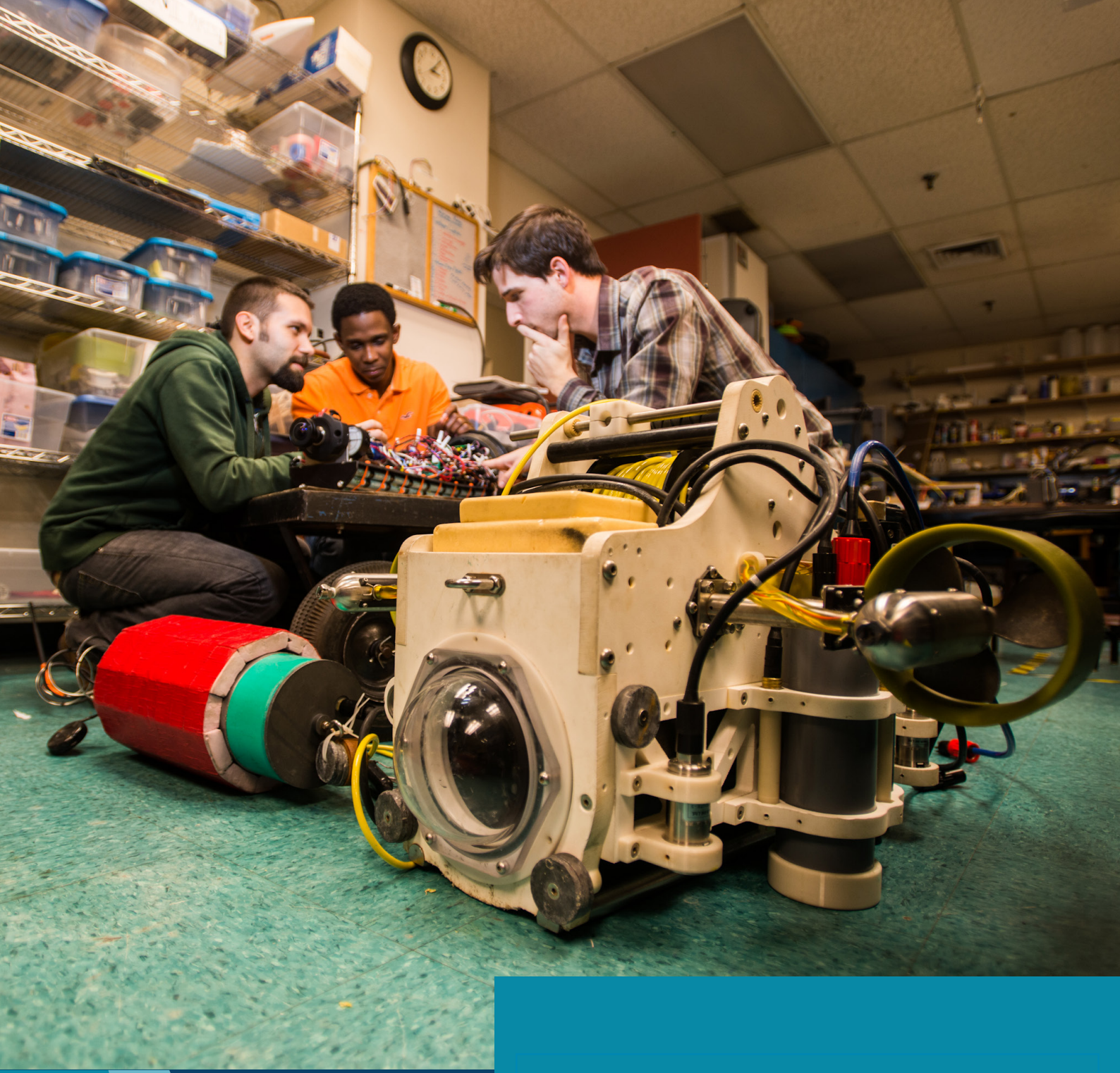


MIT SEA GRANT COLLEGE PROGRAM
2014 SITE REVIEW BRIEFING

Massachusetts Institute of Technology

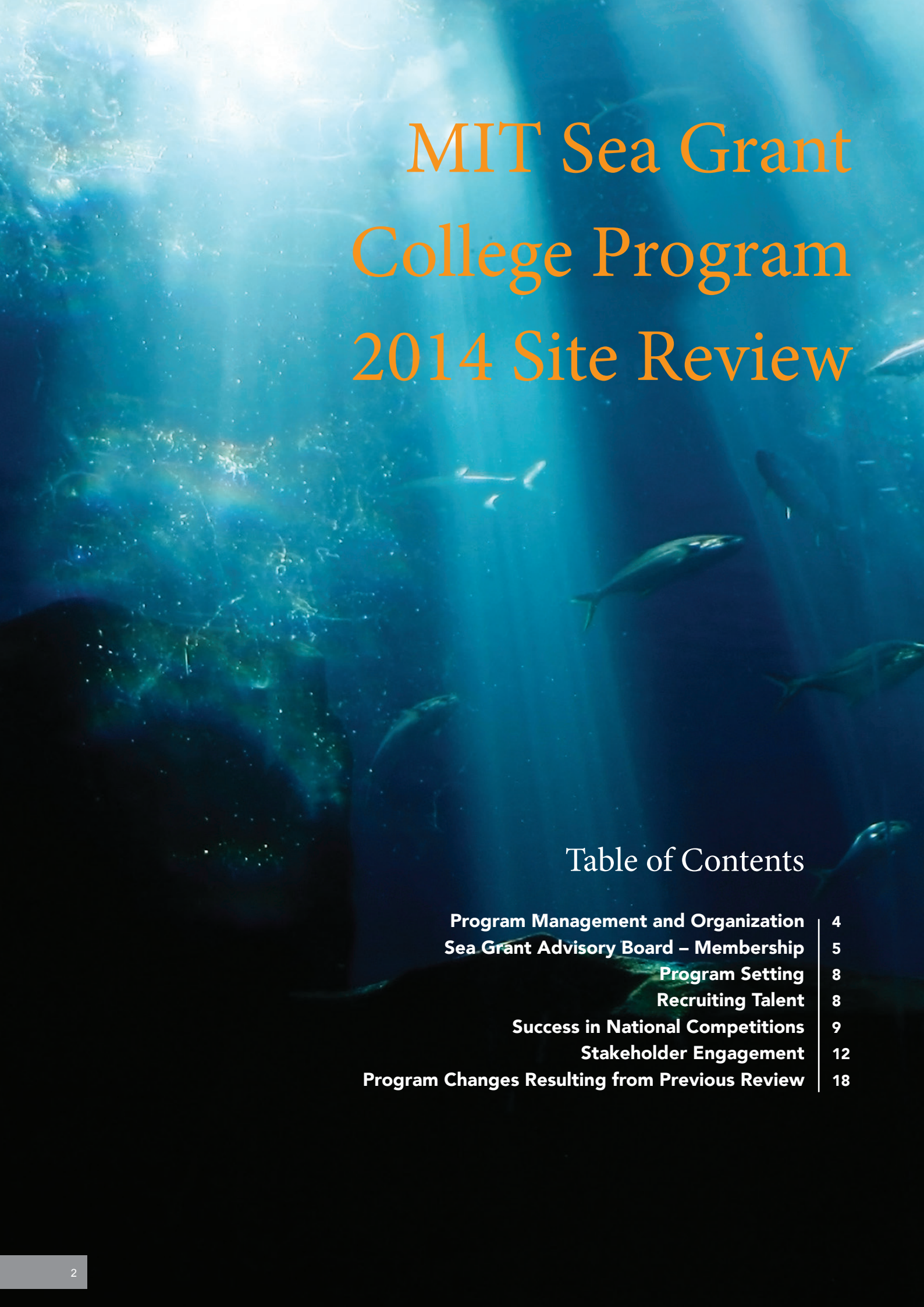
Location: Building E38-300

292 Main Street, 3rd Floor

Cambridge, MA 02142

Sea Grant
Massachusetts Institute of Technology

WHERE OCEAN SCIENCE MEETS CUTTING EDGE TECHNOLOGY



MIT Sea Grant College Program 2014 Site Review

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Agenda

Wednesday, 15 October

Arrival, Coffee, Continental Breakfast	08:30
Welcome, Introductions and Introductory Remarks (Chryssostomidis)	09:00
Sea Grant Management Structure & Changes from Previous Site Review (Chryssostomidis)	09:05
Marine Advisory Services Overview and Accomplishments 2010-2014 (Pederson)	09:20
Marine Advisory Services Future Plans (Vincent)	09:45
E-SeaGrant (de Zengotita; Bray)	10:00
Break	10:30
Marine Advisory Services Projects and Impacts (Simpson; Sacarny; Hall-Arber; Pederson)	10:45
Break	12:30
Supporting Communities with our Science (Chen; Bowen; Lermusiaux; Gschwend; Adams)	13:30
Break	15:30
Advisory Services Education and Communications (Shroyer; Sacarny; Paquette)	15:45
Poster Reception	17:15
Group Dinner in Boston for SG Review Committee and MITSG Management Team (Optional)	19:00

Thursday, 16 October

Arrival, Coffee, Continental Breakfast	08:30
AUV Lab Projects and Impacts (DeFilippo; Pederson; Simpson; Sacarny; Beardsley and Chen)	09:00
