Docent’s Program: Instructional Material
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Introduction

Welcome to the Florida State University Coastal & Marine Laboratory (FSUCML) docent program. We thank you for being an important and valuable member of our efforts to tell the FSUCML story. At the FSUCML, a docent is a volunteer who conducts tours and special programs for visitors. Due to their public visibility, docents also serve as ambassadors for the FSUCML to a wide variety of guests. At the FSUCML, docents are volunteer members of the lab’s staff. We hope that your time and experience as a docent is both enriching and rewarding. We also hope that the information that you gain from your training and time as a docent will instill you with a strong interest in the conservation and protection of our natural resources.

What is a docent?

- a person who leads guided tours especially through a museum or art gallery
- a person who acts as a guide, typically on a voluntary basis in a museum, art gallery, or zoo
- a title given in the United States of America to persons who serve as guides and educators for the institution they serve, usually on a voluntary basis

Overall, a good docent is a good communicator who is knowledgeable of the FSUCML history, mission, and research priorities. Above all, docents should be gracious and friendly with all visitors.

The primary responsibilities of FSUCML docents are:

- To help publicize the lab to your colleagues, civic groups, K-12 schools, government organizations, and other entities with which they are involved.
- To give tours of the laboratory and help organize off-site outreach programs including the following:

**Popular Highlights Tours**

Highlights tours are generally available to the public on a walk-in basis on Friday’s and provide an overview of some of the popular and significant research projects.

**School Group Tours**

Tours for school groups are schedule ahead of time and serve as a supplement the classroom curriculum or accommodate a specific study interest. These tours are pre-scheduled.

**Special Interest Tours**

Special interest tours, demonstrations, and hands-on activities offer an in-depth look at the local environment and the research conducted at the laboratory. These tours are pre-scheduled.

**Off-site Outreach Programs**

Outreach programs for schools and community organizations can be arranged by appointment. The program involves scientist visits as a unique educational experience for schools, community groups, and nursing homes.

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1 Merriam-Webster Dictionary
2 Oxford Dictionary
3 Wikipedia
Docent Philosophy and Technique

Docent Mission Statement
FSUCML docents contribute time, energy, and ideas to enhance a marine lab visitor’s experience so that it is understandable, interesting, and rewarding. By creating a dialogue with visitors about the facility, research, education and conservation efforts, a docent stimulates awareness, possibility, observation, and connection.

Standards for FSUCML Docents

An FSUCML Docent
- Understands and supports the mission, structure, and policies of the Florida State University and the Coastal and Marine Laboratory
- Makes his or her special skills or experience available to the Lab
- Conducts himself or herself in accordance with the standards of conduct and ethics of the FSUCML
- Completes any orientation, training course, or continuing education required
- Endeavors to be flexible in accepting assignments; performs assigned responsibilities willingly and courteously to the best of his or her ability; accepts the guidance of the Docent Program Chair
- Complies with the time and dress requirements of the FSUCML
- Obey all security and safety rules of the FSUCML
- Respects the confidentiality of sensitive or proprietary information
- Provides timely notification to the Docent Program Chair of absence or resignation
- Serves as a goodwill ambassador for the FSUCML to the community

In addition, the FSUCML Docent will:
- Commit to a regular volunteer schedule
- Commit to a minimum of two years of service to the FSUCML
- Share in training and evaluation of self and peers
- Regularly check the on-line Docent Handbook for updates
- Keep track of volunteer service hours and training sessions in FSUCML Docent Register
- Attend docent continuing education as required
- Devote time, energy and enthusiasm to the docent program
- Maintain a friendly professional attitude keeping a mature outlook that does not reveal personal opinions or problems
- Be punctual, flexible and dependable
- Find a substitute if docent is unable to make the scheduled time
- Abide by the annually signed Docent Contract giving 100 hours per year with a miming 50% of those hours being tour hours
- Continually evaluate and redefine touring techniques, being cognizant of the fact that different people learn differently; adapt as needed

Following the standards set by The American Association of Museum Volunteers (AAMV), a nationally affiliated organization of the American Association of Museums
• Be ready to change direction or react to an unexpected situation whenever problems arise
• Report any confrontational or uncomfortable situations arising with visiting groups
• Know the subject: Study and be aware of all aspects of the marine lab - research, faculty and programs

A docent’s observation can act to stimulate seeing by the visitor. We ask that as a docent, you do not share subjective or negative thoughts but rather inform about what you are presenting from an objective educator’s perspective.

**Policies of Docent Program**

**Docent Preparation**

All docents must complete and fulfill the requirements of the docent-training program provided by the FSUCML. Training sessions occur on a regular basis and include information on docent behavior, the history of the lab, and ongoing research and activities. You must know this material and be able to present it to visitors. The materials are provided to docents at the training sessions with additional resources available as needed. A new docent gains experience by shadowing veteran docents as a means of learning tour procedures prior to going it alone.

On becoming a docent, please indicate your availability for tours. It is expected that the individual will commit to a specific number of day(s) per month. There will be a procedure for maintaining volunteer hours, which will be the responsibility of the docent to follow. If a docent cannot make his/her scheduled tour, it is the docent’s responsibility to notify (designated person in lab).

**Meetings** - Docent meetings are held on a regular basis. These meetings are designed to:

• Review current FSUCML research/activities
• Introduce new research/activities
• Distribute new materials and resources
• Share tour experiences
• Discuss any issues

**Evaluation** - Docent evaluations occur on an annual basis. The evaluation will consist of observation of tour techniques, compliance with procedures and guidelines, self-evaluation, and a conference meeting if necessary.

**Dress Code** - Our dress code represents an image of the Lab. As a representative of the Lab, the docent should project a contemporary, relaxed, yet professional image. This may be achieved by a neat, casual appearance appropriate for tours of the Lab.

**Badges** - Badges will be available for each docent at the end of the training period. Badges must be worn at all times while on the property and while conducting tours.

**Tour Procedures**

Each Docent is responsible for the following:

• Arrive at the marine lab 15 minutes before scheduled.
• Keep in mind the demographics of the group you will be leading
• Keep the topic and goals of the tour in perspective
• Know how long the tour will be
• Wear your docent Badge
• Sign-in and put in your hours in the Docent Book
• Check with staff to see if there is any new information of which you should be aware
• It is important to discuss with your visitors the importance of leaving lab experiments alone

Tour Tips
A docent has the power to make a guest’s visit memorable. Appearance, demeanor, enthusiasm, and warmth make the difference.

• Docents should work with the Tour Coordinator/Docent Coordinator to confirm the type of tour that is being offered. When possible, docents need to confirm how much time has been set aside for the tour and if the group has any special interests.
• Each docent should take time at beginning of the tour for introductions, introducing themselves and taking a little time to ask the guests about themselves, how they learned about the Lab, and why they wanted to visit the Lab.
• A good introduction is necessary at the beginning of the tour. Explain how the Lab came into being, present a brief history of the Lab, and discuss future plans for the site.
• For children groups, ask the children to find something they liked during the tour and ask a few of them to tell what they saw and liked.
• Having a theme for the tour ensures that you focus on specific details rather than attempt to cover everything about the Lab. While docents are expected to know a great deal about the Lab, they are not expected to be “experts” on everything. Docents should feel comfortable saying, “I don’t have the answer to that, but I can certainly find out,” and follow-up with, “I will relay your question to someone at the Lab to find an answer.” By reporting the inquiry to Lab officials, the information can be integrated into future tours.
• If a member of a tour group contradicts something you say, do not get into an argument. Allow the individual to state his/her view and then move on to the next topic. Remember, docents represent the Lab and should be polite, pleasant, courteous, but firm. You are presenting valid information based on research and development.
• Above all, be flexible. Situations may arise that may impact your presentation. By being flexible and “going with the flow,” docents will still be able to offer an informative and friendly tour.

Special Considerations
The FSUCML brings people from many different backgrounds and countries. A general awareness of different cultures and backgrounds can reduce misunderstandings. It is important that docents make everyone’s visit pleasurable and informative.

• Remember to speak clearly and distinctly without speaking loudly or shouting. Enunciate words properly and avoid slang or jargon unless it is pertinent to the topic. If pertinent, be sure to explain the jargon.
• Use greetings such as “good morning/afternoon/evening” and “goodbye” instead of “hi” and “bye.” It is always appropriate to use terms such as “please,” “thank you,” and “you are welcome.”
• Minimize hand movements. Some gestures may be considered rude or inconsiderate. Many cultures consider it rude to point with one finger. Instead, point with your hand.
• Many of us have been taught to “look people in the eye.” This type of eye contact may make some individuals uncomfortable. Therefore, do not assume a visitor is rude if eye contact is avoided.
• Do not assume that a guest’s behavior is rude, evasive, too personal, suggestive, or improper as the behavior may be rooted in cultural differences. Also, remember that an innocent remark or gesture on the part of the docent could be similarly misinterpreted.

• People from some cultures enjoy a good discussion and very often become very animated and excited. They may appear angry or impatient, but simply are expressive in making a point. Do not feel insulted if you find yourself interrupted.

• People with disabilities have as many differences as people with no disabilities. Simple adaptations in service can often solve accessibility issues. The principles of basic respect and consideration apply equally to persons with disabilities as to the general public.

• Address the person directly without using a third party whenever possible.

• Be considerate and attentive. It may take more time for the guest to say or do things.

• Observe what types of aids the guest is using (cane, sight dog, wheelchair, etc.). Keep this in mind when giving directions to the rest room or other public facility.

• Don’t be shy about asking the guest if he/she needs help. If the answer is “no,” respect the visitor’s wishes.

• The wheelchair is part of the person’s personal space and, as such, should not be handled without the guest’s permission.

• Speak directly to the visitor in a normal tone of voice, even if he/she is hearing impaired. It is important for the individual to be able to “read” your face as well as hear your voice.

Remember, our guests are the most important part of the tour. Our docents should be gracious and friendly to all visitors.

Docent Benefits

• Opportunities to gain and share information about coastal ecosystems, ecological problems challenging the ecosystems, and the efforts to develop solutions to these problems

• Opportunities to meet scientists and researchers

• Opportunities to meet and inform the public of the work of the FSUCML

• Participation in a training program that provides materials and articles on marine ecology and conservation

• Participation in a training program that enhances skills in communication and interpretation of FSUCML’s mission and activities

• Advance notice of FSUCML programs

• Receive a discount on FSUCML tee shirts, books, and other items

Emergency Procedures

Emergencies such as an accident or health issue may occur at any time. A docent’s responsibility is to remain calm and seek assistance immediately. It is important to remember that discussing a visitor’s health with staff or other visitors is not professional and may be illegal. During an emergency, it is also important to ensure the safety of all visitors.

If there is an incident, locate the nearest staff person via radio, cell phone, or line of sight and ask for immediate assistance. When making the call, use the phrase “First Aid Needed” and identify location. Do not move the visitor until a staff member arrives. If it appears to be a life-threatening incident, call 911.

Serious Injury/Life Threatening Situations

The following situations call for immediate positive action to prevent the loss of human life or some level of permanent damage to the visitor:
• Severe bleeding
• Head wound
• Suspected spinal injury
• Heart attack
• Loss of consciousness

• Loss of breathing
• Exposure to toxic chemicals
• Poisoning
• Drowning
• Anaphylaxis

Serious Injury/Life Threatening Procedures
• Assess the situation. Call 911
• Contact Administration or seek nearest staff member, report the situation, and ask for assistance
• Consult with staff regarding an accident report

Minor Injury/Non-life Threatening Situations
• Cuts
• Bruises
• Muscle strains
• Epileptic seizures
• Dehydration
• Closed fracture (non-bleeding bone break)

Minor Injury/Non-Life Threatening Procedure
• The docent or staff member may offer treatment.
• First Aid training will be a prerequisite of the docent program.
• Consult with staff regarding an accident report.

