From the Chair

I am very pleased to report that the Geology Department at Wayne State University has had an excellent year. Large numbers of students continue to take our classes, and enrollments in the upper-level courses in particular continue to grow. Our faculty continue to make significant progress in their respective areas of research.

Since our last Newsletter, Dr. Mark Baskaran was promoted to Full Professor. This is well-deserved recognition of his expertise and his outstanding performance in research, teaching, and service. Dr. Baskaran’s research, which is being conducted with graduate student Tom Novell, involves quantifying the water discharged in the sinkhole vents in Lake Huron by using stable isotopic composition of oxygen and hydrogen, as well as naturally occurring radionuclide tracers. They are also interested in determining the age of the sink-hole vent waters. This research is important because submerged groundwater vents appear to be a hot spot of nutrient efflux and microbial activity. Quantifying the amounts of water and nutrients in the lake is a key to understanding the lake ecosystem.

Dr. Jeff Howard recently completed a study of the provenance and paleogeographic implications of glacial erratics in Late Pleistocene sediments in southeast Michigan. He presented his results at the recent meeting of the Geological Society of America. He is in the final stages of producing maps of the glacial geology of the greater Detroit area. Howard is working with a graduate student Craig Clawson to study the soil chronosequence associated with Late Pleistocene glaciolacustrine sediments near Detroit.

Dr. Ed Van Hees continues to investigate the formation of giant mesothermal gold deposits in Canada and more recently in Peru. He has obtained several research grants and contracts from mining companies to fund this research. His collaboration with Dr. Mark Baskaran and his M.S. student Jason Jweda resulted in a publication on the movement of sediment and PCBs in the Clinton River of southeastern Michigan.

Dr. Larry Lemke continues to investigate the influence of geologic heterogeneity on the movement of groundwater contaminants through glacial aquifers in urban areas. He was recently awarded a 5-year Career Grant from the National Science Foundation to pursue this research. In addition, Dr. Lemke and his students are modeling the spatial variability of air quality in the cities of Detroit and Windsor.

Dave Lowrie has been busy organizing the Departments extensive collection of cores, cuttings, minerals, rocks and fossils after completing their relocation to the Criminal Justice Building. This is an ongoing endeavor as we are continually adding to the collection. We have recently received two donations that have significantly added to our teaching and reference collections. This past summer two successful collecting trips resulted in copper crystals from the Keweenaw Peninsula and many good teaching specimens from the Bancroft Ontario area.

Much of the success of a department can be measured by the activities of students after they move on, and in collaborations with colleagues from around the world. Jason Jweda, who completed his M.S. degree with us in 2007, is now pursuing his Ph.D. at Columbia University. Dr. Gi-Hoon Hong, a Visiting Professor from the Korea Ocean Research and Development Institute (KORDI), is currently spending a year-long sabbatical in our Department. Ma Qiang is currently a Visiting Scientist from Xiamen University, China. She will spend one year in our Department conducting research with Mark Baskaran.

We would like very much to show you our Geology Department first-hand. If you can’t come in person, at least visit us via our website: www clas wayne edu Geology/

With my very best regards,

James D. Tucker

James D. Tucker
In early Fall 2008, fourteen undergraduate students in Geology and Environmental Science—most of them paid undergraduate researchers—participated in a research project designed to measure air quality in Detroit and Windsor. Together with counterparts from the University of Windsor, the students deployed air samplers at 100 sites across both cities to measure nitrogen dioxide (NO2), sulfur dioxide (SO2), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and particulate matter such as dust and soot. Half of the samplers involved exposing small, sensitive badges to the atmosphere for two weeks. The other half also included active samplers that forced air through filters using a pump over the same two week period. With cooperation from the Detroit Fire Department, the WSU students set up the active samplers at thirty-three fire stations throughout the city. “There are people there 24/7,” Lemke said of the fire stations, “and they are geographically distributed,” making them ideal sites. The Detroit City Engineering Division also granted a permit so that the students could hang the passive samplers from light poles around the city.

The air sampling campaign is the first step in a larger study designed by the Geospatial Determinants of Health Outcomes Consortium (GeoDHOC), a multidisciplinary, international group with researchers from WSU, the University of Windsor, the Henry Ford Health System, and the University of Toronto. In its pilot research study, GeoDHOC seeks to link the effects of exposure to outdoor air pollution to asthma in Detroit and Windsor. The pilot project is funded by the WSU President's Research Enhancement Program and the Vice President of Research at the University of Windsor.

