



# Making Waves

## SNAME Student Paper Night

The New England Section of SNAME held their Annual Student Paper Night on Thursday, 13 February 2003, at the MIT Faculty Club. Over 60 SNAME members were in attendance with large contingents of students from the U.S. Coast Guard Academy and MIT. The evening began with a pleasant social hour and tasty meal that progressed to an intense and intellectually stimulating series of student papers. Nine MIT students and one Coast Guard Cadet presented eight papers at the meeting. The papers were:

### Undergraduate Students:

"Modularity: The Multi-Mission Ship That Isn't" by Cadet 1/C Eric Burley (USCGA)  
 "A Chemical Sensor to Aid in the Search for Underwater Archaeological Sites" by Johanna L. Mathieu '04  
 "Drag Reduction of an Elastic Fish Model" by Karl-Magnus W. McLetchie '02  
 "A SWATH Model for the Charles River" by Meg Hendry-Brogan, '03 and Sheila Saroglou, '03



### Graduate Students:

"Kemonaut: An Odyssey Class AUV Platform for the NEREUS Underwater Mass Spectrometer" Richard Camilli  
 "Hull Form Optimization for Monohull Ships" by Justin A. Harper  
 "Computation of Acoustic Scattering from Axi-Symmetric Shells" by Charles Low  
 "Forecasting System and Theater Level Impacts of Technology Infusion on Conventional Submarine Design" by Kostas Psallidas and John Hootman

We look forward to sending many of the presenters to the National Meeting!

## MIT Students Tour the ship replica *Fame*



Burnham Shipyard, a historic shipyard in Essex, MA. The shipyard is building a replica of the 1812 Privateer, *Fame*.

The group first toured the Essex Shipbuilding Museum to gain an understanding of historical context. They were then introduced to the basic methods and tools used for centuries to loft and construct wooden vessels. Finally, they all stepped foot on the lofting floor, spoke face-to-face with the chapped-faced, calloused-handed men who were crafting

During IAP, five 13SEAs students joined lofting and design classes during a visit to the H. A.

*Fame* (in the cold!), and met the man of the operation himself, Harold Burnham. Their introduction to the 31 year old boat-builder, who was standing on the lofting floor in a torn sweater, filthy jeans, and shoes with "ventilation" for his toes, was quintessential. Mr. Burnham's family has been building boats on the same plot of land for centuries. And even with his seemingly infinite experience, and the sense that naval architectural intuition ran in his veins, he humored questions with replies like "I don't know, I just make it up as I go." We should all be so lucky as to have the level of craftsmanship and vision that he seems to possess. Overall, the visit was a wonderful sort of 'grass-roots' experience for engineers! It was like being transported back in time to the genesis of our industry! Special thanks to Kurt Hasselbach of the MIT Museum for coordinating the event!

- Next 13SEAs Lunch on March 19<sup>th</sup>
- Congratulations New Doctoral Students!
- Welcome New Students!

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## Student Spotlight: Meet the Sophomore Women

For this month's student spotlight, we have chosen to interview the three sophomore women majoring in Ocean Engineering, Olivia Leitermann, Maggie Loftus, and Addie Yandell (photo on page 3).

### Why did you choose Ocean Engineering?

*Olivia:* I chose OE because it is a small department and the professors really care about the students and how they are doing. After my first term, I had had about enough of

giant lecture classes. Also, OE is a neat field where you have to consider entire systems, and need to learn about the electronics, fluids, structures,



**Olivia Leitermann**

software, power systems, and everything else that goes into a vehicle. Since I'm still not sure what I'd really like to be when I grow up, learning some about a bunch of different things is a huge advantage. The systems approach also goes a long way towards helping students to consider everything that's going on, and making better engineers of us by not looking at any one aspect of a vehicle exclusively.

*Maggie:* I chose OE because I really love the ocean and boats. The curriculum includes most of the different kinds of engineering, and I like the idea of integrating all of those aspects into one project instead of just focusing on the electronics or the mechanics or something. I like the challenge associated with waterproofing all of our components, and the projects that we do interest me more than a lot of the other majors.

*Addie:* I came to MIT with a very good start on a math major with a possible double major in course 9. However, those plans changed thanks to the advice of my dad. We decided that since I love swimming and other water sports Ocean Engineering would be a good department to investigate. Fortunately, Melissa Harness, invited me to her 13.018 presentation my freshman year. I really liked the fact that the Ocean Engineering curriculum has a group design project that involves so many aspects of engineering. I got to know some people in OE and decided that I really liked the people and size of the department and got a great UROP!

