Newsletter from the MIT Course 13 Student Engineering Association

Winter 2004 Volume 3, Issue 2

Making Waves

- **iQuarium Launch, Feb 6th, 4-6pm, Hart Nautical Gallery!**
- **Volunteer for the Science Bowl 2004 on Feb 21st! Email for info: markum@mit.edu**
- **Congratulations Award and Scholarship Winners!**

Highlights:

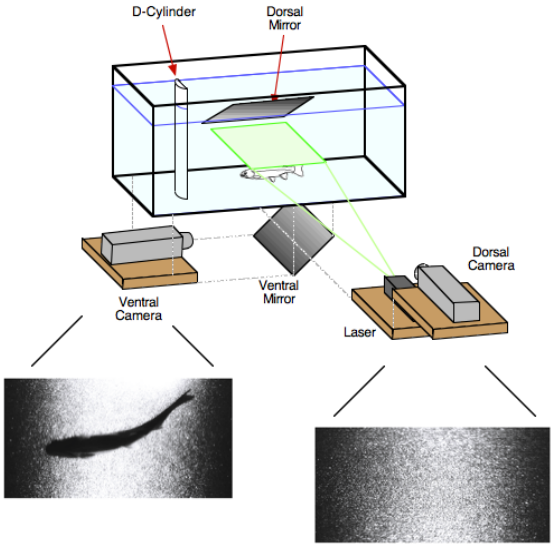
Schooling – For Fish?

Research on fish swimming hydrodynamics in the Department of Ocean Engineering, has been making headlines as of late. Under the supervision of Professor Michael Triantafyllou, David Beal (S.M. 1997, Ph.D. 2003; Course 2), working closely with biologists at Harvard University, researched how fish harness the energy of eddies in the water to conserve their own energy while swimming in schools or upstream in turbulent environments.

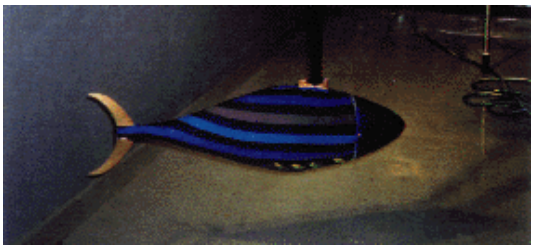
Beal was recently published as a co-author in the Nov. 28th issue of *Science* with the article "Fish Exploiting Vortices Decrease Muscle Activity." MIT Ocean Engineering Professor Triantafyllou, Beal, and scientists from the biology department at Harvard University, studied how fish harness the energy of eddies to propel themselves. Fish swim in schools in order to conserve their energy and piggy-back off of the eddies created by the movements of other fish in the group.

The engineering applications are numerous, as turbulence is present on land and in sea, and its energy can be extracted. Specific possibilities include building AUVs that are able to navigate in turbulent waters, such as the surf zone, modeled after the movements of fish in eddies.

In the process of looking at animal behavior and water flow, the scientists discovered the "Karman gait." A previously unknown swimming motion, fish minimize their muscle activity by way of eddy action. The study is the first to provide evidence that the schooling of fish could be a hydrodynamic benefit. Funding was provided in part by MIT Sea Grant for this controlled study of fish movements.



Experimental setup used for studying Fish swimming in a turbulent wake.



The MIT RoboTuna

Beal got his start into fish swimming research working with his colleague, Michael Sachinis (S.M. 2000, Course 2), to redesign the original biologically inspired fish-like swimming robot, *RoboTuna*, to incorporate a modified cable-pulley system in order to further study the efficiency of fish-like swimming. Currently Dr. Beal is working at the Naval Undersea Warfare Center (NUWC) in Rhode Island.

Source: Tech News

ROV Team Answers the MATE Challenge

A team of fifteen eager students joined the ROV Team for this years MATE Competition. The team is comprised of students from not only Course XIII, but also Courses II and VI. The team is all sophomores, with some assistance and leadership from experienced participants Stephanie Fried (G) and Addie Yandell ('05). Dr. Franz Hover has volunteered his time as team advisor, and Dr. Tom Consi also lends his expertise.