Procedures for handling other types of emergencies including weather, threatening situations and fire will be announced over the FSUCML PA system.

Tours and Outreach Programs:

Popular Highlights Tours
Highlights tours are available to the public by appointment on Friday’s and provide an overview of current research, a tour of marine operations including the research vessel, lab buildings and grounds including the informational kiosks. In addition, brief chats with faculty and graduate students occur when possible. These tours are free of charge.

Educational, Community, and Special Interest Group Tours
Tours for these groups are conducted on a prescheduled basis and are designed to supplement the classroom curriculum or accommodate a specific study interest. These tours can be as basic as the Highlights Tour to a more in-depth educational hands-on activity tour requiring FSUCML staff and facilities such as labs and/or boats. These in-depth tours do have a costs associated with them and are scheduled by the programs coordinator.

Off-site Outreach Programs
Outreach programs are offered by appointment to schools and community organizations. The program involves scientific visits as a unique educational experience for schools, community groups, retirement communities, and nursing homes. Examples include:
• Show and tell faculty view at local schools (e.g., Jefferson county schools)
• Rotary club and other civic community organization talks by faculty
• Community events i.e. Seafood Festival, Mullet Festival, Blue Crab Festival, Worm Grunting Festival

FSUCML Information

Mission Statement
The mission of the FSUCML is to conduct innovative, interdisciplinary research focused on the coastal and marine ecosystems of the Wider Caribbean that contribute to solving the ecological problems of the region. The Wider Caribbean includes the large marine ecosystems of the Gulf of Mexico, the Caribbean Sea, and the southeast U.S. Continental Shelf (thus covering both Florida coasts) — an area that is both enormously underserved and of high economic and geostrategic value.

Research and Education
The FSUCML research program focuses on coastal and marine issues of ecological importance that provide the scientific basis for policy decisions. The program is interdisciplinary in nature, based on an ecosystem-level approach. This kind of program at this time is critically important because the northwest Florida coast is facing a dramatic increase in coastal development. Research is conducted by the faculty, postdoctoral associates, graduate students, and undergraduate investigators from the FSUCML, from the main campus, and from other universities throughout the world. Collaboration among investigators is often the key to successful research.

We have strong ties with scientists from the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, the Apalachicola National Estuarine Research Reserve, the St. Marks National Wildlife Refuge, other colleges and universities around the world, as well as with a number of environmental organizations, including the Nature Conservancy, the Apalachicola Riverkeeper, and the Pew Charitable Trust.

The FSUCML welcomes scientists from across the university (including undergraduate and graduate students) and from across the globe to conduct their research and teach their courses in the pristine coastal and marine habitats of the region, using them as living classrooms. The FSUCML also provides a wonderful site for working retreats.

We also offer “The Virtual Classroom – Building Coastal Literacy,” which provides online resources for teachers, students, and curious citizen scientists of all ages to learn more about the habitats and ecological communities around the FSUCML.

We offer educational field trips for visiting groups that typically include a lecture given by a faculty member on their research on topics ranging from salt marsh communities to Goliath Grouper and coastal sharks. These field trips can be as simple as a walk through the coastal environment to learn more about the critters that live there, to a trip on the pontoon boats to examine species located in the remarkable seagrass beds that hug our coastline. Their day concludes with time in the laboratory to examine more closely the organisms they have brought back from the field to compare their body types, coloration, and jaw morphology to understand how they make a living in coastal environments.
FSU Coastal and Marine Laboratory Physical Tour

The laboratory footprint covers a total of 80 acres (see image to the left). Most of the laboratory infrastructure resides on the 4.5 acres east of the boat basin. There are 4.0 acres to the west of the boat basin where small boats are kept and 72 acres on the north side of Highway 98. Nearly 36 of the acres are forested and 17 acres contain long leaf pine habitat that is being restored. Current plans include construction of a new research building on the North side of Highway 98.

The drawing shows the physical footprint of the main buildings at the laboratory. The tour starts in front of the Administration Building and ends up there as well. Start out front, talk about the murals. While waking down to the waterfront, point out the graduate student house, the dorms, and then from kiosk to kiosk until reaching the waterfront. At the last kiosk, move to the seawater system, the small boats and the RV Apalachee. Then go through Academic Diving, through the research building and reef fish ecology building, back to the administration building, starting at the auditorium and working forward.

The laboratory footprint covers 80 acres (see image below). Most of the laboratory infrastructure resides on the 4.5 acres east of the boat basin (pictured to the left). There are 4.0 acres to the west of the boat basin where small boats are kept and 72 acres on the north side of Highway 98. Nearly 36 of the acres are forested and 17 acres contain long leaf pine habitat that is being restored.

Current plans include construction of a new research building on the North side of Highway 98.
**Administration Building (462)**
The administration building houses the administrative staff, faculty office, a post-doc office, conference room, copy room, communications room, kitchen and dining area, technician offices, and the auditorium.

The conference room seats 10 and has an overhead projector and white board. The auditorium seats 70 and is used for public conservation lectures, meetings, conferences, and as a classroom.

Things to highlight while touring the administration building are items in the front reception area, including
- The future building for the lab
- Displays of the North 70 restoration

In the back reception area, include displays of ROV and the CTD when they are not being used.

**Research & Education Space –**

Research and research space are available for all FSU users to further the research, education, and outreach missions of the FSUCML.

**Research Space – Main Building**

*Wet tables, Tanks, Runways and Greenhouses* - Wet tables, tanks and the runway are underneath the main laboratory building. They are used for staging marine organisms for educational purposes and research. Two of the three greenhouses also have tables and tanks. These greenhouses can also be used for research on coastal marsh grasses, sea grasses and beach grasses. The Doc Herrnkind greenhouse which also contains wet tables and tank can be used as a classroom

*Individual laboratories* - These labs are assigned to FSUCML faculty, and are available to FSU faculty from the main campus, and to visiting scientists.

*Environmental Chambers and Autoclave* - These two chambers, each 7 ft. x 7 ft., provide controls for temperature (2°C-38°C) and light (with a timer) for conducting experiments. Autoclave is used for sterilization of lab equipment.

*The Analytical Laboratory* - This lab contains the following equipment:
- Balances – Wet & Dry
- Centrifuges
- Fume Hood
- Millipore Filtering Apparatus, Vacuum pump and paper
- Ovens – Drying, Muffle Furnace
- Ultrafreezer -80°

*The Necropsy Lab* – Necropsy- a postmortem examination of specimens
- Stainless Steel work areas
- Wet table
- Seawater and potable water
The FSUCML Zoological Collection - Preserved specimens are used for education, research, and outreach opportunities. Approximately 1,015 specimens are on display and have been collected from all over the Gulf of Mexico and Caribbean.

The Aquarium Room - This 900 gallon recirculating tank system is perfect for experiments requiring individuals to be in separate tanks but experiencing the same environmental conditions. The system consists of 56 individual tanks stacked three tiers high.

The Microscopy Room – This lab contains 2 high powered microscopes that interface with a computer for examining and documenting specimens.

Classroom Space
Main Laboratory Building Small Classroom (17-ft x 19-ft, seats 18)
The Doc Herrnkind Greenhouse (20-ft x 45-ft, wood deck flooring; seats 15)
Reef Fish Ecology Building Large Classroom (42 ft. x 20 ft.; seats 42)

Housing
The FSUCML dorms provide comfortable housing for graduate students, visiting scientists, community/retreat groups, and agency professionals for overnight or long-term stays.

The Graduate Student Building – This building is equipped with bunk beds, a kitchen, and desk space, providing graduate students with proper accommodations for potential overnight stays.

Dormitories -- Dorms are fully furnished, include linens, and have fully equipped kitchens. The FSUCML is a great setting for holding faculty or staff retreats. Dorms accommodate 40 people -- four dorms that each sleep six, and the house sleeps 16.

Kiosks
• Welcome Kiosk -- Welcomes visitors to the Apalachee Bay area and gives a brief overview of the kinds of animals they could encounter in the region, as well as a look at the seagrass meadows and hardbottom reefs
• Zonation Kiosk – Shows an overview of how terrain changes from saltmarsh out into the shallow waters of the Gulf, including the oyster reefs
• Going to Sea Kiosk – Includes the ways in which the FSUCML conducts research, using small boats, the R/V Apalachee, and the Academic Diving Program as tools
• Seawater System Kiosk – Explains how the seawater system pulls in water and how it is distributed to areas around the lab

The Waterfront
**The Seawater System:** Start at the kiosks under the holding tanks, point to offshore area from which water is drawn, and to the dock from which water is pumped to the holding tanks.

This substantial system provides our scientists with clean, local seawater for use in experiments on organisms from local marine habitats and areas offshore in the Gulf of Mexico.

The seawater moves from two intake boxes 330 meters (1000 feet) offshore in Apalachee Bay through pipes to a wet well. From there, the water is pumped to t3 18927 liters (5000gals) reservoirs, where both organic and inorganic matter settles to the bottom, passing clean water to labs, holdings tanks/tables, greenhouses and classrooms across campus. A bypass system delivers water directly to support mesocosm experiments with unfiltered water. The FSUCML has both open flow-through and closed seawater systems. The open system delivers captured water throughout the laboratories and returns it to the coastal waterway on a daily basis. The closed system filters and recycles water within the laboratories.

Computer controlled seawater delivery ensures that water use matches research needs, while a diesel powered generator ensures uninterrupted seawater delivery in this storm prone region where power outages are common.

**The R/V Apalachee:** The 65-ft R/V Apalachee is the flagship of the FSUCML fleet. The vessel’s name comes from the Apalachee Indian Tribe that lived in the Florida Panhandle for thousands of years, as is the bay on which the FSUCML sits.

The R/V Apalachee is perfect for working in coastal and offshore waters, allowing scientists and students to conduct research on the ocean's biological, chemical, geological, and physical characteristics that affect global and coastal oceans. The ship can provide bunk space for six scientists and both wet and dry laboratories. The R/V Apalachee also serves as an excellent diving platform. See link for ship’s specification and equipment. [https://marinelab.fsu.edu/marineops/rvapalachee/specs](https://marinelab.fsu.edu/marineops/rvapalachee/specs)

**General Specifications:**
- Length: 64.75 ft.
- Beam: 21.5 ft.
- Draft: 4.25 ft.
- Cruising: 12-16 knots
- Range: 1000 Nautical Miles
- Fuel Capacity: 2,500 GAL (diesel)
- Portable Water: 350 GAL
- Endurance: 3-6 Days before refueling
- Crew: 2 Berths

The Academic Diving Program (ADP), established in 1975, supports all underwater research conducted by faculty, students, and staff from the FSU Coastal & Marine Laboratory, the Center for Ocean-Atmospheric Prediction Studies; and the departments of Biological Science, Earth, Ocean and Atmospheric Sciences, and Anthropology for whom underwater research is an element of their research or job description.

The Wood, Machine, and Boat Shops house tools and materials to assist with basic maintenance around the lab, as well as provide support faculty in their research endeavors.
Appendix 1 – Meet the Scientists

**Faculty**
Faculty are not always available while you are giving tours. Impromptu stops are not recommended. Please check with them at least a day ahead of time to make sure that a visit is possible. Try to visit at least one scientist while giving a tour.

Dr. Sandra Brooke - [https://marinelab.fsu.edu/labs/brooke/](https://marinelab.fsu.edu/labs/brooke/)

Corals are important components of deep-sea hard-bottom habitats and like their shallow counterparts they are being impacted by various human activities. Deep sea research is logistically difficult and expensive, but through a combination of *in situ* observations, laboratory experiments, and environmental monitoring, we can begin to define the distribution 'envelope' for deep sea corals.

