October, 2006

It is with great pleasure that we share with you some of the events at IIHR during the past year. IIHR’s fiscal year 2006 proved to be very successful, and was a record year for IIHR in the area of receiving grants and contracts. From July 1, 2005, to June 30, 2006, IIHR’s research was funded by 79 grants and contracts, totaling $7,945,812 in research expenditures, from 43 different funding sources, which led to 5 Ph.D. and 5 M.S. degrees and 45 publications. Details can be found in our Summary of Activities.

The research capabilities, instrumentation, and number of funded projects at the institute continue to grow and expand. Throughout the history of IIHR and for the last 85 years, hydroscience research has always been critical and integral to the success of the institute. Research collaborations are continuously being developed and established between IIHR and many world renowned individuals and organizations. IIHR students and researchers have greatly benefited from these collaborations and have gone on to become very successful in the global marketplace.

A few of the current IIHR research projects are highlighted in this year’s newsletter. We are extremely proud of the following collaborative projects that have developed - Hydro-Kansas, Simulation Based Design, Clear Creek Observatory, and Semivolatile PCBs. Please read more about these current projects on the next few pages.

Numerous accomplishments have been made and two prestigious awards were received this year by remarkable IIHR faculty members. Dr. Krishnan Chandran received the UI College of Engineering’s Faculty Excellence Award for Research in May, 2006. Dr. Chandran joined the UI faculty in 1978, and is an international leader in biofluid dynamics with application to the human cardiovascular system. Dr. Tatsuaki Nakato was awarded the 2006 Hydraulic Structures Medal by the American Society of Civil Engineers also in May, 2006. This award is given for “significant contributions to the advancement of the art and science of hydraulic engineering as applied to hydraulic structures.”

With the continued growth of IIHR faculty, staff, and students, it is with much excitement that I announce the preliminary planning efforts of a new IIHR Research Facility. Much more information will be forthcoming in future newsletters and on our homepage (www.iihr.uiowa.edu) about the new building, which will considerably expand IIHR’s research capabilities and laboratory space. The new IIHR Research Facility will be a great addition for faculty and students and will ensure the legacy of IIHR’s research to benefit future generations.

Please do not hesitate to call on any of the IIHR staff if we can be of assistance to you or your organization.

Best wishes,

Larry J. Weber
IIHR Director

Alumni - We want to hear from you!

Have you had any professional changes?
New spouse or children?
Change in address or other contact information?
What’s going on in your life?
We would love to hear from you! Photos are always appreciated!
Please contact Laura Myers at (319) 335-5253 or by e-mail at laura-l-myers@uiowa.edu.
Hydro-Kansas

Witold Krajewski and Anton Kruger have been participating in a multidisciplinary, multi-institutional study to determine the statistical similarity of flow in different order streams (i.e. streams of different sizes) within a single watershed channel network. The NSF-funded project, led by Vijay Gupta at the University of Colorado (a member of IIHR’s Advisory Board), has established a unique field-observation network in Kansas’ Whitewater Basin. IIHR has been collecting rainfall and streamflow data using instrumentation developed in-house. IIHR’s wireless data communication and Internet tools allow the data to be accessed immediately, anywhere in the world. The cyberinfrastructure equipment also provides an interface between data and mathematical models of hydrologic processes. The Hydro-Kansas project aims to improve the basic understanding of how streamflow and flooding in a watershed are organized in time and space, and how they are influenced by rainfall, topography, vegetation, land use, and climate.

Simulation Based Design

Fred Stern, Pablo Carrica, and many others are continuing to refine their ship-hydrodynamic code CFDSHIP-Iowa, under a new 2-year grant from the Office of Naval Research. This sophisticated numerical code, which for the past 12 years has been used to compute ship resistance and boundary layer analysis, is now being expanded to measure a ship’s response to resistance and waves and to study high-speed multi-hull designs. The code has several external users in the U.S. Navy. As part of the new project, IIHR, Bath Ironworks, and David Taylor Model Basin are developing and evaluating numerical tools for the design of a new generation of transport ships with high-speed sealift capability, which will be able to deploy rapidly and land in ports that are shallower, smaller, and less developed than normal.
IIHR has been developing a field eco-hydrologic observatory in the Clear Creek watershed near Iowa City. Several research projects are now underway, involving multiple federal and state funding sources and researchers, with Craig Just, Marian Muste, Anton Kruger, Thanos Papanicolaou, and Jerry Schnoor all being active in their planning and execution. The projects are tackling a variety of topics, such as developing methods for using biogeochemical tracers to fingerprint eroding soils and link the sediments to specific agricultural land uses, investigating the watershed’s water quality, and developing new cyberinfrastructure-based frameworks for integrated watershed studies. These projects are fostering the collaborative teamwork that is essential for today’s major research and educational efforts. In addition to serving present research needs, the observatory serves as a research test-bed for future large-scale hydro-erosion model observatories.