SG Review Committee: Private Deliberations and Writing	11:00
Lunch with MIT Administration	12:00
Outbrief by SG Review Committee to MITSG Management Team	13:30
Adjourn	14:00

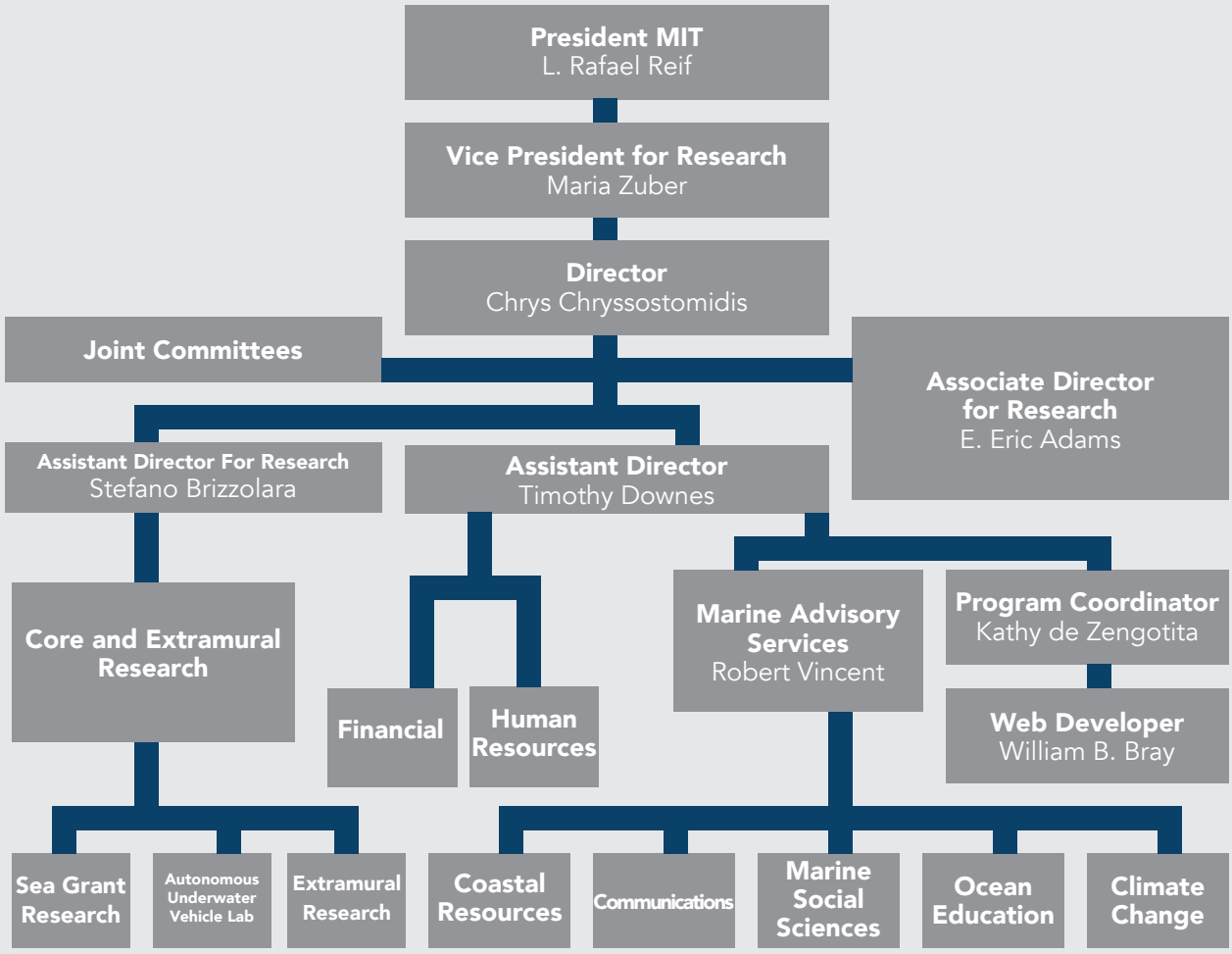


Figure 1: 2014 MIT Sea Grant Organization Chart

Program Management and Organization

MIT Sea Grant (MITSG) uses a tiered management approach to program coordination and policy development. The management team meets monthly to discuss program operations, strategic planning, and progress towards programmatic goals. Between monthly meetings, the management team utilizes email, phone calls, and/or face-to-face conversations to keep abreast of staff activities and address any issues that may arise. In addition, the MITSG Director conducts weekly strategy meetings with the education coordinator and Advisory Leader. The MITSG Director also meets weekly with Autonomous Underwater Vehicle (AUV) Lab engineers to discuss current projects and future development plans. The Advisory Leader coordinates monthly team and individual staff meetings to discuss Marine Advisory Services (MAS) activities. Staff from the AUV Lab are also included in these monthly meetings in an effort to streamline collaborations between the two groups. Descriptions of the MITSG management team are provided below, and the MITSG organizational chart is presented in Figure 1. The percentage of time that staff devotes to Sea Grant is provided in Table 1.