My primary research is on coral reefs from shallow waters to the deep sea. My focus is on understanding their distribution, abundance, and physiology, as well as how they are affected by anthropogenic impacts. In the course of this research, I have developed a technological approach to deep sea research, particularly on the deep-water branching coral, *Lophelia pertusa*, that enhances our understanding of deep coral reefs and other ecosystems.

After completing my undergraduate and M.Sc. degrees in England, I spent a few years working in mosquito control in the Cayman Islands, where I learned to dive and discovered marine ecology. I then obtained an M.A in Marine Biology from the Virginia Institute of Marine Science, and a Ph. D (2002) from the Southampton Oceanography Center, UK, where my research examined reproductive ecology of a deep water coral *Oculina varicosa*.

I have since worked on deep-water coral ecosystems in the Aleutian Islands of Alaska, Norwegian Fjords, South Atlantic Bight and Gulf of Mexico, including the conduct of post-Deepwater Horizon oil spill damage assessment. I have also worked extensively on shallow coral reefs in the Caribbean and south Florida. My recent research has focused on the biology and ecology of deep corals and characterization of deep reef ecosystems, particularly to identify sensitive hard bottom habitats such as coral reefs that are ecologically valuable.

Dr. Felicia Coleman - [https://marinelab.fsu.edu/labs/ck/](https://marinelab.fsu.edu/labs/ck/)

My primary research interest is in marine ecology, with an emphasis on the linkages between reef fishes and habitat. This interest led me to explore the effects of fishing on the demography of exploited populations, particularly in its effects on spawning aggregations of fish in the grouper family. Groupers are protogynous hermaphrodites/ that is, each individual changes sex from female to male over the course of its lifetime. What I found was that, for several species at least, fishing appears to lead to a loss of males, thus skewing the sex ratio in favor of females.

This research, plus my long-standing interest in conservation, led me to question how (or whether) such ecologically relevant information for an exploited species was incorporated into its
management and reflected in governmental policy. What I have found over the years is that in many cases, the information is not properly transferred from scientists to policy makers and the general public. I have spent a number of years working to bridge this gap with respect to management of marine resources. In this work, I have been fortunate enough to serve on a number of committees and councils whose charges involve conservation of marine resources, including the Gulf of Mexico Fishery Management Council, The National Marine Fisheries Service Ecosystem Management Advisory Panel, The Gulf of Mexico Fishery Management Council's Ecosystem Advisory Panel, The Tortugas 2000 Marine Reserve Working Group, the Marine Protected Areas Federal Advisory Committee and the National Research Council.

Dr. Chip Cotton - https://marinelab.fsu.edu/labs/cotton/

My research efforts are broadly applied to studies of life history and ecology for a variety of fishes. Since some of the species I study are rare or poorly described, several taxonomic investigations have naturally co-evolved with this work. Much of my recent research has focused on deep-water species, but future projects will also include studies of estuarine and marine fishes important to the ecology and economy of the Gulf of Mexico (e.g. groupers, drums, and coastal elasmobranchs). My typical research products include characterizing and quantifying life histories, taxonomic revisions, morphometric analyses, habitat delineation and determining movement patterns. These data can be incorporated into local or regional fisheries management and ecosystem-based models for a range of ecosystems. Current research in my lab is largely concentrated on the study of fish age, growth and reproduction. Most recently, this has included the development and improvement of novel ageing techniques using dorsal fin spines of deep-water chondrichthyans, as well as parameterization of life history models for these species. As a member of the Deep-C Consortium (www.deep-c.org), I am actively studying age, growth, and reproductive biology of gulper sharks (Centrophorus spp.) and dogfish sharks (Squalus spp.) inhabiting the northeastern Gulf of Mexico. I am actively involved in several biotelemetry studies, i.e. describing diel migration patterns of sixgill sharks (Hexanchus griseus) using pop-off satellite transmitters (with Dr. Grubbs) and habitat use and movement patterns of Atlantic stingray (Dasyatis sabina). I am also presently collaborating with several domestic and international collaborators (Portugal, Japan, Australia, and Taiwan) on a series of taxonomic studies of gulper sharks (Family: Centrophoridae). My ongoing life history studies of deep-water sharks will necessitate future taxonomic investigations for these taxa. Lastly, I have a long-standing interest in life history and ecology of soniferous fishes (primarily Family: Sciaenidae) and marine catfishes (Family: Ariidae). Future work in my lab will include such studies of these unique species in the Florida Panhandle region.

Dr. Dean Grubbs - https://marinelab.fsu.edu/labs/grubbs/

My primary research interests are in ichthyology and marine ecology with emphasis on the biology of exploited estuarine and marine fishes. Much of my research addresses specific questions or fills specific biological gaps necessary for management of fisheries resources, especially elasmobranch fishes. As a primary tool, I use fishery-independent survey methods to study population dynamics, life histories, and distribution patterns of fishes. I also use conventional mark-recapture studies and modern telemetry techniques to acquire data on movement patterns, habitat use, residency and philopatry. A principal goal of this line of research is to
delineate essential and vulnerable habitats, especially in estuaries and nearshore marine environments. For example, my work in Virginia led to the federal designation of a Habitat Area of Particular Concern (HAPC) for juvenile sandbar sharks in the lower Chesapeake Bay, a highly vulnerable area that serves as a primary and secondary nursery for this large coastal species. While my work in these areas has primarily involved coastal sharks, I have been involved in projects that included diverse taxa such as estuarine teleosts and terrestrial reptiles.

I also have immense interest in the biology of pelagic and deepwater fishes. Areas of research have included the behavioral and trophic ecology of tropical tunas, the relationship between intermediate seamounts and pelagic predators, the impact of industrial-scale fisheries on the trophic dynamics of pelagic ecosystems, and the role of mesopelagic communities in oceanic ecosystems. My deepwater research is in its infancy but includes studies of life histories, reproductive biology, and movement patterns of elasmobranchs associated with island and continental slopes. I currently have projects in the central Pacific, western Atlantic, and Caribbean investigating various aspects of the biology of bluntnose sixgill sharks (*Hexanchus griseus*), bigeye sixgill sharks (*H. nakamurai*), deepwater stingrays (*Plesiobatis daviesi*), and short-spined spurdogs (*Squalus mitsukurii*).

Dr. Sophie McCoy - [http://www.marecology.com/](http://www.marecology.com/)

Research in the lab draws relationships between processes that occur at small scales to macro-scale patterns. In the context of changing climate, I focus on links between physiological response and the dynamics of populations and communities. I am especially interested in effects of environmental stress on traits that mediate species interactions and scale up to community-level processes. Recent and current work in the lab focuses on marine macrophytes. Coastal communities dominated by macrophytes provide a useful model system in which many stressors co-occur. Macrophytes are important components of coastal ecosystems and also play a major role in coastal carbon cycling. In many ways, the fates of coastal marine communities are tied to the responses of macrophytes to environmental stressors and ongoing changes. I am interested in observing and better understanding how changing ocean conditions differentially affect interacting seaweed or grazer species, and identifying repercussions on community assembly and function.

My general interest lies in connecting environmental conditions with organism physiology and ecological processes. This work typically involves field experiments, laboratory experiments, and laboratory analysis of seawater chemistry or other local environmental conditions. Interested graduate students and postdocs are encouraged to develop new techniques or study systems across a range of taxa or environments, including marine, aquatic, or terrestrial systems.

Dr. Jeroen Ingles

I am a marine ecologist with a wide interest in benthic biodiversity, ecosystem functioning and food web ecology in marine ecosystems. After an MSc degree in Zoology and an MSc in Marine and Lacustrine sciences at Ghent University, I completed a PhD in deep-sea biology and ecology, specializing in meiofauna and free-living nematodes (metazoans smaller than 1mm) and working together with marine scientists across Europe. After my PhD I was involved in several international projects focusing on deep-sea habitats and Antarctic marine ecosystems under pressure of climate change before moving to the UK with an
EU Marie Curie Fellowship to develop more holistic meiofauna research in coastal and shelf environments at Plymouth Marine Laboratory.

At FSU CML my research focusses on creating a better understanding of the role of meiofauna in marine ecosystem function, and advancing our knowledge of meiofauna and nematode biology and ecology. Meiofaunal organisms are abundant in all marine ecosystems and play a pivotal role in key processes and functions. Despite their ecological importance, they are often overlooked and many aspects of their biology and ecology are still unknown. Research projects aim at understanding what drives (meio) benthic diversity and how it affects marine sediment functions with links to important processes such as biogeochemical cycling and food-web flows and the assessment of anthropogenic and climate-change impacts. Some of the key outstanding issues include:

- Increasing the knowledge on meiofauna ecology and biodiversity drivers in naturally variable ecosystems and under anthropogenic pressures; and this in shallow waters as well as the deep sea
- Increasing the knowledge on ecologically important meiobenthic functions and the faunal/biogeochemical processes they contribute to
- Provision of adequate meiofauna data based on their ecological importance to underpin models, ecosystem management and conservation practices
- Moving beyond the normal range of perception and establish the ecological importance of meiofauna in scientific and general public circles

To get answers to the outstanding questions (and generate new ones!) a multidisciplinary approach is required. Using long-term monitoring analysis to understand natural spatial and temporal meiobenthic patterns and variability, in combination with laboratory mesocosm/microcosm and in situ experiments to assess impacts of environmental change on meiofauna diversity and function, underpins many of my research activities. If we want to move further, however, we also need more integration of field and experimental results into coupled ecosystem models to develop, consolidate and validate the (meio)benthic component, whilst assessing current and future meiobenthic contributions to ecosystem function, and ultimately their contributions to ecosystem goods and services, and the socio-economic value of marine ecosystems.

Aside the core research outlined above, I also value the fundamental building blocks that have led to our current level of understanding. These include 1] characterizing and describing novel biodiversity, and 2] gaining insight into the biology of meiofauna organisms (e.g. life-history, behavior, communication, etc.). Both are research topics I pursue throughout my research.

In recent years, I have been involved in several regional and global assessments of anthropogenic and climate-change impacts on marine ecosystems with for instance a chapter in the First UN World Ocean Assessment and reviews of global change impacts in the Southern Ocean. As public awareness of the importance of the Global Ocean increases, such efforts are important to continue as they support science-policy-public communication and ultimately the successful management of – or “caring for” - the marine resources humankind relies on so heavily.
Graduate Students

FSU Department of Biological Science

Abbey Engleman, Ph.D. student- Advisor: Dr. Sandra Brooke

My research interests are rooted in understanding coral reef ecology, resilience, and response to changes in environmental parameters. I am particularly intrigued by how anthropogenic influences- such as climate change, coastal development, artificial reef development, and recreation and tourism uses- impact coral’s response rate and reproductive success. I aim to produce research that can be applied to future conservation and management of coral reef ecosystems.

Johanna Imhoff, Ph.D. student - Advisor: Dr. Dean Grubbs

I am broadly interested in the ecology of elasmobranch fishes (sharks and rays), particularly in their foraging and movement ecology, and in using innovative techniques or technologies for studying them. My past research topics include the use of accelerometer transmitters to study feeding and movements of aquatic animals, the movements of estuarine elasmobranchs, and ecology and conservation of endangered sawfishes. My current research focuses on the trophic ecology of six species of sharks in the northern Gulf of Mexico, ranging from the continental shelf edge to the lower continental slope. I am also studying levels of methylmercury contamination in these sharks relative to their trophic ecology, habitat, and proximity to the Deepwater Horizon oil spill.