Although the toxic effects of PCBs (polychlorinated biphenyls) have been recognized for many years, very little is understood about PCB airborne exposure or its effects. To address this deficit, several IIHR researchers including Keri Hornbuckle, Jerry Schnoor, and Craig Just are joining a dozen others from the UI’s medical, pharmacy, and public health colleges in a new $12 million project titled “Semivolatile PCBs: Sources, Exposures, and Toxicity.” Keri Hornbuckle is looking specifically at sources of airborne PCBs, one facet of the multifaceted four-year project, which is funded by NIH through the Superfund program. Others at IIHR are providing analytical, field measurement, and phytoremediation components.
New Post Doctoral Appointments:

- **Jordan Clayton**, August 2005
- **David Cwiertny**, October 2005
- **Guohua Xia**, June 2006
- **Jianming Yang**, September 2005

Staff Changes:

- **Li-Chuan Chen** took the position of Post Doctoral Research Scholar in June 2006.
- **Andy Craig** was hired as a Research Assistant III in August 2005.
- **Seng-Keat Ooi** took the position of Post Doctoral Research Scholar in June 2006.
- **Joe Longo** was promoted to Associate Research Engineer in July 2005.
- **Troy Lyons** was promoted to Engineer II in May 2006.

Staff News:

**Awards and Accomplishments:**

- **Krishnan B. Chandran** received the UI College of Engineering’s Faculty Excellence Award for Research in May 2006. Chandran, who joined the UI faculty in 1978, is an international leader in bio-fluid dynamics with application to the human cardiovascular system.

- **Tatsuaki Nakato** has been awarded the 2006 Hydraulic Structures Medal by the American Society of Civil Engineers. This award is given for “significant contributions to the advancement of the art and science of hydraulic engineering as applied to hydraulic structures,” and was presented during the 2006 World Environmental & Water Resources Congress held May 25th in Omaha, Nebraska.

- **Thanos Papanicolaou** and **Larry Weber** were appointed in 2006 to the Iowa Water Center Advisory Council. The goal of the council is to bring together researchers in Iowa’s universities and colleges, water resource professionals in Iowa’s public agencies, and citizens in Iowa’s communities in a collaborative approach to effectively address water problems.

Student Awards Included:

- **Ryan Asman**: 2006 John F. Kennedy Memorial Fellowship.
- **Curt Kampman**: 2006 James L. Shive Memorial Scholarship.
- **Yongli Zhao**: 2006 Amelia Earhart Fellowship by Zonta International.
- **Gabriele Villarini**: $24,000, three year NASA Earth Systems Science Fellowship.
- **Xiaoyi Liu** and **Piotr Lewandowski**: Outstanding Student Paper Awards from the Atmospheric Sciences Section of the American Geophysical Union (AGU) at the 2005 AGU Fall Meeting.

At the annual UI College of Engineering faculty/staff recognition luncheon (May 2006), five IIHR staff members were recognized for their years of service to the college:

- 10 Years: **Darian DeJong** and **Marian Muste**
- 15 Years: **Steve Laszczak**
- 20 Years: **Twila Meder**
- 30 Years: **Tatsuaki Nakato**

**New Post Doctoral Appointments:**

- **Jordan Clayton**, August 2005
- **David Cwiertny**, October 2005
- **Guohua Xia**, June 2006
- **Jianming Yang**, September 2005

IIHR helped sponsor this year’s Project A.W.A.R.E. (A Watershed Awareness River Expedition), held from June 17 to 24, 2006, on the Iowa River south of Iowa City. The activity is coordinated by two Iowa Department of Natural Resources volunteer programs -- IOWATER and Keepers of the Land. Since its inception in 2003, hundreds of volunteers from across Iowa have set out in canoes and kayaks to haul garbage from waterways. Next year’s week long A.W.A.R.E. trip is being planned for the Nishnabotna River. (The first installation of submerged vanes in the U.S. was in the East Nishnabotna River at Red Oak, a project headed by **Jacob Odgaard** and funded by the Iowa Department of Transportation.) (Sculpture from the 2003 A.W.A.R.E. trip pictured right.)
Travel:

George Constantinescu, Rob Ettema, Marian Muste, Tatsuaki Nakato, Jacob Odgaard, V.C. Patel, and Larry Weber traveled to Seoul, Korea, to attend the XXXI International Association of Hydraulic Engineering and Research Congress, “Water Engineering for the Future - Choices and Challenges,” from September 11th to 16th, 2005. IIHR and the College of Engineering hosted a UI alumni gathering for local alumni in the Seoul, Korea area. (Trip photo on right.)

