

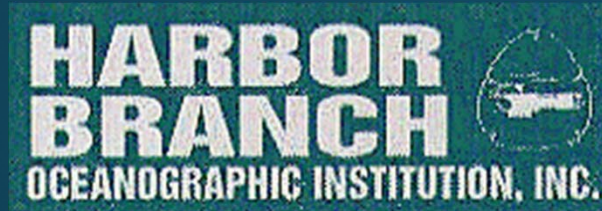
FAU-HARBOR BRANCH OCEANOGRAPHIC INSTITUTE & FAU-HARBOR BRANCH RESEARCH PILLAR

HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY

*Jim Sullivan, Ph.D., Executive Director
FAU Harbor Branch*

HARBOR BRANCH OCEANOGRAPHIC INSTITUTE, INC. (1971-2007)



MERGED WITH FLORIDA ATLANTIC UNIVERSITY (2008)



FAU HARBOR BRANCH OCEANOGRAPHIC INSTITUTE (FAU - HBOI)



HARBOR BRANCH
OCEANOGRAPHIC INSTITUTE

FAU HARBOR BRANCH (FAU RESEARCH PILLAR - 2017)



FAU RESEARCH PILLARS

- Institute for Sensing and Embedded Network Systems Engineering (**I-SENSE**)
- Institute for Healthy Aging and Lifespan Studies (**I-HeAL**)
- FAU Brain Institute (**I-BRAIN**)
- FAU Harbor Branch (**FAU Harbor Branch**)

RESEARCH PILLAR EXECUTIVE DIRECTORS

I-SENSE: DR. JASON HALLSTROM

I-HEAL: DIRECTOR SEARCH UNDERWAY

I-BRAIN: DR. RANDY BLAKELY

FAU HARBOR BRANCH: DR. JIM SULLIVAN



HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY®

Campus acreage: 144
Campus buildings: 32
Staff: ~200 ; 28 Faculty



HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY®

FAU-HBOI IS PRIMARILY A “SOFT MONEY” RESEARCH INSTITUTE
RESEARCH FUNDING DURING FY18:

| Funding Source | Amount |
|--------------------------|--------------|
| Federal | \$4,267,054 |
| State | \$1,005,079 |
| Industry & other | \$1,641,340 |
| HBOI Foundation | \$1,777,132 |
| Specialty License Plates | \$1,917,634 |
| Philanthropy/development | \$174,035 |
| TOTAL | \$10,782,274 |

HBOI Primary Research Areas

- **Aquaculture & stock enhancement** (seaweed, shellfish, shrimp, fish)
- **Marine biomedicine & biotechnology** (cancer treatments and antibiotics)
- **Marine microbiology, genomics & metabolomics** (genetic fingerprinting)
- **Marine ecosystem health** (monitoring, nutrient pollution, restoration)
- **Harmful Algal Bloom (HAB) dynamics** (causes & ecosystem/human effects)
- **Coral reef ecology, health and conservation** (disease assessments, mapping)
- **Ocean engineering & technology** (novel instrument development)
- **Ocean optics and underwater imaging** (satellite remote sensing, new sensors)
- **Ocean exploration & technology** (NOAA Cooperative Institute)
- **Ocean dynamics & modeling** (fluid dynamics and biophysics)
- **Marine mammal research & conservation** (epidemiology, rescue)
- **Population dynamics & behavioral ecology** (dolphins, whales, sharks)
- **Fisheries ecology & conservation** (protected species, tracking)
- **Biogeochemistry** (marine plastics, nutrients, carbon cycles)

AQUACULTURE & STOCK ENHANCEMENT

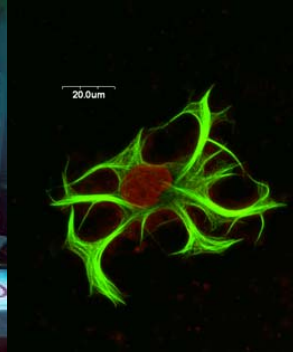
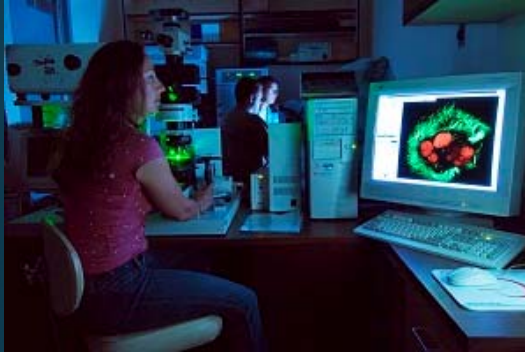


Dr. Paul Wills
Dr. Susan Laramore
Dr. Megan Davis
Dr. Dennis Hanisak

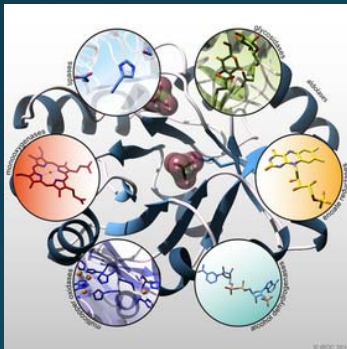


Cultured organism nutrition, health and disease (macroalgae, crustaceans, shellfish, fish, etc.)
Industry partnerships (e.g. Zeigler, Seaventures)
Integrated multi-trophic aquaculture (IMTA)
Stock enhancement and restoration (e.g. Bonefish & Tarpon Trust)
Sustainable and responsible aquaculture, food safety (Aquaculture Without Frontiers)

MARINE BIOMEDICAL & BIOTECHNOLOGY RESEARCH



Dr. Amy Wright
Dr. Esther Guzmán
Dr. Guojun Wang
Dr. Peter McCarthy
Dr. Shirley Pomponi
Dr. Nick Dickens
Dr. Tracy Mincer



Bioinformatics and metabolomics
Microbiology (e.g. dynamics of pathogenic bacteria)
Sponge biotechnology & natural products
Cancer cell biology
Natural products chemistry & drug discovery
 New therapeutic compounds for cancer
 New antibiotics
Harmful algal bloom toxins



Center for Excellence in Biomedical and Marine Biotechnology
Marine organism specimen collection
 (30000 marine macro-organisms & 19000 microbial organisms)
 Natural products collection

MARINE ECOSYSTEM HEALTH



Dr. Jim Sullivan
Dr. Matt Ajemian
Dr. Josh Voss
Dr. Dennis Hanisak
Dr. Brian Lapointe
John Reed, M.Sc.
Dr. Jordon Beckler
Dr. Tracy Mincer

Fisheries ecology and conservation
Coral reef research (e.g. discovery, mapping, molecular ecology, etc.)
 Robertson Coral Reef Research & Conservation Program
Marine botany (e.g. macroalgae and seagrass)
Harmful Algal Blooms
 (ecological dynamics, monitoring and toxins)
Phytoplankton dynamics
Nutrient dynamics
Plastics pollution
IRL Observatory Network (IRLON)



IRLO

Indian River Lagoon Observatory

HARBOR BRANCH
FLORIDA ATLANTIC UNIVERSITY
(Water Quality in a World View)

LOBO Land/Ocean Biogeochemical Observatory

[HOME](#)
[LOBOVIZ](#)
[CGI](#)
[QA/QC](#)
[WIRELESS](#)
[GOOGLE EARTH](#)
[ABOUT](#)
[CONTACT](#)

Latest. Click site name for data.

Weather

IRL-LP Indian River Lagoon - Link Port
2017-12-05 07:00:00 EST [Q](#)

IRL-JB Indian River Lagoon-Jensen Beach
2017-12-08 09:00:00 EST [Q](#)

IRL-SLE Indian River Lagoon-St. Lucie Estuary
2017-12-08 06:00:00 EST [Q](#)

SLE-ME St. Lucie Estuary-Middle Estuary
2017-12-08 09:00:00 EST [Q](#)

SLE-NF St. Lucie Estuary-North Fork
2017-12-08 09:00:00 EST [Q](#)

SLE-SF St. Lucie Estuary-South Fork
2017-12-08 09:00:00 EST [Q](#)

SLE-SF2 St. Lucie Estuary-South Fork 2
2017-12-08 09:00:00 EST [Q](#)

Water Quality

IRL-LP Indian River Lagoon - Link Port
2017-12-05 07:00:00 EST [Q](#)

IRL-FP Indian River Lagoon - Fort Pierce
2017-12-08 09:00:00 EST [Q](#)


IRL-VB Indian River Lagoon - Vero Beach
2017-12-08 09:00:00 EST [Q](#)

IRL-SB Indian River Lagoon - Sebastian
2017-12-08 09:00:00 EST [Q](#)

IRL-JB Indian River Lagoon-Jensen Beach
2017-12-08 09:00:00 EST [Q](#)

IRL-SLE Indian River Lagoon-St. Lucie Estuary
2017-12-08 06:00:00 EST [Q](#)

FAU Harbor Branch Indian River Lagoon Observatory



The Indian River Lagoon Observatory Network of Environmental Sensors

The Indian River Lagoon is the longest and largest estuary on the east coast of Florida. It is a vital ecosystem that provides many services to the state and the nation. The lagoon is home to a diverse array of plants and animals, and it plays a crucial role in the state's economy and environment. The Indian River Lagoon Observatory (IRLO) is a network of environmental sensors that monitor the lagoon's health and provide data to scientists and the public. The network includes a variety of sensors that measure water quality, temperature, salinity, and other factors. The data from these sensors is used to track changes in the lagoon over time and to identify potential threats to its health. The IRLO is a key component of the state's efforts to protect and manage the Indian River Lagoon.

| Water Quality | |
|--|-------------------------|
| IRL-LP Indian River Lagoon - Link Port | |
| 2017-12-05 07:00:00 EST | |
| Temperature | 22.87 °C 73.17 °F |
| Salinity | 22.23 PSU |
| Dissolved Oxygen | 4.91 mg/L |
| O2 % Saturation | 65.02 % |
| Turbidity | 3.74 NTU |
| CDOM (Water Color) | 35.57 QSD |
| Chlorophyll a | 3.62 µg/L |
| Nitrate Concentration | 8.8 µM 0.123 mg N/L |
| Phosphate Concentration | 1.14 µM 0.035 mg P/L |
| Depth (Instrument) | 2.240 m 7.35 ft |
| Current Direction | 6.8 ° N |
| Current Speed | 278.0 mm/s 0.91 ft/s |

Florida's Indian River Lagoon is a vital ecosystem that provides many services to the state and the nation. The lagoon is home to a diverse array of plants and animals, and it plays a crucial role in the state's economy and environment. The Indian River Lagoon Observatory (IRLO) is a network of environmental sensors that monitor the lagoon's health and provide data to scientists and the public. The network includes a variety of sensors that measure water quality, temperature, salinity, and other factors. The data from these sensors is used to track changes in the lagoon over time and to identify potential threats to its health. The IRLO is a key component of the state's efforts to protect and manage the Indian River Lagoon.

