MATE Technical Internship Program

The Marine Advanced Technology Education (MATE) Center's technical internship program offers college and university students hands-on experiences in marine science and technology. Since the program began in 1999, MATE has placed 132 students in at-sea and shore-based internship positions. Sixty-five of those students have sailed on board UNOLS vessels.

In 2005, the MATE Center placed 13 student interns on research vessels, in laboratories, and with industry. Nine of these interns were placed on ten UNOLS vessel cruises for 1-8 weeks; one intern worked on a research vessel with the Oregon State University Marine Geology Active Tectonics Group; and three students worked in shore-based positions ranging from the Pennington Marine Science Center on Catalina Island, Moss Land Marine Labs: Science Learning & Exploration with the Sea Lions and the Pelagic Shark Research Institute. The nine UNOLS interns worked directly with the marine technicians aboard the *US Coast Guard Healy, Blue Heron, Knorr, Walton Smith, Endeavor and the Kilo Moana.*

The majority of the students said the cruises were the highlight of their year and felt they had gained hands-on experiences that will be invaluable to their future education and career decisions. For example, 100% of the students indicated an increased interest in marine science and technology and said they had an increased confidence in working on technical problems as a result of their internships. One student said, "Overall my internship was an exceptional experience. I learned a great deal about the marine technology which was used on the ship as well as what it took to keep everything running and to stay current with new equipment. Everyone aboard was extremely helpful in teaching me not only the technology side of things but also a great deal of information relating to research vessel living and general ship board techniques and procedures. The internship definitely increased my interest in pursuing a career in marine technology and greatly helped me in becoming more proficient with the technology and knowledge needed to pursue that career."

One hundred percent of the previous individuals who served as intern mentors also felt the students had gained experiences during their internships that increased their employability, and all said they would be willing to mentor another intern. In addition, 75% of the previous employers who hosted interns said they would hire the intern as an entry-level employee.

This year, we received new funding from NSF/UNOLS to place 15 students on UNOLS/IODP research vessels each year for the next 3 years. This funding covers the student's travel and a stipend. Intern hosts need only to provide the intern with a bunk, food and mentor. For more information about the program, including how you can get involved as an intern host, visit www.marinetech.org/careers/internships.php or contact Lani Clough at lclough@marinetech.org or (831) 646-4011.

MATE ROV Competition
Forty-two student teams from across the U.S. and Canada showed they had the "right stuff" during the fourth annual international student ROV competition. Organized by the MATE Center and the Marine Technology Society's (MTS) ROV Committee, the event was hosted June 17-19 by the NASA Johnson Space Center at its Sonny Carter Training Facility's Neutral Buoyancy Laboratory (NBL).

Underwater robots designed and operated by middle school, high school, college, and university teams from across the U.S. and Canada descended into the NBL's astronaut training pool – at 200 feet long, 100 feet wide, 40 feet deep, and holding 6.2 million gallons of water, it's the largest "swimming" pool in the world. The student-built ROVs, some smaller than one square meter, contrasted with the pool's full-sized mock-ups of the space shuttle and International Space Station.

Missions to Outer and Inner Space
A major goal of the event was to highlight the similarities between technologies used in the ocean and space industries. In addition to the National Science Foundation, NOAA's Office of Ocean Exploration, and MTS, more than 60 other ocean and space-related organizations sponsored the event.

On a simulated mission to Jupiter's moon Europa, *Explorer* teams were challenged to pilot their ROVs through a 60-by-60 centimeter hole in the moon's ice-crusted surface to the ocean waters that lie beneath. Once through the hole, the ROVs had to descend to the full depth of the pool to repair a communications link, collect data probes and water samples, and measure the temperature of venting fluid.

Ranger teams tackled three "Olympic" tasks set up on platforms suspended in 15 feet of water above the shuttle payload bay and the space station's starboard truss segment. Simulated tasks included capping an old oil well, repairing a severed subsea telecommunications cable, and installing a new instrument module on the Hubble space telescope.

Regional events
The top two teams from the following six regional events fed into the international competition's *Ranger* class:

The Southern California ROV Fly-Off is organized by SIO and the Birch Aquarium at SIO, with support from the MTS-San Diego section and the University of California San Diego's Jacobs School of Engineering.

The Texas Regional ROV Contest is organized by Alvin Community College (ACC) with support from the MTS-Houston section and the Flower Garden Banks National Marine Sanctuary.

The New England Regional ROV Contest is organized by the University of Rhode Island's (URI) Department of Ocean Engineering and supported by the MTS-New

England section, URI's Robotics Education and Research Institute, and Stellwagen Banks National Marine Sanctuary.

