

Newsletter

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MATE

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CENTER
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IN THE spotlight:

Researchers Advance Polar Science with ROV Built by MATE Competition Participants

When researchers at the University of California, Santa Barbara (UCSB) needed an ROV to withstand the rigors of research in the Antarctic, they turned to two high school students that had participated in the MATE Center's ROV competition. Last year, Ryan Garner and Amanda Wilson of Cabrillo High School in Lompoc, California built an ROV that helped UCSB scientists learn more about the behavior of marine organisms in polar environments.

Dr. Gretchen Hofmann, associate professor at UCSB's Department of Ecology, Evolution, and Marine Biology, leads a team of researchers who are studying the ecological physiology of marine organisms. Explains Hofmann, "We study how certain organisms function in the marine environment and how physical factors like temperature, salinity, and pH affect their physiology. We're interested in learning how these organisms respond to changes in these conditions, such as temperature changes."

To learn how marine organisms have adapted to a polar environment, Hofmann's team studied benthic fish in Antarctica. Benthic fish—those that live at the bottom of the ocean—can be collected by divers or standard fishing techniques, but Hofmann was interested in observing the fish in their natural habitat. That's where the ROV came in.

Graduate students in Hofmann's lab had worked with Cabrillo High School in 2005, when the school



The ROV M'RAJE returns to the surface after a successful dive in the Antarctic.

Courtesy of Peter West, National Science Foundation

article, p. 3). For example, the ROV's tether cable had to be strong enough to withstand being scraped against ice. Size had to be carefully considered because the ROV would have to be lowered through a hole cut in a thick layer of sea ice. And since scientists would be working in research huts with no power, the ROV had to run off car batteries.

fielded a team in MATE's international ROV competition. Hofmann's research team felt comfortable asking two of the students, Ryan Garner and Amanda Wilson, to build an ROV that would meet the challenges of the harsh polar environment. "We had no hesitations in asking Ryan and Amanda to help us. They were obviously talented and we had seen them execute successfully before," says Hofmann. "We gave them the requirements and they designed, built, and tested it, even though they were still in high school at the time."

The requirements were tough—the same as those faced by students in this year's ROV competition, which also required participants to build an ROV that would survive in polar conditions (*see related*

"The greatest challenge was ensuring that the seals on the electrical connections wouldn't contract too much with the temperature changes," Hofmann says. "Ryan and Amanda had to make the ROV really robust, because we didn't have the technical capability to service it in the Antarctic."

Working closely with several graduate students and an instructor from their high school, Garner and Wilson built an ROV that they named M'RAJE (pronounced mirage) and tested it in UCSB's swimming pool. Too young to travel to Antarctica to participate in the mission in person, Garner and Wilson instead taught Hofmann and her team how to operate the ROV and conduct minor technical repairs.

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Captain Chris Wade,
Dive Safety Officer &
Senior Aquarist

MPC

Monterey Peninsula College



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Last Printed Issue of Newsletter

Send MATE Your E-Mail Address!

To help the environment, reduce costs, and allow timelier communication, the MATE Center will soon switch its newsletter from paper to electronic format. This will be the last printed issue! To ensure that you continue to receive the MATE newsletter, please send your e-mail address to info@marinetech.org or call (831) 645-1393.

From Our Director

MATE's Tenth Anniversary: Reflecting on Past Success and Looking Ahead to the Future

With the four-year renewal of funding from the National Science Foundation (NSF), the MATE Center is ushering in a new era. Michael Gilmartin, MATE's director since 2002, is handing the reigns to Deidre Sullivan, who has been with the Center since its inception as the curriculum and industry manager. Michael will continue to play an integral role in the MATE Center as senior advisor and Monterey Peninsula College liaison. Deidre will continue in many of the same capacities as she guides MATE into the future.

The MATE Center will celebrate its 10th anniversary this summer—and we have much to celebrate! Over the past ten years, the MATE Center has diversified its partners, work, and funding base. The Center is having a substantial impact on marine technical education. Colleagues from Scripps Institution of Oceanography recently said:

The MATE Center has over the last decade brought a level of coherence and organization to the preparation of students for marine technical careers that did not previously exist. The MATE Center's impact now extends beyond community college and high school levels to major marine research institutions around the country.¹

It's hard to believe how much the MATE Center has accomplished and how much we've grown in ten years. Our core projects are going strong:

- ▼ **ROV Competition.** The sixth annual international student ROV competition took place in June in Newfoundland and Labrador, Canada with 41 teams from six countries participating.
- ▼ **ROV Summer Institute.** In July, an advanced ROV Summer Institute focused on computer controls and sensors was offered for 21 faculty from across the country.
- ▼ **Student Internships.** Twenty-six students from 19 institutions were placed in extended at-sea internships this summer.
- ▼ **Community College Partners.** A meeting for MATE's community college partners took place in August, with more than half of our 29 partners attending.