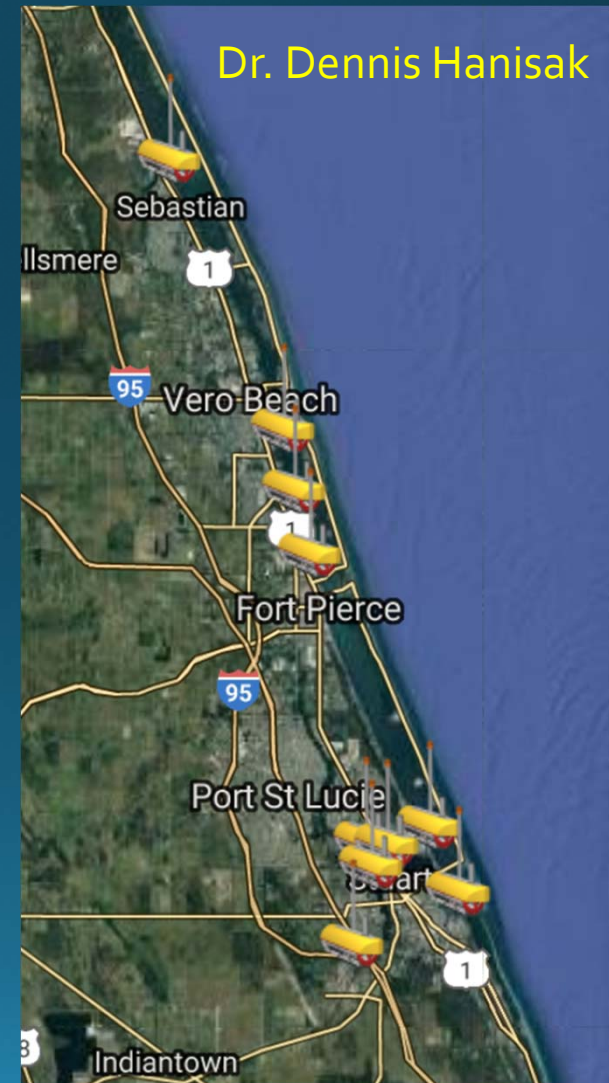
Archived Data

Use [LOBOviz](#) to graph and download archived data from this LOBO node.

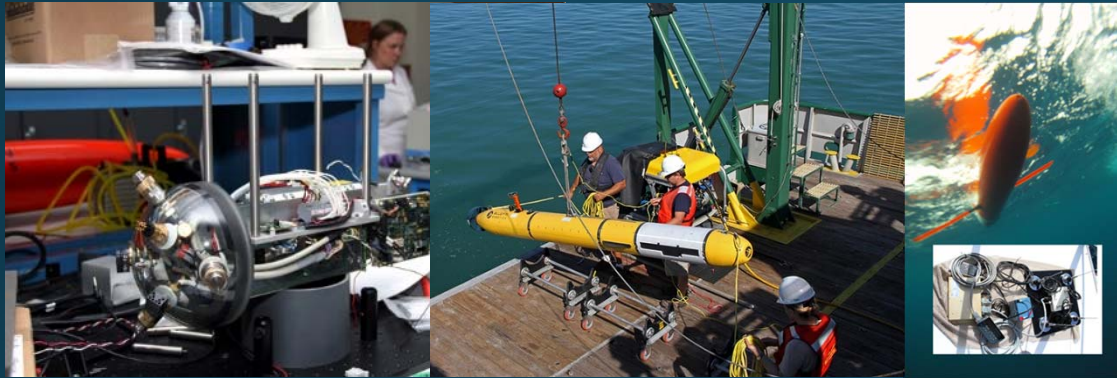
Configuration

| Manufacturer | Instrument | Measurements |
|--------------|-----------------------------|---|
| Satlantic | LOBO | Power distribution Sensor control Wireless communication Data management |
| Satlantic | SeaFET pH | pH |
| Satlantic | SUNA Nitrate | Nitrate Concentration |
| WET Labs | WQMX Water Quality Monitor | Salinity, Temperature, Dissolved Oxygen, Turbidity, Chlorophyll Concentration, CDOM (Water Color), Depth (Pressure) |
| WET Labs | Cycle PO ₄ Meter | Phosphate |
| Nortek | Aquadopp | Current Speed, Current Direction |

Dr. Dennis Hanisak



OCEAN ENGINEERING & TECHNOLOGY



Dr. Fraser Dalglish (affiliate)
Dr. Bing Ouyang
Dr. Mike Twardowski
Dr. Anni Vuorenkoski Dalglish
Dr. Jim Sullivan
Dr. Aditya Nayak
Dr. Sid Verma

Novel instrument development and applications

LIDAR, autonomous sensors, in situ holographic imaging, optical sensing

Deployment platforms and instrument integration (e.g. Wave Glider, SPRAY glider)

Industry Partnerships (Raytheon, Liquid Robotics, SeaCorp, etc.)

Compressive sensing, machine learning, big data

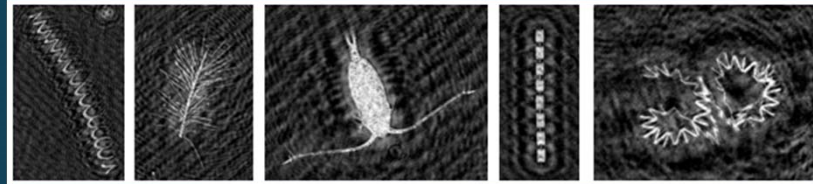
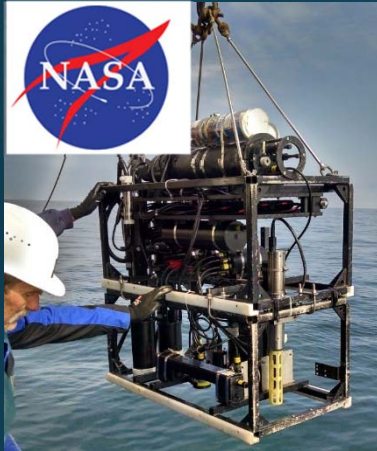
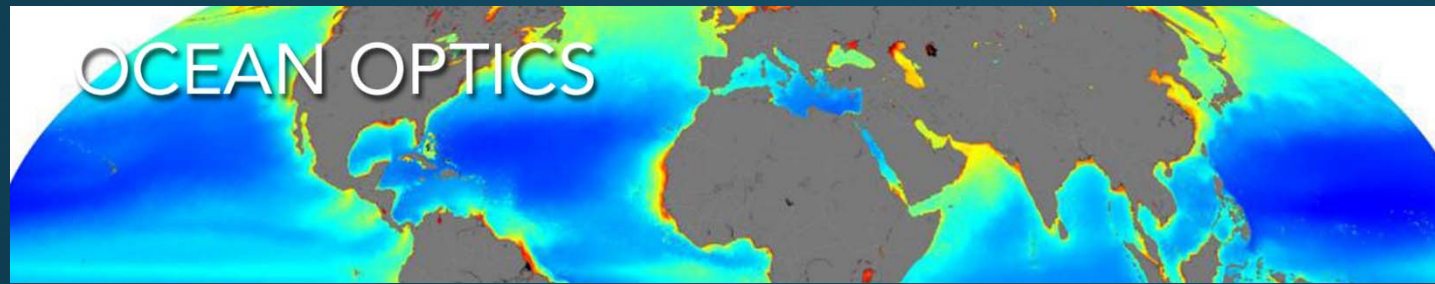
Defense research

ONR, DOD, DARPA, classified projects

Tech Runway

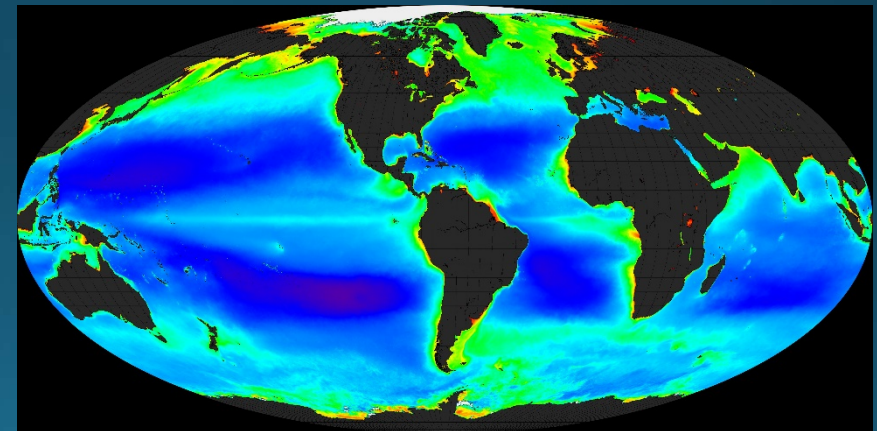
small business startups





Dr. Fraser Dalglish (affiliate)
Dr. Bing Ouyang
Dr. Mike Twardowski
Dr. Anni Vuorenkoski Dalglish
Dr. Jim Sullivan

Satellite remote sensing
In situ optical measurements
 calibration/validation activities
Optical modeling
 radiative transfer, compressive sensing
Instrument development and calibration
 VSF and absorption sensors, holographic cameras, laser based sensors
Optical particle detection, characterization and dynamics
 particle orientation, composition, size distributions, etc.



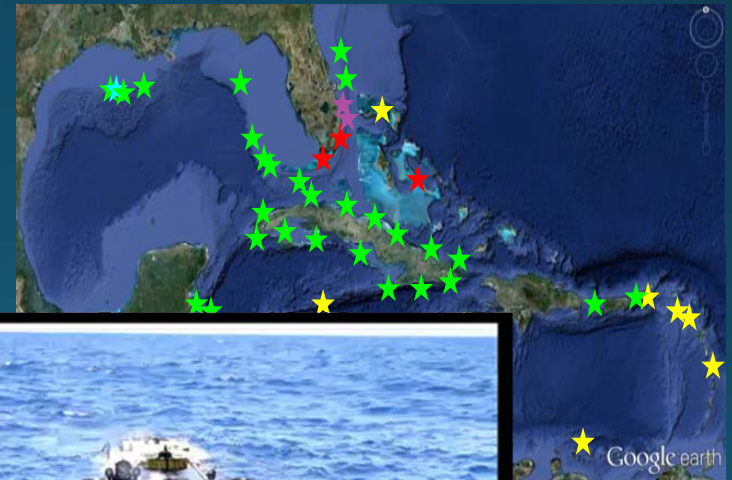
OCEAN EXPLORATION



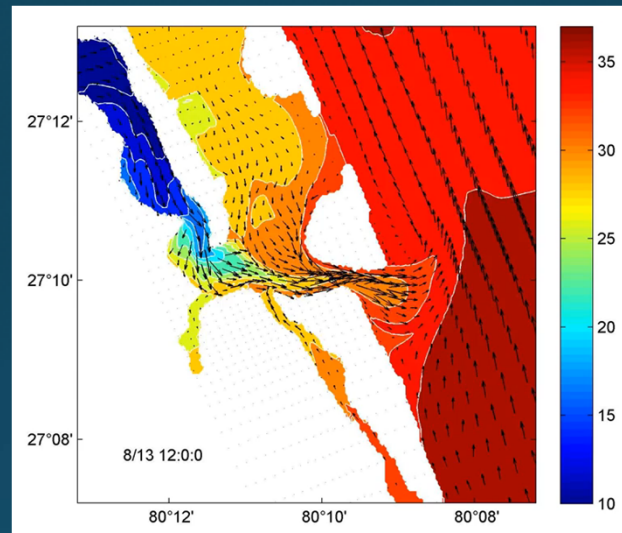
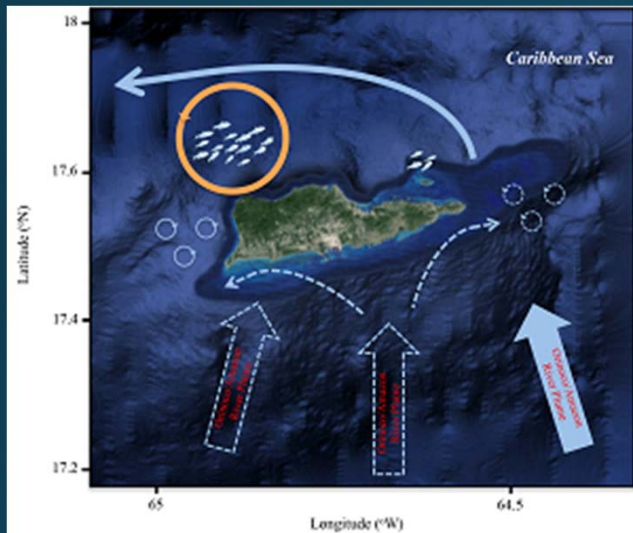
Dr. Shirley Pomponi
Dr. Josh Voss
Dr. Dennis Hanisak
Dr. Jim Masterson
John Reed, M.Sc.