The theme for the 2004 contest is "Lost on the Titanic: Rusticles or Bust." There are a variety of tasks involved in the competiton; some of these include taking a fluid sample, recording temperature and depth, locating an acoustic pinger, and measuring the length of the sunken ship. The National Competition is June 25th-27th at the University of California Santa Barbara. The team is excited with the challenge posed by MATE this year.

Brian Myhre (Course VI) is a new member to the team. Brian is working on the electronics system with fellow EECS student Jonathan Downey. "I am expecting great results because of the experience, organization, and enthusiasm team members are bringing to this project," Brian said. The team invites members from all majors to bring a new perspective and develop interest in ocean related problems.

As an incentive to invest the significant amount of time and energy that the team requires, students can opt to register for the class 13.704 (Special Projects in Ocean Engineering) or receive UROP credit. The team website will be posted at the end of IAP and be continually updated.

If you are interested in sponsoring the team, please contact Ms. Bridget Brett ('06) at bridget1@mit.edu. The team is always welcoming donations of parts or financial assistance.

Advisor Franz Hover and ROV Team member Bridget Brett look at the 12-25 Class vehicle for the 2003 competition

World Maritime Technology Conference 2003

Contributed by Meghan Brogan

Activity at the student congress

As the student steering committee representative from MIT, Meghan Brogan (G'03) attended the annual SNAME meeting held at the Moscone Center in San Francisco CA. Our own Dr. Burke and several 13A students also attended.

The conference was its typical success including an extensive expo area showcasing a myriad of commercial vendors from the marine engineering and naval architectural fields. The paper sessions covered many interesting topics and were again a wonderful opportunity for our students to meet people from the industry and do some valuable networking.

The student program included the annual "student congress" where all of the students in attendance (this year there were over 100!) were split into groups and given approximately 90 minutes to design and build a vessel to meet a specific challenge. The challenge this year was designed by a group of students from the University of New Orleans and was to build a self-propelled heavy lift vessel.

The students were supplied with an array of random materials including some balsa wood dowels, foam pieces, etc. The winning team walked away with $300! The conference also included student paper presentations which showcased the winners of the 2003 LISNYK and ISODC competitions.

It's almost time...

Join in for the inauguration and public release of iQuarium on February 6th in the Hart Nautical Gallery. Email ktwass@mit.edu for details.

Job Opportunity

Farrell Nicholes from ChevronTexaco is looking to recruit '04 OE graduates. Email FNicholes@chevrontexaco.com If you're interested.

Welcome...

to our new Ocean Engineering undergraduate student: Ms. Lauren Cooney. Lauren is a sophomore.

Looking for speakers...

to give a talk for the spring lunch seminar series. Email amichel@mit.edu if you would be interested in presenting a talk to the OE department! Or, if you know of anyone outside of MIT who would be interested in giving a talk, feel free to invite!

Attention All Alumni...

Making Waves wants to hear your sea stories and how MIT made your career possible! Email bridget1@mit.edu if you would like to be our next alumni spotlight!

13SEAs Luncheon Series

contributed by Ms. Meghan Brogan

The fall season of 13Seas lunch talks was both busy and informative. We were honored with four guest speakers, (and the accompanying cuisine) since the return to school in September. We hosted an MIT OE alum, Mr. Shashank Karve, from MODEC. Mr. Karve is the CEO of MODEC, an offshore construction company, and he spoke to us about the current state of offshore engineering, most specifically the FPSO (a floating production, storage, and offloading vessel) market. He stressed a desperate need for young blood, given that the average age of the engineers in the industry is of retirement age.

Finally, Kelly Cooper and Martin Donnelly from the NSWC-Carderock Division came on November 5th to talk to us about, surprise surprise, job opportunities. This lunch talk also included presentations from current seniors Matt Greytak and Kate Baker on their summer internships at Carderock, and a surprise visit from alumnus John Hootman. Overall, the talks were successful this fall, but I would always like to see more people & it's really a shame to throw away food!