### What extracurricular activities are you involved in?

*Olivia:* I play hockey when there is ice and rugby when there is not. You should all play rugby. And hockey too. I am also an EMT and I work with SEMS on campus. Occasionally I do theater things, mostly tech.

*Maggie:* I am on the sailing team. And I am in AXO, so I do a lot of stuff planning events with them, but other than that I'm not in any organized groups. I spend a lot of time on my UROP.

*Addie:* I am in Sigma Kappa and am the PR Chair for 13SEAs. I am the Vice-Chair of the Undergraduate Association Judicial Review Board. I am also a member of Campus Crusade for Christ here at MIT and am one of a team of directors for Park Street Church. Finally, during the last semester and IAP I was involved with Leadershape as the Logistics and On-Site Coordinator. I also absolutely love swimming and spend every spare moment in the pool. You could say that I'm double majoring in extracurricular activities.

### What are your research interests?

*Olivia:* Personally, I'm most interested

in AUVs and ROVs, but I have no idea, really, where I'll end up a few years from now. Plus, what better than to spend a summer working on a boat someplace warm? I grew up near the ocean and enjoy swimming and playing on the shore.

*Maggie:* I want to design sailboats, cruising yachts, and racing yachts



**Maggie Loftus**

and hope to be in on the construction side in addition to the design side. I think it would be fun to see my project go from start to finish and

to know that I was important in making it happen.

*Addie:* AUVs definitely, but I haven't figured out what about them is so appealing. I think the cool toy aspect may have something to do with it.

### Do you have a UROP or a current research project?

*Olivia:* During the fall semester, I had a UROP with John Leonard. I took the Edgerton Center machine shop class and made a pressure housing for a camera that may be installed on an ROV.

*Maggie:* I have a UROP in the Water Tunnel helping Melissa Harness with her research. We are studying the forces generated by a foil flapping in 3D. Right now we are trying to determine how efficient the propulsion is so we can determine if the foil can be used on vehicles. There is actually an AUV in construction right now that is going to use foils like ours.

*Addie:* I used to work with Victor Polidoro and Stephen Licht on their Flapping Foil AUV, however this semester I have switched over to the MATE ROV design competition. My team is designing a ROV that will go down into a mock Titanic and pick up PVC sea probes. It has been fun so far and has given me a chance to couple my interest in cool toys with my interest in leadership.

## 13SEAs Members Attend MTS New England Meetings

During IAP, a group of 13SEAs members drove down to attend the January meeting of the MTS New England section at SAIC in Newport, RI. This meeting featured a talk about the current and future developments of UUVs given by Mike Keegan of the UUV division of the Naval Undersea Weapons Center (NUWC). This talk highlighted the present and future of AUVs and discussed a few potential paths to create the AUVs of the future. In particular, Mike spoke about one of the current AUVs used by NUWC, the Manta (MTV). He discussed proposed fleet offensive and defensive activities that we will strive to develop in the future. There was also discussion of the important role that UUVs will play in the future of Naval warfare.

On February 19<sup>th</sup>, a large group of undergraduates, most of whom are competing in the MATE ROV competition, attended the February MTS meeting. This meeting was held at WHOI and featured a talk by Matt Naiman as well as a tour of the Deep Submergence Lab. The talk focused on the development of Jason II ROV and DSL-120A



Addie, Katie, Meg, & Justin in Newport.

vehicles including the AUVs Seabed and ABE, and the sister ROV of Jason, Isis, which is currently at sea. It highlighted Isis, which is being built by WHOI for the Southampton Oceanography Centre (UK). The group was shown the vehicle itself as well as the control center.

MTS New England's theme for this year is AUVs, so look for more interesting meetings to come!

## MATE ROV Competition: MIT Update

The second annual Marine Advanced Technology Education **ROV Design Competition will be held at MIT's new Zeisger Center Pool June 19-21, 2003.** The competition, geared towards both college and high school students, features two different classes, the open class and the 12/25 class, each with a different challenge. MIT has entered a team into both classes. The goal of the open class is to design and build a search and rescue ROV to retrieve a stranded ROV from a mock wreck of the Titanic. The stranded ROV is 2ft<sup>3</sup>, ten pounds negatively buoyant with an unknown center of mass, and must fit through an opening that is 4 ft. x 4 ft. Moreover, the wreck is dark and contains unknown debris. The 12/25 class must design and build an ROV to retrieve small scientific probes from the wreck. This ROV must be small and agile in order to successfully find and recover the objects.