Other ongoing projects include:

- ▼ **COSEE partnership.** Our five-year partnership in the Centers for Ocean Sciences Education Excellence (COSEE) network provides a voice for community college interests in a forum dominated by major research universities. The www.OceanCareers.com web site, a collaboration with COSEE, continues to be a leading source of

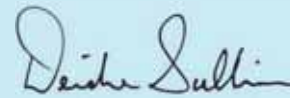
comprehensive information on marine-related education and careers.

- ▼ **Workforce Studies.** The Center is leading two unique workforce projects: *Understanding and Predicting Changes in the Ocean Science, Technology and Operations Workforce*, funded by the National Oceanographic Partnership Program (NOPP), and *Assessing the need for a Certification Program for Oceanographic Professionals*, funded by NOAA. These projects will help to better define marine workforce needs and provide faculty with information on how to improve and expand their programs to meet these needs.

The Marine Technology Society (MTS) continues to be a strong financial supporter and technical collaborator. The MTS ROV Committee co-sponsors the ROV competition and the society partners on other projects, such as the NOPP workforce study and the development of a comprehensive *Guide to Marine Education and Training Programs in Higher Education*, which will be distributed to high schools across the country.

The MATE Center will continue to refine and expand its programs that link students and educators with working professionals—a hallmark of the Center. For example, one new direction involves transitioning retired military personnel into the marine workforce. Another growing area is ocean observing systems (OOS). The NOPP-funded workforce project includes an extensive study of the OOS workforce. Upon its conclusion, we will work with our partner colleges to integrate real-time data and workplace experiences into their curricula.

I feel honored to have been part of the MATE Center from its beginning. As its new director, I'm proud to usher MATE into its second decade. Our mission remains the same: to increase the number of technical professionals ready to enter the marine workforce. Stay tuned—the best is yet to come.



—Deidre Sullivan
Director, MATE Center

¹Cheryl Peach, Ph.D. and Sharon Franks, Ph.D., Scripps Institution of Oceanography

(In the Spotlight continued from page 1)

Garner and Wilson started the project in January 2006 and delivered *M'RAJE* to Hofmann's team in September. By that time they had graduated from high school. "It could have cost hundreds of thousands of dollars to build an ROV that would meet our needs, but Ryan and Amanda were able to build one for about \$5,000," says Hofmann.

The payoff came in October, when Hofmann's team traveled

to McMurdo Station, the National Science Foundation's (NSF) logistics hub in Antarctica. There, *M'RAJE* withstood the challenges of polar research and endured a full season of Antarctic diving. It made about ten dives before it began to show signs of wear and tear, a common problem in polar environments. Hofmann and her team returned to California with a deeper understanding of benthic marine organisms and underwater video

footage that they have used in educational presentations and research conferences.

M'RAJE became a media sensation as well. Hofmann appeared live from Antarctica on ABC's "Good Morning America" and the NSF featured a multimedia story on the ROV on its web site. Well-known documentary filmmaker Werner Herzog, the recipient of a grant from the NSF Antarctic Artists and Writers program, was also at

McMurdo Station and took video footage of Hofmann's team and *M'RAJE* in action.

As for Ryan Garner and Amanda Wilson, both attend Alan Hancock College, a community college in Santa Barbara County. Each plans to further her education and have a career in—what else?—ROV technology.

To see *M'RAJE in action in Antarctica*, visit <http://hofmannlab.msi.ucsb.edu/antarctica06.htm>

2007 ROV Competition: Rookie Teams Score an Icy Victory

Rookie teams were the ones to beat at this summer's sixth annual international student ROV competition. In an event that highlighted the International Polar Year, the winners were first-time participants Jesuit High School of Carmichael, California (*Explorer* class) and Cornerstone Academy of Gainesville, Florida (*Ranger* class).

Held at Memorial University's Marine Institute (MI) and the Institute for Ocean Technology (IOT) in the province of Newfoundland and Labrador, Canada, the competition featured forty-one teams representing schools from six countries. This is the first year that the event has been held outside the U.S.