The Detroit-Windsor international border provides a unique opportunity to investigate the effects of common environmental stressors across demographically dissimilar populations with contrasting environmental regulations and health care systems. “Air doesn’t care about the international boundary,” said WSU professor Larry Lemke, who serves as Director of the Environmental Science Program, and supervised the air sampling efforts in Detroit. “We’re mapping environmental conditions and health outcomes, and we’re trying to see how they overlap.”

The students who participated in the project trained over a four day period in August. The training was conducted at WSU with assistance from the University of

Continued on Page 3

Lawrence D. Lemke - Research Summary

Dr. Larry Lemke’s research focuses on the spatial variability and transport of contaminants in air and water. In the past year, he and his students have analyzed the relationship between natural radioactivity and texture in glacial sediments, the exchange of gasses across the hyporheic zone in a tributary of the Clinton River, and geologic heterogeneity in glacial sediments in southeast Michigan. Joseph Cypher, Dr. Lemke’s first graduate student, successfully defended his thesis entitled “Hydrogeologic Modeling of a 1,4-Dioxane Plume in a Glacial Aquifer System, Washtenaw County, Michigan.” Most recently, Dr. Lemke lead a team of WSU undergrads who sampled air quality across the city of Detroit. The data they collected will play an important role in the thesis research of Dr. Lemke’s second graduate student, Shannon Molaroni.
Dr. Lawrence D. Lemke has been awarded a 5-year grant by the National Science Foundation. His project, entitled Integrating Research, Education, and Heterogeneity into Groundwater Models of Glaciated Urban Areas, will combine deterministic and geostatistical approaches to characterize spatial variability in glacial sediments in urban glacial aquifer systems. Dr. Lemke and his students will model and quantify uncertainty in groundwater flow and contaminant transport beneath Ann Arbor, Michigan.

The project includes a companion Education Plan that will strengthen the WSU Environmental Science Program by training a new generation of students to apply the proposed methodology. Each year, approximately 1,000 general education students and 30 Geology and Environmental Science majors will work with problem-based learning activities tied to the research project. In addition, three graduate and five undergraduate student research assistants will be supported and mentored in this program.

The Faculty Early Career Development (CAREER) Program confers the National Science Foundation’s most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research within the context of the mission of their organizations. Career awards are highly competitive and Dr. Lemke’s recognition marks an important milestone in the Geology Department’s commitment to develop societally-relevant research programs while providing the highest quality educational experience to our students.

Geology Professor Receives NSF CAREER Award

From Page 2
Windsor and Health Canada scientists.
Students learned about the technology of air sampling, practiced with the equipment, and eventually demonstrated their proficiency in all aspects of deployment and take-down.

WSU graduate research assistant Shannon Molaroni played a leadership role in the project by organizing equipment and daily workplans for the undergraduate students. Student worked in teams of two and three for safety and used hand-held GPS units to gather precise information on the location of each sampler. WSU undergrad Maggie Tucker commented, “For me this was a really great experience. I am very new to the environmental sciences program and it was extremely helpful to get a small taste of where my studies could potentially lead. This experience helped me to get a feel for real-life applications. It’s also gotten me really excited to continue to pursue this particular path.”

Now that the first round of sampling has been completed, it will take several months to get the air quality data back from the laboratory. In the upcoming months, the air quality data will be used to predict exposure rates which will be linked to asthma incidence and exacerbation in Detroit and Windsor residents.

Environmental Science major Nick Morelli summed up the feelings of all the team members when he said, “I really enjoyed being a part of the research team, and am excited to see what the results will show.” If it is successful, the study should have implications for both environmental policy and clinical practice.

Student air sampling team with Detroit Fire Dept. Engine 59 Crew.

Geology News
Geology Department Growing Strong

The Geology Department at Wayne State continues to grow thanks to its enthusiastic and involved student population, its dedicated and hard working faculty, and generous support from its alumni. Tangible signs of our progress include the acquisition of new equipment for teaching and research, upgraded laboratory space, continuing field trip activity, and increasing student enrollment.