The open class team includes five students: Katie Wasserman '04, Kate Baker '04, Johanna Mathieu '04, and Stephanie Fried '03 in the Ocean Engineering Department, and Amit Hathi a CMI student in the Mechanical Engineering Department. Professor

Alex Techet is the team's advisor. So far the team has concentrated primarily on fundraising and conceptual design work. **They have begun construction of their ROV's metal frame** and have begun to price and order parts.

The 12/25 team is comprised of eleven students: Jesse Austin-Breneman '05, Steve Fantone '05, and Addie Yandell '05 in the Ocean Engineering Department, and freshmen Bridget Brett '06, Heather Brundage '06, Noel Davis '06, Tim Pennington '06, Rob Radez '06, Sarah Sheppard '06, Jordan Stanway '06, and Thaddeus Stefanov-Wagner '06. Dr. Franz Hover is the team's advisor. The freshmen who plan on majoring in Course 13 see the project as **an opportunity to broaden their knowledge of the field.** Team members got a head start on term and were able to begin designing their ROV over IAP. They will begin its construction within the next few weeks. The 12/25 team must compete in a regional competition that will be held April 22-23, 2003 at Cambridge Rindge and Latin High

School before going on to the June competition.

Both teams traveled to Woods Hole to attend the Marine Technology Society February meeting that included a presentation about WHOI's new ROV, Isis, in order to learn about real-world designs and applications of ROVs.

The open class team and the 12-25 team are sponsored by the Ocean Engineering Department, MIT Sea Grant, the Edgerton Center, IEEE/OES, and the MATE Center. Supplies and expertise are being generously donated by Cape Shore Welding Inc.

See the 12/25 team's website at <http://web.mit.edu/radez/www/rov/index.html>.

To learn more about the competition visit: [http://www.marinetech.org/rov\\_competition/index.html](http://www.marinetech.org/rov_competition/index.html).

If you have any questions, would like to sponsor the teams, or would like to volunteer during the competition, please feel free to **contact [rov@mit.edu](mailto:rov@mit.edu)**.

**Congratulations to our newest doctoral students!**

- Areti Kiara
- Bertrand Renard
- Julie Chalfant
- Don Eickstedt
- Talha Ulusoy
- Konstantinos Pelekanakis
- Tianrun Chen
- Stephen Licht
- Wenyu Luo

**13SEAs welcomes the departments new students!**

- Marianda Papaioannou 13B
- Gabriel Weymouth 13M
- Ioannis Bertatos 13M
- Stilianos Kasselakis 13B
- Khary Bridgewater 13U

**Special Thanks...**

to the Ocean Engineering Department, Edgerton Center, MIT Seagrant, IEEE OES, and Cape Shore Welding for sponsoring the MIT MATE ROV Teams!

**13SEAs in the Community!**

Five students recently volunteered at the Ocean Science Bowl!

- Meg Hendry-Brogran
- Sheila Saroglou
- Sarah Shepard
- Joe Edwards
- Areti Kiara

Great job helping high school students learn about the ocean!

**OE Students in the News...**

<http://wired.com/news/technology/0,1282,57946,00.html>

**A Report from the Big Easy**



On February 8th-10th, Karl-Magnus Mcletchie traveled down to New Orleans to attend the 2003 Underwater Intervention. This conference brings together all of the world leaders in

ROVs, AUVs, and Commercial Diving. He had a very educational evening on Bourbon St., attended a day-long sonar tutorial, and saw an exhibition of current ROV technology. He also attended the awards luncheon, where he was presented with the 2003 ROV Scholarship, awarded by MTS and the ROV Committee.

Karl had a great time and met a lot of people that have been successful through ocean engineering. He would like to thank Chuck Richards Jr. and Drew Michel Sr. for their hospitality and for giving him the opportunity to attend the conference.

**IAP and February 13SEAs Lunch Seminars**

On February 21<sup>st</sup>, Glenn Ashe (SM '75) of the American Bureau of Shipping (ABS) presented "The Role of Classification and Certification in the Ship Design and Construction Process." This interactive talk reviewed the historical development of classification societies as well as their roles in the modern marine industry. Specific examples of maritime law and regulation as well as recent maritime events were discussed. Alum, Rich Wilson, came to share his sea stories with the department on February 25<sup>th</sup>. Wilson shared his stories of trying to beat historical sailing records as part of a project to excite children about

science, geography, and history! To learn more about his current voyage, check out [www.sitesalive.com](http://www.sitesalive.com)! On March 3<sup>rd</sup>, NOAA Environmental Hero, Bob Michelson, presented the REEF Environmental Education Foundation's new Northeast Fish Identification Program, sponsored by The Stellwagen Bank National Marine Sanctuary. Students who participated in the class learned to identify 56 species of local fish! Hopefully these students will see some of these fish next time they dive in the area! We are always looking for more speakers, so if you would like to present a seminar to the department, please email [amichel@mit.edu](mailto:amichel@mit.edu)!