Mesophotic reef exploration
Sponge ecology
Natural products collection
Exploration Command Center
remote telepresence
Technology development
International collaborations
Cuba reef study – 2017-18

Johnson Sea-Link & archives



OCEAN DYNAMICS & MODELING



Dr. Laurent Cherubin
Dr. Mingshun Jiang
Dr. Aditya Nayak
Dr. Sid Verma

Ocean modeling and biophysical processes

- circulation models of the IRL and other ecosystems
- effects of climate change
- biophysical interactions

Physical-biogeochemical ocean observations and coupled models

- measurements using novel AUV/ROV technology
- water quality impacts in the IRL and Florida reef tracks
- fish spawning and aggregations

MARINE MAMMALS



Dr. Annie Page-Karjian, DVM
Dr. Greg O'Corry-Crowe
Steve Burton
Marilyn Mazzoil
Adam Schaefer, MPH

Epidemiology, population health & pathology
Marine wildlife veterinary medicine & research
Dolphin research
 photo ID, population dynamics, health
Manatee, Right whale & sea turtle research
Marine mammal stranding & rescue



POPULATION BIOLOGY & BEHAVIORAL ECOLOGY



Dr. Greg O'Corry-Crowe
Dr. Matt Ajemian

Ecology, behavior and evolution of marine apex predators
dolphins, sea lions, beluga whales, sharks, etc.

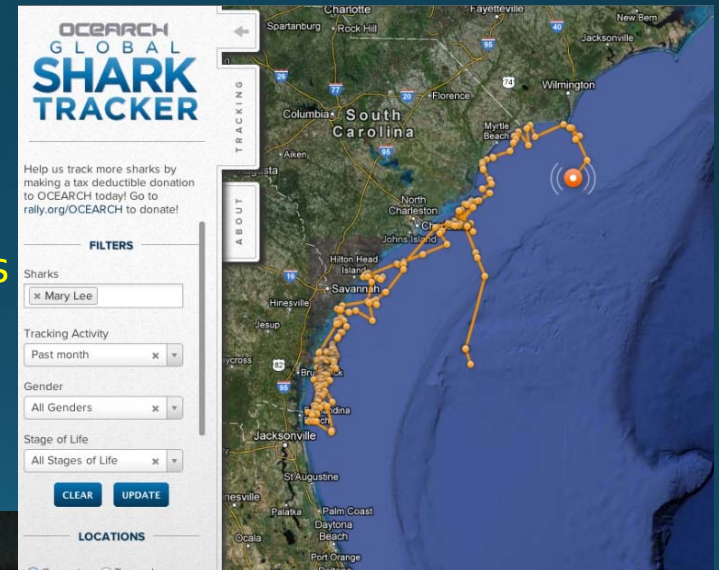
Ecology and physiology of protected fish species

Gene flow and dispersal

molecular techniques, genetics/omics

Population structure and movement patterns

tracking telemetry, acoustics, photo-ID



ABOUT THE HARBOR BRANCH RESEARCH PILLAR:

PILLAR ESTABLISHED IN 2017, LEADERSHIP TRANSITION IN 2018

PURPOSE:

WITH HBOI SERVING AS LEAD, LEVERAGE THE DIVERSE OCEAN AND ENVIRONMENTAL SCIENCE & TECHNOLOGY EXPERTISE *ACROSS THE FAU SYSTEM* TO FOSTER COLLABORATIONS AND PARTNERSHIPS TO PROMOTE/ENHANCE RESEARCH EXCELLENCE.

STRATEGIC GOALS:

RECRUIT NEW FACULTY TO *ENHANCE* RESEARCH CAPABILITIES.

DEVELOP INTERDISCIPLINARY RESEARCH INITIATIVES AND CENTERS OF EXCELLENCE TO GROW THE FAU RESEARCH ENTERPRISE.

CREATE NOVEL EDUCATION, OUTREACH AND DEVELOPMENT PROGRAMS.

THE ROLE OF FAU HARBOR BRANCH

SCIENCE

TECHNOLOGY

LEADERSHIP



New device alerts NASA to algae in Lake O

SeaPRISM planned for week of June 11

Tyler Treadway
Treasure Coast Newspapers
USA TODAY NETWORK - FLORIDA

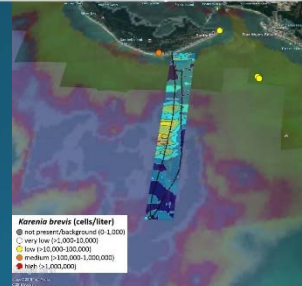
FORT PIERCE - There's good news for all the people who've said, "If they can put a man on the moon, you'd think they could stop algae blooms in the St. Lucie River."

The folks who put a man on the moon are now on the job. A SeaPRISM water-monitoring device developed by NASA will soon be keeping track of algae blooms in Lake Okechobee.

Scientists at Florida Atlantic University's Harbor Branch Oceanographic Institute are partnering with NASA to use the device to get real-time information about algae levels in Lake O, the source of the massive blooms along the St. Lucie



Jim Sullivan, Interim Executive Director of Harbor Branch Oceanographic Institute at Florida Atlantic University, introduces the SeaPRISM system, a device built by NASA, to help monitor for blue-green algae blooms in Lake Okechobee, during a meeting on Wednesday at the Harbor Branch campus in northern St. Lucie County. The device was deployed in the middle of Lake O on June 11. CIRC HASSETT/CTP/ALM



THE CHALLENGE:

THERE ARE CURRENTLY OVER 70 FAU PROFESSORS WHO COUNT THEMSELVES AS MEMBERS OF THE HARBOR BRANCH PILLAR.

THE HARBOR BRANCH PILLAR IS THE LARGEST (IN MEMBERSHIP) AND BROADEST IN RESEARCH SCOPE OF ALL THE PILLARS.

COLLABORATIONS & PARTNERSHIPS WITHIN FAU:

HBOI, I-SENSE, I-BRAIN & I-HEAL

SeATech

COLLEGE OF SCIENCE (BIOLOGY, ENVIRONMENTAL SCIENCE & GEOSCIENCES)

FLORIDA CENTER FOR ENVIRONMENTAL STUDIES

HONORS COLLEGE

COLLEGE OF ENGINEERING AND COMPUTER SCIENCE (OME)

COLLEGE OF MEDICINE

COLLEGE OF NURSING

COLLEGE OF BUSINESS

COLLEGE OF ARTS & LETTERS (SOCIAL SCIENCE)...

BUILDING THE HARBOR BRANCH PILLAR:

DEVELOP PILLAR RESEARCH THEMES, FACULTY TEAMS AND THEME “CHAMPIONS” FOR SUCCESS.

WATER QUALITY

(NUTRIENT EUTROPHICATION, HABs, TOXINS, HUMAN HEALTH, POLLUTANTS, MONITORING, MITIGATION, MANAGEMENT, POLICY)

CONSERVATION

(MARINE MAMMALS, SEABIRDS, TURTLES, SHARKS/RAYS, FISHERIES, SEAGRASS, EVERGLADES, COASTAL RESILIENCY, OCEAN PLASTICS, POLLUTION)

OCEAN ENGINEERING

(SENSOR DEVELOPMENT, MODELING, BIOTECHNOLOGY, DEFENSE, ENERGY)

AQUACULTURE & FOOD SAFETY

(FOOD STOCKS — SCIENCE, SAFETY & SECURITY, STOCK ENHANCEMENT)

BIOMEDICAL

(NATURAL PRODUCTS, TOXINS, METABOLOMICS/GENOMICS, HUMAN HEALTH)

OCEAN EXPLORATION

(MESOPELAGIC RESEARCH, CORAL REEFS, NOVEL SENSORS)

CLIMATE CHANGE AND BIOGEOCHEMISTRY

(COASTAL RESILIENCY, SEA LEVEL RISE, OCEAN ACIDIFICATION, NUTRIENT DYNAMICS, EXTREME EVENTS)

RECENT PILLAR ACCOMPLISHMENTS:

FIVE PILLAR FACULTY HIRES COMPLETED:

1. ELECTROCHEMIST (JOINT HIRE W/ I-SENSE)
2. BIOGEOCHEMIST (JOINT HIRE W/ WHC)
3. OCEAN ENGINEER - FLUID DYNAMICS (JOINT HIRE W/ OME)
4. OCEAN ENGINEER - COMPUTATIONAL (JOINT HIRE W/ OME)
5. DEVELOPMENTAL BIOLOGIST (JOINT HIRE W/ WHC)

COMPLETE FACULTY RECRUITMENT – *3 MORE STRATEGIC HIRES IN FY20*

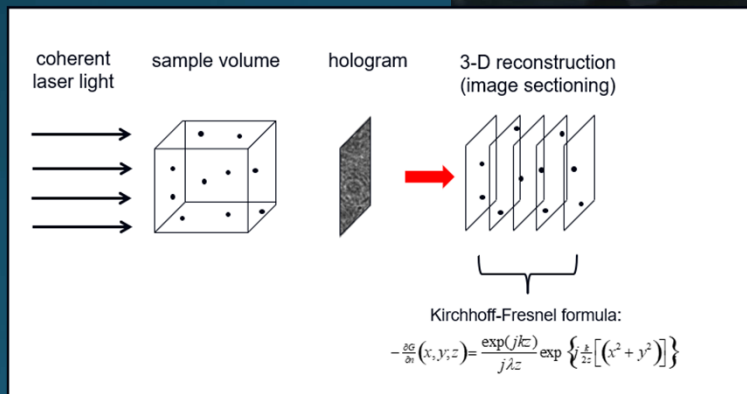
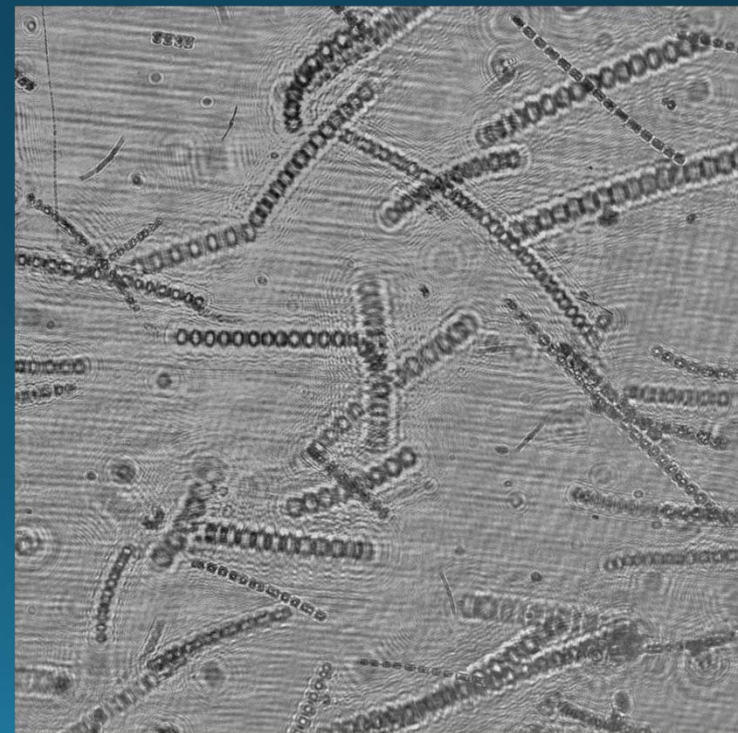
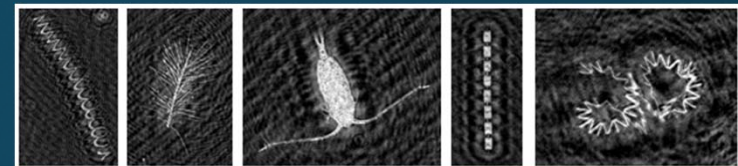
CONTINUE: PILLAR SCIENCE LECTURE SERIES, PROMOTING VISITS BY POTENTIAL SCIENTIFIC AND INDUSTRY PARTNERS, BUILDING FACULTY PARTICIPATION, ENGAGING STAKEHOLDERS (E.G. WATER MANAGERS, POLICY MAKERS, COMMUNITY LEADERS, PHILANTHROPY, ETC.), FACILITATING PILLAR OUTREACH AND COMMUNITY ENGAGEMENT.

