Academy for Astrobiology inspires students, looks to future

In recent years, NASA has made it a priority to emphasize education and encourage students to pursue careers in science and technology. Internship and research programs across the Ames campus are evidence of this initiative.

One of Ames' best educational assets lies in the NASA Academy for Astrobiology. Started in 1997, it is a 10-week-long summer program that provides students with research opportunities, leadership experience and broad-based views of the inner workings of the space program.

NASA photo by Dominic Hart

Astrobiology Academy co-director Zann Gill leads a panel discussion on the future of the academy and its programs.

"It's an informal learning process," said Zann Gill, co-director of the academy. "The research associates are already leaders from the states they represent. Coming from diverse backgrounds, they learn a lot from their work and from each other."

Astrobiology is broadly defined as the study of life in the universe. It encompasses many fields, including biology, geology, chemistry and other sciences. Astrobiology asks the questions, "How did life begin?" and "Is there life elsewhere in the universe?"

The academy is as diverse as the field of astrobiology. The 13 undergraduate and graduate students, referred to as research associates, major in a variety of subjects, including aeronautics, aerospace engineering, Earth and planetary science, geological engineering, geology, biomedical engineering, biology and mechanical engineering.

The students applied to the academy program through their state space grants process. It is very competitive and is based on academics, leadership and multiple essays.

"They are some of our best and brightest," said SETI Institute Director Jill Tarter, who visits with academy students nearly every year. To read more about Tarter and her presentation at the Ames astrobiology colloquium, see 'SETI Scientist Visits the Academy for Astrobiology' article on the following page.

Each student in the academy works with an Ames astrobiology scientist, investigating a specific research project. All of the students collaborate on a group project during the 10-week period.

The 2002 academy's group project, 'Mars as a Mission Driven Project,' addressed the advantages of planning a manned mission to Mars in terms of exploration, innovation and education.

The team noted a study by the National Science Foundation (NSF) in 2000, which predicted that in 10 years there will be a 15-percent increase in demand for physical scientists and a 20-percent increase in demand for engineers. Enrollment in these areas has been down in recent years.

The students also noticed that in years after key NASA missions, like Apollo 11 and Apollo Soyuz, the number of science and engineering students increased. They concluded that a manned mission to Mars would help strengthen student interest in science and engineering, just as previous missions did.

This year's academy is focusing on a different type of project that came about "serendipitously," in the words of current academy research associate John Keefner.

An academy alumna, Loretta Hidalgo, is working on a deep-sea dive with Titanic director James Cameron. She told the academy that she would take an experiment down for them.

The group quickly formulated a plan, built an apparatus and sent it to Hidalgo.

"The hard part was deciding what to send down, so we came up with a general plan and then incorporated everyone's talents and strengths into the plan," Keefner said. "It was just a great opportunity."

The team's project, 'Microbiologically Influenced Corrosion at Deep Sea Vents,' will send a variety of metals and heat shield tiles to the Menez Gwen deep-sea vent. The materials will be at a depth of 850 meters in acidic, 280 degrees Celsius water for a few days.

The experiment aims to gain insight about extremophiles (organisms that live in conditions that are physically and chemically harsh or extreme) by studying corrosion of the apparatus. This will help scientists develop hypotheses about the origins of life on Earth. The undersea location could also serve as an analogue to possible extraterrestrial life.

The academy allows the students to do first-rate research and get a foot in the door by meeting and collaborating with a variety of scientists at Ames and other NASA centers. But for some students, their experience is also a dream turned into reality.

"Last summer was the best summer of my life," said Julie Litzenberger, a 2002 academy participant and one of this year's resident assistants. "You can't put the uniqueness of the academy into words."

Mike Hannon, also a former participant and current resident assistant, said he was always interested in "anything NASA," but that his experience with the academy has enhanced his understanding of the agency, making it an attainable goal.

"The academy puts faces to the whole organization. It takes it out or the realm of fantasy and makes it real," he said.

Hannon has reshaped his career plans as a direct result of his academy experience.

"I always had notions of medicine in the back of my mind and now I'm interested in space physiology," he said. "I found out my interests through my exposure in the academy. Now I hope to become a NASA flight surgeon someday."