New Teaching and Research Equipment. The Department of Geology continues to enjoy support from the WSU College of Liberal Arts and Sciences that allows us to enhance our teaching and research facilities. Since the time of our last newsletter, we have been awarded funds to purchase 8 new binocular petrographic microscopes (we now have a total of 18 scopes), 12 hand-held GPS units, a 42” color scanner, and a 44” color plotter. These resources allow us to accommodate the growing number of students enrolling in mineralogy and petrology, and to produce maps and cross sections for student assignments in sedimentation and stratigraphy, structural geology, and hydrogeology courses. Faculty members have used the printer and scanner to reproduce geologic maps and prepare posters for research presentations at national meetings.

New Research Lab Space. Geology faculty members have moved into three new labs located in the basement of the Physics building and the ground floor of Old Main during the past year. Dr. Mark Baskaran has moved his instruments into the new Radioisotope Lab in the basement of the Physics Building. Next door, Dr. Ed van Hees installed his Induced Coupled Plasma – Optical Emission Spectrometer (ICP-OES) and Continuous Flow – Isotope Ratio Mass Spectrometer (CF-IRMS) in the IRIS Geochemistry Lab that he shares with Dr. Jeff Howard. Dr. Larry Lemke has finished setting up his Computer Modeling Lab in Old Main.

Increasing Enrollment. Perhaps the best barometer of growth in the Geology Department is the increase in enrollment for Mineralogy, a core course for our Geology and Environmental Science B.S. degrees. Thirty three (33) and thirty six (36) students enrolled during the fall 2007 and 2008 semesters. This number is ~100% higher than the average of the previous three years (2004-2006). We attribute the increase to proactive recruiting efforts initiated by the Geology and Environmental Science faculty during the 2006-2007 academic year that included:
• annual meetings to inform WSU academic advisors about changes in our program;
• a 10-minute career talk for students in introductory Geology and Biology courses;
• an annual Career Night to provide potential majors with career information;
• improved Geology Department and Environmental Science Program web pages;
• creation of marketing materials including a new B.S. in Geology flier; and
• faculty representation at all Open House and Scholars’ Day functions.

WSU Mineralogy Enrollment

2002 2003 2004 2005 2006 2007 2008

Academic Year

Students Enrolled

5 10 15 20 25 30 35 40
Field Trips. Field Trips continue to be a mainstay of recruiting and education in the Geology Department. In addition to course field trips in Mineralogy, Petrology, Structural, Sed/Strat, Hydrogeology, and Soils courses, we offer field trips to majors and non-majors alike in Physical Geology, Environmental Geology, and through Departmental Field Trips. Since our last newsletter, a local Urban Environmental Excursion was organized for 30 students to visit a DTE coal-fired electrical power plant, the Marathon petroleum refinery, and the GDRRA trash incinerator in Detroit. Departmental field trips gave 30 additional students the opportunity to visit post-Katrina New Orleans in 2007 and Yellowstone and the Tetons in 2008. Alumni support continues to help us keep our field trip costs down and, consequently, student participation up!

Promotion to Full Professor

Dr. Mark Baskaran was promoted to the rank of Full Professor in August 2007 in the Department of Geology, in recognition of his continued scholarship, teaching and service to the University. He has been continuously funded by a variety of funding agencies (NSF, EPA, NOAA, State agencies and private companies) over the past 9 years and has published over 95 peer-reviewed journal articles, more than half of which were published after he joined Wayne State in 1999. Many of his publications are highly cited and he has a cumulative Science Citation Index of over 1700. Dr. Baskaran’s promotion marks an additional milestone in the advancement of our department and represents a clear indication that geological research is thriving at Wayne State University.
Student Awards and Honors

Ira Adolphues
• 2007 WSU Honors Undergraduate Research Grant
• 2007 MI-LSAMP Undergraduate Research Grant
• 2007 GSA Minority Student Travel Grant

Christopher Bobryk
• 2007 WSU Honors Undergraduate Research Grant

Lee Copp
• 2007 Midwest Mineralogical and Lapidary Society Scholarship

Joseph Cypher
• 2007 Geology Department Graduate Student Merit Award

Ira Adolphues
• 2007 WSU Honors Undergraduate Research Grant

LeAnn Germer
• 2007 Midwest Mineralogical and Lapidary Society Scholarship

Tanya Martin
• 2007 WSU Environmental Science Program Student Merit Award

Dan Greene
• 2006 Geology Department Undergraduate Student Merit Award
• 2007 Phi Beta Kappa Honor Society Membership