PILLAR RESEARCH HIGHLIGHTS:

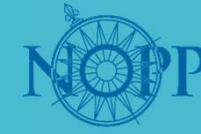


TECHNOLOGY DEVELOPMENT

UNDERWATER HOLOGRAPHIC VIDEO MICROSCOPE (NSF)



PILLAR RESEARCH HIGHLIGHTS:

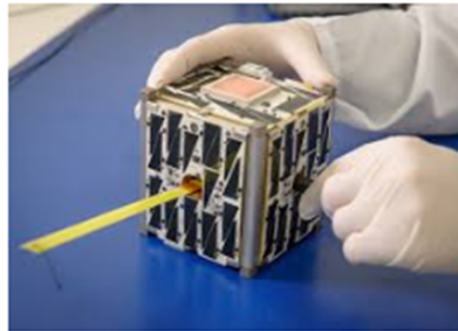


TECHNOLOGY DEVELOPMENT

FAU Harbor Branch Funded to Develop Imaging System for CubeSats

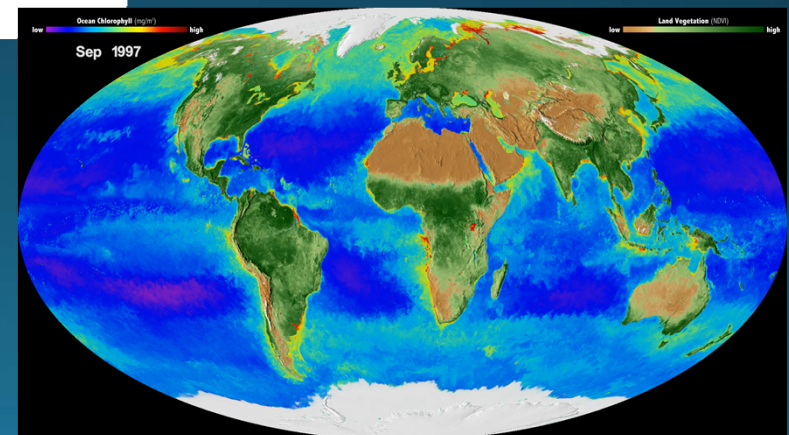
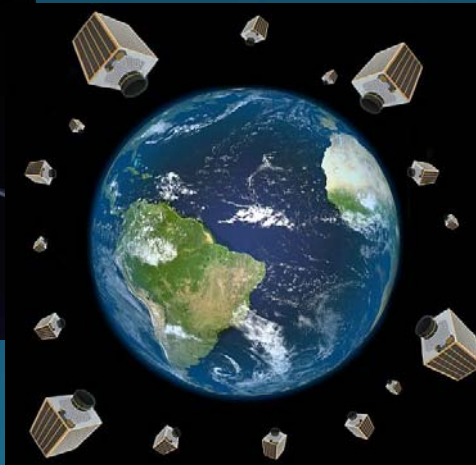
FAU Harbor Branch's Dr. Michael Twardowski and Dr. Bing Ouyang recently received funding to develop an imaging system for CubeSats, low-cost miniaturized satellites. The two-year project, "High Quality Littoral Ocean and Aerosol Characterization from a Cubesat with Novel Spatial Light Modulator Imaging System," is collaboration between FAU Harbor Branch and Navy Space and Naval Warfare Systems Command. This \$300K project is funded through National Oceanographic Partnership Program (NOPP), managed by the Office of Naval Research (ONR). [Read more.](#)

Photo Credit: NASA Ames



CUBESAT IMAGER FOR OCEAN ECOLOGY (NOPP/ONR)

GOAL: DEVELOP AND LAUNCH NOVEL IMAGING SYSTEM ON A CONSTELLATION OF CUBESATS TO MEASURE VITAL OCEAN ECOLOGY PARAMETERS FOR US NAVY MODELS



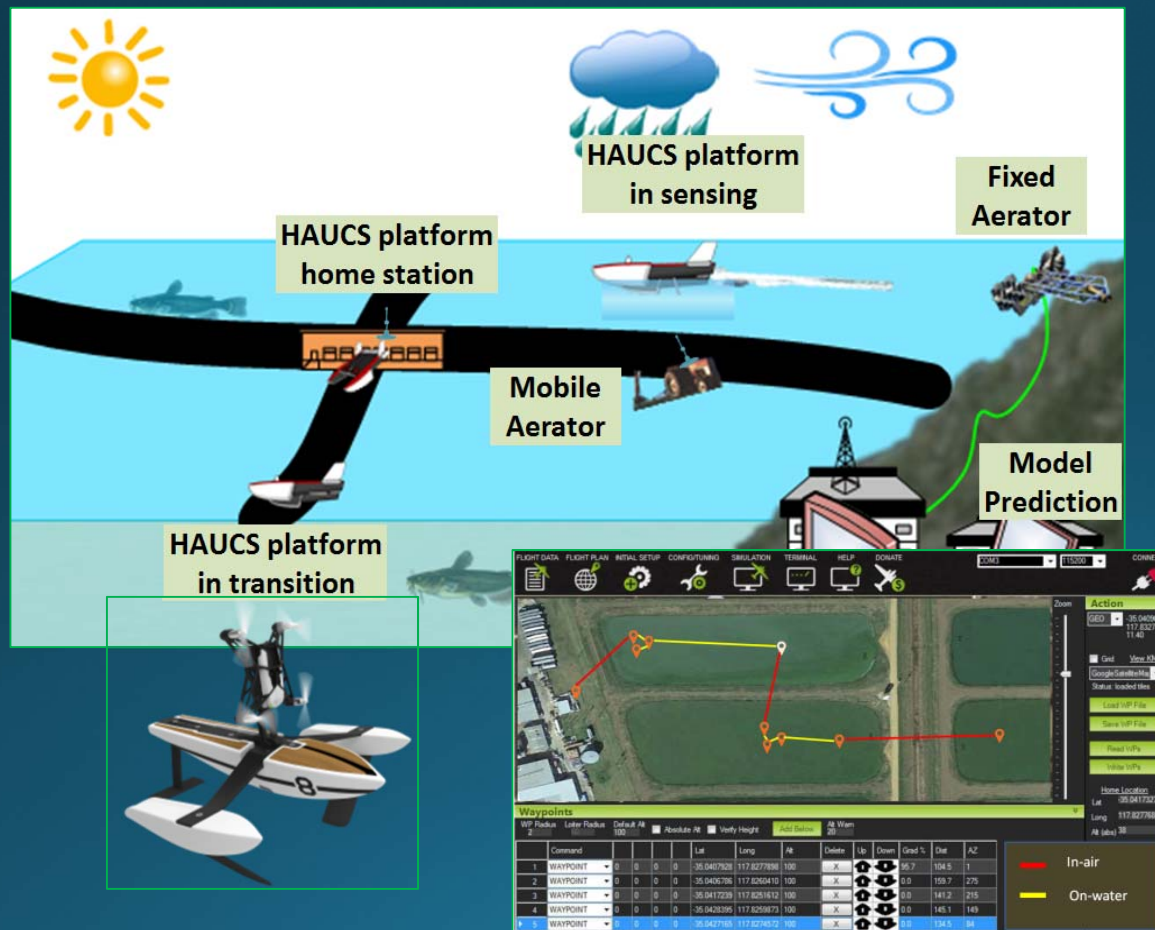
PILLAR RESEARCH HIGHLIGHTS:



TECHNOLOGY DEVELOPMENT

HYBRID AERIAL/UNDERWATER ROBOTIC SYSTEM (HAUCS)

GOAL: SCALABLE, ADAPTABLE SENSING AND MAINTENANCE OF AQUACULTURE FISH FARMS



PILLAR RESEARCH HIGHLIGHTS:

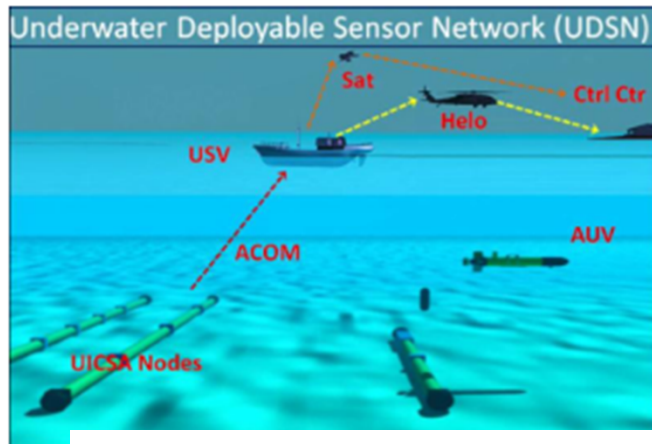


TECHNOLOGY DEVELOPMENT

ROBUST ACOUSTIC SENSING WITH UNDERWATER INFLATABLE PASSIVE SONAR ARRAYS

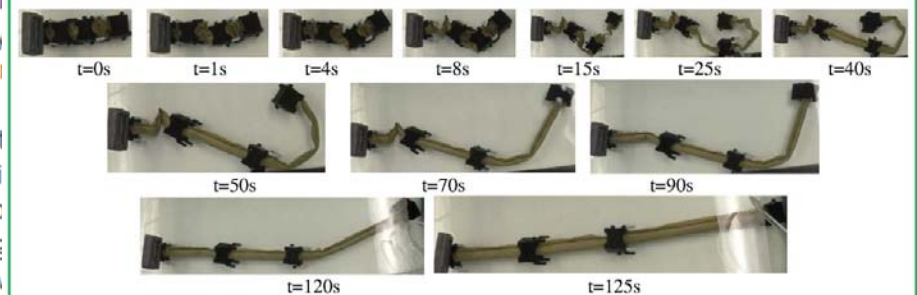
GOAL: IMPROVING NAVAL CAPABILITIES IN TIGHT PAYLOAD SPACES

Ouyang Awarded Office of Naval Research Grant



FAU Harbor Branch's Dr. Bing Ouyang was recently awarded a grant from the Office of Naval Research for the proposal titled, "Robust Co-Prime Sensing with Underwater Inflatable Passive Sonar Array extend through April 2025".