Chris Malinowski, Ph.D. candidate- Advisor: Dr. Felicia Coleman

I am interested in aquatic and marine ecology, particularly as it relates to interactions between fish and their environment. My research focus is in prey and habitat preference, demographic patterns, movement patterns, and spawning behavior. I have also in the past researched foraging ecology, niche partitioning, and nutrient selection in marine mammals. I am evaluating the effects of mercury on the critically endangered Goliath Grouper throughout Florida waters.

Ryan Mckenzie, MSc. Student- Advisor: Dr. Felicia Coleman

My research focus is in fish ecology and conservation. Specifically, I study reef fish reproductive ecology, social structure, habitat use, and growth across the life cycle. My current research focuses on the spawning behavior and sensory cues involved in sex-change with the goal of obtaining critical biological data that informs management decisions and the public about the sustainable use of natural resources. Previously, I studied fishing impacts on large-mouth bass, and the role of placoid scales in the sensory biology of sharks.
Brian Moe, Ph.D. student - Advisor: Dr. Chip Cotton

My research is broadly rooted in the ecology, life history, and population dynamics of marine fishes, particularly elasmobranchs. While my past research focused on modeling elasmobranch lifetime growth and estimate mortality rates, my current research focuses on describing the life history of deepwater sharks in the Gulf of Mexico, many of which are still poorly understood. I also am investigating the use of near-infrared spectroscopy as a mechanism for aging sharks.

Cheston Peterson, Ph.D. student - Advisor: Dr. Dean Grubbs

I study the natural history and trophic ecology of fishes in the Florida Bend seagrass meadows, using gillnet and longline surveys to document coastal shark and larger teleost assemblages in this area. I am describing their trophic structure using stable isotope analysis, a technique I also use in studies of commensal fishes -- sharksucker and remora --and elasmobranch ectoparasites, including the effects of highly mobile and migratory species on ecological systems.

Bianca Prohaska, Ph.D. student- Advisor: Dr. Dean Grubbs

I study the ecological and physiological conservation of fishes, particularly deep sea sharks, using plasma hormones to understand their reproduction, and blood stress parameters relative to the Deepwater Horizon oil spill. In previous research, I developed non-lethal methods for studying the reproductive biology of sharks, skates, and rays) using reproductive hormones extracted from skeletal muscle tissues.

FSU Department of Earth, Ocean, and Atmospheric Science

Austin Heil, MSc. Student - Advisor: Dr. Sandra Brooke

I study the reproductive biology, mating strategy, and spawning behavior of economically important fish, particularly the sheepshead (Archosargus probatocephalus). I am studying their spawning in the NE Gulf of Mexico, deciphering differences in reproductive potential among habitats, and providing novel data on their spawning behavior.

Mackellar Violich, MSc. student - Advisor: Dr. Dean Grubbs

I am generally interested in deep-sea ecology and marine conservation. Specifically, I am interested in spatial ecology of deep-sea species distribution with depth and geographic ranges. My graduate research will focus on relative abundance of deep-water sharks in different depths temperature and geographical ranges. I will be monitoring the species through noninvasive methodologies; using a deep-sea camera to record abundance and biodiversity.
Appendix 2 – History of the Laboratory
Evolution of the Florida State University Coastal and Marine Laboratory

MICHAEL J. GREENBERG, WILLIAM F. HERRNKind, AND FELICIA C. COLEMAN
Evolution of the Florida State University Coastal and Marine Laboratory

MICHAEL J. GREENBERG, WILLIAM F. HERRNKIND, AND FELICIA C. COLEMAN

SIXTY YEARS OF HISTORY

In 1949, just 2 yr after the Florida State College for Women was transformed into a coeducational institution—The Florida State University (FSU)—marine science gained a permanent foothold on the Tallahassee campus with the formation of The Oceanographic Institute (OI). This institute—within the College of Arts and Sciences—was meant to train graduate students in marine science, to provide marine research facilities for faculty and students and visiting investigators, to conduct interdisciplinary basic research in the northeastern Gulf of Mexico, and also to conduct applied research directed toward improving Florida’s fishing industry and developing other marine resources.

At first, the OI had three remote marine facilities, but two of them—a station at Mayport on the St. Johns River and another on Mullet Key at the mouth of Tampa Bay—were closed sometime after 1955. The remaining facility, sited on 25 acres of the peninsula that constitutes the southern shore of Alligator Harbor, about 45 miles south of Tallahassee, became FSU’s operative marine laboratory (Fig. 1). The structures constituting this Alligator Harbor Laboratory were built to accommodate Harold Humm, the first director of the OI. The main laboratory building consisted of a room provided with seawater for research and classes, and a room of research cubicles. Other structures included a residence for faculty and visitors, a boathouse–shop, large concrete seawater tanks for keeping marine animals, a large pool (21.3 × 15.2 m, 2.1-m deep) constructed in 1954 to keep porpoises for W. N. Kellogg, and a 100-m concrete pier for docking small boats. The laboratory’s fleet included five power boats (6.7 to 11.6 m) and several skiffs.

Throughout the 1950s and 1960s, research at the Alligator Harbor Laboratory was substantial. But in 1966, under the direction of Carl Oppenheimer, FSU replaced the OI with a Department of Oceanography; the Alligator Point Laboratory was closed, and a new facility was built across the harbor, just west of St. Teresa near Turkey Point (Fig. 1). Because Ed Ball, President of the St. Joe Paper Company, donated some of the land to FSU, the new facility was officially designated as the Edward Ball Marine Laboratory. This name, however, was rarely used, and the toponym Turkey Point Laboratory or, more often, the FSU Marine Laboratory (FSUML) stuck for more than 4 decades.

In 2006, Felicia Coleman became the 13th director of the Laboratory. She is the first director whose primary workplace is at the laboratory, and the first with an on-site faculty to manage. And the laboratory became the FSU Coastal and Marine Laboratory (FSUCML).

The history of these two laboratories, which follows, is narrated primarily by three of the 13 directors. We have divided the narrative into four distinct periods: The Genesis, 15 yr at Alligator Harbor; The Great Move from Alligator Harbor to Turkey Point, 7 yr of change; The Long Struggle at Turkey Point, 34 yr of intermittent, slow increases in activity; and finally, The Awakening, 4 yr of exploding activity. We describe these periods, revealing how this long experiment finally succeeds.

The backbone of our narrative is a series of vignettes describing the backgrounds and activities of each of the 13 directors. References to earlier and later vignettes provides cohesion and continuity. But we have also interspersed, within the backbone, sketches about the activities of students, faculty, and visiting investigators, and about educational and outreach programs. In a way, then, this narrative is a mosaic. The sketches are in the first person, except when an individual is deceased, aged, distant, or prefers the third person omniscient narrator.

THE GENESIS (1949–1964)

The natural surroundings at Alligator Harbor.—Alligator Harbor proved an enormously productive backyard for researchers. It was then and remains today a narrow, shallow bay (roughly 6.4 × 1.6 km; depth 1.8 m, except for a central basin); the southern flank of the harbor is a thin peninsula (Alligator Point). No freshwater streams flow into the harbor, and rainfall does not exceed evaporation, so the salinity is the same as that in the gulf. A great attraction of the laboratory at this site was its access by skiff to Baymouth Bar (Fig. 1), a sandbar that almost completely closes the mouth of the harbor. At low tides, Baymouth Bar is exposed—revealing an expanse of sand, with seagrass around its edge and on its flanks. It is home to an extraordinarily wide diversity of marine invertebrates that were
Fig. 1. FSU’s successive Marine Labs locations and offshore worksites: (A) Alligator Harbor Lab (1949–66) viewed southward from the harbor (a). (B) Turkey Point Lab (1966–present), built just west of the Point (b) in greater St. Teresa, is now called FSU Coastal & Marine Lab. Local worksites: (1) Baymouth Bar; (2) Turkey Point Shoal; (3) Lanark Reef; (4) Dog Island Reef; (5) Ochlockonee Bay; (6) Ochlockonee Bay Dotted boundary: Alligator Harbor Aquatic Preserve. Distant worksites (lower insert): (7) Apalachicola Bay; (8) Apalachicola Bay.
objects of research and teaching at the FSUML or on the campus in Tallahassee. Well into the 1960s, the Point and the Bar were separated by a deep channel, which closed sometime in the 1970s. And at about the same time, the property at the tip of Alligator Point was donated to the Nature Conservancy, which closed it to vehicular and pedestrian traffic. Further below, we will describe some of the more important research initiatives undertaken in this remarkable location.

The Directors: Humm, Meyer, Fox, Metz, and Collier


In the course of his career, Harold Judson Humm became—three times, and for three different institutions—the first director of a marine laboratory. The first instance was at Duke, where, after receiving his doctorate in botany, he was appointed Resident Investigator at the marine laboratory in Beaufort, NC. In 1948, he was appointed the first Resident Director of the Duke Marine Laboratory, and a year thereafter (1949) he came to FSU to be the founding director of the newly established OI and its Alligator Harbor Laboratory, which was soon under construction.

In 1950, Humm reported to a National Research Council committee on work conducted at the Alligator Harbor Lab: composition of a checklist of the common species of animals in Apalachee Bay (Fig. 1), and the distribution of marine algae in the region; the ecology of intertidal annelids on several types of beaches; and a study of the physical properties of the agar or agaroids available from several species of seaweed that were abundant in the region. These glutagenous substances are used globally as culture media in medicine and microbiology, and Humm already had a patent on a method for extracting the gels. By the early 1960s, much of this work was completed and published. In 1954, Humm left FSU precipitously, and returned to Duke.

Years later, in 1967, Humm became the founding director of the Institute of Marine Science at the University of South Florida (USF), St. Petersburg, where he died in 2001. Humm was known to his students at USF as an exemplary teacher and as “the last of the great naturalists”; indeed, at least 11 species of marine algae, diatoms, and invertebrates were named after him.

Samuel L. Meyer.—(Director 1954–1955), Ph.D., University of Virginia, Charlottesville (1940): Areas of expertise: bryology, academic administration.

Samuel Meyer began to study the physiology of mosses while he was a graduate student at the University of Virginia, and continued this line of research for 8 yr at the University of Tennessee, publishing some 10 papers on the subject. His work at Tennessee was interrupted by stints in the U.S. Army and at Emory University, and when he returned to Nashville, it was as Professor and Chairman of the Department of Botany—the same rank and position that he was to hold at FSU when he moved there in 1951.

In 1954, when Humm resigned, Meyer became director of the OI, while the search for a new director went forward. He took seriously the responsibility to “include all relevant disciplines” in his administration; his staff of 19 faculty represented 11 departments, seven of them distinctly nonbiological. During his year of service, Meyer completed the construction of the porpoise pools at the Alligator Harbor Laboratory, and he and Robert H. Williams, a Professor of Marine Science, wrote and published a detailed, illustrated, and historically useful description of the Alligator Harbor Laboratory’s earliest years.

Meyer left FSU in 1955 to become Dean at Central Methodist College (now Central Methodist University) in Fayette, MO, where he had received his A.B. degree. In 1965, he became president of Ohio Northern University, in Ada, where he oversaw a 12-yr period of striking academic and physical growth. Widely honored, he became President emeritus in 1977, retired to Lexington, KY, and died there in 2000. Faculty and students from Ohio Northern University continue to visit the FSUCML today.


Fox studied chemistry at the University of California at Los Angeles, and was guided to doctoral study at the California Institute of Technology (Cal Tech) by Linus Pauling, with whom he worked as a postdoctoral associate. In 1955, after various commercial positions and a period of fundamental research on protein chemistry at Iowa State College (Ames), Fox came to FSU to direct the OI. He remained at the OI until 1961, when, encouraged by the

1 Updated in 1956 by R. Winston Menzel.
National Aeronautics and Space Administration (NASA), he became Director of the Institute of Space Bioscience at FSU.

