



Making Waves

Letter From the Cap'n

Contributed by Gabe Weymouth (G)

Ocean Engineering Students and Alumni,

With the merger of the Ocean Engineering and Mechanical Engineering Departments a few months behind us all, I wanted to give you an update on the status of your "Course 13 Student Engineering Association", 13SEAs.

The 13SEAs was founded to advocate relations with the marine technology societies and to encourage student contact with industry and alumni in the ocean engineering field. In the wake of the merger, and with the founding of the new Center for Ocean Engineering, we believe it is more important than ever before that there be a student group dedicated to these efforts.

With that in mind, the 13SEAs has another semester full of interesting activities and lectures already underway. In addition to continuing the joint OE-ME socials, we are organizing new events ranging from BBQs in the boat club to a day trip in Gloucester for deep sea fishing. We have also just completed a t-shirt design contest among our student members and will be producing those new shirts in time for summer wear.

We are also continuing with the lunchtime lectures featuring industry and research leaders in the field of ocean engineering. This semester we are excited to host Dr. Massimo Ferrigno and world-record holder Tanya Streeter as they present a lecture on Human Performance in Freediving Tuesday April 26th. There will also be a lecture this semester on Chinese Maritime History given in the Clipper Ship Exhibit room of the MIT Museum on May 5th, followed by a faculty mixer afterwards.



*The New 13SEAS T-Shirt Design
by Yile Li (G) and Tadd Truscott (G)*

Maintaining the ocean engineering community at MIT in the coming years is in all of our best interests and the 13SEAs will be able to help with that. If you have any questions or are interested in helping out, feel free to drop me a line. Also, look for updates to these activities and more 13SEAs information on our newly renovated website <http://web.mit.edu/13seas/www/>.

Thank you for your time,
Gabriel Weymouth
Graduate President of the 13SEAs

- Congratulations to Ocean Engineering Graduates!

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13SEAS Luncheon Series

Contributed by Jordan Stanway ('06)



A Nice Shot of VIV from the Seneca Lake Field Experiments

This term, the 13SEAS lunch seminars were kicked off by Susan Swithenbank (G) presenting her "Results of the Lake Seneca Field Experiments in VIV." She explained the reasons her research group is studying this phenomenon, how they are processing the data, and what preliminary results they have found.

Matt Greer, an MIT/WHOI alum at ExxonMobil, presented a talk on "Marine and Ocean Engineering Career Opportunities at ExxonMobil." LNG tanker design and other topics were discussed, and questions ran for a long time after the talk had ended.

Shashank Karve, another MIT graduate, came from MODEC International to speak about "What's On The Horizon For The Deepwater Production Industry." He discussed the growing global energy needs, the declining production, and the need for new talent in the energy industry.

Upcoming talks include a visit from Dr. Massimo Ferrigno of Brigham and Women's Hospital and World-Class freediver Tanya Streeter, presenting "Human Performance in Freediving." This talk will be given Tuesday, April 26 at 3pm in room 6-120. Tanya was called "The World's Most Perfect Athlete" by Sport's Illustrated in 2002, and has set multiple freediving records in her short career. In addition, on Thursday, May 5th at 6:30pm at the MIT Museum, Dr. Jin Wu, distinguished oceanic scientist and former Minister of Education of the Republic of China, will discuss the historical, scientific and technological aspects of the Chinese voyages set out over 600 years ago.

SNAME Student Paper Night

Contributed by Matt Unger (G)

This past February, the New England Section of SNAME held its monthly meeting at the MIT Faculty Club. But this was by no means your "run of the mill" SNAME meeting; instead, it was the Student Papers Night where the professionals step aside to hear the presentations of students from throughout the New England region. While it has not been confirmed, the meeting must hold some record for the most papers presented at any one SNAME section meeting. In all, nine student papers were presented!

If there is one word to describe the Student Paper Night, that word must be *variety*. Allow me to explain. The meeting was attended by a *variety* of people from the professional and academic realms. Students from a *variety* of schools (MIT, U.S. Coast Guard Academy, University of New Hampshire and Maine Maritime Academy) presented their papers during the evening. The presentations covered a *variety* of aspects (practical, experimental, and theoretical) of a *variety* of subjects (naval architecture, marine engineering, and ocean engineering). And all of this was squeezed into one evening's event!