From March 6th to April 12th, 2006, Marian Muste visited the Faculty of Environment and Resources Studies (FERS), Mahasarakham University, Thailand, to carry out a Fulbright Senior Specialist assignment focused on the connection between Cyberinfrastructure (CI) and Integrated Water Resources Management (IWRM). (Trip photo on right.)

Craig Just traveled to Paris, France, for the U.S. National Commission for the United Nations Educational, Scientific, Cultural Organization, a federal advisory committee to the Department of State that supports worldwide humanitarian development and values. The Paris meeting was the beginning step for establishing an International Engineers for a Sustainable World organization.

Marcela Politano, Songheng Li, Rob Ettema, Marion Muste, George Constantinescu, Thanos Papanicolaou, Larry Weber, and Connie Mutel traveled to Omaha, Nebraska, to attend the World Environmental & Water Resources Congress 2006, "Gain New Perspectives on Recent Catastrophes and Renewed Inspiration to Face Critical Challenges Ahead," from May 20th to the 28th, 2006.

In February, 2006, Larry Weber and Songheng Li visited Tsinghua University, Wuhan University, the China Institute of Water Resources and Hydropower Research (IWHR), and the Three Gorges Project in China. At the Three Gorges Project, they had a chance to climb to the top of the dam. The trip’s purpose was to exchange research results, develop cooperative arrangements with Chinese institutes and universities, and attract top students from Chinese universities to

A key laboratory of Water Development and River Harness in IWHR.

IWHR model of Hongyanhe Nuclear Power Station, Liaoning, China.

Looking down on the Three Gorges Dam from the adjacent hillside.

Tsinghua University’s model of the Three Gorges Dam reservoir area.
Student Activities:

A report from the Students of IIHR (SIIHR) President Cagri Turan: This year SIIHR has been trying to increase communication between students and staff. We have been organizing a student seminar series where graduate students present their research to students and faculty. These seminars are beneficial to students and allow others to have an idea about different research projects at IIHR. We also have been organizing several social events. As students of IIHR we are members of the student chapter of IAHR (International Association of Hydraulic Engineering and Research). In the summer of 2007, an SIIHR representative will attend the IAHR congress in Venice, Italy, and meet with student representatives from other student chapters. These efforts will give IIHR students an opportunity to be a part of an international network of hydraulic engineers.

M.S. Graduates from July 1, 2005 to June 30, 2006:

Ben Fennelly: (Advisor, Larry Weber) Three-Dimensional Hydrodynamic Model of Pool 13, Mississippi River. Ben is now working at PBS&J in Omaha, Nebraska, as an Engineer I.

Reinaldo Morales Garcia: (Advisor, Robert Ettema) A Large-Scale Hydraulic Model of Riprap-Apron Performance at a Bridge Abutment on a Floodplain. Reinaldo remains at IIHR working towards his Ph.D.


Loren Wheymeyer: (Advisor, Frank Weirich) Evaluation of Design Flood Frequency Methods for Iowa Streams. Loren remains at IIHR working towards his Ph.D.

Ph.D. Graduates from July 1, 2005 to June 30, 2006:


Sreedevi Krishnan: (Advisor, H.S. Udaykumar) An Efficient Adaptively Refined Eulerian Methodology for Moving Boundary Problems Applied to Biomedical Systems. Sreedevi is now a Postdoctoral Research Scholar at IIHR.


SK Ooi: (Co-Advisors, George Constantinescu and Larry Weber) High Resolution Numerical Simulations of Lock-Exchange Gravity-Driven Flows. SK is now a Postdoctoral Research Scholar at IIHR.

Ceyda Polatel: (Co-Advisors, Marian Muste and V.C. Patel) Large-Scale Roughness Effect on Free-Surface and Bulk Flow Characteristics in Open-Channel Flows. Ceyda is now working for the South Florida Water Management District.

Jun Shao: (Advisor, Fred Stern) Anisotropic Turbulence Model for Ship Flows. Jun is now a Postdoctoral Research Scholar at IIHR.


Nate Young: (Advisor, Larry Weber) Physical Characterization of Freshwater Mussel Habitats in Upper Mississippi River Pool 16. Nate is currently an Assistant Professor of Civil Engineering at Arkansas State University.
News from Alums:

Matahel Ansar (M.S. ’93 and Ph.D. ’97) was nominated for the South Florida Water Management District’s (SFWMD) Leadership Award for his exceptionally hard work and positive results achieved in a litigation case, *Morris et al v. SFWMD*.