Director, Chrys Chryssostomidis, has been leading MITSG since 1982. Prof. Chryssostomidis is responsible for overall program management and acts as senior principal investigator for the program. Prof. Chryssostomidis plans to take a six-month sabbatical starting in January, 2015; and after more than thirty years at the helm of MITSG, may also consider retirement in the coming years.

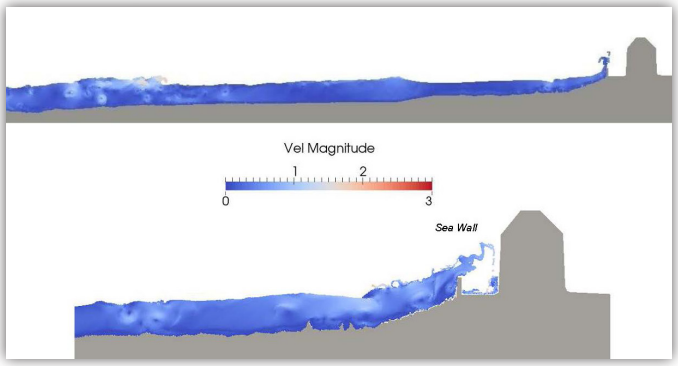
Assistant Director, Timothy Downes, is responsible for all financial and human resource operations at MITSG, which includes the Omnibus submission process. Mr. Downes also acts as liaison with the National Sea Grant Office, other sponsors, and recipients of Omnibus sub-awards.

Associate Director for Research, E. Eric Adams, assists the director during the MITSG strategic planning process. Dr. Adams also acts as a principal researcher, focusing his research on coastal processes.

Assistant Director for Research, Stefano Brizzolara, is the third member of the MITSG programming and strategic planning team. Dr. Brizzolara also directs research in the field of computational fluid dynamics.

Program Coordinator, Kathy de Zengotita, oversees the omnibus proposal process, ensuring that reviews are conducted in accordance with national office standards. She is also responsible for managing fellowship, professorship, and awards competitions, and regional and national research proposal competitions. Additional responsibilities include collecting annual report metrics and documents, report writing, and overseeing the development and implementation of eSeaGrant.

Former Advisory Leader, Judith Pederson, has led the MAS group for the past four years. Her group included five staff members with expertise in climate change mitigation, coastal ecosystems, invasive species, educational programming, fisheries anthropology, and data and communications. Dr. Pederson will remain on staff as a Marine Ecologist with plans to retire in February, 2015.



Brizzolara's new high fidelity numerical model to mitigate coastal flooding problems

Advisory Leader, Robert Vincent, assumed the role of managing the MAS group in July, 2014. There are currently seven MAS staff members and one administrative assistant in his group. Dr. Vincent has over twenty years' experience in estuarine research and restoration, and spent the past eight years with NOAA Fisheries focusing on habitat restoration and statistical analyses of commercial fisheries.

MIT Sea Grant Advisory Boards - Membership and Function

There are three Advisory Boards (SGAB) that work closely with the Director and provide guidance for the MIT Sea Grant Program. Members are solicited based on their expertise in areas that best represent MITSG program goals; they serve the interests of our stakeholders. Members serve three-year terms, but may be reappointed if appropriate based on MITSG and stakeholder needs. At the end of each three-year term, stakeholder needs are reassessed and SGAB membership is revised accordingly.

The MIT Faculty Committee provides technical oversight and review of MIT Sea Grant research programs and decides on distribution of MIT-specific awards such as the Doherty Professorship and the Horn Award for Undergraduate Research. Committee members include senior faculty from the departments of engineering, computer science, aeronautics and astronautics, chemistry, biology, and management (Table 2). The State/Industry Council is comprised of Massachusetts government agency and industry leaders. The Council identifies management priority areas and provides planning oversight to ensure that MIT Sea Grant addresses the challenges of ocean and coastal resource management throughout the state and region (Table 3). These two boards meet twice yearly as the Joint Advisory Committee: in the spring, to review the preliminary proposals and in the fall, to approve final selection of projects for the Omnibus and to decide the general direction of the research program for the following year.

The MAS Review Panel was established in 2011 to provide programmatic oversight for the MIT Sea Grant Marine Advisory Services group. The Panel consists of representatives from various Massachusetts state agencies and regional groups involved with management of ocean and coastal resources. The MAS Review Panel meets annually in the spring (Table 4).

Table 1. Percentage of Time Director and Staff Devote to SG (FTEs)

FTE FY2010-2014	Title	FTE Federal	FTE Match	Total FTE /Leveraged
Management and Planning				
Chryssostomidis	Director	0.50	0.50	0.85
Adams	Associate Director for Research		0.15	0.85
Brizzolara	Assistant Director for Research		0.15	0.85
Downes	Assistant Director; Administrative / Financial Officer; Human Resources Manager; Affirmative Action Officer	0.45	0.55	
de Zengotita	Program Coordinator	1		
Dennis	Financial Coordinator	1		
Bray	Web Developer	1		
Walters	Administrative Assistant		1	
McHugh	Administrative Assistant to the Director		1	
Advisory Services				
Vincent	Advisory Leader	1		
Pederson	Marine Ecologist	1		
Hall-Arber	Anthropologist	0.70		
Simpson	Coastal Ecologist	1		
Shroyer	Engineering Educator	1		
Paquette	Communications Coordinator	1		
Bastidas	Visiting Research Associate	1		
Sherman	Administrative and Publications Assistant	1		
AUV Lab				
Defilippo	Research Engineer			1
Sacarny	Research Engineer			1
Misic	Research Support			1
Design Lab				
Chalfant	Research Scientist			0.70
Karniadaikis	Research Scientist			0.20
Noble	Software Engineer			1
Babaee	Postdoctoral Associate			1
Zheng	Postdoctoral Associate			1
Xie	Postdoctoral Associate			1
Shi	Visiting Student			1
Vernengo	Visiting Research Scholar			1
Cooke	Research Scientist			0.20

Table 2. MIT Faculty Committee

Name	Title	Affiliation
E. Eric Adams (ex officio)	Senior Lecturer, Senior Research Engineer, Director of Mechanical Engineering Program	Dept of Civil and Environmental Engineering
Robert Armstrong	Professor; Deputy Director, MIT Energy Initiative/Chevron	Dept of Chemical Engineering
Dara Entekhabi	Bacardi Stockholm Water Foundations Professor	Dept of Civil and Environmental Engineering
Wesley L. Harris	Charles Stark Draper Professor of Aeronautics and Astronautics	Dept of Aeronautics and Astronautics
James L. Kirtley	Professor	Dept of Electrical Engineering & Computer Science
Alexander M. Klibanov	Novartis Professor of Chemistry and Bioengineering	Dept of Chemistry
John J. Leonard	Professor	Dept of Mechanical Engineering
Scott R. Manalis	Professor	Dept of Biological Engineering
Martin F. Polz	Professor	Dept of Civil and Environmental Engineering
Alexander H. Slocum	Professor; ESG Director, MacVicar Fellow	Dept of Mechanical Engineering
James M. Utterback	David J. McGrath Jr (1959) Professor of Management & Innovation Professor of Engineering Systems	Sloan School of Management