There were three papers submitted by students from MIT:

- *ROV Castor: Design of a Multi-Mission Remotely Operated Vehicle* – MIT – H. Brundage, S. Clark, L. Cooney, B. Downey, J. Downey, H. Lichter, B. Myhre, T. Pennington, M. J. Stanway, T. Stefanov-Wagner, K. Stiehl, and D. Walker
- *Sailing the Flettner Rotor: The Spirit of the Challenge* – MIT – J. Austin-Breneman, J. Chandler, S. Fantone, J. Gilbert, M. Loftus, O. Leitermann, C. Malesci, A. Yandell
- *Geometry and Performance of Stereolithographed Model Propellers 5449 and 5450 at NSWCCD* – MIT – E. Karlik

All the student presenters should be commended for a job well done! The evening was an opportunity to show SNAME members what students are capable of doing, and in my opinion this was definitely accomplished. I, for one, am looking forward to an equally interesting and diverse Student Papers Night next year.

13.017 Design of Ocean Systems I

Contributed by Tim Pennington ('06)

It seems that every year the members of the class of 13.017/.018 wait with much anticipation to receive the design challenge they will work on for the next two terms. Well, we (the 2005 students of this subject) were certainly no exception. When Dr. Franz Hover and Mr. Christiaan Adams presented the the challenge statement which read: "Your goal is to create a new capability in ocean observation, by constructing a small, autonomous surface vessel system capable of tracking a subsurface acoustic source." we were very excited.

A unique dynamic of our class this year is that six out of the eight of us participated on the Remotely Operated Vehicle team last year, and most were on the same team the year before that as well. This has proved helpful not only because we have worked together before and experienced design challenges as a group, but also because of the our specific work with under water robotics. This year's design project's most obvious application is for a surface vehicle which can follow an autonomous underwater vehicle and serve as a communications link between the radio frequency (RF) transmissions and an acoustic modem.



Jordan Stanway ('06) tests out the kayak.



Heather Brundage ('06) tests the acoustics system

So far the team has a kayak, a trolling motor, some acoustic sensing electronics, and a lot of great ideas. We have spent the last month or so testing out those ideas with multiple experiments including an incline test for stability of the hull and acoustic ranging tests on the dock of the sailing pavilion. From these, and other tests, we have developed a tentative design which includes a bow driven vessel with three hydrophones (including one in the bow and two mounted laterally off the stern). The vessel will also include a Global Positioning System(GPS) way point navigation system which will allow it to autonomously navigate a preset, or continuously updated via RF, list of way points.

The current goal for the project this term is to have solidified our solutions to the individual subsystems and to have integrated those components into the hull. Then, next term when we return for 13.018, we will be prepared to launch the boat and begin field testing. There is still a lot to do this spring, but with each new design we get more excited about

Underwater Intervention 2005

Contributed by Lauren Cooney (ME '06)

From February 12th-15th, I traveled down to New Orleans for Underwater Intervention 2005 as a recipient of the MTS ROV Committee Scholarship. On Sunday and Monday, I had the opportunity to be the student representative at the Marine Technology Society's Strategic Planning Meeting. Learning about how such a large society functions was very interesting, and it was inspiring to be able to participate in such an influential organization. The organization's dedication to students was very apparent, and we arrived at several plans for supporting students both during their time spent in school and afterwards.

On Monday and Tuesday, I went to UI 2005, visiting booths and attending technical sessions. I got to see some really cool technology used to explore our oceans. The coolest demonstration was probably the SeaBotix booth, where I got to drive around an incredibly maneuverable small ROV in a large tank. I also had the chance to meet a lot of interesting people at the conference, who had great stories to tell about ocean engineering.

I'd like to thank Chuck Richards Jr., Drew Michel, and Judy Krauthamer for such a wonderful opportunity!

13SEAS Website

Check out the revamped
13SEAS website!
web.mit.edu/13seas/www

Email

Webmaster

Extraordinaire

Harish Mukundan

harishm@mit.edu

with comments.

ROV Team

Good luck to the MIT
ROV Team as they
compete at the
MATE/MTS ROV
Competition, June 17-19
at the NASA Neutral
Buoyancy Laboratory in
Houston, TX.
Email naiad23@mit.edu
for details.

Calling all alumni...

Do you have fond
memories of your time in
Course 13? Do you have
sea stories to share?

Have you learned
important life lessons in
jobs or in the Navy that
you would like to share
with current students and
other alumni? If you
would like to be in our
next alumni spotlight,
Email lacooney@mit.edu

Bridget's Trivia Time!

Contributed by Bridget Downey ('06)

1. Sailing – What does “wing and wing” mean?

- a. A racing term for the point at which an overtaking boat passes directly abeam of its rival
- b. Downwind run on a two sailed boat with one sail to port and one to starboard
- c. The name for sails on a two masted boat with a wishbone boom
- d. The action a small boat takes when thrust up by both a breaking wave and a gust of wind.