The Monterey Bay Regional Contest is organized by the Monterey Bay Aquarium and the MATE Center, with support from Monterey Peninsula College's (MPC) Technology Preparation Program, the MPC Foundation, Monterey Bay Aquarium Research Institute (MBARI), the MTS-Monterey section, and the Monterey Bay National Marine Sanctuary.

The Hawaii Underwater Robot Challenge (HURC) is organized by the University of Hawaii (UH) Manoa and Waipahu High School and supported by the UH's Seafloor Mapping Lab and the MTS- and Institute of Electrical and Electronics Engineers (IEEE) Hawaii sections.

The first-ever Florida Regional ROV Contest is being organized by Hillsborough Community College (HCC) with support from HCC and Busch Garden's Adventure Island amusement park.

The Winners!
It was a stellar year for rookies as first-time competitors took home the championship in both the *Explorer* and the *Ranger* class.

Explorer
1st place – Eastern Edge Robotics Team (St. John's, Newfoundland)
2nd place – Monterey Peninsula College (Monterey, CA)
3rd place - Carl Hayden High School (Phoenix, AZ)

Ranger
1st place – High Technology High School (Lincroft, New Jersey)
2nd place – Career & Technology Education (CATE) Center/Humble High School (Humble, TX)
3rd place – Pasadena Memorial High School (Pasadena, Texas)

For a complete list of winners, visit the MATE web site at www.mpcfaculty.net/jill_zande/2005_rov_competition_winners.htm.

Highlights
Prior to the competition kick-off, students and educators had the opportunity to watch as astronauts went through a training exercise in the same pool where they would carry out their mission tasks. In addition, the NASA Extreme Environment Mission Operations (NEEMO) Project arranged for participants to take part in a live-link with aquanauts highlighting NOAA's *Aquarius* underwater habitat, which, for NEEMO, serves as a very wet analog to flying in space.

Awards banquet highlights included music by the *Max-Q* Astronaut Band and a special prize for *Explorer* class champion Eastern Edge Robotics. ROV Committee Chairman

Drew Michel presented the team with a surprise travel and housing support stipend to attend the 2006 Underwater Intervention conference and exhibition. In addition to showcasing their vehicle, the team will also give a presentation about their ROV design and operation as part of the conference technical sessions.

Ocean Observing Systems: Tools for Tomorrow's Science & Technology Workforce
The 2006 competition theme will focus on ocean observing systems. The MATE Center and the ROV Committee have teamed up with the National Office for Integrated and Sustained Ocean Observations ("Ocean.US") and the Ocean Research Interaction Observatory Network (ORION) to challenge teams to develop ROVs for tasks associated with the operational aspects of deploying, operating, maintaining, and collecting data from ocean observatories. For example, students will design and build vehicles to deploy and network instruments for power and communications, recover equipment for maintenance and repair, and collect and interpret data on the physical environment.

NASA's NBL is planning to host the international competition again this year. The event is tentatively scheduled to take place in mid-June 2006.

The following seven new regional events will join the existing regional competition network and serve as feeders into the international competition's *Ranger* class:

The Great Lakes Regional ROV Contest is organized by Thunder Bay National Marine Sanctuary & Underwater Preserve and supported by NOAA's Great Lakes Environmental Research Lab and Lake Superior State University.

The Big Island Regional ROV Contest (BIRR) is being organized by Kealakehe High School and the Hawaii Island Economic Development Board's Women in Technology Program (WIT) and supported by WIT and the MTS-Hawaii section.

The Northern California Regional ROV Contest is being organized by Arcata High School with support from Humboldt State University.

The Puget Sound Regional ROV Contest is being organized and supported by the MTS- and IEEE Oceanic Engineering Society-Puget Sound sections, the Naval Undersea Museum, and the Youth Maritime Training Association.

The Mid-Atlantic Regional ROV Contest is being organized and supported by the Monitor National Marine Sanctuary and Nauticus, the National Maritime Center.

The Southeast Regional ROV Contest is being organized and supported by Gray's Reef National Marine Sanctuary and the Georgia Aquarium.

Memorial University of Newfoundland is planning to organize a regional contest for middle and high schools in the St. John's region.

The MATE Center and Ocean.US are working together to connect the eleven regional integrated ocean observing systems (IOOS) associations with existing regional competitions and teams. The goal is to engage the regional associations in supporting the competitions by providing expertise (i.e., mentorship), use of facilities, access to excess parts and supplies, industry supporters, competition judges, team sponsorship, and/or training opportunities for individual teams and instructors.

For more information about the 2006 event, including how you can become involved as a competition sponsor or team mentor, visit www.marinetech.org/rov_competition/index.php or contact Jill Zande at jzande@marinetech.org or (831) 646-3082.