Missions Featured Realistic Environmental Conditions

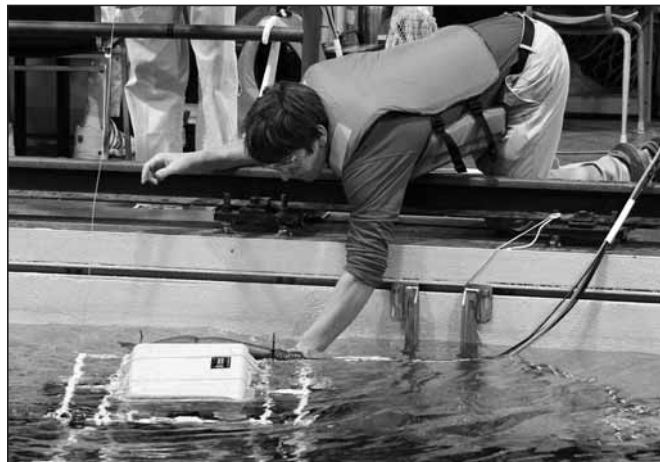
Teams designed and built ROVs for operation in polar environments and researched the culture and history of human life at the poles. The

world-class facilities at MI and IOT gave students the unique opportunity to experience the real-life working conditions common to polar environments.

For example, MI's flume tank is the biggest in the world. Teams completed the mission task of threading a messenger line through a sunken buoy anchor ring and returning the messenger line to the surface under the influence of the flume tank's current.

With an air temperature of 5 degrees Celsius and water temperature of -1 degree Celsius, missions in the IOT's ice tank challenged students to design vehicles that took into account variables such as condensation and the influence of ice particles. Students collected "benthic jellyfish" and "algae" samples and installed a simulated passive acoustic sensor on the bottom of the tank, deploying their vehicles through a large hole cut into the one-inch thick sheet of ice.

Last but not least, the IOT's tow tank featured surface waves that caused students' vehicles to heave, much like a professional ROV would in heavy ocean waves. The tow tank mission tested the teams' ability to prepare a subsea oil wellhead by installing a simulated gasket and "injecting" anti-corrosive material.



A student launches his team's ROV in the flume tank at the Marine Institute.

Courtesy of the Marine Institute

Winners in a Class by Themselves

In the *Explorer* class, the Jesuit High School team's first place finish was due to its outstanding scores in the mission tasks. Jesuit team member Eric Guess was honored with the "gROVer" award for demonstrating courtesy, kindness, and professionalism and assisting other teams. Last year's champions, the Eastern Edge Robotics Team of St. John's, Newfoundland and Labrador, took second place honors. The Eastern Edge team also finished with the top poster score, and team member Jonathon Higdon was honored with an engineering MVP award. The British Columbia Institute of Technology of Burnaby, British Columbia came in third and took home the coveted "Sharkpedo" award for "outside-the-box" design innovation.

In addition to winning first place in the *Ranger* class, Florida regional

competition winner Cornerstone Academy was also named *Ranger* rookie of the year and tied for the best engineering evaluation. Heritage Collegiate of Lethbridge, Newfoundland and Labrador was the second place winner. Flower Mound High School of Flower Mound, Texas took third place honors, with team member Luke Cragin singled out for his talents with an engineering MVP award.

For the complete list of winners and award prizes, please visit www.marinetech.org/rov_competition/2007/final_standings.php.

Ocean Career Expo Features Competition Sponsors

The ROV competition also featured the Ocean Career Expo, a regularly scheduled part of the international event that is organized by the MATE Center and its

(continued on page 5)



The ice tank at the Institute for Ocean Technology provided a real-life polar environment for student ROVs.

Courtesy of the Marine Institute

International Polar Year Celebrates the Earth's Extremes

Icebergs and glaciers. Polar bears, penguins, and leopard seals. Freezing cold water and the northern lights. These are the images that make our planet's poles so enticing to scientists, explorers, and students around the world.

They are also the impetus behind the designation of 2007-2008 as the International Polar Year (IPY), a scientific program organized by the International Council for Science and the World Meteorological Organization.

Over the years, scientists and explorers have witnessed and recorded environmental changes in the Polar Regions. IPY highlights these findings and encourages new research and expeditions that use today's technologies to better



understand the role that Polar Regions play in global processes.

The goal is to help humans understand how changes in the poles affect them and the earth's climate—and in turn, how the actions of humans affect the poles.

Polar Changes Impact the Earth

Environmental changes taking place in the earth's Polar Regions are vivid. For example, the Arctic ice cover is decreasing at an alarming rate. And in the Antarctic, temperatures have risen by about two degrees Celsius over the past 50 years, an increase that is more pronounced than in other regions of the world. The resulting changes in snow cover and sea ice thickness

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Employer Profile

NOAA Fisheries Service Office of Law Enforcement

Lovers of marine wildlife will find many kindred spirits at NOAA Fisheries Service, Office of Law Enforcement (OLE), the government agency dedicated to enforcing laws to protect and regulate marine resources and their natural habitats. OLE agents and officers enforce numerous statutes and treaties that help conserve and protect marine resources, such as the Marine Mammal Protection Act; the Endangered Species Act; the Lacey Act; the Marine Protection, Research and Sanctuaries Act; and the Magnuson-Stevens Fishery Conservation and Management Act.