It was while he directed the OI, however, that Fox started his groundbreaking work on the origin of life. In seminal experiments, he thermally activated amino acids to produce proteinoids (thermal proteins). He then showed that, when these proteins were mixed in water, they spontaneously self-organized into microspheres. The formation of these structures and their resemblance to primitive cells suggested a process by which life might have originated. This exciting work redounded to the reputations of the OI and FSU, but Fox’s concerns could not have stretched to include the Alligator Harbor Marine Laboratory. Fortunately, however, there was Charles Metz.


Metz’s doctoral research at Cal Tech was on the biochemical interactions of eggs and sperm during fertilization. And it was fertilization—as well as the underlying general mechanism of cell–cell recognition—that remained the focus of his research throughout his career. In 1953, after completing his education and four brief faculty positions, Metz came to the Department of Zoology2 at FSU and set up his laboratory in an old barracks about 3 miles from campus. Within a year or two, he had attracted a few graduate students, one of whom was Mike Greenberg (your narrator). Consistently, at low tides, Metz and his students would drive down to the Alligator Harbor Laboratory, get into Metz’s boat, and run to the facility. Moreover, he was familiar with the laboratory. It was a good choice: Metz was the most consistent user of the Alligator Harbor Laboratory. It was a good facility. Moreover, he was familiar with marine labs in general, having spent summers, since childhood, at the Marine Biological Laboratory (MBL) in Woods Hole, where he became a member of the MBL corporation, and an MBL Trustee. He was also enthusiastic about natural history, fishing, and boating.

In 1955, when Fox arrived in 1955 to direct the OI, Metz became Associate Director in charge of the Alligator Harbor Laboratory. It was a good choice: Metz was the most consistent user of the facility. Moreover, he was familiar with marine labs in general, having spent summers, since childhood, at the Marine Biological Laboratory (MBL) in Woods Hole, where he became a member of the MBL corporation, and an MBL Trustee. He was also enthusiastic about natural history, fishing, and boating.

In 1961, when Fox started the new Space Institute, Metz joined him, leaving the OI and the Alligator Harbor Lab without direction. Then, in 1964, Metz and Fox both moved to the University of Miami to found an Institute of Molecular and Cellular Evolution. Metz stayed on in Miami as a Professor of Zoology until he retired. But Fox, in 1989, moved as a Distinguished Professor, first to Southern Illinois University, and then to the University of Southern Alabama, where he retired.

Albert Collier.—(Director 1962–1964), M.S., Rice University (1933): Areas of expertise: chemical oceanography, diatom and dinoflagellate nutrition, oyster feeding.

Collier’s scientific and administrative abilities were already firmly established when he came to Florida from Texas. After finishing his education, he had worked for various agencies, including the National Marine Fisheries Service and the U.S. Fish & Wildlife Service. His thorough study of dissolved carbohydrates in seawater and their effects on oyster feeding, published in 1950, is still cited.

In 1946, several oil companies were sued by Louisiana oystermen, who complained that polluted water released during the production of petroleum had caused unusually large losses of market-sized oysters. Collier was one of the key researchers who concluded, eventually, that high temperatures and high salinity, caused by drought, had made the oysters vulnerable to a parasitic protozoan that they called Dermocystidium marinum, but which is now known as Perkinsus marinus, named after F. O. Perkins (incidentally, a graduate student of Winston Menzel, the seventh Director.)

From 1957 to 1962, Collier helped build the Texas A&M University Marine Laboratory at Fort Crocket, an old barracks in Galveston. He then helped the university to locate the Texas State Maritime Academy in that same building. In 1962, just as the academy opened, Collier moved to FSU to become director of the OI, and in 1963, he initiated a doctoral degree program in the institute.

Collier, in a 1963 assessment of the Alligator Harbor Laboratory, notes that research was ongoing in neurophysiology (Dexter M. Easton), mariculture (R. Winston Menzel), diatom and dinoflagellate nutrition (Albert Collier, himself), embryology (Charles Metz), and taxonomy (Henry Kritzler).3 He also mentioned that “…the laboratory has served principally as a summer teaching installation,” and although we cannot be sure who taught those courses, we assume that Collier might well have participated, on the basis of his interest in education.

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3In 1956, the Departments of Bacteriology, Botany, Physiology, and Zoology were integrated into a single Department of Biological Science.

3The names in parentheses were added by the authors; but only Kritzler is in doubt.
In the 1970s, at the Turkey Point Laboratory, Collier offered the first residence course ever taught at the coast. The students stayed in the dorms, and Collier rented a house in St. Teresa Beach because the lab superintendent, Don Phillips, was living in the Director’s house. Collier taught all of the topics in marine biology, but also recruited other faculty to give lectures and to come on field trips (including WFH and MJG). Toward the end of the 1970s, there was an intense but brief flowering of residence education, which is described later.

In 1964, Collier left the directorship for the Department of Biological Science. He served as associate chair for undergraduate studies, and on thesis committees of graduate students with interests in diatoms, oyster gills, and photosynthesis. And in about 1970, he wrote the opening overview chapter—Oceans and coastal waters as life-supporting environments—of Otto Kinne’s five-volume treatise “Marine Ecology.”

Collier was a renaissance man, often hosting informal eclectic gatherings of artists, scientists, faculty, and students to discuss scientific and societal issues. Moreover, he was an accomplished award-winning artist, especially after retiring to Arizona in the 1980s. He painted in oils, but became an early experimenter in computer art well into his 80s. While a Visiting Scholar at the University of Arizona, he illustrated a field guide to the common tide pool invertebrates of the northern Gulf of California.

RESEARCH AT THE ALLIGATOR HARBOR LABORATORY

Winthrop N. Kellogg—(1949–1961) (Ph.D., Columbia, 1929), an Indiana University psychologist, although well known for his studies of conditioning in animals, was even better known for rearing his child with an infant chimpanzee for 9 mo to determine the relative effects of nurture and genetics on development. The resulting book—‘‘The Ape and the Child’’—by Kellogg and his wife, Luella Kellogg, appeared in 1933. In 1950, after 20 yr at Indiana University, Kellogg accepted an offer from FSU to be a Professor of Psychology because, as Howard Baker, an FSU psychologist, reported: ‘‘B. F. Skinner had been made department head [at Indiana] instead of him…He was through with research, which he concluded had got him nowhere, and he was just going to teach and go sailing.’’

Indeed, Kellogg did go sailing in the Gulf of Mexico, but there he became fascinated with porpoises and initiated a study of echolocation—‘‘this complex avenue of audioperception’’—whereby the animals navigate, avoid obstacles, and find their food in the ocean, even at night or in turbid water, and at 12–15 miles per hour. He contacted the Alligator Harbor Lab—then being developed—about facilities for his project. Both Humm and Meyer were supportive, and constructed a large holding tank for porpoises on the site. Kellogg also found support with the U.S. Navy Mine Defense Center in Panama City, which lent him specialized equipment for measuring and analyzing sound. The research, which began in 1951, resulted in an article in Science by 1952 (the first of many), and another book, ‘‘Porpoises and Sonar,’’ in 1961. ‘‘Needless to say,’’ Kellogg recalled, ‘‘it was all a great deal of fun.’’ And he retired shortly thereafter.

Robert B. Short.—(Ph.D., University of Michigan, 1950) came directly to FSU from Michigan after completing his doctorate. He accepted a position as an Assistant Professor of Zoology, stayed for 40 yr, retired in 1990, and passed away in 2007. Short was a distinguished parasitologist with interests in trematode systematics, life cycles, and sensory structures; chromosomes and sex determination in blood flukes; and dicyemid Mesozoa (parasites of invertebrates). Although his primary research was carried out on campus, he trained many of his students at the Alligator Harbor Laboratory.

The training procedure, as described by Short, involved a drive with his students from town to the coast, during which they collected (as available) birds, fish, snails, or even fresh road kill in their quest for parasites. When they had enough material, they would drive it to the marine lab, remove any parasites found in the intestines, heart, and other organs, and identify and study them microscopically. They often found new species that they subsequently described in the literature. It is not surprising that when Bob Paine—then a graduate student at the University of Michigan and a visitor at the Marine Lab—found metacercariae infecting the brachiopods that he was studying, they were identified as gymnophalline trematodes by Bob Short.

Dexter M. Easton.—(Ph.D., Harvard University, 1947) was a neurobiologist in the FSU Department of Biological Science from 1955 until 2005. He was interested in teaching and had designed equipment that would allow students to make simple observations of electrical potentials. From at least the late 1950s to mid-1960s, he would take his class to the Alligator Harbor Laboratory and teach them how to record from excitable tissue. Easton also carried out research on the morphology and physiology of fish brains at the Alligator Harbor Laboratory; he had a house on the beach very near the lab, so his family could come with him while he worked. In the summer
of 1961, Jack Rudloe—just out of Leon High School—was hired by Easton to collect striped burrfish and bat fish. Rudloe grew up to be a marine biologist in Panacea, FL, co-Managing Director (with his wife Anne) of the Gulf Specimen Marine Laboratory there, and a well-known nature writer.

*The Illsion Excursions (MJG narrates).*—Charles Metz directed my Master’s research on the chemical and physiological properties of fertilizin, a component of the jelly coat on the surface of sea urchin eggs. In 1955, I graduated from FSU, and went to Harvard, where my doctoral studies were on the pharmacology of serotonin on quahog hearts. In the course of this work, I became interested in how the effects of transmitters on bivalve cardiac muscle would vary with species, and whether the pattern of variation would be predictable. So I began to study those questions in 1958, when I joined the zoology faculty at the University of Illinois.

Although Illinois has plenty of freshwater clams, they are difficult to identify, and the hearts are difficult to work with. In 1959, therefore, I arranged with Metz to visit the Alligator Harbor Lab for a week in mid-April; I aimed, simply, to determine the diversity of bivalves on Baymouth Bar and to test the experimental effectiveness of the hearts. This brief review was encouraging, and one of my colleagues—Clyde Manwell, an expert in respiratory pigment function—was excited to learn about the red “blood” in *Noetia ponderosa* (an ark shell) and *Cardita floridana* (a small clam). So the two of us went to Florida for 2 wk, near year’s end; we collected animals, and did experiments at the Alligator Harbor Laboratory—he on the distribution and function of hemoglobins in the two species of bivalves, and I on the effects of acetylcholine on the hearts of several bivalve species.

Sometime in 1963–64, while Collier was Director, Manwell returned to the Marine Lab to study the striking differences in the hemoglobins of “stout” and “thin” sea cucumbers (*Thyonella gemmata*). He published three or four papers on the basis of his Florida studies, then went to live in Great Britain, and we have never met again.

My data set from Florida required expansion, so I went to marine laboratories in other regions of the country, until I had examined about 50 different species, and the variation in heart responses was clear and predictable. Then I published a couple of papers and continued doing comparative pharmacology until I retired.

Robert T. Paine and the Great Graduate Student Sabbatical.—That *Glottidia pyramidata*—an inarticulate (or lingulid) brachiopod—is relatively common along the west coast of Florida is probably still not well known. But Bob Paine did know, having read the literature of the late 19th and early 20th centuries. And why wouldn’t he want to do his doctoral research on the ecology of a species that had remained virtually unchanged since the Ordovician, i.e., for 40–50 million yr? Paine reports: “So I made exploratory trips from Ann Arbor (University of Michigan) in 1957 and 1958, just to prove to my advisor that brachiopods could be found.”