Table 3. State and Industry Council

Name	Title	Affiliation
Jella Atema	Marine Biologist	Boston University Marine Program, MBL
John Blair	Private Consultant	NOAA and MIT (Emeritus)
Kathyrn Ford	Environmental Analyst	Massachusetts Division of Marine Fisheries
Bill Hubbard	Chief, Evaluation Branch New England District	U.S. Army Corps of Engineers
Carlton D. Hunt	Research Leader	Battelle Labs
Ambrose Jearld	Director of Academic Programs	Northeast Fisheries Science Center
Martin Klein	President	Martin Klein Consultants
Joseph B. Lassiter	MBA Class of 1954 Professor of Management Practice	Harvard Business School
Justin E. Manley	Senior Director, Business Development	Teledyne Marine Systems
Michael B. Manning	Vice Provost for Research	Worcester Polytechnic Institute
Judith McDowell	Director	Woods Hole Sea Grant
Charles Richards	CEO	CoreValue Software
Bill Schwab	Team Chief Scientist	USGS Woods Hole Field Center
Edwin Tiffany	Principal	Bickford Hill Partners
Emily "Paddy" Wade	President	Museum Institute for Teaching Science

Table 4. Marine Advisory Services Review Panel

Name	Title	Affiliation
Nancy Balcom	Associate Director, Extension Leader	Connecticut Sea Grant
James Bales	Assistant Director	Edgerton Center, MIT
Anne Donnovan	Communications Manager	Massachusetts Office of Coastal Zone Management
Lisa Engler	Outreach/MetroBoston Regional Coordinator	Massachusetts Bays Program
Paul Fontaine	VP Education	Museum of Science
Kurt Hasselbalch	Curator, Hart Nautical Collections	MIT Museum
Jay Kaufman	State Representative	Massachusetts State Legislature
Carole McCauley	Outreach Program Coordinator, Marine Science Center	Northeastern University
Julia Olson	Social Scientist	NOAA Northeast Fisheries Science Center
Andrea Rex	Program Manager, Marine Data	Massachusetts Water Resources Authority
Kurt Sternlof	Executive Director	MIT Earth System Initiative
Barbara Warren	Executive Director	Salem Sound Coastwatch

Program Setting

MIT was designated a Sea Grant College Program in 1976. To date, MITSG has funded nearly 1,000 marine science research projects, produced over 1,600 scientific and informational publications leading to informed policies, and established an internationally acclaimed AUV laboratory. Our MAS staff guides our science and technology transfer effort. In addition to creating education and outreach programs, MAS collaborates with state and federal agency partners, conducts its own original research, and offers training and workshops in such areas as marine bioinvasions, water quality, coastal habitat restoration, climate impacts and adaptation, ocean engineering, and the impacts of policy change on fishing communities.

The state of Massachusetts hosts two Sea Grant programs. We enjoy an excellent partnership with the Woods Hole Sea Grant Program (WHSG) which is based at the Woods Hole Oceanographic Institution on Cape Cod. Together, our two organizations collaborate with universities and institutions across Massachusetts to address ocean-related challenges and stakeholder needs. Beyond Massachusetts, MITSG is part of the Northeast Sea Grant Consortium (NESGC); established in 2009 to address regional concerns.

Recruiting New Talent

Setting Investment Priorities – NOAA strives to ensure wise use of public funds in all programmatic areas, and MITSG management is mindful of this policy when setting its priorities. The MITSG Joint Committee meets twice a year to advise the Director on program priorities and funding, and to discuss specific research proposals. MITSG funds research, education, and outreach projects that meet the requirements of the National Sea Grant Strategic Focus Areas, as well as the MITSG Strategic Plan. MITSG maintains close relationships with academic institutions, state and federal agencies, and local community leaders to identify emerging priority areas. In addition, MITSG staff members serve on regional committees and boards to ensure that the MITSG Strategic Plan remains current and continues to address regional concerns.

Proposal Review – MITSG proposal review is a rigorous three-step process designed to ensure that only projects of the highest quality, meeting National Sea Grant and MITSG priorities and objectives, are funded. Preliminary and full proposals are reviewed by the Director, the Joint Advisory Committee, and a Technical Review Panel. The Director selects Panel participants based on their subject matter expertise. Massachusetts reviewers are excluded from the peer review phase to avoid the potential for bias, but are invited to staff the Technical Review Panel.

The Request for Preliminary Proposals (RFP), with deadlines, is distributed each January through the MITSG website, various listservs, and email announcements. Preliminary proposals received by deadline are reviewed by the Joint Advisory Committee. Investigators, whose projects are determined to be scientifically sound, with goals relevant to the MITSG strategic plan, are encouraged to submit full proposals. Full proposals are then sent out for peer review. Reviewer comments (blinded) are made available to the Principal Investigators (PI) for response. Finally, the Technical Review Panel meets in September to discuss and assess the full proposals, peer reviewer comments, and PI responses. The Director then submits all materials to the Joint Advisory Committee (described above) for their recommendations, subject to approval by the Program Monitor. Selected proposals are then included in the MIT Sea Grant College Program Omnibus Proposal.

Success in National Competitions

MIT Sea Grant is responsible for administering a number of research and fellowship competitions that are funded through the National Sea Grant Office, such as the Dean John A. Knauss Marine Policy Fellowship, the NOAA Coastal Management Fellowship, and the NOAA Fisheries / Sea Grant Fellowship. In addition, we assist in administering the Northeast Regional Social Science Research and the National Strategic Initiative (NSI) competitions.

MIT Sea Grant also successfully applies for support from other government funding agencies, such as the Office of Naval Research, and from private industry groups such as Chevron and Google. These monies are used to synergistically support the strategic goals of our program. The research funds managed by MITSG in the last four years are summarized in Tables 5 and 6, and Figure 2 presents the MITSG budget allocation for the same time period.

MITSG Researchers monitor invasive marine species

New England Regional Collaborations – MITSG has successfully partnered with other regional Sea Grant programs, most notably through the NESGC, a collaborative effort by seven northeast Sea Grant Programs (CT, ME, MIT, RI, NH, NY, and WH) organized in 2009 to address regional stakeholder concerns. The NESGC is dedicated to advancing research, education, outreach, and diversity of programming for regional projects, and to seeking additional funds to support the projects. To date six projects have been funded addressing fisheries, non-native species, marine mammals, and social and legal issues associated with marine spatial planning and ecosystem services. MITSG organized the 2013 NESGC biennial meeting, with the organizing committee co-chaired by MITSG colleagues Judy Pederson and Madeleine Hall-Arber. Additionally, in an effort to expand its impact on regional issues, the NESGC has entered into a memorandum of understanding with another active regional organization, the Northeast Regional Ocean Council representing state and federal agencies in the Gulf of Maine region.