Headquartered in Silver Spring, Maryland, the agency has six divisional offices and 54 field offices, and maintains a presence in all coastal and marine areas of the United States and its territories. The agency's enforcement activities deal primarily with fishery conservation and management; protection of endangered species, marine mammals, and marine sanctuaries; and enforcement of state, federal, tribal, and international laws regarding the import and export of marine wildlife.

According to Dale Jones, OLE director, the agency has nearly 225 full-time employees including approximately 150 special agents and 20 enforcement officers. Special agents are criminal investigators, while officers work in uniform and are sworn to uphold the law. Jones says that an analogy can be made between special agents and police detectives, while enforcement officers are more similar to beat police. "Most of our enforcement officers are stationed in Alaska, making contact with fishing vessels and enforcing individual fishing quotas," he explains. "On the other hand, special agents are spread throughout the country. They investigate violations of the law and gather information on criminal activities."



"Our biggest mission area is domestic and commercial fishing," says Jones. "We handle approximately 3,300 cases a year, ranging from minor investigations up to very complex situations."

Other investigative areas involve smuggling, illegal takes of endangered species, enforcement of sanctuary laws, and protection of marine mammals.

Public awareness is important in ensuring compliance of federal and state laws. Special agents are involved in community outreach and public affairs to promote education and voluntary compliance. "Our outreach effort is growing because we realize that many people aren't familiar with marine wildlife regulations," Jones says. "We work with sea life centers, aquariums, and schools to promote our conservation message."

OLE also has a number of partnerships that are critical to its success, says Jones. The agency partners with the U.S. Coast Guard, Bureau of Immigration and Customs Enforcement, Civil Air Patrol, and other enforcement agencies to conduct a variety of additional patrols and inspections. "Cooperative enforcement is very important to us," he explains. "We tend to look favorably on prospective employees that can show concrete examples of collaboration with others."

International collaboration is also an important part of the agency's growing role in global resource conservation. "We're becoming more involved in illegal, unregulated, and unreported fishing in the high seas, working with a lot of other countries," Jones

explains. "That's because of growing pressure on highly migratory species, such as tuna and Patagonian toothfish."

Patagonian toothfish—commonly known as Chilean sea bass—is heavily fished because it's highly profitable. "We work with countries such as Chile and South Africa to make sure current fishing regulations are enforced," Jones continues. "And we also work with many regional fisheries management organizations."

"Everyone has love and respect for our natural resources and a passion for conservation."

In addition to special agents and enforcement officers, OLE has a team of support personnel that includes program managers and administrative and technical staff, whom Jones describes as "the glue that holds the organization together." For example, OLE's technologists are working to expand the agency's vessel monitoring system (VMS), which uses satellite tracking and networking technology to monitor and track approximately 5,000 fishing vessels. VMS allows the OLE to monitor compliance, track violators, and provide substantial evidence for prosecution. "Certain ships participate in the monitoring program based on the management plans of specific fisheries," explains Jones. "Using GPS, we can track the movement of these vessels in near real-time."

Many new hires have law enforcement experience, or an educational background in law enforcement or criminal justice. Jones suggests that students interested in working for the agency look into degrees in

environmental conservation—particularly marine conservation—and environmental law enforcement. Technical applicants need to have a background in data management and computer networking.

Jobs at OLE are regularly posted on www.usajobs.gov, and the agency recruits and hires throughout the year, according to Jones. Each summer, it hires at least two interns in its headquarters office and one in each regional office. "The intern program is a good way for us to recruit, and we usually hire four or five agents each year through that program," adds Jones.

As soon as they're hired, employees are provided with job-specific training. Special agents take criminal investigation courses designed to provide traditional investigative law enforcement skills and expertise in criminal human behavior, modern technology, law, and other approaches to effective law enforcement. Courses are taught in fraud investigation, undercover operations, electronic surveillance, and advanced interrogation.

Enforcement officers attend a program in police training designed for natural resource management agencies, emphasizing the patrol functions of enforcement in a natural resource environment. They receive training in interviewing, suspect control, arrest techniques, driving skills, law, firearms, narcotics, and communications.

Jones says that a fierce dedication to marine resource conservation is the primary common trait of employees. "Everyone has love and respect for our natural resources and a passion for conservation," he explains.

The prime location of OLE's field offices is another bonus for employees. "Since all of our offices are in coastal areas, they're beautiful places to work," says Jones. "Everyone that works here enjoys the water and the outdoors."