2. Maritime History – What vessel held the record for the fastest Atlantic crossing for so long a race to challenge her record was her record was held nearly a century later?

- a. America
- b. Endeavor
- c. Atlantic
- d. Cutty Sark

3. Navigation – If you spot a red over white masthead light, what should you do?

- a. Heave to for a Coast Guard random inspection
- b. Duck and cover – it's a minesweeper
- c. Maintain your course and speed, you are the burdened vessel
- d. Steer clear, there may be fishing nets in the water

4. Boatbuilding – Which of these materials was not traditionally used for caulking?

- a. Cement
- b. Tar
- c. Oakum
- d. Flax

If you're looking for more of a challenge, see

<http://sailing.about.com/library/weekly/aatriviaquizg.htm>

Answers: 1(b), 2(c), 3(d), 4(d)



*Congratulations to esteemed 13SEAS
President Gabe Weymouth (G) for
winning the St. Patrick's Day Spirit
Award at the Thirsty Ear Pub!*

Professor Spotlight In His Own Words: Michael Triantafyllou

Prof. of Mechanical and Ocean Engineering, Michael S. Triantafyllou, was selected Director for the Center of Ocean Engineering at the beginning of this year. With the new identity for Ocean Engineering at MIT, Prof. Triantafyllou was asked about the Center, as reported by Bridget Downey ('06).

What are the short-term goals of the Center for Ocean Engineering (COE)?

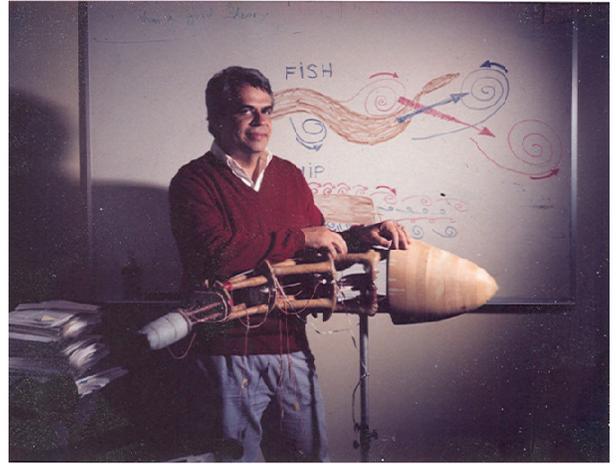
Establish an exciting ocean engineering web site and help in the transition from a department to a unit within Mechanical Engineering.

What are the long-term goals for the COE?

- 1) Identity. Provide an enduring ocean engineering identity, giving visibility to the outside world of MIT's commitment to the oceans.
- 2) Focus. Be the focus point of ocean-related research work at MIT.
- 3) Education. Support the graduate programs in ocean engineering, provide resources and guidance for undergraduates studying ocean engineering, inform potential MIT students, and support relevant student organizations.

Besides being a part of the MechE Dept, what makes the COE unique from the previous Dept of OE?

There are many opportunities to expand the OE activities building bridges with the ME laboratories and faculty. There are dangers for the field too, such as loss of critical mass and focus. The Center comes at a critical time to help create opportunities and eliminate the dangers.



How do you define your role, as Director of COE?

I will be the facilitator for all students and faculty in focusing our work and preserving our identity and excellence in the field.

What is one thing you hope to see, as a result of the creation of the COE?

I hope to see OE students feeling at home in this center and organizing exciting activities just as 13Seas has been doing over the past years.

We thank Prof. Triantafyllou for his enthusiasm and dedication toward advancing the Center for Ocean Engineering!

Discover Ocean Engineering 2005



The 8th annual Discover Ocean Engineering (DOE) Freshman Pre-Orientation Program will be held from Tuesday, August 23rd to Saturday, August 28th. Ocean Engineering undergraduate and graduate students are encouraged to participate in several of the DOE events and talk to DOE students about MIT and Ocean Engineering. If you are interested in helping out, please contact Super Mentor Jordan Stanway (squall@mit.edu).

Alumnus Spotlight in Her Own Words: Katie Wasserman



Katie (left) at SEA Semester

In May, I moved to the ExxonMobil Upstream Research Company and spent the blazing-hot summer playing ultimate frisbee and hanging out with Meg Brogan (MIT OE '03) and some of the 400 other Exxon summer interns in the Houston area. We had an ExxonMobil beach volleyball team called Exxtreme Exxon and played (and beat the pants off) other teams in the oil and gas league.