Table 5. Program Management Indicators: Project Selection – Core Funds

	2011	2012	2013	2014
Preproposals Submitted	17	17	16	38
Number of Institutions	9	8	7	14
Full Proposals Submitted	6	10	8	15
Number of Participating Institutions	10	16	10	8
New Projects Funded	5	6	6	5
Continuing Projects	11	9	8	6
Recruitment of PIs	3	4	5	4
Number of PIs and Co-PIs Funded	36	40	30	26
Number of New PIs and Co-PIs Funded	9	5	11	8
Number of Institutions Funded	4	5	6	6

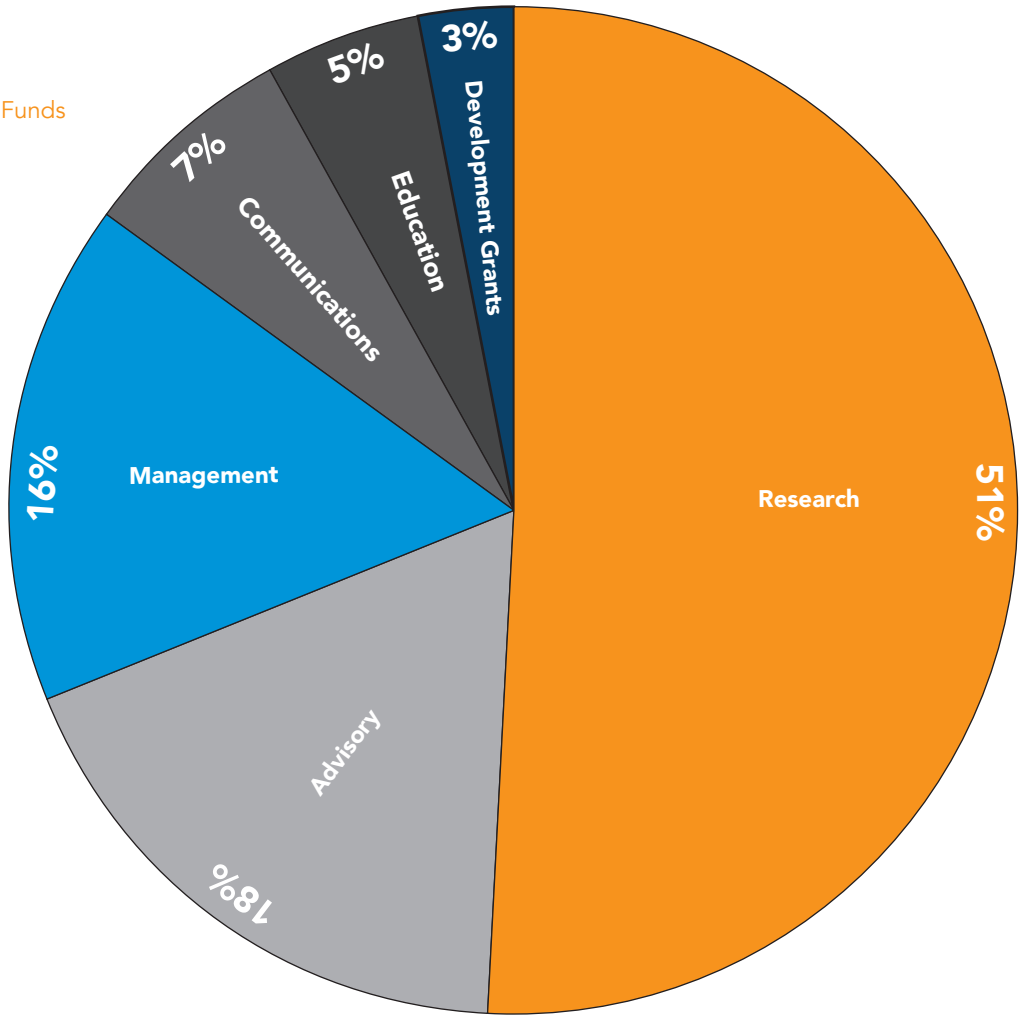
Table 6. Leveraged Funding (money in $USD managed by or within direct influence of MITSG, received from other sources 2011–2014)

	2011	2012	2013	2014
NSGO	**160,415**	**494,216**	**239,229**	**187,352**
National Strategic Investments	50,249	47,249	43,749	
Regional/Multi-Program Project		365,884	110,897	187,352
John A. Knauss Marine Policy Fellowship	46,000	49,000	52,500	
NMFS/Sea Grant Population Dynamics	64,166	32,083	32,083	
Other Federal	**3,639,353**	**2,421,077**	**578,333**	**646,039**
Office of Naval Research	1,687,690	763,073	250,000	646,039
Office of Education		532,152		
New England Fisheries Management Council	26,000			
National Science Foundation	620,000	755,500	328,333	
US Department of Energy	941,500			
National Research Foundation Singapore	180,000			
NOAA	95,000	370,352		
NOAA Fisheries				
National Ocean Sciences Bowl	25,000			
US Department of Agriculture	64,163			
State	**82,000**	**60,000**	**0**	**0**
MA Water Resources Authority	65,000	60,000		
Charles River Conservancy	17,000			
Private	**1,071,403**	**309,654**	**55,000**	**190,000**
Woods Hole Oceanographic Institution	25,000			
BP Gulf of Mexico Research Initiative	103,242	85,835		
Henry Grace Doherty Foundation	50,000		50,000	50,000
Chevron Energy Technology Company	63,000	181,500		140,000
Singapore-MIT Alliance for Research & Technology	785,542	5,638		
Consortium of Ocean Leadership	14,619	30,907	5,000	
Industrial Economics. Inc.	30.000			
Other		5,774		

Table 6. (continued)

	2011	2012	2013	2014
University	**5,000**	**8,000**	**109,528**	**0**
Clark University		3,000		
Texas A&M			109,528	
University of Tennessee		5,000		
MIT	5,000			
Subtotal	**4,958,171**	**3,292,947**	**982,090**	**1,023,391**
Core Funds	**2,062,244**	**2,117,421**	**2,117,434**	**2,130,000**
Research	1,043,836	1,143,397	1,145,380	940,041
Education	108,311	111,082	111,082	132,390
Advisory	352,653	349,883	349,883	423,008
Communications	153,713	153,713	153,713	154,148
Management	321,730	321,730	321,730	381,431
Development Grants	82,001	37,616	35,646	98,982
Annual Totals	**7,020,415**	**5,410,368**	**3,099,524**	**3,153,391**

Figure 2:
FY2010-2014
Distribution of Core Funds



Stakeholder Engagement

For over 40 years, the MIT Sea Grant College Program has brought the expertise of the Massachusetts Institute of Technology to bear on ocean-related challenges. Collaborating with researchers and academics from other Massachusetts universities and institutions, we apply knowledge and creativity in a timely response to the relevant issues. Our education programs include hands-on training and mentoring of high school and college students to become the next generation of ocean science and engineering researchers.