**Yo Ho Ho and a Bottle of Beer**



**Peg-leg McCord & the Dread Pirate Vandiver.** Yarr! The 13SEAs 4th semiannual student/faculty mixer was a success. The festive pirate theme was wonderfully complemented by the delicious sushi from Jae's Cafe and the great beer selections of John Hootman and George Katsoufis.

Many thanks to One-Eyed Burke for supervising the event and to the professors who attended the event for their support.



*Magnus von Magnussen and his new pet.*

## What's Your IAP Story?

### Addie Yandell

Addie was the logistics/on-site coordinator for MIT's Leadershape, a leadership training program that is held every IAP. Addie was asked to be a part of what makes it happen and says it was really rewarding to see the participants learning a lot and stretching themselves to meet personal goals set during the week. Part of the program challenges participants to come up with a vision for the future, something that they feel passionate about and would like to see happen. Her best experience was realizing what an amazing bunch of students surround her at MIT.

### Johanna Mathieu

Johanna traveled to England to do research at the Southampton Oceanography Center and the University of Southampton Institute for Sound and Vibration in acoustics and underwater archaeology with Professor Justin Dix. Her project was to look at acoustic backscatter trends from sediment and archaeological wood in order to establish some way of distinguishing between the two so that underwater archaeologists will have a better way of locating sites using sonar data alone. She performed many sonar experiments in a large indoor tank, first on sediment and then on a piece of 5<sup>th</sup> century archaeological wood that was once part of a Viking ship! Besides research, Johanna also got to spend a week traveling around England visiting places such as London, York, Birmingham, Portsmouth, Cambridge, and Paris!!



### Anna Michel and Katy Croff



In December, graduate students Anna and Katy traveled throughout the Caribbean as explorers of the sea through a unique partnership between Royal Caribbean International, the University of Miami's Rosenstiel School of Marine and Atmospheric Science, NOAA, and NSF. Royal Caribbean's Explorer of the Seas vessel has been equipped with state of the art oceanographic and atmospheric laboratories. Since 2000, the ship has sailed a weekly Eastern Caribbean itinerary. This repetitive cruise track allows scientists to collect information continuously, supplying a detailed data set never before possible. These observations will provide improved descriptions of seasonal to inter-annual variability in ocean-atmosphere interactions in this tropical regime.

Scientists are welcomed aboard to use the laboratories for their research for a minimal cost. When the labs are not in use, scientists and graduate students are invited to spend a week aboard the ship to present their research to the ships passengers and giving tours of the facilities. These talks and tours educate the passengers about the ocean and atmosphere and the instruments used to study them. Katy gave a talk on Deep Sea Archaeology and High-Tech Tools and Anna spoke about the oceanographic and atmospheric instrumentation aboard the ship. Between talks and tours, Katy and Anna found time to be real cruisers. They went scuba diving, ice-skating, and rock climbing, watched shows, and ate lots of food. In addition, they visited Puerto Rico, St. Thomas, St. John, St. Maarten, and the Bahamas during the cruise! If you are interested in presenting your research aboard the Explorer, check out the website at <http://www.rsmas.miami.edu/rccl>.

### Did you know?

The first engineering degree granted to a woman by MIT was in 1903 to Lydia G. Weld who received a degree in Naval Architecture and Engineering!

### Are you an alumnus with some great stories to tell?

We'd love to include you in a future issue!  
Email [jmathieu@mit.edu](mailto:jmathieu@mit.edu) if you are interested!

