

MSC NEWSLETTER – JULY/AUGUST 2015



MSC, Stevens and USMMA researchers and students perform acoustics experiments aboard the USMMA TV Kings Pointer (shown above) at Kings Point, NY.

MSC Researchers Perform Acoustics Experiments in Conjunction with U.S. Merchant Marine Academy at Kings Point. The Maritime Security Center (MSC) led by Stevens Institute of Technology fielded two teams to perform acoustics-based research at the U.S. Merchant Marine Academy (USMMA) on July 30 and 31, 2015. The Stevens teams were hosted by Commander Carolyn Hunter, an Assistant Professor at USMMA and a PhD student at Stevens. The first team, the Remotely Operated Vehicle (ROV) Team consisted of Dr. Brendan Englot and students Shi Bai, Jinkun Wang, Tixiao Shan, Frankie Chen, Nathaniel Goldfarb, and Kevin Doherty. This team used an ROV to acoustically map the hull of the USMMA TV Kings Pointer.

This technique will enable the determination of whether unwanted devices might be affixed to a ship's hull. The data gathered will allow the team to further develop their algorithms for robust 3D mapping with sparse and noisy data.

The second team, the Passive Acoustics Signal Recorder (PASR) Team, consisting of Drs. Alexander Sutin and Barry Bunin, Maritime Security Doctoral Fellow Alex Pollara, and students Blaise Linn, Cory Wiedmann, and Jack Giambalvo, deployed two passive acoustic configurations to study the application of passive acoustic methods to port protection. The Stevens Passive Acoustic Recorder, a new multi-sensor recording platform developed by the Center's Summer Research Institute students, was tested and used to record data from an accelerometer and magnetometer to monitor the systems orientation and stability throughout the experiment.

Approval to conduct the joint experiment at USMMA was granted by Capt. Lindman, Department of Marine Transportation, USMMA, and Mr. Tony Margan, MARAD School Ship Program Manager. Data collected from the acoustics-based experiment will be used as part of the MSC's research in Mobile, Modular, Maritime Domain Awareness.

Stevens DHS CDG Fellows Conduct Research Aboard the CGC HEALY in Internship with the USCG RDC. DHS Career Development Grant (CDG) Maritime Systems Fellowship students at Stevens Institute of Technology, Hasan Shahid and Nicholas Haliscak, recently completed a ten week internship hosted by the USCG Research and Development Center (RDC) in New London, CT. A week into their internship program, the students were given the opportunity to participate in the RDC's 2015 Arctic Shield mission held aboard the Coast Guard Cutter (CGC) HEALY in the Arctic.

Joined by active duty Coast Guard and RDC researchers among others, the students assisted in technology evaluations, including the use of unmanned aerial systems (UAS) to assess the Coast Guard's search and rescue mission capability in the Arctic Ocean.

The students will discuss their research and experiences in an all-hands meeting at the USCG RDC in September. The student's on-site internship was coordinated by Mr. Timothy Hughes, Chief, Acquisition Support & Analysis Branch.



DHS CDG Fellow Hasan Shahid (left) assists DV2 Adam Harris in the deployment of a remotely operated vehicle (ROV) during a situational awareness exercise aboard the USCGC HEALY in the Arctic Ocean.

Students Present Research Conducted on Sensor Integration, Underwater Acoustics and Emergency Response Visualization Tools at 6th Annual SRI Event. Representatives from Customs and Border Protection (CBP), the Port Authority of New York and New Jersey (PANYNJ) and the Naval Facilities Engineering Command (NAVFAC) attended research presentations by student participants in the Maritime Security Center's 6th Annual Summer Research Institute. The presentations included work completed by three teams of students during the MSC's eight week intensive maritime security program.



Estefania Quinones-Melendez (University of Puerto Rico-Mayaguez) and Jack Giambalvo (Stevens Institute), students on the Underwater Acoustics Team, express pride in their accomplishments following their team's research presentation.