Partners, Stakeholders, and Program Involvement

Our interdisciplinary staff works together to communicate the knowledge gained from applied research to our partners and stakeholders. MIT Sea Grant MAS works closely with state and federal partners to identify priority needs and adaptations necessary to preserve the ecological and socio-economic integrity of our coastal systems and communities. Our education and communications colleagues engage stakeholders from academia, public, and private sectors to promote our findings and extend the reach of impact for our work. We engage in a range of topics involving marine spatial planning; commercial fisheries management; impacts from climate change; coastal community development and vulnerability assessments; invasive species management; ocean engineering, and literacy enhancement in the fields of marine, estuarine, and climate science. The mosaic of interests that compete for our coastal and marine resources create challenges and opportunities that allow us to build on our past accomplishments as we strive to achieve a balance between sustainability and progress. Below are a few examples of MITSG MAS research, education, and communications efforts.

Hall-Arber's fishing emergency preparedness training

Research and Community Involvement

Robert Vincent is the MIT Sea Grant Advisory Leader. Vincent's research focuses on estuarine ecology and restoration. He works closely with state, federal, and stakeholder groups to assess climate and anthropogenic impacts on natural systems and ecosystem services. Vincent represents MITSG and the Regional Sea Grant Network on the River Herring Technical Expert Working Group, a multi-partner collaboration of more than 30 state, federal, industry, and NGO participants charged with assessing the status of river herring populations and resource requirements along the Atlantic Coast. In addition, Vincent is currently partnering with the National Park Service and Cape Cod National Seashore to investigate climate effects on coastal erosion and invasive species. Results from this work will help to inform resource managers about the secondary effects of climate-induced coastal erosion, and aid in their efforts to control invasive species. Vincent is also partnering with the Massachusetts Office of Coastal Zone Management to monitor coastal habitat vulnerability to sea level rise. Information from these studies will inform local stakeholder community leaders and contribute to regional planning efforts.

Madeleine Hall-Arber is an anthropologist using research on socio-economic impacts associated with commercial fishing to inform community leaders and regional fisheries management councils. Hall-Arber partnered with the NOAA Northeast Fisheries Science Center and New England Fishery Management Council to analyze the impacts of regulatory changes on fishing operations and communities, culminating in the report, Social Impact Assessment of Amendment 5 to the Herring Management Plan. Results of this study will help guide NOAA and regional Councils in establishing future regulatory actions.

Hall-Arber has been influential in working with local fishing communities on issues ranging from offshore space-use planning and conflict avoidance, to managing unforeseen complications resulting from climate impacts. For example, Hall-Aber has been working with fishing community representatives to develop the Fishermen Rescue Project (FRP), a community-based program geared towards developing a best management guide for responding to fishing emergences and managing media relations. The FRP will become more valuable as storm intensity associated with climate change continues to increase.

Judith Pederson is a marine ecologist working with state and federal partners to assess the ecological and economic impacts of invasive species on marine resources. Pederson's climate research helps resource managers and community planners understand and adapt to climate induced pressures on marine resources and coastal communities.

Pederson, in partnership with the Massachusetts Office of Coastal Zone Management and the Northeast Sea Grant Consortium, has been instrumental in identifying and tracking non-native species colonizing the Gulf of Maine. The collaboration between our MAS and AUV programs integrates technological advancement with ecological assessments allowing complex surveys to take place in open ocean environments. Public outreach and education is significant part of the program, with information available through two websites (MIT Sea Grant and Northeast Marine Introduces Species [NEMIS]).

The effects of climate change on coastal ecosystems and communities have gained much attention in recent years, and MITSG has taken a leadership role in bringing together key partners and stakeholders to address regional challenges. Pederson works with local community leaders to assess climate impact threats to public safety and infrastructure, and identify local adaptation strategies. MITSG recently hosted the Climate Change Symposium on Sustaining Coastal Cites, a three-day conference that brought together regional partners and stakeholders from academia, industry, non-profit organizations, federal, state, and local governments, to discuss major issues and facilitate regional collaborations. Institutional support for the MITSG Climate Symposium was summarized in the opening remarks by MIT Vice President for Research, Maria Zuber.

Juliet Simpson is a coastal ecologist researching the impacts of pollutants and climate change on coastal habitats. Simpson's project on the role of blue carbon in eelgrass beds as potential mitigation for the effects of greenhouse gasses has resulted in strong partnerships with the Massachusetts Department of Fish and Game and the US EPA; it also provides education and hands-on training for students from Suffolk University. The eelgrass blue carbon project provides an excellent opportunity for the MITSG MAS to work closely with our AUV Lab on integrating technology with ecological research and outreach.

Simpson's sample of eelgrass extracted from Nahant Beach

Simpson also engages partners in her outreach to local communities through estuarine ecology education programs with local school groups. Partnering with the New England Aquarium, Simpson participates in Summer on the Marsh; a series of week-long programs geared towards raising awareness of salt marsh ecosystems and associated ecosystem services.

Carolina Bastidas is a visiting research associate working with researchers in the MIT Department of Civil and Environmental Engineering to investigate the effects of ocean acidification on coral habitats, an issue of great concern for the commercial fishing industry. Bastidas is also active in ocean literacy and science programs involving underserved communities; and is working to recruit new teams of minority students to take part in the MIT Blue Lobster Bowl, the annual state qualifying competition for the National Ocean Science Bowl.

Communications

Lillie Paquette is MIT Sea Grant's communications specialist. She integrates the work of her colleagues into a unified platform for dissemination of MIT Sea Grant products and services. Paquette's multimedia approach utilizes print, electronic, video, and social media to effectively reach a variety of audiences and increase exposure for the MIT Sea Grant College Program. Through her work with the National Sea Grant Communicators Network, Paquette has expanded the use of video promotions and outreach throughout the Sea Grant Network. Locally, Paquette has worked with middle school teachers to promote student involvement in MITSG Ocean Engineering programs (MITES and E2), and with students and teachers from the Blue Lobster Bowl teams.

Paquette engages in community outreach with products like the video, Keeping Maritime Traditions Alive, and through newsletter and website stories highlighting key partner and stakeholder involvement with the various MITSG programs.

Gayle Sherman is the MIT Sea Grant MAS administrative assistant and publications coordinator. Sherman works closely with MIT Sea Grant staff and project partners to ensure accurate representation in the National Sea Grant Planning, Implementation, and Evaluation Reporting system. Sherman also coordinates requests for MIT Sea Grant MAS publications, and supports our public outreach events such as the Blue Lobster Bowl, the MITSG Speaker Series, and the MITSG Climate Change Symposium on Sustaining Coastal Cities.

Education

Kathryn Shroyer, MIT Sea Grant MAS Engineering Educator, oversees a variety of ocean engineering education programs that target K-12, Freshman College, and teacher training groups. The MIT Sea Grant MAS education programs involve local and national partners in education.

The MIT Sea Grant Education Program's vision for Massachusetts is to facilitate innovative, hands-on, learning opportunities that promote ocean- and technology-literacy through a creative problem solving process, leading to local awareness and protection of coastal and marine resources. The program goal is two-fold:

1. Increase Science, Technology, Engineering, and Math (STEM) ocean-literacy among the citizens of Massachusetts, fostering their ability to understand and make informed decisions about local marine resources and technology.
2. Provide workforce development by inspiring and training students to be the next generation of marine scientists and engineers.