Shannon Molaroni
• 2006 WSU Environmental Science Program Student Merit Award

Rebecca Jackson
• 2007 WSU Environmental Science Program Student Merit Award
• 2008 David MacKenzie Honor Society Inductee
• 2008 Phi Beta Kappa Honor Society Membership

Valentina Taranovic
• 2006 Geology Department Undergraduate Student Merit Award
• 2007 National Association for Geoscience Teachers Field Course
• 2007 Society of Economic Geologists Graduate Student Fellowship

Tanya Martin
• 2007 MI-LSAMP Undergraduate Research Grant

Dean’s List
Caroline Addis
Rebecca Jackson
Tanya Martin

Colin McPartlin
Steven Schafer
Sonja Wiedmann

Thanks to Our Friends!
The Geology Department would like to express our deepest appreciation to the following organizations and people for their contributions this past year. Your generosity has allowed the department to make progress toward reaching goals of modernizing our teaching and research facilities, sending students on field trips and to conferences, and giving scholarships and awards to our undergraduate and graduate students. Thank you very much!

Organizations
Chrysler Foundation
Michigan Mineralogical Society

Individuals
Mr. Neil Babb
Mr. Frank J. Banar
Mr. William T. Barksdale
Mr. Kenneth R. Chaivre
Mr. Kenneth L. Crawford
Mr. Tyrol B. Coley
Dr. and Mrs. Robert B. Furlong
Mr. Brian Goss
Mr. Barry E. Havver
Mr. Gregory M. Karageozian
Dr. Lawrence Lemke
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Mr. George J. Toth
Mrs. Mary Jane Toth
Mr. John Vitkay, Jr.
Dr. Edmond van Hees

Dean’s List
Caroline Addis
Rebecca Jackson
Tanya Martin

Colin McPartlin
Steven Schafer
Sonja Wiedmann
Edmond H. van Hees - Research Summary

Dr. Ed van Hees’s primary research focus is on the origin, lithogeochemical and stable isotopic composition of giant mesothermal gold deposits. He has worked on 5 of the 11 giant mesothermal gold deposits (that have produced >100 tons of gold) in the western hemisphere. Gibran Washington, Dr. van Hees’s first graduate student, has just completed a study on the Hollinger-McIntyre deposit, the largest of these giant deposits, and will defend his thesis research in December. Dr. van Hees has also received funding for additional studies of gold deposits in the Porcupine Mining Camp of Northern Ontario and the San Juan Gold Camp in southern Peru. Several WSU undergrads are preparing country rock and vein samples collected from the Bristol Township portion of the Porcupine camp for analysis by Zachary Stevison, as part of his M.S. research. Another of Dr. van Hees’s graduate students, Dawn Niedermiller, is studying an unusual Archean age conglomerate-hosted diamond deposit near Wawa, Ontario, Canada.

CLAS Excellence in Teaching Award

Dr. Ed van Hees has been awarded one of eleven College of Arts and Science (CLAS) Excellence in Teaching Awards for 2008. The award recognizes the many outstanding contributions that he has made in teaching both undergraduate and graduate geology courses at Wayne State. Dr. van Hees’ teaching philosophy involves setting universally high expectations and challenging his students to think critically to prepare them for the role they will play as future professionals in our society.

This award is the third teaching award received by current Geology Faculty members. Previous awards include a WSU President’s Award for Excellence in Teaching presented to Dr. Larry Lemke in 2006 and a College of Science Excellence in Teaching award presented to Dr. Jeffery Howard in 2000.

Jeffrey Howard - Research Summary

Dr. Jeff Howard recently completed a study of the provenance of Late Pleistocene diamicton deposits near Detroit. The results show that the Defiance Moraine was clearly formed by the Huron lobe. He has completed mapping the Quaternary geology of ten USGS 7.5 minute quadrangles near Detroit, a project initiated 10 years ago. He is also working with a graduate student to test a new relative dating method using adsorption isotherm analysis.
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