Former MATE Interns Transfer their Experience to Full-Time Jobs

For Drew Cole and Colleen Peters, participating in a MATE internship was the first step to a rewarding ship-based career. Both of these former MATE interns were able to successfully use the experience and skills gained during their internships to earn challenging full-time jobs in marine technology.

Learning About a New World at Sea

In August 2006, Drew Cole was an intern on the *New Horizon*, a Scripps Institution of Oceanography research vessel. During a typical day, he might collect data with a CTD device, which measures water conductivity, temperature, and depth, or help other crew members launch and recover buoys. Cole also helped with the launch and recovery of an autonomous underwater vehicle (AUV) that collected research data.

Cole was hired by Scripps as a direct result of his MATE internship. In his current job as part of Scripps' technical support team he uses what he learned in his internship every day. As the resident marine technician, Cole runs the deck operation on research ships. This includes operating CTDs, buoys, AUVs, and collection nets. "My job is to help the research team meet their objectives and ensure the safety of the science party, their equipment, and the ship," he explains.

Cole also worked in Hawaii, as a crew member and snorkel instructor on a whale watching boat. He

has nearly completed an associate's degree in marine technology at Honolulu Community College's marine education program. "My internship is the reason I am doing what I am right now," says Cole. "MATE showed me a world I did not know and I fell I love with it."

Responsibility Builds Confidence

Colleen Peters participated in two MATE internships: in June 2001 onboard R/V *Seward Johnson* and in May 2003 onboard the R/V *Thomas G. Thompson*. On the *Seward Johnson*, Peters was in charge of operating the CTD and using it to monitor the depth of the ship's tow net. On the *Tommy G. Thompson*, Peters worked with Woods Hole Oceanographic Institution (WHOI) scientists and technicians on the ROV *Jason* team. She logged events during the ROV's operation and worked with the crew to repair and maintain the vehicle.

Peters graduated cum laude in 2005 from the Maine Maritime Academy, with an A.S. in small vessel operations and a B.S. in marine science. In part because of her MATE internship experiences, she soon after received a job offer from NOAA. Recently promoted to senior survey technician on the *Oscar Dyson*, Peters maintains the lab areas, operates the CTD and associated sensors, and ensures that the NOAA's shipboard scientific computer system is functioning properly. She also works on deck



Courtesy of Colleen Peters

As an intern on the R/V *Thomas G. Thompson*, Colleen Peters helps configure the ROV *Jason*.

to deploy and recover scientific devices and collect data. "My internships gave me the confidence to carry out orders and troubleshoot problems when I needed to," Peters explains. "I was given a lot of responsibility to figure things out on my own."

"The MATE internships were a great peek into life at sea on a research vessel," Peters continues. "They prepared me for my current job because I was able to see the

coordination of scientific operations."

Nearly 200 students have participated in marine science and technology internships through the MATE Center's program since its inception in 1999. If you're interested in becoming a MATE intern, or have students who might be interested, contact Lani Clough, the Center's internship coordinator, at lclough@marinetech.org or (831) 646-4011.



Courtesy of Drew Cole

Onboard the Scripps Institution of Oceanography's R/V *Melville* in the Philippines, Drew Cole (center) helps his team deploy a buoy.

(2007 ROV Competition continued from page 3)

COSEE partners. Competition sponsors including Oceaneering International, Acergy, OceanWorks, Seatrepid, and others showcased their companies and career opportunities. Students had the opportunity to speak with representatives of these organizations to learn more about current job openings, which proved very fruitful for one member of the Monterey Peninsula College team—he was hired by Oceaneering shortly after the competition!

From Icy Canada to Sunny California

The 2008 competition will be held in a dramatically different environment. Participants are more likely to see surfers than icebergs when they head to Scripps Institution of Oceanography—University of California, San Diego next June.

Next year's contest will focus on the scientific and technological challenges of working in deep sea hydrothermal vent environments, the geologically and biologically active areas where moving tectonic plates result in the eruption of geothermally heated water from the sea floor. The MATE Center looks forward to building on this year's success and keeping students challenged with missions that involve incorporating sensors on their ROVs (hint, hint!).

More than 100 working professionals donated their time and talents to serve as judges and volunteers at the international event, while more than 100 companies donated funds, facilities, equipment, and materials in support of the competing teams. On behalf of participating students and faculty, the MATE Center extends the deepest appreciation to these individuals and companies. The event would not happen without their support!