MIT Sea Grant has outlined the following major objectives to fulfill the goals of the Education program:

Objective 1 - Skill Building for Students:

MITSG will provide students with hands-on ocean science and engineering experiences aimed at introducing real world challenges and encouraging creative problem solving.

Objective 2 – Training Teachers:

MITSG will increase the Commonwealth's capacity to inspire our youth to be environmentally conscious, creative problem solvers by training both formal and informal educators.

Objective 3 – Public Outreach:

MITSG will continue to bring relevant, current information about ocean science, engineering and technology to the general public in interactive and engaging ways.

Tables 7-8 summarize MITSG's approach to achieving these objectives.

Table 7. Education Outcomes Summary (Summer 2010 – Summer 2014)

Activity	Impacts (per year)
Sea Perch Presentations and Outreach	20,000-30,000 students
Teacher Training and Sea Perch Partner Support	2-4 teacher workshops
MITSG Website	5,000 downloads (Sea Perch Manual); 15,000 visits
Blue Lobster Bowl	120 Students; 80 volunteers; 24 teachers
Ocean Engineering Experience	57 high school students; 33 students went on to undergraduate students in ocean engineering (5 at MIT); 23% minority students; 32% women
Underwater Robotics (E2) 2014	28 high school students; 100% underserved minorities in STEM; 64% women
Underwater Robotics (MITES) 2014	13 high school students; 100% underserved minorities in STEM; 50% women
Interns	18 college interns; 3 high school interns; 44% women
Sea Perch Institute	1,500 high school students reached; 22 teachers reached

Table 8. MIT Sea Grant Education Outreach Events 2010 – 2014

Date	Event	Partner	Location	Audience
3/12/2010	Nautical Night	MIT Museum	Boston, MA	400
4/20/2010	Cambridge Science Festival	Cambridge Science Festival	Boston, MA	10000
6/8/2010	World Ocean Day	New England Aquarium	Boston, MA	300
7/26/2010	Boy Scout Centennial Jamboree	Fort A.P. Hill Virginia	Fort A.P. Hill, Virginia	2000
11/8/2011	New Hampshire Boy Scouts Jamboree	Boy Scouts Of America	Waterville Valley, NH	2500
11/19/2011	First Lego League Regional Qualifying Tournament	Newton North High School	Newton, MA	200
3/9/2012	Nautical Night	MIT Museum	Cambridge, MA	400
4/22/2012	Cambridge Science Festival	Cambridge Science Festival	Cambridge, MA	500
6/3/2012	World Ocean Day	New England Aquarium	Boston, MA	4000
3/11/2011	Nautical Night	MIT Museum	Cambridge, MA	400
4/16/2011	Robot Block Party	Boston Museum of Science	Boston, MA	5,547
4/30/2011	MIT 150 Anniversary Open House	MIT	Cambridge, MA	200
6/5/2011	World Ocean Day	New England Aquarium	Boston, MA	1,500
6/5/2011	Annual Scholarship and Awards Program		Dorchester, MA	120
7/1/2011	National Marine Educators Association Annual Conference	NMEA	Boston, MA	351
7/20/2011	Girl Scouts' Oceanography Destination	Girl Scouts	Boston MA	43
7/28/2011	Extreme Engineering	Boston Museum of Science	Boston, MA	19
10/7/2012	Boston Minuteman Council Scouting's Outdoor Adventure on the River (SOAR)	Boy Scouts of America	Cambridge, MA	6,401
10/19/2012	Know the Coast	University of New Hampshire	Durum, NH	300
2/16/2013	Family Science Day	AAAS	Boston MA	3,647
3/23/2013	Science on the Street Cape Cod Natural History Museum	Cambridge Science Festival	Boston, MA	300
4/13/2013	Cambridge Science Festival	Cambridge Science Festival	Cambridge, MA	30,000
4/11/2014	Nautical Night	MIT Museum	Boston, MA	245
4/19/2014	Cambridge Science Fest Carnival	Cambridge Science Festival	Boston, MA	15,000
4/24/2014	Cambridge Sci Fest @MIT Museum	Cambridge Science Festival	Boston, MA	689
5/8/2014	World Ocean Day	New England Aquarium	Boston, MA	3000

Kids test drive Sea Perch at the Family Science Days during the 2013 American Association for the Advancement of Science (AAAS) Conference

Coastal Outreach Traning

MITSG Marine Advisory Services on Boards and Committees

MIT Sea Grant MAS is a group of eight research, education, and communications professionals committed to expanding our knowledge of, and ability to manage, the coastal and marine resources of Massachusetts. Staff participation on committees and boards allows MAS to maintain leadership roles on local, regional, and national levels. A listing of MAS service on committees and boards by partner groups is provided below; a detailed summary of the MITSG collaborative network/NOAA partnerships is provided in the Briefing Book Supplement.

Sea Grant Network

- Biennial Regional Sea Grant Meeting Chair; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Ohio Sea Grant Site Review Team (2010); MITSG Director Chrys Chryssostomidis
- Northeast Sea Grant Consortium; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Woods Hole Sea Grant Advisory Board; MITSG Marine Ecologist and former Advisory Leader Judy Pederson

NOAA

- NOAA Eastern Region Climate Team; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- NOAA Eastern Region Climate Team; MITSG Coastal Ecologist Juliet Simpson
- NOAA River Herring Technical Working Group, Habitat Subgroup; MITSG Advisory Leader Robert Vincent
- NOAA River Herring Technical Working Group, Species Interactions Subgroup MITSG Advisory Leader Robert Vincent

Other Federal Organizations

- EPA Climate Change Sentinel Monitoring program, Estuarine Working Group; MITSG Coastal Ecologist Juliet Simpson
- EPA/State Ocean monitoring Science Advisory Panel; MITSG Marine Ecologist and former Advisory Leader Judy Pederson

State/Regional

- Atlantic Coast marine Fisheries Commission Herring Technical Committee; MITSG Anthropologist Madeleine Hall-Arber
- Atlantic Coast Marine Fisheries Commission - Northern Shrimp Technical Committee; MITSG Anthropologist Madeleine Hall-Arber
- Atlantic Coast marine Fisheries Commission - Committee on Economics and Social Science (Chair); MITSG Anthropologist Madeleine Hall-Arber
- Boston Harbor Dredge technical Committee; MITSG Marine Ecologist and former Advisory Leader Judy Pederson