Veera P. Rajendran (Ph.D. ’98) was hired as a Senior Design Engineer in the Turbine Aerothermal Design department with the Rolls-Royce Corporation, designing aircraft engine hot-section components (turbine blades and vanes).

Emmanouil (Manos) N. Anagnostou (M.S. ’94 and Ph.D. ’97), Associate Professor at the University of Connecticut, received the Marie Curie Excellence Award in Dublin last December. This award is the highest honor of the European Commission.

Hong-Yuan Lee (Ph.D. ’84), Professor of Civil Engineering, National Taiwan University, has accepted the job of deputy governor of Taipei Prefecture, Republic of China. Lee also is professor of civil engineering at National Taiwan University. His research interests are in river hydraulics, mechanics of sediment transport, and fluid mechanics.

S. Anil Kumar (MS ’96), previously Anil Subramani, is currently a senior analyst at The Glosten Associates, an ocean engineering consulting firm in Seattle, and a registered professional engineer in Washington state.

Jon E. Zufelt (Ph.D ’96) was awarded the 2005 American Society of Civil Engineers (ASCE) CAN-AM Civil Engineering Amity Award. He also recently took over as Editor for the *ASCE Journal of Cold Regions Engineering*. He welcomed several Iowans to Anchorage last summer at the 2005 ASCE World Water and Environmental Resources Congress (Rob Ettema, Larry Weber, Marian Muste, and Jacob Odgaard), and he hopes to get back to Iowa City to see the rest of the gang soon.

Ismail B. Celik (Ph.D ‘80) was named Fellow of the American Society of Mechanical Engineers.

Ahmet Selcuk Uzuner (MS ‘75 and member of the College’s Distinguished Engineering Alumni Academy) is an engineer and entrepreneurial business leader respected throughout the Middle East and around the world. He is a co-founder (along with his brother, Secil, another member of the College’s Distinguished Engineering Alumni Academy) and Vice President of UZKA, a leading Turkish contracting firm, and president of UZPA, an international trading company in Turkey and the Middle East. He was asked to join the College’s Engineering Development Council, which assists the College and The University of Iowa Foundation in identifying and developing fund raising goals and initiatives.

C. Bryan Young (Ph.D 2000) was promoted to Associate Professor in the Department of Civil, Environmental and Architectural Engineering at the University of Kansas.

Arthur R. Luecker (M.S. ’39) passed away on May 17, 2005. Arthur was born on February 25, 1916 in Plymouth, Wisconsin to Arthur C. and Mae Rowe Luecker. He completed his undergraduate work in hydraulic engineering at the University of Wisconsin and later attended The University of Iowa where he obtained his Masters Degree in civil engineering. After graduate school, Arthur worked for the State of Wisconsin as a surveyor, and in 1942 he worked on the Panama Canal. During the war years he worked for the Corps of Engineers and was stationed in Virginia. In 1945 he moved to New York City to work for Tippetts Abbett McCarthy Stratton, a consulting engineering firm, until his retirement in 1987. During his employment he dealt with a wide variety of civil engineering projects, but his specialty was dams, water control and hydroelectric works. Projects ranged in size from small to the 2 mile long, 500 foot high Tarbella Dam across the Indus River in Pakistan. During his employment he traveled and lived in Pakistan, Argentina, Colombia, and Lesotho. In 1955 he married Doris Lobmayer, his wife of 50 years. In 1957 Arthur and Doris moved to Bronxville, New York, where they raised their two children Arthur and Jayne.
A category F2 tornado, with winds up to 150 miles per hour, caused considerable damage along a 4.5 mile-long stretch of Iowa City this past April. The tornado touched down on the southwest corner of town near the Iowa City Airport and ripped through to the northeast, ending near Hickory Hill Park. Damage in Iowa City totaled approximately $4 million, with the University alone suffering another $6 million of damages. The UI Motor Pool building was destroyed entirely, with debris from its roof landing in our Model Annex parking lot. Although the C. Maxwell Stanley Hydraulics Laboratory stayed safely out of the tornado’s path, it was less than one block from the massive destruction. Trees surrounding the lab were ripped from the ground, roots and all.

The tornado’s path of destruction included St. Patrick’s Catholic Church (pictured below), where the steeple and southern portion of the roof collapsed directly onto pews that had been filled with parishioners moments before. The rectory building also sustained significant damage, but parishioners sheltered in the basement escaped unharmed. The Alpha Chi Omega sorority house (pictured far right) also suffered a direct hit, with residents remaining unharmed as they hid in lower levels of the house. Miraculously, no one was killed by the wrath of the Iowa City tornado. The historic Hydraulics Laboratory remains standing, as strong as ever.