In June, 1959, with the proof in, Paine embarked on what he calls “my graduate student sabbatical: moving to Florida, [and] living out of my VW van.” It was on this third trip that Paine found the Alligator Harbor Marine Laboratory and was given permission to reside there for an extended period, in fact, about 11 mo. In that time, and with plenty of travel, he managed to determine the range and habitat of *Glottidia* and then—focusing on two populations, in Alligator Harbor and Cape Haze—to quantitatively describe their life history, particularly reproduction, and the ecology of the planktonic larvae, leading to the distribution of the adult populations.

In the course of investigating *Glottidia*, Paine became fascinated with a complex community on Baymouth Bar. The food web comprised eight predatory gastropods and a variety of animals (including some of the gastropods) who were their prey. By determining the prey of each gastropod, and identifying the adaptations or conditions that allowed others to avoid predation, it was possible to tease apart a complex food web into simpler subwebs, which could then be studied more effectively. Paine remarks: “In many ways, the gastropods were more interesting than the brachiopods, and they certainly stimulated my career-long interests in predation.” Indeed, within 10 yr of leaving Florida, he clarified, in two landmark papers, the role of “keystone predators” in biodiversity.

Paine finished at Michigan in 1961—the *Glottidia* story was his dissertation—and went off to a postdoctoral fellowship at the Scripps Institute of Oceanography, where he organized his Alligator Harbor data into about six papers. He joined the Department of Zoology at the University of Washington in 1962, where he became chairman, and where, though retired, he still works. Paine’s work has had a marked influence on ecology, converting it into a dynamic experimental science; he has received many honors, and is a member of the National Academy of Sciences. And he will appear again toward the end of this narrative.
THE GREAT MOVE


Soon after his doctoral studies, Oppenheimer joined the faculty of the Institute of Marine Science at the University of Miami. From there, in 1964, he moved to FSU, and during the next 7 yr, fulfilled several goals: he served as the last director of the OI, he oversaw its closing (1964–68), and he replaced the OI with a new Department of Oceanography in the College of Arts and Sciences, where he developed a new graduate program and served as the first chairman (1968–71).

Oppenheimer also oversaw the funding, development, and design of a new marine laboratory at St. Teresa. In 1964, the State Board of Control had approved FSU’s request for $27,000 to buy an 80-acre lot that, with Ed Ball’s donated land, would provide space to build a new laboratory with enough left over for future expansion. The new FSUML was about 8 miles west of the previous site on Alligator Harbor, and 48 miles from campus, about the same distance as that from campus to the Alligator Harbor Lab (Fig. 1).

The new lab had a larger research building with labs and suites with running seawater, a classroom/library, a large maintenance shop, four efficiency apartments, and a four-bedroom house for a resident superintendent. A large basin and a high concrete dock were designed to serve an oceangoing research vessel.

In the expectation that the new facility would develop a major seagoing research initiative, a deep channel was dredged adjacent to the laboratory, and Oppenheimer obtained the Stormy Petrel, a 125-foot hull, intended as the primary seagoing research platform. Although the ship had a newly reconditioned winch on it, it lacked an engine. Moreover, the hoped-for research initiative failed to develop, and funding for large ships was dedicated to the newly formed (in 1967) Florida Institute of Oceanography, a statewide academic infrastructure support organization.

Oppenheimer’s directorship transformed FSU’s marine laboratory in every conceivable way: its location, size, structure, services, administration, and especially its potential for growth and development. But the direction of that growth and development was not at all clear. So although a metamorphosis had surely begun, it would take almost 4 decades to complete—or not. In 1971, Oppenheimer returned to the University of Texas, where he remained for the rest of his career. After he left FSU, the Stormy Petrel was towed away.


Natural surroundings near the FSUML.—The location of FSU’s marine laboratory near Turkey Point is unique in a number of respects (Fig. 1). It resides between two extensive watersheds, those of the Ochlocknee River to the east and the Apalachicola River to the west, and is nested within a region of extensive conservation lands. It lies within the Alligator Harbor Aquatic Preserve (5,814 ha) managed by the Florida Department of Environmental Protection; littoral coastal areas to the east are within the St. Marks National Wildlife Refuge (27,519 ha) and, to the west, within the Apalachicola National Estuarine Research Reserve (99,553 ha). Further, the Apalachicola National Forest (228,647 ha) and Tate’s Hell State Forest (81,914 ha) stretch to the north and west. These substantial conservation efforts have resulted in virtually pollution-free nearshore waters. Seagrass beds (mainly Thalassia testudinum) provide most of the local subtidal primary productivity and habitats for a remarkably diverse fauna (including more than 65 marine algal species, 150 molluscan species, 80 annelid species, 120 decapod species, and numerous marine vertebrates and planktonic species), playing fundamental structural and functional roles in coastal and marine ecosystems. They are also vulnerable to exploitation and to disturbance. Indeed, the area within which the lab is embedded is considered to be among the more productive and diverse coastal habitats in the United States, and a prime candidate for serving as the focus of intense research and conservation efforts.

THE DIRECTORS: FROM HARRISS TO IVERSON

Robert Harriss.—(Director 1971–1974), Ph.D., Rice University (1965): Areas of expertise: regional and global environmental change, cities as complex adaptive systems, integration of science with the arts.

As a young oceanography faculty member, the 1970s were an exciting, productive, and often impetuous era in my life and career. In a moment of weakness, I accepted the additional responsibility as Director of the FSUML. Vice President of Research, Robert Johnson, and Carl Oppenheimer, my Oceanography Department head, assured me that a reduction of one course
from my teaching load would provide the time necessary to lead the lab. This was a gross underestimate, but I viewed the Marine Lab as an opportunity to live and work close to the coastal ecosystems that I researched.

During my first week at the lab, I was confronted by staff discord. With great anxiety, I called the maintenance and ship staff for a face-to-face discussion of the issues. The problematic staff member resigned, and I promoted Earnest Gay to the Marine Supervisor position, where he served until the mid-1980s. Earnest saw to the day-to-day operation of the facility and would become an important mentor during my tenure as Lab Director. Joe Barber, the Captain of the R/V Tursiops (a 60-foot steel-hulled T-boat), Bobby Millender, First Mate, and other support staff were a great team. Meanwhile, I lived on site, in the house on the lab property, during much of my tenure.

The 1970s were the best of times for researchers in the environmental sciences. Our R/V Tursiops was an ideal platform for research programs on the biogeochemistry of rivers, estuaries, and coastal waters, from the Florida Everglades to the Mississippi Delta, and the National Science Foundation (NSF) provided adequate support for the vessel to be at sea 100–150 d each year. Moreover, the Vice President of Research provided a modest increase in the lab budget to support my efforts to attract more scientists and students to the lab, both FSU folk and visitors. Rich Iverson, Jim Jones, Skip Livingston, Bill Herrnkind, and other faculty had very productive projects at the lab. A major South Florida study included a fruitful collaboration with H. T. Odum at the University of Florida: my group learned how to do modeling with an analog computer, and his students were introduced to field measurements. Odum’s 1971 book, *Environment, Power, and Society*, profoundly influenced my thinking and subsequent career interests. At the same time, Skip Livingston and Walter Glooschenko collaborated with me to document coastal environmental damage, and to take on paper, pesticide, and other polluting industries.

Many of my graduate students subsequently had distinguished careers in academia and government laboratories. Jack Winchester, Chair of the Department of Oceanography, provided inspiring leadership. I resigned my position at the lab in 1974 to assume a position as a temporary program manager at the NSF, where I hoped to inspire more awareness of the power of interdisciplinary approaches to the environmental sciences.

After my departure from FSU in 1978, I held positions at NASA, the University of New Hampshire, Texas A&M, and the National Center for Atmospheric Research. In 2006, I returned to Houston, birthplace of my professional career, to serve as President of the Houston Advanced Research Center, a nonprofit institution dedicated to sustainability science. I also hold adjunct faculty positions at Texas A&M-Galveston and the University of Houston.


Menzel came from a family of commercial fishermen who worked on the Chickahominy River in Virginia. But after his Master’s study of the James River catfish fishery, Menzel’s interests turned to the reproduction, development, and growth of oysters. He was working in Louisiana, and in 1946, was involved—as Collier had been—in the legal argument between the Louisiana oystermen and the oil companies. His doctoral work also involved oysters—a biological comparison of *Crassostrea virginica* and *Ostrea equestris*, and when it was complete, in 1954, he joined the FSU Department of Marine Science.

Menzel’s research at FSU, though focused on a few bivalve genera, was quite broad; about half of it addressed biological questions (ecology, population biology, behavior, and parasitology); a smaller proportion dealt with cellular, genetic, and chromosomal questions (including hybridization and protozoan diseases); and only a small fraction of his papers were about cultivation. But such an artificial parsing of his oeuvre is clearly off, for cultivation of marine animals underlies virtually all of Menzel’s work. He remarked in 1961 that open land was disappearing as the population increased, and suggested that shallow coastal waters be exploited by scientifically based ‘husbandry of marine forms, or mariculture,’ thus both coining the word, and revealing his perspective.

Menzel carried out substantial field and laboratory research both at the Alligator Harbor Laboratory and at the FSUML when it moved to Turkey Point. In 1956, he updated the checklist of local animals and plants that Harold Humm had prepared in 1953, adding more species and commentary, and this annotated checklist is now in its third edition (1971).

Menzel’s relaxed manner and slow drawl led people to discount him. But he was close to his many students, who respected his grasp of the literature and natural history, his intelligence, and wit. Through the four years of his director-
ship, Menzel attended to his research and writing, continued to do so after he retired, and then until he passed away in 1989.


Research: In 1965, 10 yr after my Master’s degree studies with Charles Metz, I returned to FSU’s Department of Biological Science. The astonishing biological diversity at Baymouth Bar and along the coast was still compelling, and the diverse interests of the graduate students in my lab led to a varied research program that included osmotic regulation and echinoderm regeneration, as well as the basic theme of bivalve heart pharmacology and physiology.

When it was my turn to be Director of the FSUML, my primary aim was to develop an acceptable level of scientific activity at the laboratory—and that was strange, considering the operation of my own research group. Typically, during low tides, we would use the skiffs at the Alligator Harbor Lab to go down to Baymouth Bar, or drive to other sites along the coast. We would collect the required animals and then drive them back to campus, where we would maintain them in aerated, artificial seawater in a temperature-controlled walk-in cooler, until they were used in experiments. Clearly, the Alligator Harbor Lab was serving our research program primarily as a transportation hub, and that relationship did not change when the new facility at Turkey Point opened in the spring of 1970.

Education: In the 1970s, Bill Herrnkind and I began to participate in the general residential marine biology course that Albert Collier had developed at the FSUML. But also in the 1970s, I was involved in Experimental Invertebrate Zoology, a residential summer course offered at the MBL (Woods Hole). Like most MBL courses, it was team-taught, so specialized instruction could be provided by several expert faculty. This seemed a good model for a multidisciplinary course in Experimental Marine Biology (EMB) at FSUML. There were only three problems: recruiting students and instructors, and obtaining general measuring and optical equipment for the labs.

Fortunately, the State universities in Florida were on the quarter system during the 1970s. So we proposed—and could reasonably expect—that at least some interested students would be willing to devote 10 wk, 5 d per wk—lecture, lab, or fieldwork from morning to evening—to this one course. But in return, students would receive all of their credits for the quarter (15 hr). They would not need to commute, but would live in the FSUML dormitories. Many students signed on. Moreover, common course numbering had just been instituted in the State University System, so we invited students from other universities to join in, and a few did.