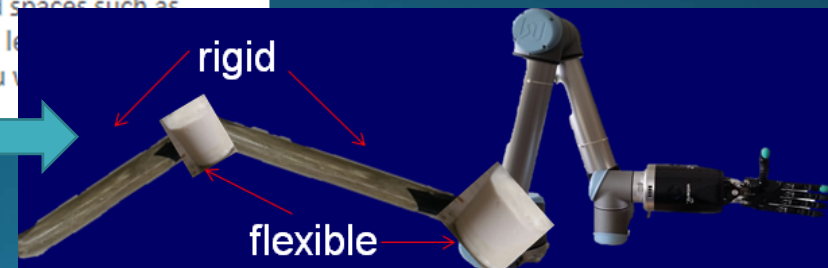
In collaboration with the University of Texas at Austin, this project will build a transformative co-Prime Sensing Deployable Sensing



prime
comp
unma
Branch
be a



ieve "two-way"
d spaces such as
ll le
u v



PILLAR RESEARCH HIGHLIGHTS:



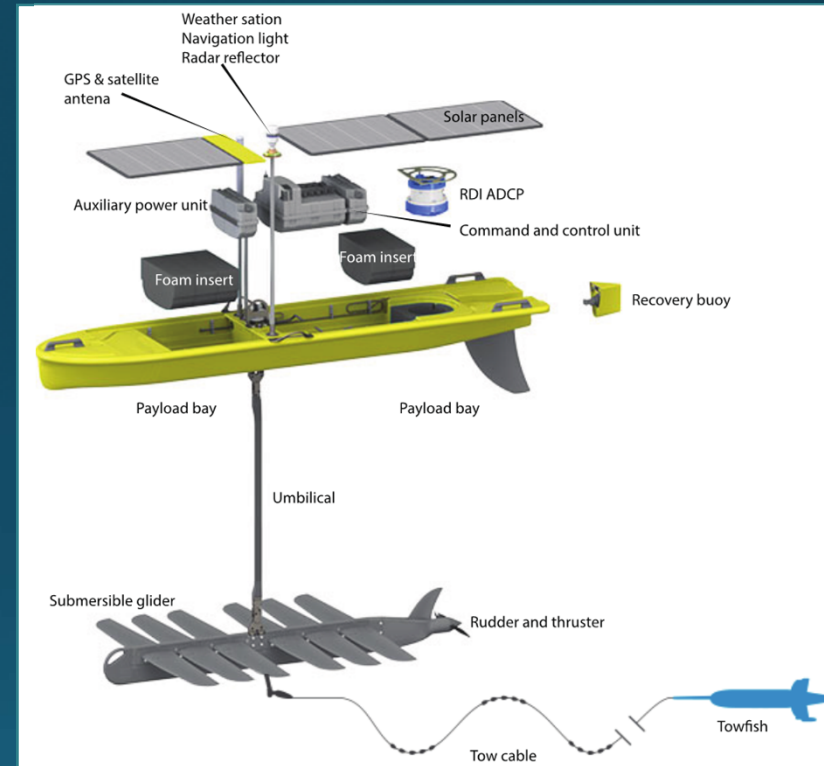
DEFENSE ADVANCED
RESEARCH PROJECTS AGENCY

PREVIOUS RESEARCH & DEVELOPING UNIQUE FUNDING OPPORTUNITIES (DARPA)

LARGE TERRITORIAL FISH CAN HAVE
STRONG VOCALIZATIONS RELATED TO
THEIR ENVIRONMENT AND BEHAVIOR.



THESE FISH ARE FOUND TO BE AGGRESSIVE
AND VOCAL TOWARDS “NON-NATIVE”
THREATS (E.G. DIVERS).



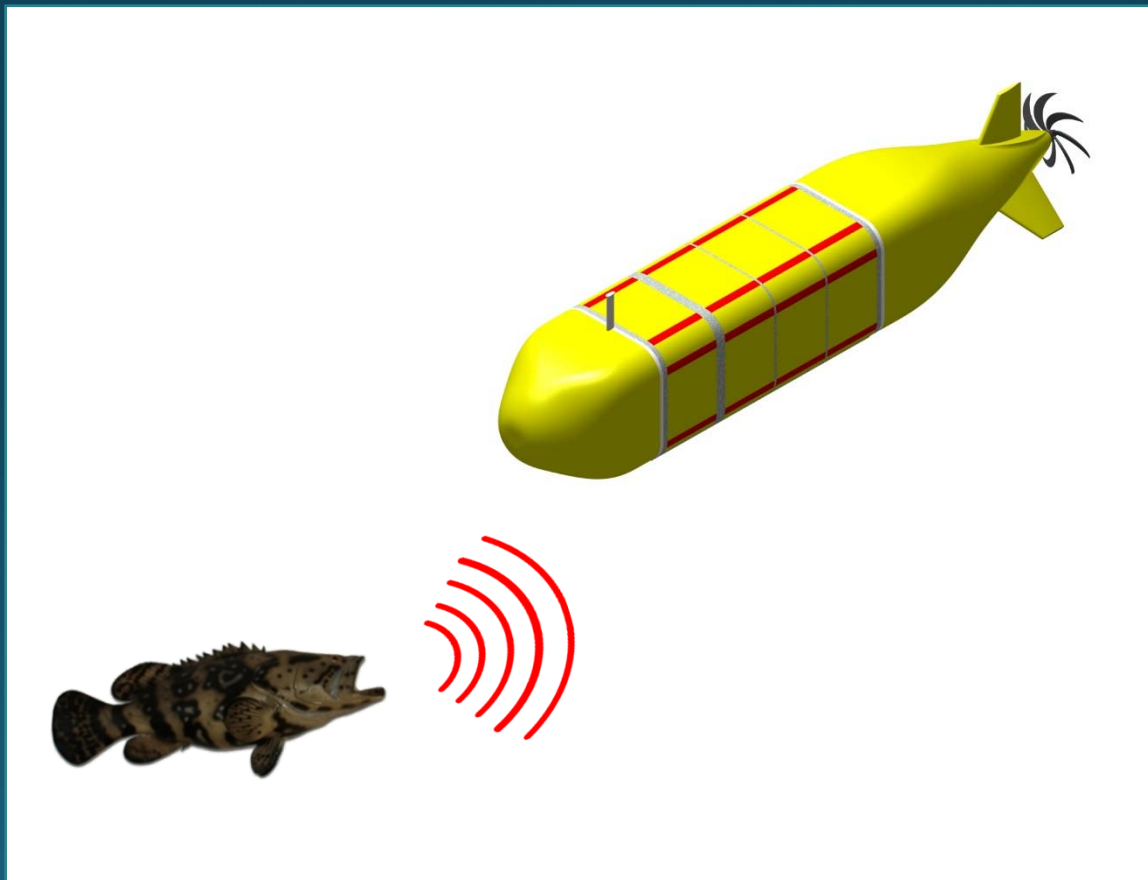
PILLAR RESEARCH HIGHLIGHTS:



DEFENSE ADVANCED
RESEARCH PROJECTS AGENCY

DARPA FUNDING (~ \$6M PENDING PROJECT)

THE BEHAVIOR AND UNIQUE VOCALIZATIONS OF THESE FISH COULD BE USED AS A NATURAL
DETECTION AND WARNING SYSTEM AGAINST FOREIGN "THREATS".



PILLAR RESEARCH HIGHLIGHTS:

BIOMEDICAL RESEARCH:

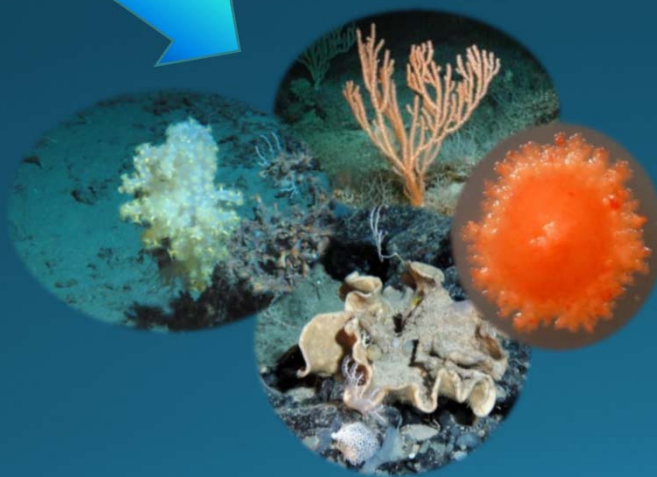
HBOI HAS BUILT AN EXTENSIVE LIBRARY OF UNIQUE DEEP-SEA ORGANISMS WHICH ARE USED IN NATURAL PRODUCTS DISCOVERY EFFORTS.



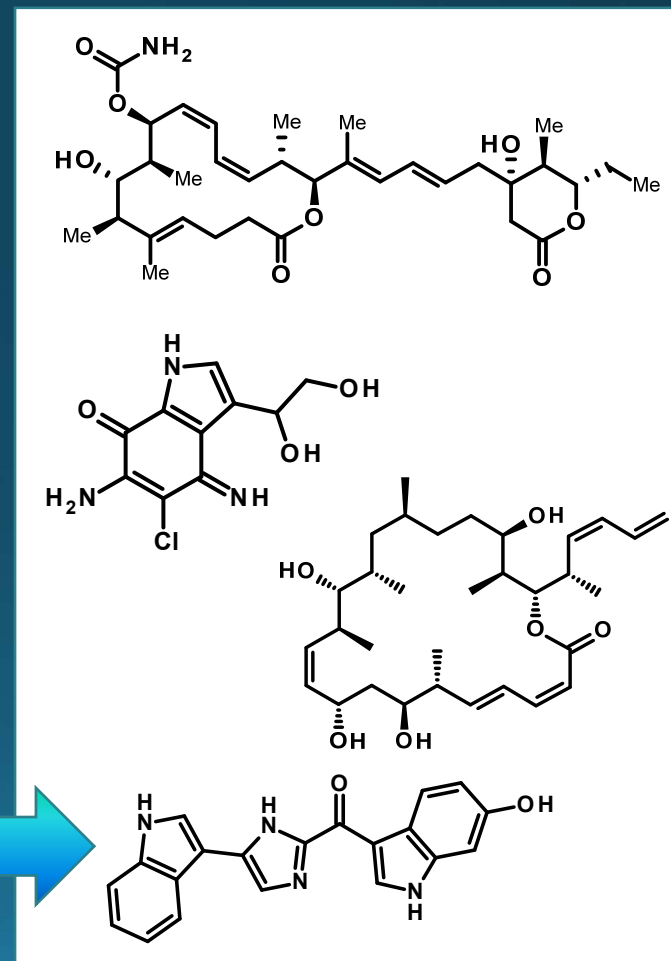
JOHNSON-SEA-LINK



MOHAWK ROV



DIVERSE ORGANISMS

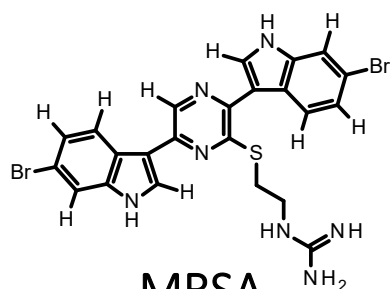


DIVERSE CHEMISTRY

PILLAR RESEARCH HIGHLIGHTS:

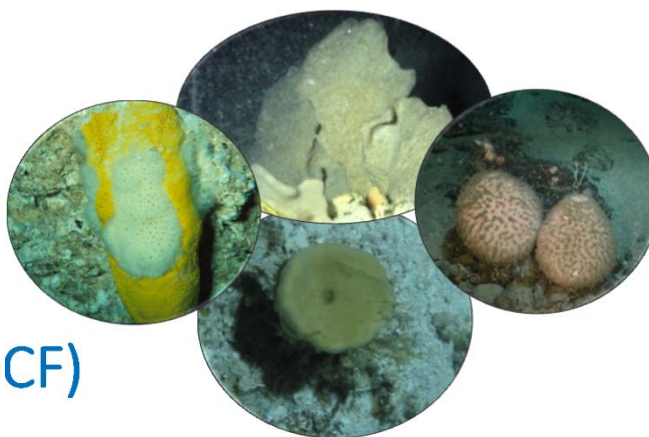
THE NATURAL PRODUCTS LIBRARY (>30,000 SAMPLES) IS TESTED BROADLY AT HBOI AND THROUGH COLLABORATIONS, FOR EXAMPLE:

DRUG RESISTANT BACTERIA (HBOI)

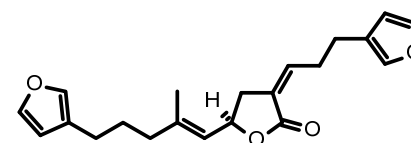


MRSA

MIC : 1 μ M SI >80



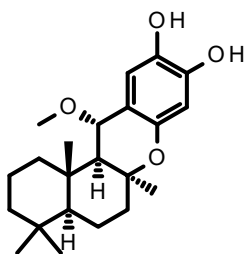
MALARIA (UCF)



DD2 resistant *P. falciparum*

EC₅₀= 290 nM SI: 62.5

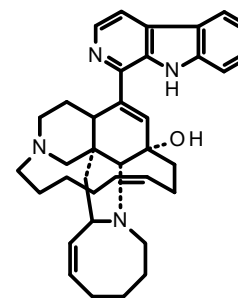
LATENT TUBERCULOSIS (UCF)



Latent *M. tuberculosis*

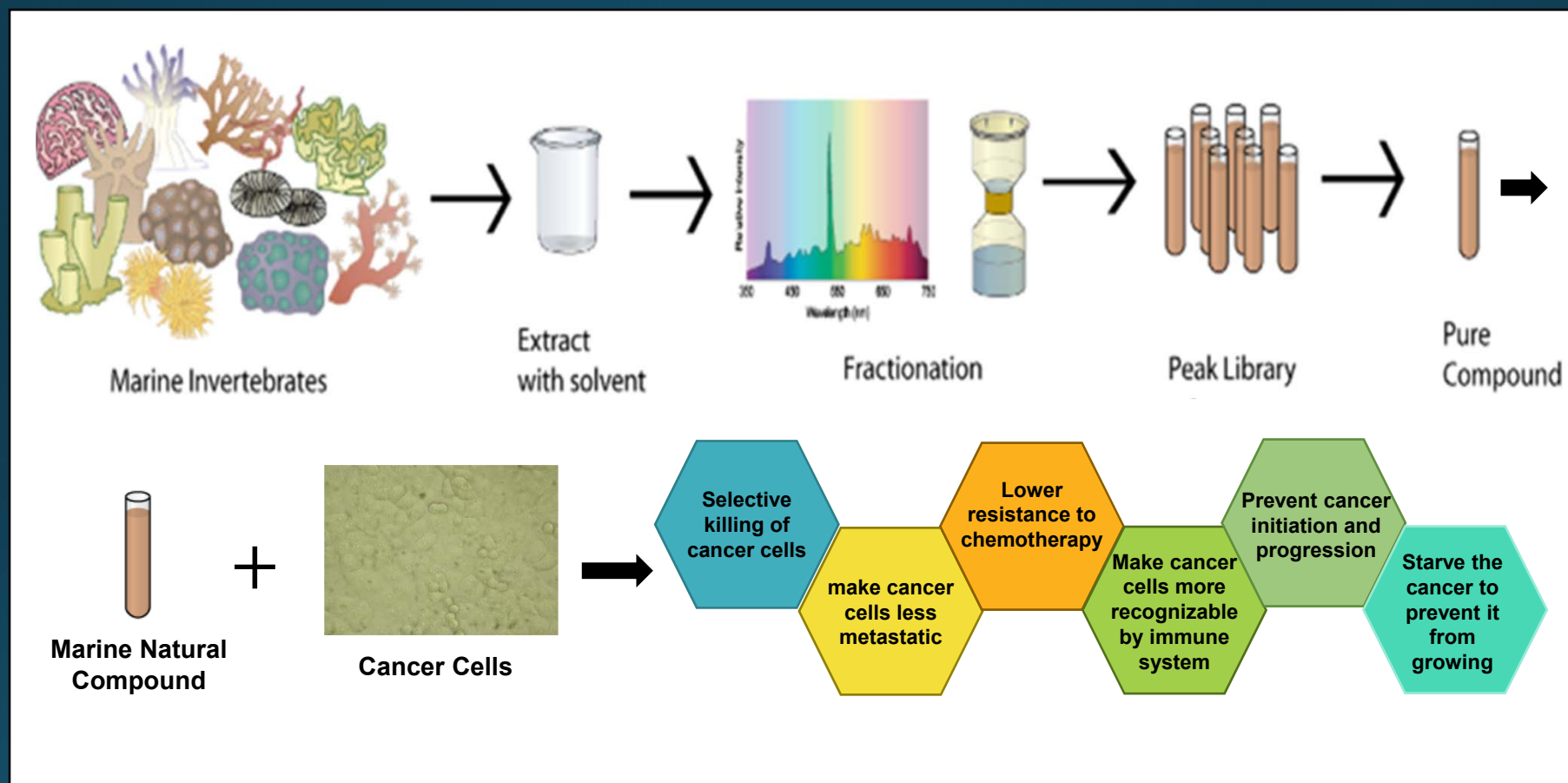
MIC : 1 μ M SI: 17

CANCER (HBOI)



PILLAR RESEARCH HIGHLIGHTS:

BIOMEDICAL RESEARCH



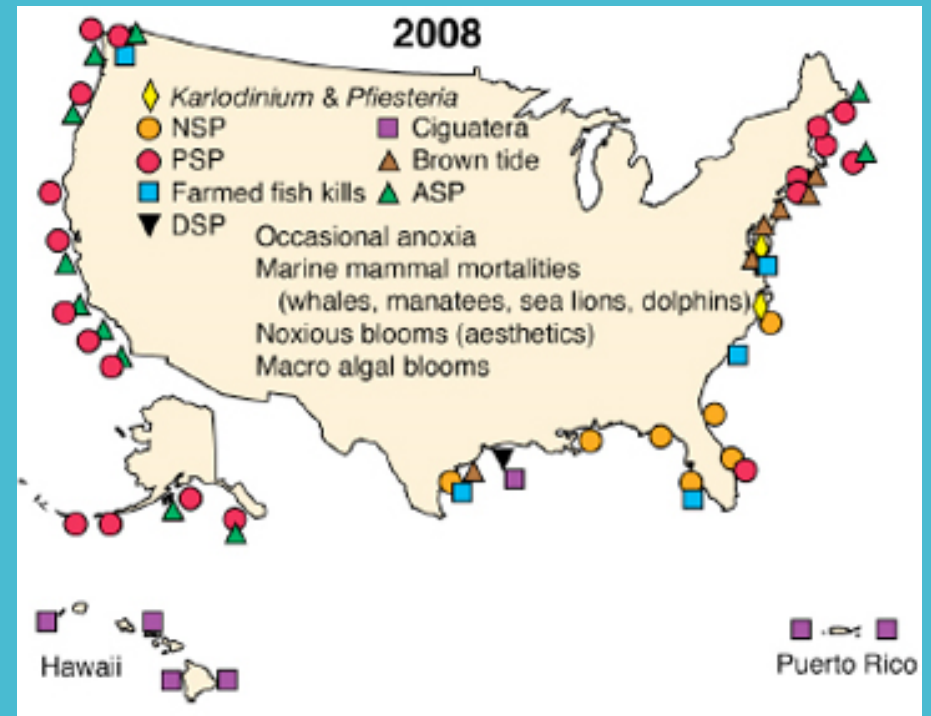
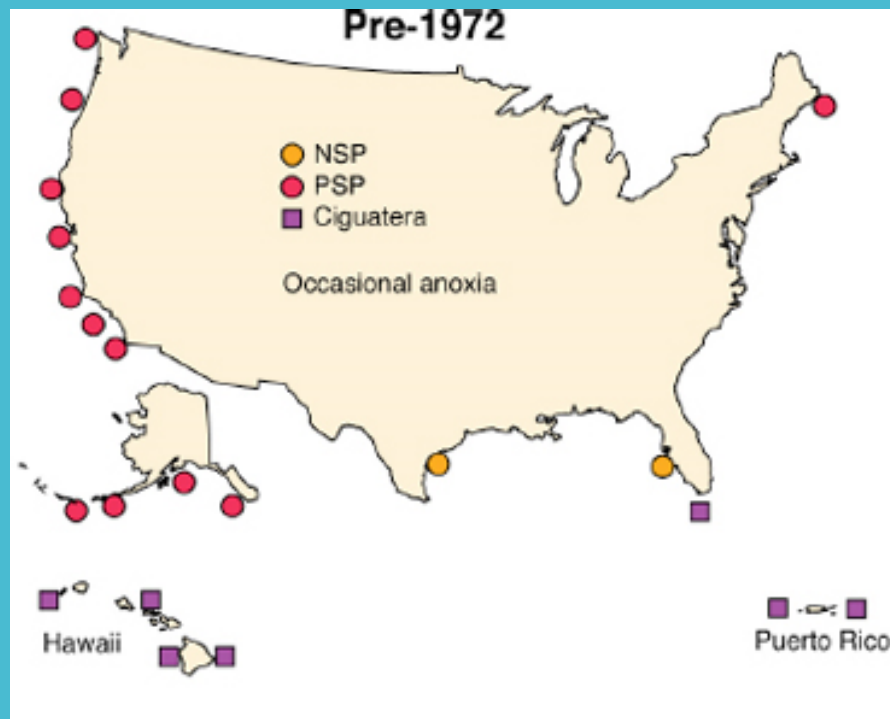
ACTIVE RESEARCH IS CURRENTLY ONGOING TO FIND THERAPEUTIC COMPOUNDS TO TREAT PANCREATIC CANCER, TRIPLE NEGATIVE BREAST CANCER AND LUNG & COLON CANCER.

