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UH RESEARCHERS WIN TOP PRIZE FOR RESEARCH WITH HUMANITARIAN APPLICATIONS

Their Computational Tools Will Help Us Better Understand How Microbes Govern Human, Environmental Health

HOUSTON, Aug. 19, 2008 – We all understand that even the tiniest changes in the environment can create big opportunities and challenges for plants, animals and humans, but rarely do we consider what’s happening on a microscopic level and what those changes could mean for the infinite varieties of life on Earth – or how mankind’s day-to-day experiences could be affected.

But University of Houston researchers Yuriy Fofanov and Lennart Johnsson understand that what we don’t see often carries big-picture implications. They’ve recently garnered international recognition for applying such vision while creating technologies to help monitor the sizes and genomic diversity of microbial communities.

Fofanov and Johnsson, both of UH’s Texas Learning and Computation Center, were named this month as the winners of the second annual Itanium Solutions Alliance Innovation Contest for the humanitarian applications of their team’s research. They will accept the award Wednesday (Aug. 20) at a ceremony at the San Francisco Museum of Modern Art in conjunction with the Intel Developer Forum, a high-profile and high-tech gathering of industry executives and developers.

Microbes, which are responsible for more than 50 percent of the oxygen produced on Earth, play integral roles in human body function and ecosystems, and the team’s new computational tools will help researchers better understand how human activities and environmental changes affect the multitude of microbial communities that govern human health and life on our planet – and perhaps others.

“To put it into perspective, there are more microbes than there are cells in the human body. In fact, they often are the first line of defense against disease or environmental disasters,” explains Fofanov, associate professor of computer science, biology and biochemistry who heads up the Bioinformatics Laboratory. “Microbes are mostly our friends, but sometimes they can be pretty nasty.”

While microbial communities are ordinarily relatively stable, climate and environmental factors can spur the success of some and the destruction of others. In agriculture, for instance, changes in diverse microbial communities can cause complete crop loss; however, by learning how to manipulate them, farmers may one day be able to better manage plant diseases and insect infestations.

“This approach will advance human progress in environmental protection, public health and safety, sustainable energy and many other research areas,” Fofanov said.

Similarly, some microbes have been known to make polluted water drinkable, and harnessing that quality has the potential to eradicate water-borne diseases and help alleviate drought and famine.

“The computational tools will pave the way to less expensive and more reliable tests that can be used across the globe. The sheer number of microbial communities presents great commercial potential,” said Johnsson, Cullen

distinguished professor of computer science, mathematics, and electrical and computer engineering and head of UH's TLC² and ACRL.

The team's winning contest entry was judged by internationally recognized industry and academic leaders in computation and research and used both high-performance computational tools at TLC², which were powered by Intel Itanium-based systems, and the latest genomic sequencing analysis technologies.

"Itanium-based systems, with their relatively large caches, provide the effective memory bandwidth we need for fast processing of genomic information. Their high-availability design has been serving us very well, providing very dependable access for years," said Johnsson. "The efficiency and availability of the Itanium systems have enabled us to make very rapid progress and broaden our research into a broad range of genomes."

The Itanium Solutions Alliance Innovation Contest recognizes solution-based research projects in three categories: humanitarian impact, business application and entrepreneurialism. The winner in each category receives \$50,000 or can make a charitable donation to an organization of his or her choice

The UH team conducted its research with funding from the National Institutes of Health, the Department of Homeland Security's Science and Technology Directorate, the Texas Learning and Computation Center, and the Keck Center Biomedical Discovery Training Program of the Gulf Coast Consortia.

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About the University of Houston

The University of Houston, Texas' premier metropolitan research and teaching institution, is home to more than 40 research centers and institutes and sponsors more than 300 partnerships with corporate, civic and governmental entities. UH, the most diverse research university in the country, stands at the forefront of education, research and service with more than 35,000 students.

About the Itanium Solutions Alliance

The Itanium Solutions Alliance was formed by leading enterprise and technical solutions providers to work together toward a common objective of transitioning the world of proprietary computing platforms to open, industry standard solutions based on Intel Itanium architecture. Together with leading enterprise software and hardware providers, the Alliance is dedicated to accelerating the adoption and ongoing development of Itanium-based solutions. For information, please visit www.itaniumsolutions.com. More information about the Itanium Solutions Alliance, membership, industry resources and developer programs can be found at www.itaniumsolutionsalliance.org.

About the Texas Learning and Computation Center

The Texas Learning and Computation Center (TLC²) fosters and supports interdisciplinary research, education, and training in computational sciences and engineering. TLC² has state-of-the-art computation, visualization and educational facilities for environmental studies, biological, biomedical, and energy research, undergraduate and graduate education, and teacher training. For more information, please visit www.tlc2.uh.edu.

About the UH Department of Computer Science

The UH Department of Computer Science at the College of Natural Sciences and Mathematics actively encourages interdisciplinary and innovative research by seeking to bring together leaders in two or more specialized fields. Teaching and leading research are combined with ethnic diversity, creating a unique and stimulating environment. For more information, please visit www.cs.uh.edu.

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