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**Youngstown State University**

**Department of Geological & Environmental Sciences**



**Faculty Research Interests**

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**Dr. Isam E. Amin** ([ieamin@ysu.edu](mailto:ieamin@ysu.edu)); Ph.D., University of Nevada-Reno, 1987

*Specialization:* hydrogeology, environmental geochemistry, and environmental geology

Dr. Amin's research interests focus on the quantification of natural hydrologic processes. He believes that quantification of these processes leads to the highest level of their understanding. Dr. Amin has published research on the quantification of groundwater residence times, groundwater recharge, groundwater leakage between aquifers, seawater intrusion, groundwater mining, movement of groundwater contaminants between rivers and their banks (Mahoning River in northeastern Ohio), and sediment transport in streams and rivers. He has also published on the water resources of Lebanon and intra-state water conflicts with special emphasis on the water resources of the politically and economically marginalized regions of Sudan – Eastern, Western (Darfur), and Southern Sudan.

While at YSU, Dr. Amin has involved five undergraduate students and six graduate students, including three students from the American University of Beirut, Lebanon in his research projects. Of the 11 students, 8 were co-authors on 8 papers presented at national conferences (annual meetings of the Geological Society of America) and one was a co-author on a conference proceeding paper.

*Collaborators:* Alan Jacobs and Carl Johnston, YSU; Wisam Khadra, Ziad Khayat, and Mohamad Hamzeh, American University of Beirut, Lebanon

**Dr. Felicia P. Armstrong** ([fparmstrong@ysu.edu](mailto:fparmstrong@ysu.edu)); Ph.D., Oklahoma State University, 2003

*Specialization:* environmental chemistry of soils, ecotoxicology, and soils remediation

Most of Dr. Armstrong's research is centered around soil and water contamination and their affects on plants and organisms. Interests include: 1) Investigation of native Ohio plants for use in remediation of contaminated soils. Several varieties of native grasses have been grown in zinc and lead contaminated soils for potential use in phytoremediation. To identify where these plants may be most usable, analysis for metal contaminants in the shoreline of the Mahoning River will start in the fall 2008; 2) Monitoring after clean-up/remediation activity. Sections of the Shenango River were remediated (Westinghouse superfund site) in 2005. Sediment samples were collected and analyzed for the absence or presence of certain varieties of macro-invertebrates and deformalities in chironomids; 3) The Shenango River is also part of research to identify spawning areas of walleye, which are a popular recreational fish that are currently stocked in the Shenango Lake. With better management of river banks and water flow there is the potential to improve the natural spawning of this popular fish; 4) Wetlands are under constant threat due to destruction or contamination. Several wetland studies are being conducted including water quality changes in suburban wetland and diversification of a monoculture in a wet meadow using various shading levels and water depth.

*Collaborators:* Ian Renne, Thomas Diggins, and Carl Johnston, YSU Biological Sciences; Shane Smith, YSU Geological & Environmental Sciences

**Dr. Raymond E. Beiersdorfer** ([ray@cc.ysu.edu](mailto:ray@cc.ysu.edu)); Ph.D., University of California-Davis, 1992

***Specialization:*** environmental geochemistry, metamorphic and igneous petrology, tectonics, and environmental geology

Throughout the early stages of his career, the main focus of Dr. Beiersdorfer's research was to increase understanding of the geochemical processes that occur during the low-temperature fluid-rock interaction of basaltic rocks. He began studying terrestrial basalts, in 1994 expanded to include the lunar environment, and on research problems in soil geochemistry, specifically on the development of a solid-substrate, slow-release fertilizer for space and terrestrial applications. Essential plant nutrients, as well as a solid support substrate, can be provided by a synthetic soil, composed of ammonium- and potassium-saturated clinoptilolite (a mineral) and apatite (a calcium phosphate). This zeoponic-substrate can provide slow-release fertilization of plants via dissolution and ion-exchange reactions. A better understanding of the ability of zeoponic-substrates to release essential nutrients is an important step in NASA's long-term goal of implementing a regenerative life support system for Lunar and Martian outposts. This technology has been embraced enthusiastically by organizations and companies concerned with nutrient pollution due to conventional liquid fertilizer application.

Dr. Beiersdorfer makes an effort to include YSU students in his research and to assist them in finding research opportunities in areas outside his expertise. The premier example of this is the effect Dr. Beiersdorfer has had on the career of one particular YSU Geology B.S. graduate (1999). In 1998, Dr. Beiersdorfer received funding for the student to work at the NASA Johnson Space Center as a component of his NASA/ASEE Faculty Fellowship. The research was published in the *NASA Contractors Report - 1999-208923*. The student received several grants directly related to this work, is currently enrolled in a Ph.D. program in Planetary Science at Arizona State University studying the geology of Mars, and was chosen by NASA as a collaborating scientist for the 2003 Mars Rover Mission.