PILLAR RESEARCH HIGHLIGHTS:

HARMFUL ALGAL BLOOM (HAB) RESEARCH

WORLDWIDE, HABs ARE INCREASING NOT ONLY IN GEOGRAPHICAL LOCATIONS, BUT ALSO IN FREQUENCY, DURATION AND SEVERITY

REPORTED HAB OCCURRENCES



FLORIDA IS LIKELY THE MOST HAB IMPACTED STATE IN THE US

PILLAR RESEARCH HIGHLIGHTS:

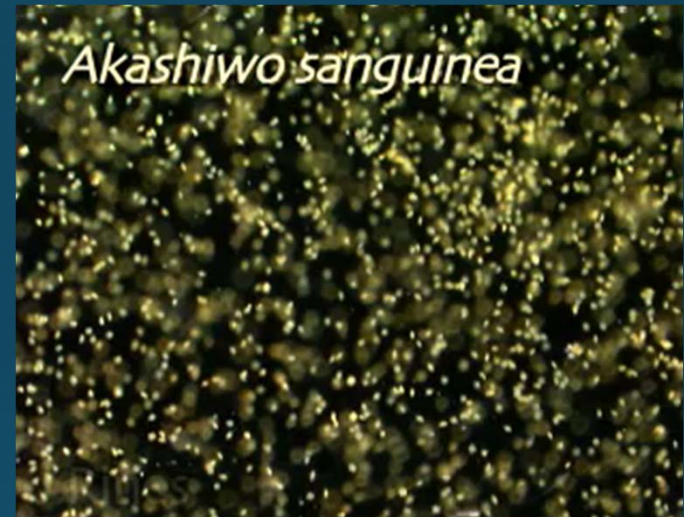
HARMFUL ALGAL BLOOM (HAB) RESEARCH

ECOLOGICAL DRIVERS (NUTRIENT, LIGHT, TEMPERATURE)

ECOLOGICAL EFFECTS (HYPOXIA/ANOXIA, TOXINS, TROPHIC
TRANSFER, HUMAN HEALTH)

MONITORING & MODELING

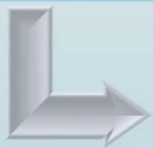
POLICY & SOLUTIONS



FLORIDA CENTER FOR COASTAL & HUMAN HEALTH

Est. August 2018 at FAU Harbor Branch

FAU/HBOI & Partner
Expertise



Florida HAB Crisis



Population Health
Impacts

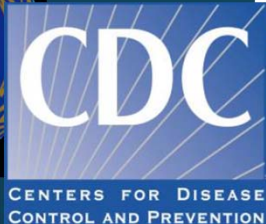


Healthy Environment &
Population



FLORIDA CENTER FOR COASTAL & HUMAN HEALTH

RECRUITING STAKEHOLDERS & STRATEGIC PARTNERS



FAU BRAIN INSTITUTE



CONDUCTING CRITICAL RESEARCH

FAU Harbor Branch tests people for levels of toxin released from blue-green algae



NASA, Harbor Branch partner on SeaPRISM to track Lake Okeechobee algae blooms

[Tyler Treadway](#), tyler.treadway@tcpalm.com Published 4:03 p.m. ET May 30, 2018 | Updated 4:23 p.m. ET May 30, 2018

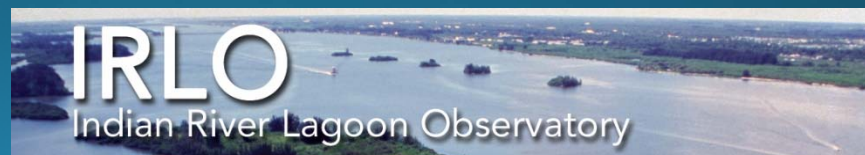
BIOLOGICAL SCIENCES

Florida Tech, Harbor Branch to Study Algal Bloom Impact on Lagoon Dolphins

PUBLIC RELEASE: 9-JAN-2018

Study finds source of toxic green algal blooms and the results stink

FLORIDA ATLANTIC UNIVERSITY



PILLAR RESEARCH HIGHLIGHTS:

MOVING TO CLASSIFIED RESEARCH

Raytheon



**3C BOSTON
ENGINEERING™**



HARRIS® TECHNOLOGY TO CONNECT,
INFORM AND PROTECT™

PILLAR RESEARCH HIGHLIGHTS:

MOVING TO CLASSIFIED RESEARCH

The Raytheon logo is displayed in a bold, red, sans-serif font. The letters are closely spaced, and the 'y' has a distinctive shape with a long tail that curves slightly to the left.

U.S. NAVY AWARDS RAYTHEON \$28 MILLION FOR VARIABLE DEPTH SONAR
INNOVATIVE ANTI-SUBMARINE TECHNOLOGY DESIGNED FOR LITTORAL COMBAT SHIPS

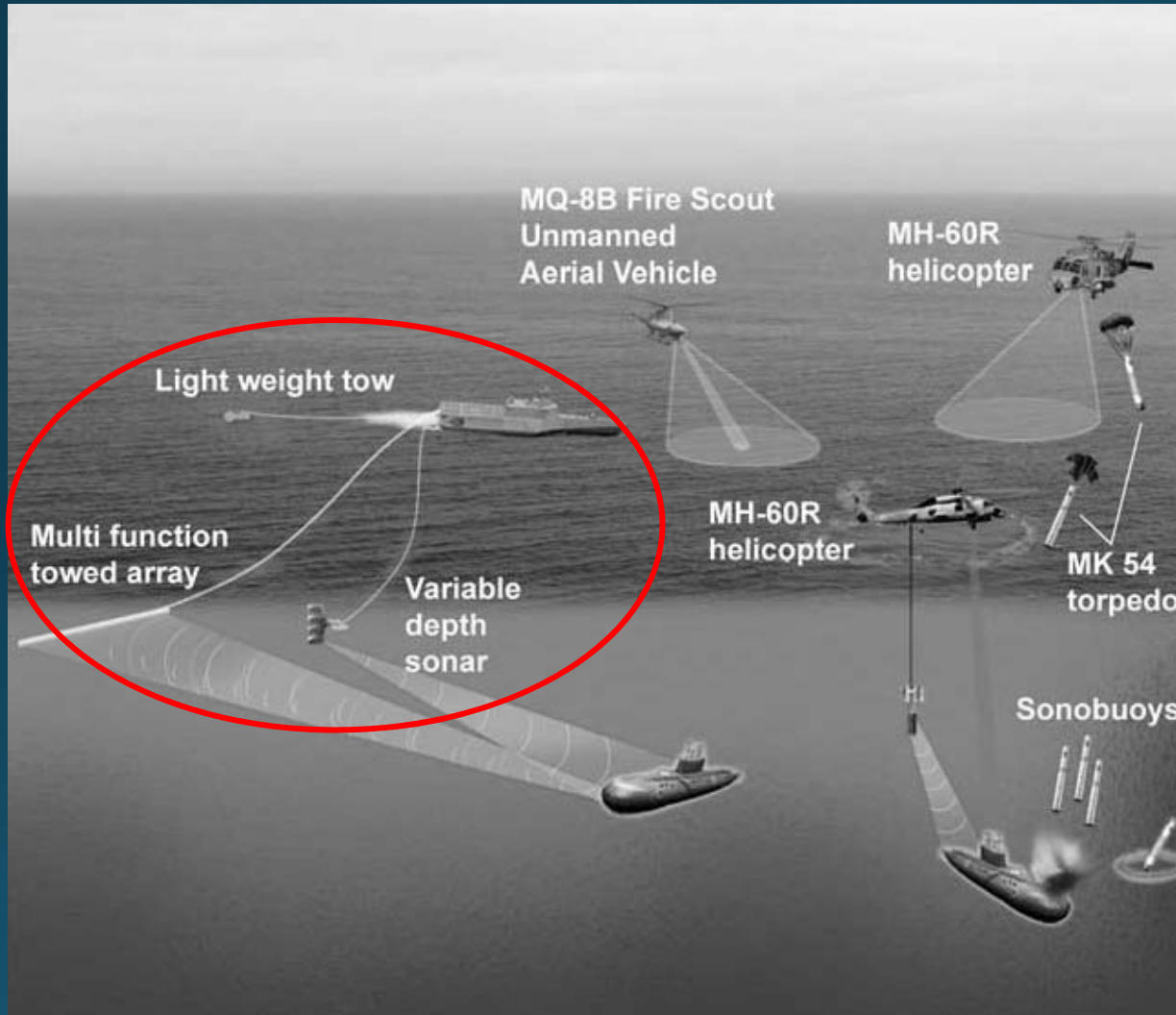
HBOI IS BUILDING THE VARIABLE DEPTH SONAR (VDS) DEPLOYMENT SYSTEM (DART) AND WILL CONDUCT FULL SYSTEM TESTING WITH RAYTHEON AND THE NAVY

PILLAR RESEARCH HIGHLIGHTS:



Raytheon

MOVING TO CLASSIFIED RESEARCH



VDS SYSTEMS ARE USED IN ANTI-SUBMARINE WARFARE (ASW)

THE DUAL ARRAY TRANSMITTER (DART) SYSTEM REPLACES THE CURRENT SYSTEM OF SEPARATE TRANSMIT AND RECEIVE ACOUSTICS INTO A SINGLE, INTEGRATED RAPIDLY DEPLOYED SYSTEM FOR THE LITTORAL COMBAT SHIPS.

THERE ARE CLASSIFIED ELEMENTS TO THIS PROJECT AND HBOI IS IN THE PROCESS OF BECOMING A CLEARED FACILITY.

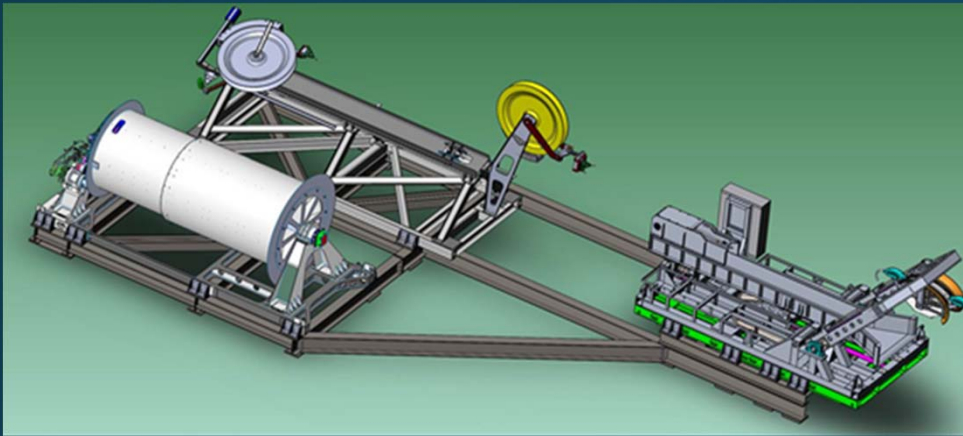
PILLAR RESEARCH HIGHLIGHTS:



Raytheon

MOVING TO CLASSIFIED RESEARCH

WE ARE ENTERING THE FINAL DOCKSIDE TESTING PHASES OF THIS PROJECT.



Raytheon
Integrated Defense Systems

DART LRS - PHASE II - LRS SEA TRIALS
(2014)

HARBOR BRANCH
FLORIDA ATLANTIC UNIVERSITY



PILLAR COMMUNITY OUTREACH:

THE HBOI VISITOR'S CENTER

THE PILLAR WILL HAVE DEDICATED PHYSICAL SPACE IN THE HBOI VISITOR'S CENTER TO HIGHLIGHT CURRENT RESEARCH AND ENGAGE THE PUBLIC. WE ARE ALSO DEVELOPING A "VIRTUAL" VISITOR'S CENTER FOR SIMILAR PURPOSES.



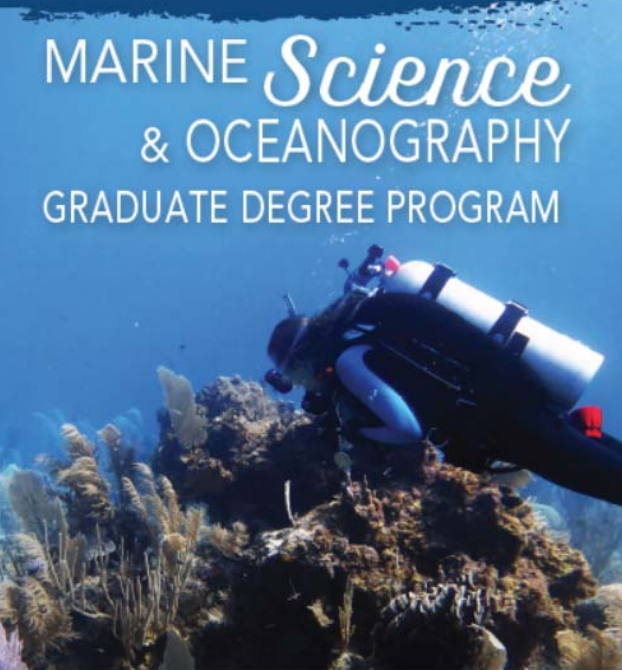
WE HAVE RECENTLY HIRED A *DIRECTOR OF COMMUNITY ENGAGEMENT & OUTREACH* TO FACILITATE COMMUNICATING THE PILLAR'S MISSION TO THE PUBLIC.