### 13SEAs Presents...

John Delaney, UW, and the Neptune Project, an amazing underwater observatory. March 19<sup>th</sup>, 12-1:30PM, MIT Student Center, Room 491. All are invited. Lunch will be served.  
[www.neptune.washington.edu/index.html](http://www.neptune.washington.edu/index.html)

## Alumni Spotlight: Roger Maloof in his Own Words

"Sea Hunt," an old television show, first gave me a passion for the undersea world. Growing up in Springfield, MA gave me summers at the Cape and local ponds where I could don a mask and fins to see the wonders of the watery world. But I took a detour from this interest that was to delay and later propel me towards my dreams. This delay was Vietnam. In 1970, I was 17 and was affected by the propaganda of the threat of communism and the Domino Theory. I wanted to do something for my country so I joined the Army and volunteered for Airborne Infantry and eventually was assigned to the only paratroop unit in Vietnam. I'll never forget the day I was dropped into the middle of the jungle in the Central Highlands of Vietnam: it was dark and wet, and those boys who were waiting for me and the other replacement were thin, serious and loaded with as much ammo and weapons as they could carry. The other replacement broke his leg jumping from the helicopter with his 80 pound pack and was immediately put back on the chopper. What was to follow was a time of terror and acceptance of my own death. Needless to say I survived with memories of horror and friendship.

Upon leaving the Army, I went through some rough times but after analyzing my interests and talents I realized my calling was engineering. As an undergraduate at the University of Massachusetts I dug into my studies with the same determination that had gotten me through the War. As I neared the end of my four years I was determined to go to MIT. After talking to the head of the Ocean Engineering Department about my passion to design submarines, I received my acceptance letter. I decided to pursue an Engineer Degree, since a PhD was too academic in relation to being a designer. I lived on Bay State Road behind Kenmore Square and remember those cold walks across the bridge looking at the Smoot lines and thinking, who is Smoot? Though I completed the three year course in two years, I always made time to see Boston, go to events, and enjoy the natural world. My advice to all MIT students is to go for walks along the river and view the world of nature. You will understand your studies more, enjoy learning how the world works, and realize the greatest design engineer of all is nature. Learn from her your skills, study her mysteries, and learn to absorb the calmness of her beauty to keep your life in balance. I've been asked what is my fondest memory of MIT? I'll never forget walking around the buildings by the river and seeing the names of the great scientists and engineers. They seem to be looking down encouraging all to enter and join in the great studies inside. And what was my worst memory? Having a Vice President of the Institute tell me that MIT was not a institute of higher learning but a corporation whose goal was to make money. That may be the goal of some officials but after traveling around the world I can truthfully say MIT is considered by most to be the birthplace of the future solvers of our world problems.

After leaving the Institute, I decided to go where submarines are operated in the worst conditions, the North Sea. It was the time of the great oil drillings. I started in a small submarine and diving company in Aberdeen, Scotland in the UK. My first time at sea, as part of a remote control submarine work crew assigned to survey a new underwater oil pipeline, almost ended in all of our deaths. While running for shelter in a large storm our ship lost all power

three hundred yards from a rocky coastline. We all thought it was the end since no one could reach us from the cliffs and since it was winter the water temperature would kill us all in only a short time. Also, the seas were too rough to launch any sort of lifeboat or raft. Just before we impacted the first rock outcrop

the crew got the engines going again and what had seemed like eminent death was now worlds away.

For the next two years, I ran remote control submarine operations on oilrigs, ships, and even small fishing vessels. My small crews grew close as we weathered great storms, one of which was the largest in 30 years with hundred foot waves. That is a memory that will live with me until my last day.

I returned to the States and took a job with the Deep Submergence Lab at the Woods Hole Oceanographic Institution. For seven years I redesigned the Alvin submersible system and developed scientific instrumentation for ocean research. My dives to the Hot Vents and to 4000 meters are some of my most fond memories. Our dive on the Titanic was a busy time but its success has been appreciated by the whole world. One of my most memorable trips was to the South Seas near the island of Saipan where I was almost attacked, after recovering the sub, by a large shark. It missed me by inches as I somehow made it into the Zodiac and it swam frustrated under the boat with its empty mouth agape.

It was then off to Draper Labs where I worked as a Program Manager for the Ocean Programs working on Unmanned Underwater Vehicle design for the Navy. I left ocean engineering for 10 years while working for the semiconductor industry designing sub-micron motion robots, then to Raytheon to design cars, radar cooling systems and communication systems. My last job was installing a satellite antenna on the Stealth Bomber. When I was allowed to sit in the pilot's seat it made my day!

I stayed away from the sea and the submarines I loved so much too long, so I have left my high paying job in the commercial world to return to the sea. I now work at Portsmouth Naval Shipyard where I am responsible for various systems on our nation's nuclear submarines. I am home again and working at the oldest Naval shipyard in the nation is just frosting on the cake. Getting to ride these subs submerged and traveling to different Naval facilities around the world is worth every minute I spent studying at the Institute.