- Boston Harbor Initiative; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Boston Harbor working group; MITSG Advisory Leader Robert Vincent
- California Citizen Science Initiative-Advisory Group; MITSG Anthropologist Madeleine Hall-Arber
- Gloucester Fishermen's Wives Association; MITSG Anthropologist Madeleine Hall-Arber
- Mass Bays Management Committee; MITSG Coastal Ecologist Juliet Simpson
- Mass Bays Program Management Committee; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Mass Bays Program Science and Technical Committee; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Massachusetts Marine Educators (Board Member); MITSG Engineering Educator Kathryn Shroyer
- MIT Outreach Program (Board Member); MITSG Engineering Educator Kathryn Shroyer
- MIT Sea Grant Climate Change Symposium Steering Committee (Chair); MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Mystic River Watershed Association subcommittee on water quality; MITSG Coastal Ecologist Juliet Simpson
- New England Fishery Management Council - Herring Plan Development Team; MITSG Anthropologist Madeleine Hall-Arber
- New England Ocean Science Education Collaborative (Board Member); MITSG Engineering Educator Kathryn Shroyer
- Northeast Aquatic Nuisance Species Panel; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Northeast Center for Agricultural and Occupational Health's Fishing Advisory Board (Board Member); MITSG Anthropologist Madeleine Hall-Arber
- Northeast Regional Ocean Council; MITSG Anthropologist Madeleine Hall-Arber
- Northeast Sea Grant Consortium; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Northwest Atlantic Marine Alliance (Board Member); MITSG Anthropologist Madeleine Hall-Arber
- Office of Naval Research Electric Ship Research and Development Consortium (Program Leader); MITSG Director Chrys Chryssostomidis
- Regional Association for Research in the Gulf of Maine (Board Member); MITSG Advisory Leader Robert Vincent
- Save the Harbor/Save the Bay (Board Member); MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Save the Harbor/Save the Bay - Water Quality Committee Co-Chair; MITSG Marine Ecologist and former Advisory Leader Judy Pederson

Other

- American Society for Engineering Education; MITSG Engineering Educator Kathryn Shroyer
- ANSFT/NISC Bioinvasions and Climate Change Publication Committee; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- ICES Working Group on Introductions and Transfer of Marine Organisms; MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- National Marine Educators Association; MITSG Engineering Educator Kathryn Shroyer
- NWWN's Voices from the Working Waterfront Projects (collaboration with other Sea Grant Programs); MITSG Anthropologist Madeleine Hall-Arber
- Ocean Protection Council - Science Advisory Team; MITSG Anthropologist Madeleine Hall-Arber
- Puerto Rico Center for the Environment and Neuroscience (Board Member); MITSG Marine Ecologist and former Advisory Leader Judy Pederson
- Transport Canada Ballast Water Adhoc Advisory Committee; MITSG Marine Ecologist and former Advisory Leader Judy Pederson

Program changes resulting from previous site review

The 2010 Site Review Team Report The 2010 Site Review Team Report (SRT) (dated December 7, 2010) gave three significant recommendations to MITSG. The MITSG management team has implemented several changes in response to these recommendations. The Advisory group filled two key vacant positions (an Engineering Educator joined the group in October, 2010; and a new Communications Specialist was added in May, 2012). In addition, a new Advisory Leader joined the group in July, 2014, replacing out-going Advisory Leader Judy Pederson (who will retire in February, 2015), and a Visiting Research Associate arrived in August, 2014. A fiscal officer was added to the Business Operations group in 2011 as well.

SRT Recommendation 1:

MITSG needs a Deputy Director of Operations or equivalent; noting that MITSG still lacks a systematic approach to the planning process.

Response: Tim Downes is the MITSG Assistant Director, and staff has been added to help alleviate demands for his time, allowing Mr. Downes to work more closely with the Director on administering the program. The planning process has been reconfigured, focusing the attention of the Supervisory Committee on program direction. The MAS Panel was established specifically to provide guidance to our outreach efforts. In addition, regular meetings among program managers and staff have increased communications among MITSG colleagues, and provides for more focused and efficient operations. These changes have resulted in a more systematic and structured approach to program management.

SRT Recommendation 2:

The position of Communications Manager should be filled as soon as possible; noting the need to develop a strategic communications plan and increase promotion of non-research successes.

Response: In 2011, MITSG added Nancy Adams as the Communications Specialist, who overhauled the program's website and greatly increased press coverage for MITSG activities. The strategic communications plan was developed shortly thereafter, and is included each year in the MIT Sea Grant College Program Omnibus Proposal. The plan is revised annually as needed to address state and regional priority areas.

With the departure of Ms. Adams in 2012, MITSG added Lillie Paquette as the new Communications Specialist. Ms. Paquette, a talented videographer and media specialist, has increased MITSG promotions of non-research successes in a number of ways. Most notably, with the addition of high quality promotional videos focusing on outreach with the fishing community ("Keeping Maritime Traditions Alive"); ocean engineering programs (Blue Lobster Bowl, Sea Perch, Ocean Engineering Experience, Underwater Robotics E2 and MITES); and coastal community climate impact awareness (MITSG Regional Climate Change Symposium). These videos were well received and promoted by the National Sea Grant Office and various Sea Grant programs around the country.

Examples of non-research outreach publications include the Massachusetts Homeowner's Handbook to Prepare for Coastal Hazards; How Pharmaceuticals and Personal Care Products Affect our Environment; feature stories in the MITSG newsletter; and the MITSG College Program promotional guide. Social media communications such as the MITSG Facebook page, Twitter, and MIT Tech TV also play an important role in communicating non-technical successes of the MITSG program.

SRT Recommendation 3:
A coordinated Sea Grant Extension effort needs to occur in Massachusetts.

Response: MITSG has made a strong effort in partnering with WHSG in several areas over the past few years. Chrys Chryssostomidis (MITSG) and Judy McDowell (WHSG) have always worked closely to coordinate research activities among the two state Sea Grant programs. Juliet Simpson (MITSG) worked with Greg Berman (WHSG) to create the popular Homeowner's Guide to Coastal Hazards, now in its second printing. These colleagues continue to collaborate on several projects that focus on coastal inundation, climate adaptation, and coastal processes. Jeffrey Brodeur (WHSG) collaborated on a joint program newsletter with Nancy Adams (MITSG), and planning activities are underway with Lillie Paquette (MITSG), which promises to extend this partnership. Judy McDowell and Judy Pederson (MITSG) continue to work together to engage Knauss Fellows with Massachusetts Sea Grant Programs before they embark on their year in Washington. The Directors, along with their respective Advisory Services programs, have met several times since the last MITSG site review to discuss opportunities for coordinated Massachusetts Sea Grant efforts, and Robert Vincent (MITSG Advisory Leader) will be meeting with staff at WHSG in the coming weeks to discuss future collaborations.

Panel discussion at the Climate Change Symposium organized and hosted by MIT Sea Grant in June 2014


Sea Perch


Stakeholder Engagement


Community Outreach


Ocean Engineering Education


Fisheries Management


Climate Change Research

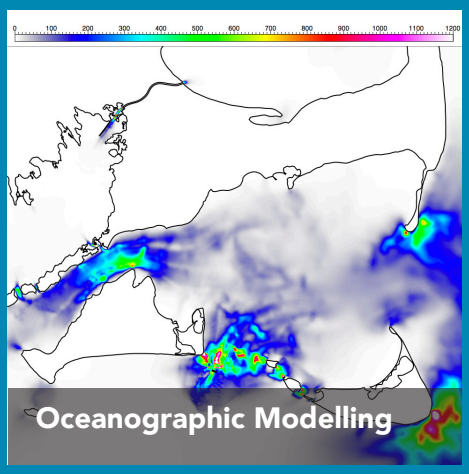

Invasive Species Monitoring

Blue Lobster Bowl


Fishing Community Outreach


Technology Development


Healthy Coastal Ecosystems


Oceanographic Modelling