Partner Profile

Del Mar College

Located in Corpus Christi, Texas, MATE Center partner Del Mar College (DMC) is a comprehensive community college with more than 22,000 credit and non-credit students enrolled annually. More than 95 percent of its students come from Corpus Christi and the surrounding five-county area in southern Texas, and more than half of its students are Hispanic. In fact, the national higher education publication *Community College Week* ranks DMC in the top three percent of community colleges granting associate degrees to Hispanic students.

DMC awards certificates and associate's degrees in more than 50 majors, including the computer sciences. The Department of Computer Sciences is home to degrees in networking technology, computer programming, information systems, and microcomputers for business, which includes an emphasis in GIS.

Complete GIS Concentration

The GIS emphasis includes a certificate, two marketable skills awards, and an associate's in applied sciences degree, which provide students with the skills necessary to pursue careers in GIS and GPS fields. Students in the program learn to acquire, analyze, and manage spatial data and information.

The GIS concentration started in 2000, says Dr. Phillip Davis, DMC professor of computer science. "That seems relatively new, but it's old in terms of GIS programs at community colleges," he adds. "Even today there aren't that many community colleges that have GIS programs."

The program graduates about 10 students each year, according to Davis. About half of them enter the workforce directly and the rest pursue a bachelor's degree. "There are many local job opportunities for GIS program graduates," Davis continues. "Most of the students stay in the area and we're able to employ them."

Although the GIS program serves the needs of the local workforce,



Davis says that instructors and advisors strongly encourage students to get a bachelor's degree after earning their associate's degree. "A lot of our students don't have the financial resources to be in college full time," he explains. "Many of them get a job after their associate's degree and work towards getting their bachelor's degree part-time."

With the help of a grant from the National Science Foundation (NSF), DMC developed a program to help students with financial challenges. "The NSF grant allows us to provide needy students with a considerable amount of funding if they plan to earn a degree in sciences, technology, engineering, or math (STEM)," Davis says. "This helps us recruit and keep many deserving students."

GIS-TECH Helps Develop Advanced Skills

Davis is also the director of DMC's GIS Technology Implementation Project, or GIS-TECH, which trains advanced technicians to build and maintain large relational databases, install GIS data servers, and effectively use GIS applications. A three-year program funded by the NSF, GIS-TECH addresses the demand for qualified GIS technicians in both private industry and public workforces in a variety of fields. GIS-TECH resulted in the development of curriculum and course materials for three advanced GIS classes. "We saw a need for classes that incorporated advanced GIS-specific IT skills such as Internet mapping," explains Davis. "We beta-tested these classes and materials on our own students and now we're ready for final publication."

Another goal of GIS-TECH was to complete articulation models for GIS classes. Articulation is the process by which a student who takes courses at one educational level can be credited at another level. DMC has articulation agreements with

11 local school districts, the Texas A&M Corpus Christi geomatics program, and the Texas A&M Kingsville geology and physics department. "We developed a couple of articulation models that can be used to implement dual class credits between secondary schools, community colleges, and four-year

"We've been a traditional computer science department that provides training in programming and networking. But today's students are looking for more exciting careers, so we've moved into areas such gaming, animation, GIS, and robotics."

Davis says that many students are introduced to IT through newer technical fields such as robotics but end up studying or getting jobs in more traditional areas. "GIS and robotics are good ways to get students interested," he says. "Once they get hooked, they see that there's a whole

"GIS and robotics are good ways to get students interested [in technology]. Once they get hooked, they see that there's a whole world of IT that they can get involved in. They're like a recruitment tool for engineering and the sciences."

institutions," explains Davis. "For example, a high school junior or senior can take a GIS course from a teacher that has been certified to teach with us and get credit for it at the high school and here at DMC."

Recruitment Tool for STEM Careers

The DMC computer science department is interested in the MATE Center because of the way that it uses robotics to get students excited about STEM careers, says Davis. Last year, DMC took a group of our computer science students to the regional ROV competition in Houston. The experience was so positive that one faculty member started a terrestrial robotics class, and the department is interested in starting an ROV class.

"ROVs are another way to get high school students excited about math and science," Davis says.

world of IT that they can get involved in and hopefully they will also want to get into a bachelor's program. They're like a recruitment tool for engineering and the sciences."

Working with MATE

Because of DMC's commitment to GIS technology and education, Davis is a member of the advisory committee for a research project spearheaded by the MATE Center and funded by NSF, *Envisioning a National Geospatial Technology Resource Center*. In addition, Davis says that DMC would like to field a team in the Houston regional ROV competition and eventually build an ROV program that could support high school programs and help them succeed.

Davis also attended this summer's MATE national partner meeting. "I'm really looking forward to leveraging what the MATE Center is already doing," he says.

(IPY continued from page 3)

have both immediate and extended consequence for marine and terrestrial ecosystems.