The first luncheon of the spring semester will be first speaker this semester will be on Friday, February 13th. Rod Evans, from SAIC, will be joining us in the conference room to give a talk on hydrographic surveys. Mark your calendars, and be sure not to miss it!

MIT Recognized as Outstanding Student Section

The Marine Technology Society recently announced that MIT is the winner of the annual Outstanding Student Section Award. The award was accepted by President Karl McLetchie, and Past President Katy Croff at the Oceans 2003 MTS luncheon. The luncheon took place at the conference in San Diego in October. Congratulations to all!

Croff and McLetchie after accepting the award

A Warm Goodbye on Behalf of Us All

Ms. Eda Daniel, Admissions Coordinator for the OE Department, announced in December that she accepted an offer of the Graduate Administrator position in ESD (Engineering Systems Division), effective as of January 5, 2004. As Department Head, Prof. Henrick Schmidt said, "This is clearly a major step forward for Eda, and I hope you will share in my congratulating her in this regard. The appointment is well deserved, and ESD is fortunate to have her among their staff as they move forward. During her OE tenure, Ms. Daniel has greatly benefited the department, especially in managing the ongoing admissions process so well. It will be difficult to find someone who can meet Ms. Daniel's level of dedication and sincere concern for every OE student. Prof. Schmidt went on to say that "I hope you will all join me in expressing a sincere appreciation of the effort Eda has given the Department of Ocean Engineering, not only in regard to admissions, but also being a central figure in our alumni and student relations. We wish her all the best in her future endeavors.

Important SNAME Information

Student Paper Competition

Help continue MIT's outstanding record by entering the SNAME Student Paper Competition! Last year, MIT students won all five of the regional and national graduate and undergraduate paper prizes. Besides the recognition, they received cash, and free trips to San Francisco. To enter this year's competition, write a new paper or submit a recent one. In Mid-January, the MIT papers will be submitted and reviewed. The following month, two undergraduate and two graduate papers will be selected and submitted to the regional competition, to be held on Feb 12th at the MIT Faculty Club. If you have any questions, please contact Prof. Carmichael at adcarmich@mit.edu or Katie Wasserman at ktwass@mit.edu.

Scholarships for Graduates and Undergraduates

The Society of Naval Architects and Marine Engineers annually award both Graduate and Undergraduate scholarships to encourage study in naval architecture, marine engineering, ocean engineering or marine industry related fields. Graduate students may receive awards in value up to $12,000 per year and undergraduates may receive up to $2,000 per year. Membership is required for one-year prior – so plan ahead for next year! To become a member of SNAME or to find details on the scholarships being offered this year, see http://www.**sname.org**

Alumni Spotlight: Katarzyna Niewiadomska (S.M. 2002)

In her own words…

"I was born and raised in Lebanon and grew up within minutes of the Mediterranean. I left Lebanon after completing high school and came to the US for college and to get away from the war. I followed my older brother to the State University of New York at Stony Brook. My initial interest in going to college was for Marine Biology, however, the University at Stony Brook did not offer that as a major so I found myself looking for an alternative major. As my father and two brothers are engineers, I had an inclination for technology and engineering, and went into the Electrical Engineering program. I chose to design and build an autonomous land vehicle for my senior design project and ended up really enjoying vehicle design. My interest in ocean sciences was still strong so during my curriculum, I participated in a number of courses towards a minor in marine sciences, and spent my last two years doing research in the marine sciences department in physical oceanography and remote sensing. As a result of sharing my time on both engineering and oceanography, I chose to pursue a further degree in a field that could somehow combine both my interests: Ocean Engineering.