Recruiting faculty proved easy. Since EMB would be team taught, faculty would stay only a week or two at Turkey Point; they would reside in the lab director’s house, give daily lectures in their field of interest, and offer a set of laboratory projects in their field, which the students would carry out. Moreover, although the course had a research assistant, faculty were invited to bring one of their own graduate students along to help out, which they did. The instructors were primarily from Biological Science: Larry Abele (invertebrate zoology), Bill Herrnkind (marine behavior and ecology), William Marzluff from Chemistry, Gerald Schatten (development), and I (comparative physiology). But we also recruited Ranga Rao from the University of West Florida (endocrinology) and Barry Ache from Florida Atlantic (neurophysiology).

The faculty did bring such specialized equipment as was needed for their laboratory experiments, and Bob Johnson (Vice-President for Research) funded dissecting microscopes, spectrometers, and recording oxygen meters and osmometers. With the problems solved, we tested EMB in 1975–76, and offered it statewide in 1977.

Fitting EMB to the University’s academic rhythm, culture, and regulations was always challenging—but interesting. In 1980, for example, we shifted the weekend to Tuesday and Wednesday, so students could leave to conduct business on campus or in town. Still, the course succeeded and improved with each iteration; for me, it was the most rewarding undertaking of my directorship.

Maintenance: I had no sooner been appointed Director then two problems emerged: First, an inspection revealed that the reinforcement bars in the floor and in the pillars holding up the laboratory building had rusted, then expanded, and finally cracked the concrete around them. Moreover, the ventral surface of the building extending over the tank area was covered in asbestos, which we were required to remove at once. And the seawater system, beset with silt, was in need of attention. The repairs took months.

The second problem was tied up at the laboratory’s dock: a large scruffy boat that never moved—and then disappeared. Thirty-two years
later, Herrnkind explains: “In about 1969, Professor James ‘‘Jimmy’’ Jones, a geologist, came to FSU, bringing with him R/V Tursiops, a 60-foot T-boat. Small and slow, but seaworthy, it became the laboratory’s oceangoing vessel. I took it to Bimini several times (1973–75) where it served as a mobile diving platform and thus enabled my research on the population biology of spiny lobsters. I also used it in the Scientific Diving course; and others used it as well for research and teaching. By the late 1970s, however, its block funding had ended, and yet it needed major refurbishing. So it sat at the dock, and then (in about 1980) it was relinquished to the Federal Government, who took it away to storage in Bay St. Louis.”


Research: The FSUML opened in late 1967, just as I joined the Biological Science faculty at FSU, and my graduate students and I have operated there ever since. Although the primary focus of our research was on the behavior and ecology of spiny lobsters, and was conducted underwater in the subtropics, our experimental studies were carried out at FSUML. In addition, our lab continuously studied and published on littoral gastropods and crustaceans in the Gulf, and on their ecological linkages, both direct (predator–prey) and indirect (mollusk shell–web dynamics).

Diving: Already in the mid-1970s, I began to instruct my graduate students in scuba diving safety and the techniques of scientific diving. Then I hired a full-time Diving Officer and started to promote the development of an academic diving program (ADP) that would be offered and overseen by the FSUML. This campaign was successful, and ADP has provided science-diver training for many graduate students in marine science and underwater archaeology, while also offering advisory and technical support to research, including safety oversight, and free use of scuba gear and instrumentation.

Education: I continued to coordinate and teach in the multidisciplinary residence course: EMB. But in 1981, when the quarter system ended, so did the course—overwhelmed by logistical and scheduling problems. Later, however, from 1995 to 2006, I commuted from the main FSU campus, 2 d per wk, to teach Biology of Higher Marine Invertebrates.

Maintenance: For 3 yr after the departure of R/V Tursiops, only outboard skiffs and pontoon boats were available to FSUML investigators. In 1981, however, soon after becoming Director, FSU acquired a vessel from U.S. Customs. Renamed R/V Callinectes, it was a 46-foot diesel-powered craft with a semitunneled stern, suitable for use in both near-offshore and bay waters. I secured funds to upgrade it and oversaw its renovation into a serviceable research platform. Well before the age of desktops and the Internet, I also acquired a terminal with a phone-line linkage to the mainframe computer on the FSU campus. For the first time, computer access to the FSUML was available. Moreover, in response to an assault threat on a student assistant staying overnight at the coastal facility, I persuaded the administration to provide enhanced security, including a barrier fence, expanded outdoor lighting, and under my successor, after-hours security personnel.

Outreach: During my directorship, I initiated a series of outreach programs that continue to this day. For example, in 1984, Dr. Patricia Hayward and I created Saturday-at-the-Sea (SATS), a hands-on program for middle school students that has operated at the lab for 26 yr and served ~20,000 middle-school students (see Outreach section below).


Administration: I have been a faculty member at FSU in the Department of Biological Science since 1981. While Marine Lab Director, I established the position of Associate Director (AD) at FSUML to provide continuous, on-site direction for all of the diverse day-to-day operations. Thus, the AD position anticipated expanded research, teaching, and outreach at the coast, and provided the Director with time to meet faculty and administrative commitments on the main campus, and thereby to pursue long-term support for the Marine Lab. I also brought the FSUML into the National Association of Marine Laboratories. In my present position as Associate Vice President for Research, I watch over the direction and operation of the Marine Laboratory, including changes to the facility and personnel.

Maintenance: I obtained night and weekend security personnel for the coastal facility and oversaw the repair and improvement of infrastructure following substantial damage by Hurricane Kate. An unusable boat launch ramp was
replaced with a new, larger one suitable to all FSUML outboard watercraft up to 28 feet in length.

As Director, I obtained NSF funding to build a recirculating seawater system. This opened the Marine Lab to research on marine species with narrow salinity and temperature tolerances, and supported studies that require long-term controlled conditions. Additionally, I upgraded the open seawater system, providing higher water quality, greater reliability of supply, and the expansion necessitated by the increasing demands of research and outreach programs.

Research: My research program focuses on the structure, function, and evolution of phosphoryl transfer enzymes. This is a highly technical program that must be sited on the main campus. But most of the model animals and experimental materials used in the program are, or are derived from, local marine invertebrates, from sponges to octopi.


My career began at the Woods Hole Oceanographic Institution, first as a postdoctoral fellow and then as member of the scientific staff. I moved to the FSU Department of Oceanography in 1987 and assumed the FSUML directorship in 1989.

Maintenance: With two NSF facilities improvement grants, the seawater system was greatly upgraded and expanded. The raw water intake was moved farther offshore and deeper, providing a continuous flow, even during storms and extreme low tides. Because of these improvements, marine organisms could be held for longer periods, with less risk of stoppages or declines in the quality of the seawater supply. And therefore, research outcomes for replicated and long-term tests and experiments were improved.

I also supervised a mammoth dredging operation to clear accumulated sediment and to deepen the Marine Lab channel. As a result, larger vessels, including R/V Callinectes, could finally enter and leave the basin without risk of grounding or propeller damage. I also ensured that all programs were able to operate through the year-long period of dredging, that the seawater supply was adequate, and that dredged sediment caused no environmental damage or local disturbance of sensitive sea grass and oyster reef habitats.

Research: Among the major projects at the Marine Lab was my long-term, externally funded research on the life cycle needs and cultivation of marine copepods. As important as the basic research goals, was the evaluation of cultivated copepods as a superior food source for rearing commercially valuable fish species. I also built two large and durable greenhouses.

By 2001, I had served longer than any Director, before or since. After completing my term as FSUML director, I went on to become Director of the Women in Math, Science, and Engineering program (2001–2005), and Chair of the Department of Oceanography (2003–2005). By August 2005, these roles had prepared me to take on a new challenge: Dean of Graduate Studies.


During his tenure as Director, Iverson refurbished the R/V Callinectes, replacing the electrical system, installing a new winch, replacing the radar/sounding system with an advanced unit, and replacing the life rafts. These improvements assured that the craft would continue to be effective for both teaching and research cruises. Iverson also replaced the engines in the heavily used small-boat fleet that was serving, not only greatly expanded public outreach programs, but also supporting the research and teaching of FSU and other institutions.

Iverson also significantly upgraded the FSUML infrastructure. With support from Brooks Keel and Kirby Kemper, he replaced the freshwater system and installed a 5,000-square-foot modular building that had been donated by the Seminole Boosters. He also secured and oversaw two major installations affecting information transmission: fiber-optic Internet cable was laid throughout FSUML research, education, and maintenance buildings, and a server and new personal computers for all staff members were provided. These improvements permitted direct communication with the main campus via a DSL Internet connection. He also replaced the antiquated telephone system, including complete rewiring throughout all of the buildings on the Marine Lab campus.

For the first time, the laboratory could provide on-site dedicated offices, meeting space, and communications for researchers and teachers, both from FSU and elsewhere. These improvements would later enhance academic activity at the coast, facilitating an increased appreciation for the pristine habitats and diverse organisms located adjacent to the FSUML.
Robert J. "Skip" Livingston.—(Biological Science): From 1970 through the 1990s—and with the intensity for which he is legendary—Skip Livingston and a large contingent of collaborators and students, graduate and undergraduate, researched the ecology of our important panhandle estuaries: the Fenholloway, Econofina, Choctawhatchee, and especially the Apalachicola, Florida’s main producer of oysters as well as shrimp and blue crabs. Livingston aimed to accumulate sufficient long-term physical and biological data so that seasonal, annual, and future trends could be assessed. Of special interest to him was the trophodynamics of each system—the key to the nature of the food chain and to productivity measures. The work of Livingston’s group was largely in the field and sorting room, but they also had a continuous presence at the FSUML, where they conducted long-term mesocosm experiments. His ability to sustain support for such long-term data collection and subsequent analysis was remarkable.

Livingston’s projects yielded seminal discoveries about the relationship of river flow to the bay’s ecology, and the contributions of microorganisms to the productivity of the ecosystem. The projects spun off numerous Master’s and doctoral studies, and a set of lessons on the nature of the estuary was developed and was taught in the local public schools in Franklin County.

William “Bill” Herrnkind.—(Biological Science): A marine station located amidst pristine habitats that provides the basic services of small boats and running seawater can generate significant research by graduate students and faculty even when their funding is limited. This possibility has been revealed by more than 3 decades of observing the sophisticated behavior and intricate linkages among littoral Gulf mollusks and, mainly, crustaceans that constitute what has been termed the “shell web.”

In an area without nearshore rocks, mollusk shells provide both the limiting hard substrate and shelter. Although bivalves and gastropods both produce shells, it is mainly predaceous gastropods that make the shells available for other taxa to exploit, e.g., hermit crabs, sea anemones, gobies, blennies, and other benthic fishes. Meanwhile, blue, stone, and box crabs—shell-crushing predators of mollusks—remove those shells for their own use. A dynamic interaction between these processes operates in salt marshes and in sea grass meadows. Horse conchs, the top gastropod predator of local waters, devours pen shell flesh, thus providing nesting sites for several fish species and dwarf octopuses—an important indirect ecological effect. Some shell-using hermit crabs actively seek and acquire, by specialized behavior, anemones that sting potential crustacean predators. Such insights and many others have emerged from a lineage of graduate student projects that have been directed, since the 1960s, by Herrnkind and other faculty from FSU and elsewhere. Two of the earliest and best-known papers on this topic were by Robert T. Paine, present Chair of the FSUCML Science Advisory Board.