Humans are also impacted. Alaskan villages are being relocated to higher ground in response to coastal erosion and sea level rise. And the thawing of permafrost is causing the collapse of roads and buildings and having major economic, as well as societal, impacts on local communities.

The impacts of polar climate change are not limited to the Polar Regions, which are immensely influential on the entire planet's climate, environment, ecosystems, and human societies. For example, changes in the large ice sheets will impact global sea level, affecting coastal cities and low-lying areas.

A complete picture of conditions at the poles and how they interact with and influence the oceans, atmosphere, and land masses will enable scientists to understand the current global climate and what

might happen in future. By participating in IPY, scientists, explorers, engineers, and technicians in more than 60 nations around the world have embarked on an intense campaign to bring this picture into focus.

Polar Science, Education, and Exploration

The research, engineering, and exploration taking place as part of IPY complements six themes:

Status. Determine the present environmental status of the Polar Regions.

Change. Quantify and understand past and present natural environmental and social change in the Polar Regions, and improve projections of future change.

Global linkages. Advance our understanding on all scales of the links and interactions between the Polar Regions and the rest of the globe, and of the processes controlling these links.

New frontiers. Investigate the frontiers of science in the Polar Regions

Vantage point. Use the unique vantage point of the Polar Regions to develop and enhance observatories from the interior of the Earth to the Sun and the cosmos beyond.

Human dimension. Investigate the cultural, historical, and social processes that shape the sustainability of circumpolar human societies and identify their unique contributions to global cultural diversity and citizenship.

IPY will result in more than 200 science, education, and research projects, involving a wide range of physical, biological, and social research topics. For example, this summer in Svalbard, a chain of islands in the Arctic Ocean between Norway and the North Pole, the International Summer School on Sea Ice provided students and scientists with an understanding of sea ice and its interaction with ocean and the atmosphere. To the east, the Greenland IPY 2007 Space Science Symposium, which featured research related to the understanding of solar-terrestrial

interactions at high latitudes, was held in May. Last winter, Harvard University's Museum of Natural History in Boston, Massachusetts presented a three-month exhibition on the lives of Arctic and Antarctic explorers such as Roald Amundsen, Ernest Shackleton, and Richard Byrd. And the MATE Center contributed to IPY activities by using polar science and technology as the theme of this summer's ROV competition (see related article, p. 3).

A New Generation of Polar Scientists

Because IPY occurs as the earth's Polar Regions are experiencing enormous changes, it represents a unique opportunity to learn about (and maybe even solve) complicated scientific and environmental problems. Perhaps IPY's most lasting contribution is that it will attract and develop a new generation of scientists, explorers, engineers, and technicians that will be able to tackle these complex global issues.

Upcoming Events

SEPTEMBER

Association of Zoos and Aquariums (AZA)
2007 Annual Conference
September 17 - 20, 2007
Philadelphia, Pennsylvania
www.aza.org/ConfWork/AC_Intro

Marine Technology Society (MTS)/Institute of Electrical and Electronics Engineers (IEEE)
Oceanic Engineering Society
Oceans 2007 MTS/IEEE
On the Edge of Tomorrow
September 29 - October 4, 2007
Vancouver, British Columbia, Canada
www.oceans07mtsIEEEvancouver.org
The MATE Center is exhibiting and presenting at this event.

OCTOBER

American Salvage Association
National Maritime Salvage Conference and Expo
October 9 - 11, 2007
Arlington, Virginia
www.marinelog.com/PDF/SalvageTT.pdf

Deep Offshore Technology (DOT)
19th Annual Deep Offshore Technology International Conference and Exhibition
October 10 - 12, 2007
Stavanger, Norway
<http://dot07.events.pennnet.com/II/index.cfm>

American Society for Engineering Education (ASEE)/Institute of

Electrical and Electronics Engineers (IEEE)/IEEE
Computer Society
2007 Frontiers in Education Conference (FIE 2007)
Global Engineering: Knowledge Without Borders, Opportunities Without Passports
October 10 - 13, 2007
Milwaukee, Wisconsin
<http://fie.engrng.pitt.edu/fie2007>

National Association for Technology Preparation (Tech Prep) Leadership
National Tech Prep Network 2007 Conference
Pathways to the Winner's Circle
October 10 - 13, 2007
Louisville, Kentucky
www.cord.org/2007-ntpn-conference

National Science Foundation (NSF)
ATE Program
2007 ATE PI Conference
October 17 - 19, 2007
Washington, DC

The MATE Center is participating in this conference.