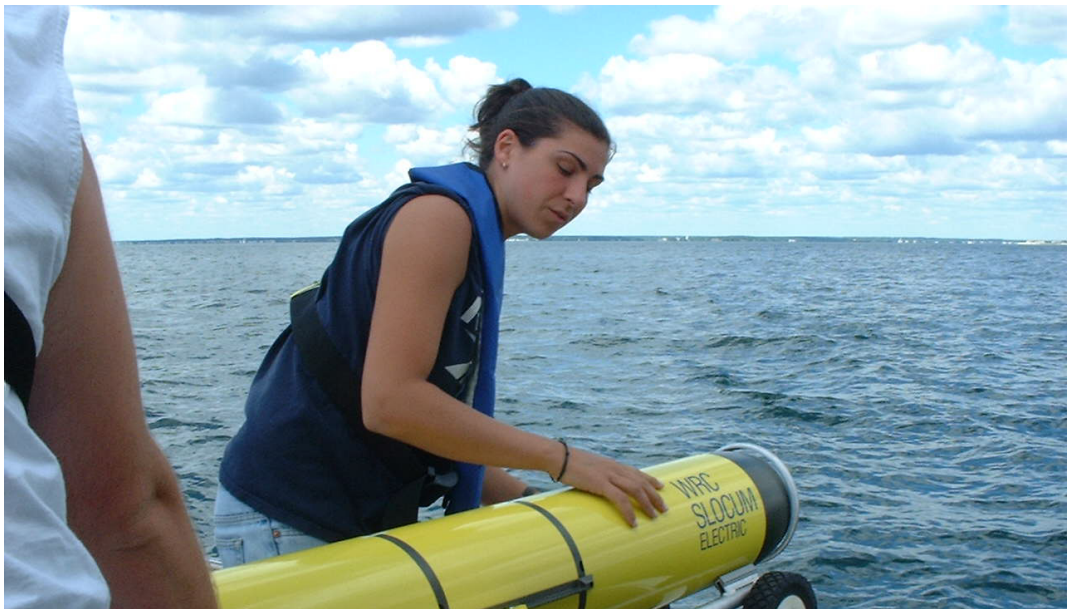
To test out the field, I spent a summer working with a scientist at WHOI and with Webb Research Corporation on the AUGV (Autonomous Underwater Gliding Vehicle) Slocum. I participated in field operations, code development and data analysis. I was sold. At MIT, my research project involved the development of algorithms for computerized educational modules in fluid mechanics. Tasks included the design of a method for optimal customized dynamic delivery of content to individual users via the Internet. Realizing that I would be more interested in engineering application, and that hands-on experience would improve my research capabilities, I left MIT with a Masters and started working with Webb Research Corporation again on the Slocum Electric Glider and the Slocum Thermal Glider.

I am currently still at WRC, working in R&D on my own project: the design and development of a new AUGV that has the capability of both gliding and resting on the bottom. I have the opportunity to work on every aspect of the design from mechanical characteristics to software to electronics to writing papers and reports. The job is challenging and interesting. It allows the chance to learn about every aspect of a design rather than one component. I actually enjoy getting up and going to work every day.

I still work on the other gliders leading field operations at a nearby pond and in Buzzards Bay. Last winter, the coldest one I've ever experienced, I spent 2 weeks of January in the Bahamas and two weeks of February in the Gulf of Mexico testing Thermal and Electric Gliders.

I am currently enjoying life on Cape Cod having the opportunity to enjoy several outdoor activities including hiking, biking, roller-blading, windsurfing, swimming, snowboarding, ice-skating, snowshoeing and playing soccer and basketball.

Future plans include going back to school for a PhD in Australia, arguably the best place for ocean exploration, and traveling the world."



Student Spotlight: LT Stephen Roe, USN

Tell us a little about your background.
I lived my whole life in Nazareth, PA, until going to undergrad at the U.S. Naval Academy in Annapolis, MD, where I studied mechanical engineering.

What did you do after you graduated from undergrad?
After graduating from the Academy in 1996, I was commissioned as a Navy Ensign, and promptly began flight school in Pensacola, FL, and Corpus Cristy, TX, receiving my wings in 1998. After additional helicopter training in San Diego, I went to my first operational squadron in Norfolk, VA. In three years at HC-8, I made two six-month Mediterranean deployments flying the H-46 Sea Knight medium lift helicopter for Amphibious Search and Rescue and logistics.

