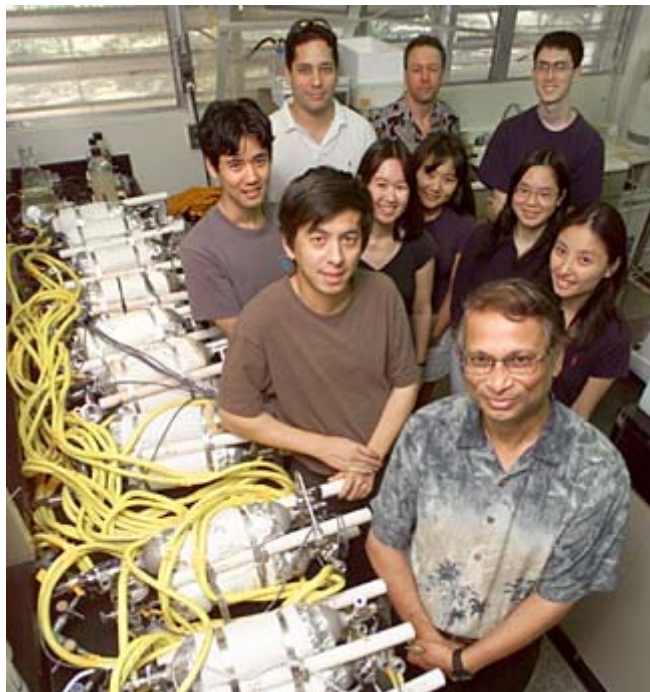


Thursday, May 8, 2003



KEN IGE / [KIGE@STARBULLETIN.COM](mailto:KIGE@STARBULLETIN.COM)

Thrilled with a scientific breakthrough, Dr. Maqsudul Alam and his team of scientists stand with several high-pressure, high-temperature reactors. Maqsudul has completed a genome for an ancient organism found in the hydrothermal vents of Loihi during a UH expedition. The reactors can keep samples in conditions similar to the deep, hot waters of Loihi's vents.

## Small UH gene team achieves big-time feat

[New center to coordinate talent](#)

By Helen Altonn  
[haltonn@starbulletin.com](mailto:haltonn@starbulletin.com)

---

A small University of Hawaii research team with limited funds and resources has sequenced the genome of a deep-sea microorganism -- an achievement usually expected only at big institutions.

The genome of an organism is its set of chromosomes containing all its genes and DNA.

The microorganism was the first new bacterial species discovered in Hawaii. It was collected in Pele's Pit, 4,376 feet below the ocean's surface on the summit of underwater volcano Loihi, off the Big Island.



Maqsudul Alam, professor of microbiology in the College of Natural Sciences, and his researchers collected hydrothermal fluids from the pit with the submersible Pisces V in 1999.

They were able to cultivate some of the bacteria for the first time, and a genetic analysis 18 months ago showed they had discovered an unknown species. It was officially named *Idiomarina loihiensis* but is called L2-TR in the lab.

Knowing its genetic code has enormous implications for commercial applications, moving the UH group into the forefront of efforts to discover new proteins, enzymes and antibiotics, Alam said.

He said L2-TR can digest lipid or fat molecules quickly, making the enzyme valuable for such products as detergents or breaking down contaminants.

"The genome sequence was sort of proof of concept," Alam said. "It was so exciting on that day when it happened, (last) Thursday at 2:31 p.m.," when the sequencing was finished.

"You know now the genetic code of this bacteria. You know now what it can do and cannot do. We are going to dissect the secrets."

Alam said computation and analysis of the raw data would be impossible without the help of Tak Sugimura, manager of business development at the powerful Maui High Performance Super Computer Center, and Dr. Eugene Koonin, bioinformatician of the National Institute of Health's National Center of Biotechnology Information.

By next Thursday, sequencing of the raw data will be transferred to NIH, and the researchers will work to figure out what the genetic code means, Alam said.

"It is a tremendously exciting thing," Alam said. "We will know how the proteins are talking to each other, how they are in

communication.

"Now that we have a genetic blueprint, we want to go to the fundamental question, how life evolved. It's pure basic research. At the same time, it has enormous applications."

Alam attributes the genome sequencing to his "dream team" of postdoctoral researchers, graduates, undergraduates and even high school students who began working in his lab as interns and stayed on.

He began the research with funding from the Marine Bioproducts Engineering Center, now being phased out. Alex Malahoff was then director, and Alam, associate director.

Alam said they took a risk in doing the microbial research because Malahoff "made the decision that it was the right thing to do for the center.

"When we started, nobody believed us," he said. "Nobody trusted us to do this kind of work. We thought we'd take the challenge."

Both left MARBEC and Alam continued the research, patching money together from assorted sources and acquiring computers for DNA and three-dimension modeling from a bankrupt company.

Laboratories on the mainland and Europe work with microbial genomes, Alam said, "but nobody has done genome sequence at a very small lab like ours."

He said he wanted to show that "a midlevel university" like UH could be competitive and do cutting-edge research.

The sequencing research normally would cost \$1.5 million to \$2 million, but his team did it for about \$200,000 to \$250,000, he said.

"You wouldn't see undergraduates and graduates doing this work on the mainland."

Key team members, he said, are Shaobin Hou, the genome leader, Kit Shan Lee and Jimmy Saw.

Others, either graduates or undergraduates, are Claude Belisle, Tracey Freitas, Tieshi Huang, Erica Dorman, Kumiko Aizawa, Seth Patek, Stuart Donachie, Jennifer Saito and Valerie Harada. Debbie Liu and Beth Nakasoni, of St. Andrew's Priory, also worked with the group.

The researchers want to know how the microorganism can survive both in extremely high temperatures and pressures of Pele's Pit and low temperatures and pressures in the lab.

"Its genomic network or blueprint must be very much adaptive,"

Alam said. "What kind of proteins does it need to adapt?"

Identifying the proteins and their function is critical and may lead to new discoveries for household or industrial uses, Alam said. He is waiting until analysis of data is complete before publishing the findings.

---

## [UH Department of Microbiology](#)

---

[BACK TO TOP](#)

# UH looks to capitalize on talent with new center for genomics

---

By Helen Altonn  
[haltonn@starbulletin.com](mailto:haltonn@starbulletin.com)

Microbiologist Maqsdul Alam and his team "have done some of the best research that's ever been performed here at the University of Hawaii," says Charles Hayes, dean of the College of Natural Sciences.

"They have done marvelous, marvelous research breakthroughs."

Hayes said a campuswide Center of Genomics, Proteomics and Bioinformatics Research is being planned to take advantage of UH's location and expertise in that area. The center was suggested by Manoa Chancellor Peter Englert, and funding is being sought, Hayes said.

He said Englert asked him to work on it, and he got a group of deans, faculty and researchers from various fields to make a proposal.

"We have real talent there but need a central organization because many of them are not aware of everybody else in the field," Hayes said.

Hawaii should excel in such life science research because it has more species of flora and fauna than anywhere else and 75 percent of the nation's coral reefs, he said. It is also a prime location for tropical agriculture and medicine research.

Hawaii not only has an opportunity, but "a responsibility to society to conduct this research," Hayes added.

He said UH is fortunate to have Alam, among those involved in planning the center, because many people are interested in him across the United States. "But one of his main reasons for staying in Hawaii is his love of the people here.

"He's seen their lives change for having been involved with what he's doing, from students in the classroom to high school students he's brought in to work in the lab, to postdoctoral people whose lives have been changed by the opportunity to work in this endeavor."