershed Dynamics project.

**GLOBE Project Leader: Mr. Gary Randolph**, involved in GLOBE since 1994, has 20 years experience in teaching and developing environmental education activities with 10 years experience in workshop facilitation and coordination. He contributed to the development of the GLOBE Teacher's Guide and created the Understanding GLOBE Student Data activities to inspire the collection, reporting and using of GLOBE data in student research. He has a background in wildlife biology and environmental education.