What is your research at MIT/WHOI focused on?
My research here is primarily with Chris von Alt of the Oceanographic Systems Laboratory at WHOI, which is the group that developed the REMUS Autonomous Underwater Vehicle for operations in less than 100 m of water depth. My specific work involves modeling water impact of the standard REMUS 100, both numerically and physically, in order to approve the REMUS for helicopter deployment and recovery. I also work with Dr. Yonghwan Kim from the VFRL on my numerical models.

Tell us a cool sea story…
Many cool sea stories, mostly flying and navy stuff, since I've never actually worked as an ocean engineer before. So the best from the last year while I've been in the Joint Program is that working with REMUS allows me to occasionally go out to test the REMUS in a small lab owned Zodiac. Due to the size of the vehicle, a zodiac is all it takes to go test it, not sea time on a big ship. So with my research, I'm hoping to get back into a helicopter to do some testing by the end of next summer.

What do you do in your free time?
Mostly I spend time with my girlfriend, Lynne Elkins, also a MIT/WHOI student (in geology). I also enjoy cooking, and I run quite a bit. I decided that while I'm here in Boston, I needed to run the
Marathon, so last spring I ran one (my sixth) and qualified for this coming spring. This winter, I'm hoping to get out snowboarding as well.

Tell us a fun fact about yourself.
Interesting fact: at USNA, I was in Tau Beta Pi, and my bent (I'm not sure about the spelling, but the brass key type thing) got to fly on a space shuttle mission. Of course they put it on display and didn't give it back. But then, I also had a set of Naval Aviator wings flown on a later mission (the one with John Glenn), and those I got back.

What is in store for life after MIT?
I am set to graduate with a S.M. from the MIT/WHOI Joint Program in September 2004. After that is still up in the air. I'm still negotiating orders, but it looks like I'll be heading to a ship in either San Diego, or Sasebo, Japan.

Congratulations Award Recipients!

The following students in the Department were presented with awards for the 2003-2004 academic year, at the November 25th Student Awards Luncheon:

Richard Connell (13B), *American Bureau of Shipping Fellowship*; Katie Wasserman (13U), *ASNE & MTS*; Karl-Magnus McLetchie (13M), *NDSEG & SNAME*; Meghan Hendry-Brogan (13M), *NDSEG & SNAME*; Johanna Mathieu (13U), *Robert Bruce Wallace Academic Prize*; Peter Connor (13B), *Shell Development Company*; Andrew Wiggins (13M), *SNAME & Wilbur N. Landers Scholar*; Matthew Greytak (13U), *SNAME*; Daniel Sura (13M), *SNAME*; Sacha Wichers (13WD), *SNAME*; and Celeste Fowler (13WD), *WHOI Presidential.*

Be sure to congratulate these students on all their hard work!

Making Waves Staff

Editor in Chief
Bridget Brett

Contributors
Meg Hendry-Brogan
Karl-Magnus McLetchie
Anna Michel
Katarzyna Niewiadomska
Stephen Roe
Sheila Saroglou
Tech News
Kathryn Wasserman
Alex Techet

We're on the Web!
web.mit.edu/13seas

Submit your news, notes, and OE anecdotes to:
13seas-news@mit.edu

13SEAs Officers *13seas-officers@mit.edu*

President
Mr. Karl-Magnus McLetchie

Seminar Coordinator
Ms. Meghan Hendry-Brogan

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Looking Ahead...

Date	What's going on?
Jan. 30	Last Day of IAP
Feb. 2	Spring Registration Day
Feb. 3	Spring Term Begins
Feb. 6	iQuarium Launch; Hart Nautical Gallery 4-6pm
Feb. 6	June '04 Degree App. Deadline
Feb. 13	Lunch Seminar: Rod Evans, SAIC
Mar. 12	Lunch Seminar: Nick Hahn & John Gullotti, Electric Boat
Apr. 1	Lunch Seminar: Tom Brewton, Maritime Management Consulting
Apr. 28	Lunch Seminar: Mike Lombardi, Applied Subsea Technologies
TBA	Lunch Seminar: Bob Meyer, Noesis Inc.

Highlights in the next Making Waves...

- Good-bye to Kathy De Zengotita
- The iQuarium Display Unveiling

Look for the next Making Waves in March!