The student research projects included Underwater Acoustics Detection, Sensor Integration and the enhancement of the Center's Magello Emergency Response Tool. Student research outcomes resulted in the development of a low cost, high-efficiency, multi-sensor underwater recording platform based on the Intel Edison micro-computer, a proof of concept which integrates computer vision from a camera with radar detections, and a port characterization and gap analysis of oceanic and environmental data sets for the Caribbean region.

For a list of the student participants and to review copies of their presentation slides, please click the links below:

- [Student Participants and Presentation Agenda](#)
- [Sensor Integration Team](#)
- [Underwater Acoustics Team](#)
- [Magello Emergency Response Team](#)

Throughout the program, students have the opportunity to engage in field visits and attend guest lectures by MSC researchers and homeland security practitioners. Interactions with stakeholders and homeland security professionals inspire interest in the student research projects and drive participation and attendance at the final SRI student research presentation events.

MSC hosts DHS MSI Summer Research Team to study the Impacts of Green Technology on Maritime Infrastructure Resilience.

Over the past several weeks, Dr. Allison Fitzgerald, Assistant Professor of Biology at the New Jersey City University (NJCU) and Ms. Kaylee Saltos, an undergraduate Marine Biology major have been engaging in research in conjunction with Dr. Jon Miller and Andrew Rella from the Davidson Laboratory, Stevens Institute of Technology, on a project designed to investigate the effects of fouling organisms on water velocity underneath piers and port structures. The team's research includes the use of oyster larvae on settlement plates attached to concrete pilings in the Raritan Bay in New Jersey. The team is working to determine the impacts of oysters on the resilience of pier piling infrastructure during extreme weather events and increased water flows.

At the end of the summer research project, the concrete pilings will be placed into a wave tank at Stevens Institute, where the 3D structure of the pilings will be tested for impacts. The team will present their research findings at the conclusion of the ten-week summer research program and will apply for follow-on funding to continue their work jointly.

The DHS Summer Research Team Program (SRT) for Minority Serving Institutions (MSI) facilitates opportunities for MSI faculty members and students to conduct homeland security-focused research in conjunction with the DHS Centers of Excellence. To learn more about this important program, visit <http://www.orau.gov/dhseducation/faculty/index.html>.



Ms. Kaylee Saltos, NJCU, conducts measurements to determine how much of a settlement plate is covered with oyster larvae.



MSC summer research students compete in the 2015 Metropolitan Waterfront Alliance City of Water Day Cardboard Kayak Race.

MSC Students Win Third Consecutive City of Water Day Cardboard Kayak Race!

MSC Summer Research Institute (SRI) alumni and Stevens Maritime Systems Master's Degree student, Carrick Porter, led his team to victory in the third annual Metropolitan Waterfront Alliance "City of Water Day" Cardboard Kayak race. The highly-competitive event brings together a diverse group of participants for a fun-filled day of design, ingenuity and good-spirited competition.

Each team is given ten sheets of corrugated cardboard, three rolls of black gaffing tape, ten rolls of clear waterproof packing tape, and two hours to design a sea-worthy vessel able to carry two paddlers in a series of races in the Hudson River.

This year's event is the third year in a row that Porter, who is also a USCG Auxiliary member and an Army ROTC cadet, has led his peers to triumph in the cardboard kayak race.

The 2015 winning team included MSC summer research students Chris Zalidis (Aristotle University) and Tyler Mackanin (Stevens Institute), the 2014 team included Sarah Walsh (Rutgers University), Reed Oberlander (Stevens Institute) and Jonathan Alarcon (Stevens Institute), and the inaugural 2013 winning team included Kristen Stilson (Elizabeth City State University) and Jonathan Alarcon (Stevens Institute). For more information about the annual cardboard kayak race and to review a list of the competitors, please visit the Waterfront Alliance website at <http://www.cityofwaterday.org/2015-cardboard-kayak-race>.

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