Christopher C. Koenig and Felicia C. Coleman (Biological Science).—Over the past 2 decades, Koenig and I have elucidated the life history and recruitment of a number of species of groupers. During the early 1990s, we worked on these aspects off the FSUML, focusing especially on gag and red grouper, two of the most sought-after and heavily fished species in both the recreational and commercial fisheries in this part of the Gulf. In particular, we found that, during their juvenile stage, gag use the seagrass beds, which extend from Apalachicola Bay to throughout the Big Bend, as critically important nursery grounds. We estimated that the year-class strength, just in the St. George Sound, was nearly 1 million young fish. This signified both the important function of this region as nursery habitat and its incredible importance in supplying fishery productivity. The National Marine Fisheries Service (NMFS) was highly interested in this work. So more than 15 yr ago, we left the Marine Lab to work with colleagues at NMFS labs throughout Florida. This change allowed us to expand our work offshore to the edge of the continental shelf and to the rest of the state.

In the early 2000s, Herrnkind used our data effectively to forestall plans for a marina to be built off the FSUML.

Outreach at the FSUML: From Harriss to Iverson

In 1984, the Florida Legislature mandated the state universities to offer their facilities and services beyond enrolled students, i.e., directly to state citizens. Bill Herrnkind and Patricia Hayward (Biological Science) designed and obtained funding for the SATS program to encourage interest in nature and science among middle-school students—an audience that tends to lose interest in science. The hands-on activities included field trips, wading and seining along the shore, and trawling the sea-grass meadows just offshore, as well as a brief wet lab session using...
dissecting microscopes and touch tanks. In 1996, the program won the Governor’s Environmental Educational Excellence Award. Now SATS and spin-off programs operate several days weekly in spring through fall. In 1994, Herrnkind initiated a NSF–Science Education program for middle-school science teachers, Marine Ecology for Teachers: A Model for Inquiry-Based Teaching. The success of this experience for the participants formed the basis of two subsequent long-term NSF grants (2000–2012).

Among the legacies of Nancy Marcus’s tenure is the very successful, ongoing, Open House Day. This biannual springtime event draws hundreds of coastal citizens to the FSUML to experience research exhibits, lectures on a wide array of timely marine topics, and close-up, hands-on contact with live, local marine invertebrates and fishes.

These collective outreach efforts have enhanced the perception of the marine lab and its regional role.

THE AWAKENING (2006–)

In 2004, Kirby Kemper, Vice President for Research, appointed a select committee of FSU Marine Science faculty (including Herrnkind and Coleman) to evaluate and recommend the direction of future development at the FSUML. The committee’s proposals led the FSU administration to appreciate the value in supporting and growing the laboratory’s research capacity, an epiphany that set the stage for significant changes in mission, organization, and scope of activity.

The mission expanded from that of a support facility to becoming a programmatically based center for research, education, and outreach, with a focus on the coastal and marine ecosystems of the northeastern Gulf of Mexico. The organization changed with the hiring of a full-time on-site director, three resident research faculty members, and three postdoctoral associates to get it off the ground, and moving both the administrative support positions and the academic diving program from the main campus to the laboratory. The scope of activity expanded to include place-based research, education, and outreach, and the significantly increased involvement of undergraduate students in marine research.

Before describing the transformation of the FSUML, I want to acknowledge the giants I’ve had for mentors. In particular, Greenberg, Herrnkind, and Bob Paine have been walking with me from the start—and Joe Travis, Dean of Arts and Sciences, even before that. Greenberg pointed me toward developing a Board of Trustees—on which both he and Herrnkind serve, and through which Travis is involved—and a Scientific Advisory Board, chaired by Bob Paine. They are as engaged and energetic a bunch as I’ve ever seen. I also acknowledge the incredible staff at the laboratory, from long-timers who shared the institutional history to the new staff now on board. They get it. All of these people are dedicated to the laboratory and all that it can become, and perhaps more particularly, they love this part of the world—now in immediate jeopardy because of the Deepwater Horizon oil spill of April 2010.

Maintenance: Marine labs are hungry beasts. During my first 2 yr as director, the 1960s-era electrical and fueling systems were replaced, and the internet connectivity of the lab was brought into the 21st century by upgrading the single DSL phone line to a T-3 line, thus unifying FSUML electronically with campus. We then went wireless. The building that was moved on site during Iverson’s tenure was quickly filled with staff, faculty, and postdoctoral associates, and was also used to host a series of outreach events. An energy audit caused us to replace outdated equipment with energy-efficient gear, and reduced our energy use by nearly half, despite the growing number of residents. We landscaped the grounds and reorganized space to squeeze in a dive locker and graduate student housing. And then took a breath. Next was research.

Research: The mission of the Marine Laboratory—outlined at its inception—is now in full swing: we focus on conducting innovative, interdisciplinary research on the coastal and marine ecosystems of the northeastern Gulf of Mexico, and on providing the scientific underpinnings for informed policy decisions.

The first three faculty and three postdoctoral associates hired to tackle this mission arrived in 2007 and 2008. They brought in research dollars for the first time, research technicians, and more recently, graduate students. Their hunger for space and developing projects has been met by moving them into existing laboratory space, constructing storage units for gear, and converting the Marcus greenhouses into labs used to
evaluate predator–prey interactions and genetic diversity in sea grass and salt marsh plant systems.

**Resident Scientists**

David Kimbro (Ph.D., University of California, Davis) studies the community of organisms that live in oyster reef and salt marsh habitats. He combines laboratory and field experiments with broad-scale monitoring to understand the suite of environmental conditions—including nutrients, phytoplankton, tidal inundation, salinity, and temperature—that both promote and inhibit predators from maintaining critical habitat all along the NE gulf coastline.

Randall Hughes (Ph.D., University of California, Davis) examines the ecological effects of species and genetic diversity in salt marshes, sea grasses, and oyster reefs. Diversity often reduces the negative impacts of disturbance and thus could be an important factor in the response of these habitats to the oil spill. In addition, because these systems provide critical habitat for a wide variety of birds, fishes, and invertebrates, any factors that mitigate the negative effects of oil could have far-reaching community and ecosystem effects.

There is a strong fisheries ecology component at the FSUCML now, including scientists who use fishery-independent surveys to develop baseline habitat-specific indices of the relative abundance of larger fishes, including sharks, grouper, and many other species throughout the region. The FSUCML shark studies, conducted by Dean Grubbs (Ph.D., Virginia Institute of Marine Science), indicate that this region is home to at least 12 species of sharks, including small and large coastal sharks that are managed at the federal level. His data show that the extensive sea grass beds in the Big Bend serve critical functions as pupping and nursery grounds for at least six of these species. In addition, Christopher Stallings (Ph.D., Oregon State University), who studies population and community dynamics of marine organisms in sea grass beds and rocky sponge reefs, finds that more than 10 species of economically important bony fishes and many species of forage fishes inhabit these habitats as juveniles or adults (or both). This kind of information is critical for assessing the ecological effects of habitat restoration efforts or improved water quality, as well as the effects of habitat degradation caused by development, dredging, or oil inundation.

Farther to the west, from Apalachicola to the Mississippi River, Kevin Craig (Ph.D., Duke University) assesses the effects of human-induced changes in water quality—such as nutrient pollution, decreases in river flow, and shoreline development—on the nursery function of estuaries and other nearshore habitats. He has a strong interest in understanding both the acute effects of human-induced impacts on economically important species living in these habitats and the longer-term effects that are mediated by interactions within coastal food webs.

Farther offshore, Koenig and I study reef fish species that have complex life cycles involving individual life stages that move from pelagic to inshore and to offshore habitats. At each stage, these fish have the potential to be affected by anthropogenic impacts. The focus of our research is understanding how these impacts affect their productivity and life history.

Campus-based faculty.—The connection between the FSUCML and campus-based faculty remains active. Indeed, more of the research is becoming collaborative and interdisciplinary, involving colleagues in the departments of Biological Science and Earth, Ocean, and Atmospheric Sciences. They include William Burnett, who has evaluated submarine groundwater discharge as a pathway for delivering nutrients and other dissolved constituents from land to the coastal ocean; Jeffrey Chanton, who uses stable isotopes as a means of investigating linkages in marine food webs; Joel Kostka, whose work focuses on marine microbial communities and their function in enhancing nutrient availability in coastal areas; Markus Huettel, who investigates sediment–water exchange of O2 and nutrients in the coastal zone, key parameters in biogeochemical studies of marine systems; Kevin Speer, who runs the Current Meter Facility, a field operations system housed in part at the FSUCML that supports grant-funded research, including hydrographic observations in the NE Gulf of Mexico; and David Thistle, an expert in benthic ecology, whose research includes studies of copepod communities throughout the Gulf of Mexico—their systematics, morphology, response to natural disturbances, and habitat associations.

**Education.**—In 2006, we moved the administration of the Certificate Program in Marine Biology to the FSUCML. Herrnkind and I developed this program over 10 yr ago, in the Department of Biological Science, to provide intensive research experiences for undergraduate students who had already demonstrated a keen interest in marine science. Many of the students enrolled in the program are mentored by FSUCML faculty and postdocs, as are other undergraduates from FSU and other academic
institutions. Knowing a good thing—when we looked back in history and saw it—and with encouragement and early participation by Herrnkind, the lab also started offering summer courses that now include “saturation time” for undergraduate students at the Marine Lab.

The faculty members at the FSUCML are also actively engaged in training graduate students, bringing in one student in 2008, four in 2009, and anticipating several more in 2010. This activity has allowed the lab to grow the research capacity beyond that provided by the faculty themselves.

Outreach.—The “Forgotten Coast” of the Florida panhandle is rapidly gaining population with its associated coastal development. To provide information of interest to coastal residents, we initiated, in 2006, a monthly Public Lecture Series that usually fills the modest FSUCML auditorium to overflowing. Speakers include local scientists, naturalists, state agency officers, and visiting authorities—a diversity of expertise. In addition, FSUCML has hosted numerous symposia and conferences for small working groups, to exchange information about coastal issues, fisheries, and living marine resource management.

To further increase the lab’s visibility, we updated the website, developed a biannual online newsletter, and have continued the Marcus tradition of holding an open house every other year. We strongly support the SATS program, and have developed a series of noncredit courses of our own that are geared primarily for adult audiences interested in learning something about marine ecology. In addition, all of the researchers are involved in providing service to state and federal agencies responsible for the management of the living marine resources of this region. It is considered an important and integral part of all research initiatives.

CONCLUSIONS

1. A marine laboratory must aim to become an interactive community of scientists—students, postdocs, and faculty—and staff, whose workplace is at the laboratory, and who all live nearby. Moreover, their number, interests, ability, and relative permanence must be sufficient to maintain the interaction, and this is the basis of “critical mass.” The selection, cohesion, and scientific productivity of this community is the function of the Director, who is also a working member of it. The Awakening at the FSUCML was possible because the Director—with the help of the FSU administration—could achieve these goals.

2. A close relationship between research and education is common at marine laboratories, but its form is variable—seminars, data clubs, formal and informal technical training, formal classes for residents, for visitors, in seasons, short, long, and classes for schoolchildren. But somehow, when an interactive research community is lacking, education, particularly at the college level, sputters and winks out. The answer is clear: research and teaching are closely related everywhere—they are functions that inform each other regardless of the site. If one can’t travel to do research at a marine lab because his research and students are at a university, how can he come to teach, and abandon his research?

3. Reaching out to a community to increase its citizens’ understanding and appreciation of an institution’s perspectives, functions, and activities is absolutely critical for rural marine laboratories like the FSUCML. Fortunately, outreach has developed amazingly at the FSUCML, as is emphasized in this article. But there are two lessons: show & tell is not the same as research & teach; and we must be careful that the community’s perception of our laboratory does not swing strongly to the former. Keeping the efforts spent on research, teaching, and outreach in good proportion is a very important function of the Director.

4. University-operated marine laboratories are always prey to the vagaries of administrative and cultural changes, changes in scientific priorities, financial disasters, hurricanes, and oil spills. But the long history of the FSUCML clearly shows us that there is always a road back—and it could be a superhighway.

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