Gill currently is writing a five-year plan, outlining the future of the Academy for Astrobiology. To brainstorm this topic, as well as to give the astrobiology community a chance to share their work with one another, the academy hosted the Ames astrobiology colloquium in July.

At the colloquium, Academy Director Doug O'Handley gave an overview on the academy and John Kaumeyer of Lockheed Martin said that industry is always looking for graduates with research experience, like academy participants. Students Bethany Ehlmann and Doug Grant from the 2002 academy presented their group project and Andrew Pohorille spoke on the Computational Astrobiology Internship Program.

Later, a number of scientists, including Tarter, spoke about several projects in the astrobiology field, and a panel discussion on the future possibilities of the academy rounded out the day.

Another highlight to the 2003 academy year was NASA Administrator Sean O'Keefe's visit to Ames on July 17. O'Keefe spoke to the research associates

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about how important the academy is to the agency's goal of education.

"NASA is focusing on education and outreach," Hannon said. "If they really want to 'inspire the next generation of explorers,' this is where it's at."

Litzenberger said her experience has definitely inspired her to consider NASA in her future.

"After the academy, I can say I want to work at a NASA center, whereas before I don't think I would have said that," she said. "Ames' location also played a role in my decision to attend Stanford for grad school."

Eight of the 12 members of the 2002 academy are pursuing PhDs. One alumnus is returning to Ames to do her postdoc.

Hannon said that the success of the academy will start to show as alumni finish their education and come back to work at NASA centers. O'Handley said he hopes other centers will sponsor academies in the near future.

"We are learning so much and having a very rich experience," Keefner said. "At the end of it all, I'd like to be able to say that I did a great job on my research -- that I got the job done. I'd like to be able to say that we started and ended a group project successfully and that we saw many opportunities as a result. And, I hope that we can provide those opportunities to future academy students in the future."

To learn more about the NASA Academy for Astrobiology, visit the new Web site at: http://nasa-academy.arc.nasa.gov.

BY ALLISON MARTIN

SETI scientist visits the Academy for Astrobiology

Astrobiology asks the question, "Does life exist elsewhere in the universe?" Renowned scientist Jill Tarter says that although we don't know the answer yet, the chances seem good enough to look into it.

"Good planets are hard to find," Tarter said, speaking at Ames as part of the astrobiology colloquium held in July. "But life started so fast (on Earth) that it seems likely it started elsewhere as well."

Tarter, director of the Center for SETI Research, presented 'From Microbes to Mathematicians,' which discussed SETI's relation to astrobiology and methods SETI uses in the search for a signal from intelligent life elsewhere in the universe.

"The astrobiology community's search for signs of life in our solar system in places like Europa or Mars interests SETI, because a second home to life in our solar system would greatly strengthen the argument for other life in the universe, Tarter said.

Tarter also discussed the different projects that SETI is currently pursuing, such as Optical SETI, which searches for powerful light pulses; Project Phoenix, which searches for a strong radio signal among 1,000 nearby stars; and the Allen Telescope Array, which will speed up radio astronomy by a factor of at least 100 once completed.

"If a signal is detected, it will have a profound influence over time," Tarter said. "I hope it will hold up a mirror and trivialize the differences we see in humans."

Tarter was pleased to speak to the NASA Academy for Astrobiology, a group of 13 college and graduate students, at the colloquium because they are the future of her work, she said.

"The project is generational and it will probably be your generation who will find the signal, if there is one," Tarter said to the students.

Tartar has met with the academy almost every summer since its inception in 1997.

"SETI is a subject the students are interested in and I'm interested in them! They have gone through a stiff competition and so are some of our best and brightest," Tartar commented. "Their presence at the academy attests to their willingness to work across historical disciplinary boundaries and get their hands 'dirty' on all aspects of a real project. Somewhere among the academy students, some day, I hope to meet my replacement."

Tarter holds the Bernard M. Oliver Chair for SETI Research and works at the SETI Institute in Mountain View. She has been a principle investigator on several educational projects and collaborations and has received numerous awards for her contributions to the scientific community. Most recently, she was elected a fellow of the California Academy of Sciences in 2003.

For more information on Tarter or the SETI Institute, visit the Web at: www.seti.org.