PILLAR EDUCATION & COMMUNITY ENGAGEMENT:

A NEW HBOI GRADUATE DEGREE PROGRAM (EST. 2017)

FLORIDA ATLANTIC UNIVERSITY
HARBOR BRANCH OCEANOGRAPHIC INSTITUTE

MARINE *Science*
& OCEANOGRAPHY
GRADUATE DEGREE PROGRAM

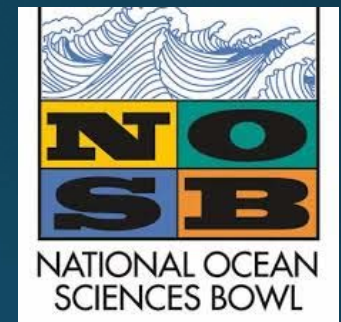


Now Accepting Applications

HARBOR BRANCH
FLORIDA ATLANTIC UNIVERSITY*

INCREASED EMPHASIS ON EDUCATIONAL
OUTREACH (K-12) AND OTHER ACTIVITIES:

DNAngler Citizen Science Project



St. Lucie
PUBLIC SCHOOLS



Home Our District ▾ Parents / Students ▾

Marine and Oceanographic Academy

PILLAR SCIENCE & COMMUNITY ENGAGEMENT:

PILLAR SEMINAR SERIES, OCEAN SCIENCE LECTURE SERIES, MARINE SCIENCE FRIDAYS, HBOI "SPEAKERS BUREAU", IRL SCIENCE FESTIVAL, ETC.

HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY®

THE JOHN & BARBARA FERRERA

2018 OCEAN *Science* LECTURE SERIES



SCIENCE TO SOLUTIONS SEMINAR SERIES

Translating Science to Improve Economies and Quality of Life

Marine Science Fridays

A Lecture Series Featuring Graduate Student Research

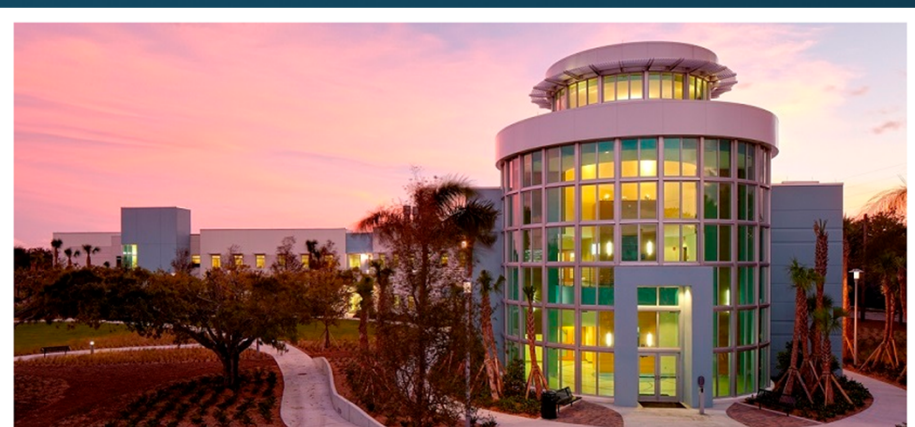
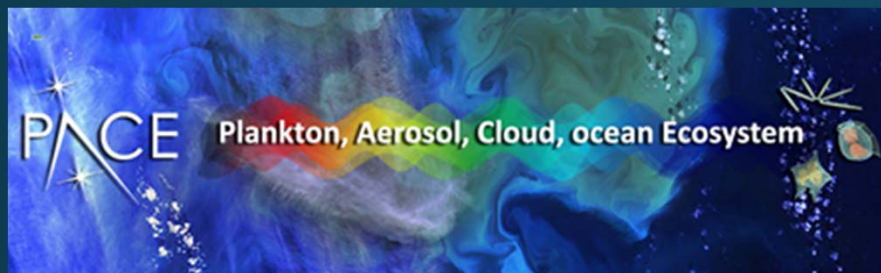
IRL SCIENCE FESTIVAL

PILLAR EXTERNAL SCIENCE ENGAGEMENT:

HOSTING CONFERENCES TO BRING WORLD CLASS SCIENTISTS TO FAU/HBOI:

NASA PACE SCIENCE TEAM ANNUAL MEETING
(2017 & 2018)

RAD LIDAR CONFERENCE
(FALL 2018)



RADLIDAR

*Recent **AD**vances in **LIDAR***

November 5-6, 2018

The Advances in LIDAR (RAD-LIDAR) Conference aims to bring together an interdisciplinary group of scientists to exchange results on theoretical, technical developments, and applications in the field of laser light scattering in the presence of media. The first RAD-LIDAR workshop was held in 2016 at INO in Quebec, and is intended to be an extension of the MUSCLE (Multiple Scattering Lidar Experiments) workshops that were held biennially, and a follow-on to NURC-Lidar Observation of Optical and Properties workshop.

Indian River Lagoon
Symposium 2017

An Estuary in Peril

INDIAN RIVER LAGOON SYMPOSIUM
(ANNUAL EVENT)

PILLAR PHILANTHROPY & DEVELOPMENT:

THE PILLAR HAS JUST HIRED A DIRECTOR OF DEVELOPMENT

THE PILLAR HAS ALSO HIRED A DIRECTOR OF COMMUNITY ENGAGEMENT & OUTREACH



THE CURTIS & EDITH MUNSON FOUNDATION



PILLAR SUPPORT - FEDERAL APPROPRIATIONS:



USDA FY19 APPROPRIATION:

COLLABORATIVE RESEARCH TO SUPPORT DOMESTIC AQUACULTURE DEVELOPMENT

\$2 MILLION ANNUALLY REOCCURRING PROJECT FUNDS ($\frac{1}{2}$ USDA : $\frac{1}{2}$ FAU-HBOI) TO ADVANCE SCIENCE FOR THE SUSTAINABLE DOMESTIC SUPPLY OF MARINE WARM WATER FISH & SEEDSTOCK SUPPORTING ADVANCEMENT OF AQUACULTURE PRODUCTION ON FARMS IN THE US.

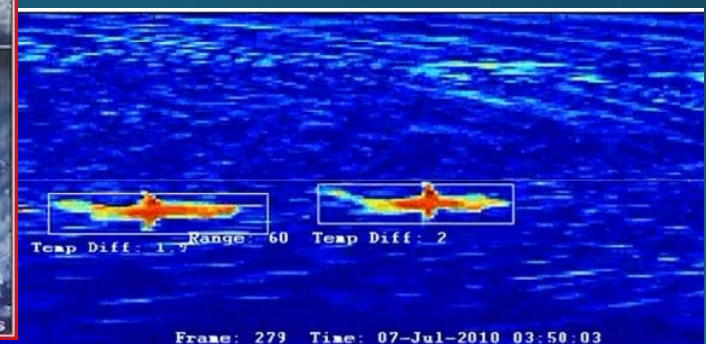
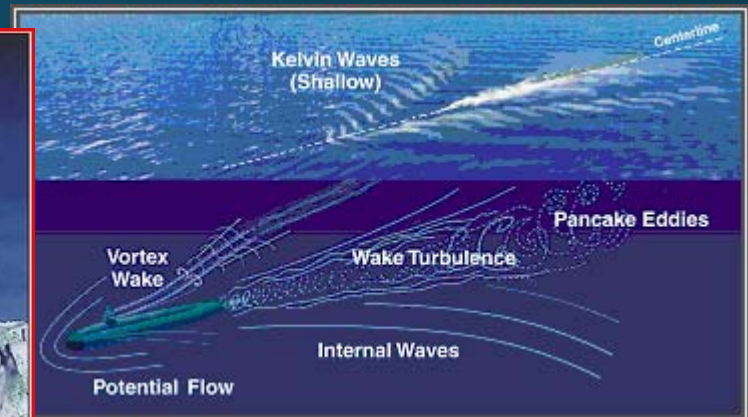
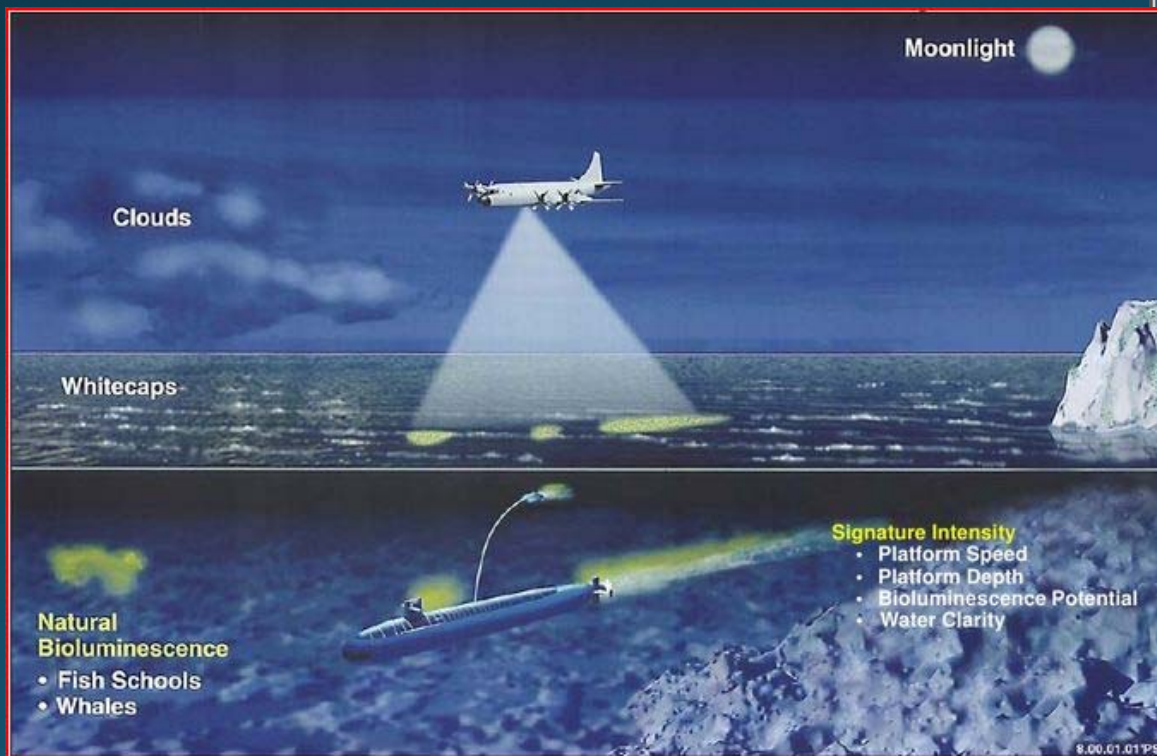


PILLAR SUPPORT - FEDERAL APPROPRIATIONS:



OFFICE OF NAVAL RESEARCH FY19 APPROPRIATION: PERSISTENT MARITIME SURVEILLANCE/NON-ACOUSTIC DETECTION

\$15 million funding request to provide development, prototyping, research, and commercial transition for novel non-acoustic detection, tracking, localization, and identification (non-acoustic DTLI) capabilities and sensors.



An aerial photograph of a coastal region. In the foreground, there's a shallow, turquoise-colored body of water with visible coral reefs and sandy patches. A small, lush green island sits in the middle of the water. To the right, a residential area with houses and palm trees is visible along the shoreline. In the background, a larger city with dense buildings and infrastructure stretches across the horizon under a clear sky.

THANKS!

QUESTIONS OR COMMENTS?