Houston is a fun town, and Exxon is a great company with great people, but I missed Froude numbers, transport factors, advanced hull form concepts, and all things high-speed and naval. So I accepted an offer to work for JJMA in the D. C. area. Before settling into a 9-5 job, I wanted to travel a bit and be on the ocean. I had talked to Heather Brundage OE '06 about the Woods Hole SEA Semester program, and it sounded exactly like what I wanted to do. Adventure on the high seas! I sailed on the SSV Corwith Cramer from St. Croix, USVI, to Bonaire, Netherlands Antilles, to Port Antonio and Discovery Bay, Jamaica, to Key West.

Greetings from the Washington, D.C. area. I'm in Alexandria, Virginia working for the naval architecture firm, formerly known as John J. McMullen Associates, Inc., now known as Alion JJMA Maritime Sector. Since I started here in January, it's been naval arc nirvana -all ships all the time. I've gotten to do launch calculations, topside integration, survivability (and more!) and I don't even have my security clearance yet.

To all the undergrads who are wondering, is there life after graduation? The answer is...I don't know. You'll have to find out for yourselves. But here's the story of my life after I graduated in February, 2004.

I was in Houston for 6 months working for ExxonMobil. My internship started out at the ExxonMobil Development Company, where I worked for MIT OE alum Matt Greer, and ran into MIT alum J. D. McNally who minored in OE.



SSV Corwith Cramer



Student Spotlight: Anna Michel

I am now in my 5th year as a graduate student in Ocean Engineering. I did my undergraduate degrees at MIT in Biology and Chemical Engineering and then my master's degree in Ocean Engineering at MIT. For that degree, I worked in the Water Tunnel under the direction of Prof. Triantafyllou. I studied the hydrodynamics of anguilliform swimming; it's the kind of swimming motion exhibited by sea snakes and eels!

After my master's, I joined the MIT-Woods Hole Oceanographic Institution (WHOI) Joint Program in Oceanographic Engineering. I am currently working on my PhD in the WHOI Deep Submergence Lab under the direction of Dr. Alan Chave in the area of chemical sensors. New chemical sensors are needed for present day expeditionary oceanography. In addition, the ocean sciences are entering a new phase involving long term *in situ* observations. In order for the new ocean observatories to meet their full potential, the development of new sensor technologies is needed.

Over the past four decades, a new spectrochemical technique, Laser Induced Breakdown Spectroscopy (LIBS) has been under development for the identification of the elemental constituents of materials. This technique uses a laser to create a spark or plasma on a sample. The plasma emission can then be analyzed with a spectrometer. From the spectral data, the elemental composition of the sample can be determined.

The development of a marine LIBS sensor would be a useful tool for studying many different systems in the ocean environment, especially mid-ocean ridge hydrothermal vents (which are the focus of my work). To determine the feasibility of using LIBS in the ocean and more specifically at hydrothermal vents, significant proof of concept work is being carried out.



Anna with the JASON vehicle

My work uses a laboratory based system for validating the technique in a simulated deep ocean environment. A high pressure chamber, capable of safely reaching 300 atm, was designed and built for investigating the effect of the ocean environment on the LIBS signal. I am currently working at MIT in the laboratory of my MIT advisor, Professor Alex Techet, using a Nd:YAG PIV laser system to conduct LIBS experiments.

Since I am in the Joint program with WHOI, I split my time between MIT and WHOI, and I live on Cape Cod. One of the things that I have enjoyed the most about my time in the joint program is the opportunity to be involved in all aspects of oceanography. My work is very cross-disciplinary and I had been able to work with scientists and engineers from different departments. In addition, I have gone on two research cruises which focused on building the Hawaii-2 Observatory, a cabled observatory between Hawaii and California, and on several geology field trips. In a few weeks, I am going to Cyprus for a field school focusing on mid-ocean ridges and hydrothermal vents!

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web.mit.edu/13seas/www

Submit your news,
notes, and OE
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Looking Ahead...

Date	What's going on?
April 26	Tanya Streeter Lecture
April 30	13SEAS Fishing Trip
May 2-5	OTC 2005 (Houston, TX)
May 5	Dr. Wu Lecture/Faculty Mixer
May 13	BBQ at Sailing Pavilion
May 12	Last Day of Classes
May 16-20	Finals Week
June 3	Commencement
June 20-23	OCEANS '05 Europe (Brest, France)

Highlights in the next Making Waves...

- Farewell to OE Class of 2005
- Results of MATE/MTS ROV Competition
- And as always... spotlights on Ocean Engineering professors, students, and alums!

Look for the next Making Waves in June!