Was it my MIT degree or my friends that helped my career most? Well my friends got me the interview and MIT got me the job. Enough said.



## Faculty Spotlight- Nick Patrikalakis

Nicholas Patrikalakis is the Kawasaki Professor Of Engineering and holds appointments in the Ocean and Mechanical Engineering Departments. Patrikalakis was born on the island of Crete in Greece. He studied Naval Architecture and Marine Engineering at the National Technical University of Athens and then joined the MIT Ocean Engineering department as a doctoral student.

When asked what his fondest memory of being in the Ocean Engineering Department he says, "The time I completed and defended my PhD thesis in 1983." He has been teaching at MIT for over 17 years. Patrikalakis currently teaches 13.10J (Structural Mechanics), 13.013J (Dynamics and Vibration), and 13.472J (Computational Geometry). As the co-director of the Design Laboratory, his areas of research include computer-aided design and manufacturing, geometric modeling of complex shapes



and their interrogation (areas in which he co-authored a textbook that was published last year by Springer) and software engineering for interdisciplinary ocean simulation. Patrikalakis has words of advice for students in ocean engineering, "Ocean engineering is an exciting field and MIT and

the OE department offer an ideal environment for undergraduate and graduate study of the highest quality. While at MIT, I encourage students to expand their horizons by taking not only OE subjects but also subjects from other departments."

## 13.017/13.018 Final Project: Saga of a SWATH



The SWATH being tested in the pool.

Beginning in the Spring of 2002, six students in 13.017 (Design of Ocean Systems) began designing a functional model SWATH (Small Waterplane Area Twin Hull) boat. One year and countless of hours of work later they had built *Pipe Dream*.

On the first day of the class the instructors, Drs. Tom Consi and Franz Hover, handed out The Challenge:

- 1) To design and build a fully functional remote-controlled model SWATH boat
- 2) To design and implement a system for dynamic pitch control of the SWATH at high speeds
- 3) To quantitatively show the boat's response in waves.

A SWATH boat consists of an upper deck connected to two parallel struts that are each connected to pontoons under water. The small size of the waterplane area allows for much greater stability with longer periods in roll. When driven at high speeds, though, a SWATH can become very unstable, especially in pitch. It is therefore necessary to have a pitch control system to correct for the instabilities.

During the spring term the six juniors in the class- Skip Dise, Stephanie Fried, Meg Hendry-Brogan, Kai McDonald, Sheila Saroglou, and Dan Sura - began by researching existing SWATH designs and learning basics of control that they would need for the pitch control system. By the end of the term, they had designed the model SWATH, done hydrostatic calculations, and detailed the design process.

Two of the team members stayed at MIT over the summer to continue working on the project. Skip Dise worked on CAD drawings of the SWATH; Stephanie Fried assembled and began programming the electronics. As fall term started, the production of the SWATH took

priority and was mostly completed by October. Then came phase after phase of programming and testing.

By the test date in mid-November, the SWATH was able to move on its own power via remote-controlled directions from shore. Problems with the electronics during the test date prevented extensive testing or sensor recording. Also, the pitch control was not successfully implemented. The remainder of the term was spent writing the final report and preparing for their presentation. Despite unavoidable setbacks during the year, both the students and instructors were pleased with the results.



The final touches.

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Prof. Alexandra Techet, MIT OE
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Ms. Jessica Donnelly  
Mr. Stephen Fantone  
Mr. Cosimo Malesci

**Looking Ahead...**

Date	Time	Place	What's goin' on
3/19	12-1:30	Room 491, MIT Student Center	13SEAs Seminar: Dr. John Delaney
3/19			MTS New England Section Meeting
3/22-30			Spring Break
3/27		East Lyme, CT	SNAME New England Section Meeting
4/3	7pm		13SEAs Dinner Seminar: Elynn Montgomery
4/16	12-1	5-314	13SEAs Seminar: Omri Predatzur
4/22-23		Cambridge Rindge and Latin H.S.	MATE Regional ROV Competition
4/23			MTS New England Section Meeting
4/25		Maine Maritime Academy	SNAME New England Section Meeting
5/15			SNAME New England Section Meeting
5/15			Last Day of Classes
5/19-23			Finals Week
5/21			MTS New England Section Meeting
6/19-21		Z-Center Pool	MATE National ROV Competition

Updates: <http://web.mit.edu/13seas/www/events/calendar.html>