***Collaborators:*** Tim Wagner, YSU Chemistry; W. Gregg Sturuss, YSU Physics & Astronomy; Sarah Woodruff, Ohio Department of Education; Xiaoming Zhai, College of Lake County, Susan Buhr, University of Colorado; Susan Haynes CORE

**Dr. Jeffrey C. Dick** ([jcdick@ysu.edu](mailto:jcdick@ysu.edu)); Ph.D., Kent State University, 1992

***Specialization:*** engineering geology, hydrogeology, geophysics, and petroleum geology

Dr. Dick's primary research interests are centered around ground water occurrence and contamination, coastal processes of Lake Erie and San Salvador, Bahamas, and geographic information system applications in the geosciences. The primary focus of Professor Dick's academic career has been integrating technology and field experiences to improve undergraduate education. His efforts were initially supported by a grant from the National Science Foundation (1993) which funded the acquisition of geophysical and drilling equipment to support hydrogeology and subsurface investigation courses. Dick also established an international studies course based in San Salvador, Bahamas in 1993 with the purpose of providing a field-based course (*Field Investigations in Geology*) for exploring new methods in undergraduate geoscience education. Over the past fifteen years this course has produced more than twenty undergraduate research projects, one master's thesis (in progress) and four separate professional publications. Professor Dick has also served Youngstown State University since 2003 as Director of Undergraduate Research and is the main force behind increased student and faculty participation in the YSU QUEST research event.

***Collaborators :*** Kathy Owens, Dave McConnell, and Dave Steer, University of Akron, Abdul Shakoor, Kent State University, BJ Arnold (Ph.D. candidate), Kent State University, Shane Smith, YSU Geological and Environmental Sciences, Bradley Shellito and Dawna Cerney, YSU Geography

**Dr. Alan M. Jacobs** ([jmjacobs@ysu.edu](mailto:jmjacobs@ysu.edu)); Ph. D. Indiana University, 1967

*Specialization:* engineering/environmental/surficial geology, hazardous waste management

Professor Jacobs has been an interdepartmental/intercollege instructor in the following programs since 1996: Environmental Studies (undergraduate and graduate), Geology (undergraduate), Environmental Engineering (graduate), and Public Health (graduate). He also developed the Masters Program in Environmental Studies at YSU. He spent a sabbatical year in Italy (2003-04), lecturing and conducting research, at the University of Genoa (Ph.D. students in Environmental Chemical Engineering and undergraduates in General Engineering) and also at D'Appolonia S.p.A. Professor Jacobs has completed consulting projects throughout the United States and in Italy, Spain, Sweden, Venezuela, the Caspian Sea Coast, Pakistan, and Korea involving the siting of major construction projects. He was the project manager on the Woodlawn Landfill superfund site from 1988-93, after which he continued peer-reviewed published research on monitoring contaminant attenuation in the groundwater at that site.

Dr. Jacobs has also developed specialized techniques and hardware for underground and underwater television probes used in boreholes, monitoring wells, and mines and subsurface investigations using these probes have been conducted in 16 US states. Professor Jacobs has received external funding from: Ohio Environmental Education Fund (PI, No. 97G-062) May 1, 1997 - October 31, 1998- "Environmental Education for Adult Audiences Using Theatrical Presentation" Total: \$46,174; National Science Foundation (No. DUE 9552347) "Instrument and Laboratory Improvement -- Environmental Studies Program" Total: \$30,000; Ohio Environmental Education Fund (No. 98G-018) May 15, 1998 - June 30, 1999- extended to December 31, 1999 "Curriculum Development in Risk Assessment" Total: \$34,071;

*Collaborators:* Isam Amin, Ikram Khawaja, Ann Harris, YSU Geological & Environmental Sciences, Dennis Henneman, Theater, YSU; (the late) Paul Christiano, Carnegie Mellon University Department of Civil and Environmental Engineering; Jerry A. Lineback, Illinois Geological Survey

**Dr. Shane V. Smith** ([svsmith@ysu.edu](mailto:svsmith@ysu.edu)); Ph. D. Washington State University, 2005

*Specialization:* stratigraphy and sedimentology

Dr. Smith's primary research is in the areas of stratigraphy, sedimentology, and volcanology. Current research projects include: 1) employing geochemical analyses to determine emplacement mechanisms of basalt flows and a fused tuff in the Columbia River Basalt Group, west-central Idaho and southeastern Washington; 2) reconstructing ancient fluvial paleodrainages in the Clearwater Embayment, west-central Idaho and southeastern Washington; 3) determining paleowind directions during deposition of Pleistocene and Holocene Eolianites on San Salvador, Bahamas; and 4) investigating pedogenic processes in these eolianites following deposition.

Dr. Smith is also collaborating on environmental research projects in the Shenango River Watershed of northeastern Ohio and northwestern Pennsylvania. These projects include: 1) monitoring the Shenango River area of the Remediated Westinghouse Superfund Site, Sharon, PA; 2) assessing walleye spawning habitat in the Shenango River immediately upstream of the Shenango River Lake to Greenville, PA; and 3) development of a GIS database for the watershed. Synergistic opportunities for research on the Shenango River Watershed have been enhanced by his election as the current President and past elections as Vice-president and Member of the Board of Directors of Shenango River Watchers, Inc. Shenango River Watchers is a non-profit watershed group founded to clean up, preserve, and protect the environmental, scenic, and recreational attributes of the Shenango River.

*Collaborators:* Drs. Felicia P. Armstrong and Jeffrey C. Dick, Department of Geological & Environmental Sciences YSU; Dr. John A. Wolff, School of Earth & Environmental Sciences Washington State University; Dr. Dawna L. Cerney, Department of Geography YSU; Dr. Thomas P. Diggins, Department of Biological Sciences YSU; Dr. Thomas A. Rothfus, Executive Director, Gerace Research Center College of the Bahamas; Mark Russell, M.S., Greenville High School; and Shenango River Watchers, Inc.