Society for the Advancement of Material and Process Engineering
Fall Technical Conference 2007
From Art to Science: Advancing Materials & Process Engineering
October 29 - November 1, 2007
Cincinnati, Ohio
www.sampe.org/events/2007Cincinnati.aspx

Diving Equipment & Marketing Association (DEMA)

DEMA Show 2007
October 31 - November 3, 2007
Orlando, Florida
www.demashow.com

NOVEMBER

Society of Petroleum Engineers
Annual Technical Conference & Exhibition
Innovate: A Golden Opportunity for People and Technology
November 11 - 14, 2007
Anaheim, California
www.spe.org/atce/2007/index.html

North American Association for Environmental Education (NAAEE)
2007 NAAEE Conference and Research Symposium
Come to the Coast: Explore New Horizons for Environmental Education
November 13 - 17, 2007
Virginia Beach, Virginia
www.naaee.org/conference

Society of Naval Architects & Marine Engineers (SNAME)
Maritime Technology Conference & Expo and Ship Production Symposium
November 14 - 16, 2007
Fort Lauderdale, Florida
<http://www.sname.org/AM2007/index.shtml>

Maritime Security Expo 2007
6th Annual Exposition & Conference
November 27 - 28, 2007

New York City, New York
www.maritimesecurityexpo.com

International Workboat Show
Keeping Your Business in Motion
November 28 - 30, 2007
New Orleans, Louisiana
www.workboatshow.com

DECEMBER

Association for Career and Technical Education (ACTE)
ACTE 2007 Annual Convention & Career Tech Expo
Connecting Education and Careers
December 13 - 15, 2007
Las Vegas, Nevada
www.acteonline.org/convention

American Geophysical Union (AGU)
AGU 2007 Fall Meeting
December 10 - 14, 2007
San Francisco, California
www.agu.org/meetings/fm07

JANUARY 2008

Association of Diving Contractors International/Marine Technology Society ROV Committee
Underwater Intervention 2008
International Conference
January 29 - 31, 2008
New Orleans, Louisiana
www.underwaterintervention.com

The MATE Center is exhibiting and presenting at this event. Students and mentors of the 2007 ROV competition Explorer class champion Jesuit High School are also participating.

See www.marinetech.org for a more comprehensive list.

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C a r e e r P r o f i l e

Captain Chris Wade, Dive Safety Officer & Senior Aquarist

Following a career path that he describes as “non-traditional,” Captain Chris Wade is a dive safety officer and senior aquarist at Sea Life Park Hawaii by Dolphin Discovery, the world’s largest provider of dolphin interactions.

Wade has a very diverse variety of job responsibilities at the park, which is located on the island of Oahu. In his role as senior aquarist, he oversees all in-water and waterfront activities on- and off- site, including animal and guest interactions, underwater exhibit maintenance, and collection of animals for display. He also designs and builds new displays and installs, maintains, and repairs animal life support systems.

As dive safety officer, Wade is responsible for dive training, dive gear repair, compressor maintenance, and supervising diving programs that adhere to the guidelines of the American Academy of Underwater



Courtesy of Chris Wade

Sciences (AAUS), an organization of science divers that develops scientific diving programs and standards. With the park’s curator of fish, he oversees more than 20 professional staff and 50 volunteer divers.

Extensive emergency medical instruction has prepared Wade to be the point person for all park and guest emergencies. He also oversees boating safety and trains all first responders and first-aid staff. In addition to these daily activities, he manages long-term projects such as reef monitoring and a captive green sea turtle breeding program.

Of all these job responsibilities, Wade’s favorite is working with animals and sharing his love of the ocean with park visitors. “I get to spend lots of time out on the water, which is great,” he says. “Sometimes I wonder why they pay me!”

However, there’s one part of his job description that Wade doesn’t care for. “Cleaning fish poop is not that enjoyable,” he says. “Not all aspects of the job are pleasant, but they’re minor when I remember being stuck behind a desk all day.”

Before becoming a diver and aquarist seven years ago, Wade was a salesperson for a technology consulting firm. He wanted a more exciting career and began working as a deck-hand, then became a first mate and dive master with a small research team.

Wade’s educational background includes EMT training and certification, dive medical technology certification, PADI instructor training, and a U.S. Coast Guard-approved Captains Course. A variety of technology certifications, including computer and network technician, round out his resume. “Most of my

training has been outside of the traditional school format, which was not always the best fit for me,” explains Wade. “I did better in educational programs and classes that were outside of the mainstream.”

One benefit of his non-traditional career path is that his training was always focused on a specific end goal. “I researched careers, talked to people, read numerous books, and formulated a plan that would give me the required experience and credentials to work in the field of my choice,” he says. “I turned what was a dream into a goal and worked towards it everyday.”

“I love my job now,” says Wade. “Since becoming involved with the ocean, I have never looked back.”

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