

M.S. AND Ph.D. PROGRAMS IN MARINE
SCIENCE
DEPARTMENT OF MARINE SCIENCE
THE UNIVERSITY OF SOUTHERN
MISSISSIPPI

STUDENT HANDBOOK
2006-2007

S. O. S.

This handbook is designed as an informal guide for DMS graduate students. The Student Oceanographic Society has endeavored to make the program information herein as accurate as possible. Official University and Departmental policies can be found in the USM Bulletin. Additional DMS policies can be obtained from your advisor, the USM Bulletin, or the departmental web page: <http://www.marine.usm.edu>.

INTRODUCTION:

The University of Southern Mississippi has been given the leadership role in marine science in Mississippi by the Board of Trustees of State Institutions of Higher Learning. In 1985, the University established the Center for Marine Science at the John C. Stennis Space Center (SSC), located near Bay St. Louis, Mississippi. Degree-granting status was awarded to the Center in 1987 for the Master of Science (M.S.) degree, and in 1990 for the Doctor of Philosophy (Ph.D). The Department of Marine Science (DMS) is an academic department within the College of Science and Technology. Although marine science is inherently multi-disciplinary, students will generally specialize in physical oceanography, biological oceanography, geological oceanography, or marine chemistry. In addition to the Marine Science Program, DMS also offers an intensive one year M.S. program in Hydrographic Science and a Ph.D. Marine Science program with an emphasis in Hydrographic Science.

FACILITIES:

Research Facilities and Associated Faculty

The Department of Marine Science occupies offices and laboratories in Buildings 1020, 1022, and 1206 in Stennis Space Center's administrative complex. Most of the faculty's offices are located in Building 1020. Graduate students' offices are concentrated in Building 1020 for Marine Science and Building 1206 for Hydrographic Science, where there are computer labs and conference rooms. A trailer adjacent to 1022 contains shop facilities and storage areas for sea-going equipment.

In the various DMS laboratories, a considerable array of research equipment is available including a high-resolution ICP mass spectrometer, spectrophotometers, high performance liquid chromatographs, fluorometers, carbon-nitrogen analyzer, liquid scintillation counters, atomic absorption spectrophotometers, image analyzers, and analytical balances.

The Department's location at Stennis Space Center gives it proximity to a variety of other agencies' facilities with which many of our adjunct faculty are associated. Such facilities contain mass spectrophotometers, gas chromatographs, scanning and transmission electron microscopes, an image analyzer, infrared carbon analyzer, and an ATP photometer.

The Department of Marine Science is part of the School of Ocean and Earth Sciences. The School of Ocean and Earth Sciences (SOES) is comprised of the Departments of Coastal Sciences (Ocean Springs, MS), Geography and Geology (Hattiesburg campus), and Marine Science (Stennis Space Center). In addition, the Gulf Coast Research Laboratory (Ocean Springs, MS) and the J. L. Scott Marine Education Center (interim site in Ocean Springs) are included in the SOES. The SOES was established in order to improve education, enhance research growth, and increase national and international recognition in ocean and earth sciences at The University of Southern Mississippi. The units comprising the SOES are currently engaged in complementary missions and providing an organizational umbrella for these activities will better serve their existing needs and will open up new opportunities for accomplishment. Educational opportunities will be improved by connecting curricular paths between the undergraduate and M.S. degree programs in Geography and Geology with the Ph. D. programs in Coastal Sciences and Marine Science.

The Gulf Coast Research Laboratory is located in Ocean Springs, Miss., (65 miles east of SSC). GCRL faculty and staff engage in a large number of applied research projects concerned with Mississippi's marine resources. GCRL faculty members participate in USM academic programs mainly through the Department of Coastal Sciences and primarily through the summer months.

Besides the land-based facilities, most faculty conduct sea-going research. Most funded research has access to the research vessel fleet of the University-National Oceanographic Laboratory System (UNOLS). This allows for graduate student participation in at-sea research. DMS operates two boats, a 22 ft Carolina skiff and a 29 ft. aluminum boat. Users must be certified by the DMS Boat and Vessel Committee. Some small boats for local use are available at the Gulf Coast Research Laboratory, which also operates the 32.5 m, 159 ton ft R/V Tommy Munro.

Students may also interact with marine oriented faculty located on the main campus in Hattiesburg, about 75 miles north of SSC. The Departments of Biological Science and Geography and Geology have marine-oriented faculty and many faculty in the Departments of Chemistry & Biochemistry, Physics, and Polymer Science as well as members of the Computational Sciences program interact with DMS faculty and students.

In summary, students have access to a wide range of facilities and resources to help them accomplish their educational and research goals.

Library Facilities

There is one library at SSC, the Maury Oceanographic Research Library. Operated by the Naval Oceanographic Office (NAVOCEANO), the library has a total of 650 current journal subscriptions. Maury Library specializes in oceanographic journals and books, remote sensing, environmental sciences, and engineering. Hours are 7:30 a.m. to 3:00 p.m. Monday through Friday. Interlibrary loan services are available from Maury Library without charge; allow a month to receive library information request. For library privileges, students must present current USM/DMS SSC site identification badges. The library provides free photocopying of library materials (one copy only per article). The library catalog can be accessed on-line at <http://library.navo.navy.mil/>.

In addition, The University of Southern Mississippi's libraries in Hattiesburg, the Cook Library and the McCain Library and Archives. The USM Library Web site (<http://www.lib.usm.edu/>) provides access to the library catalog, electronic databases such as ISI Web of Science, GEOREF, and document delivery service (CARL Uncover). Interlibrary loans and computer searching are also available by visiting the USM libraries, which also have evening (until 10 PM) and weekend hours.

Gulf Coast Research Laboratory operates the Gunter Library, located in the Caylor Building on the GCRL campus. In addition to housing many fisheries and mariculture journals that Maury does not carry, the library has many research reports written by GCRL personnel.

USEFUL INFORMATION:

Security at Stennis Space Center

All students and faculty are required to wear identification badges for security purposes at SSC. Contact Bridgett Harvey, Administrative Office, Building 1020, Room 120 for an application.

Temporary vehicle passes are also required for access to the facility. These can be obtained at the North/South Gate reception centers. Driver's license, insurance, and registration (all from the same state) are required for a temporary vehicle pass. With a badge and vehicle pass, there is no inconvenience getting on site. Without identification, one must stop at the reception center to get a visitor's pass. Your vehicle will be subject to inspection at any time while on site. USM ID cards are available for university-associated activities. See Bridgett Harvey, 228-688-3175, for further information.

Phone System

To call a number from one location to another on site use the last five digits. For directory assistance use the following numbers:

Stennis Space Center	83390
Local Area	99+1+411
Long Distance	99+area code+555-1212

Any long distance calls billed to the Department must be cleared with your advisor or the main office of the Department. **All long distance phone calls must be logged!** Local areas (Waveland, Bay St. Louis, Pass Christian) may be called without incurring long distance charges. For other information, consult the SSC phone directory.

Transportation

There is an on-site taxi that may be used for a charge, and the Department has two pick-up trucks and 2 vans for business and research use. All other transportation to and from SSC is by **personal vehicle**, unless otherwise approved. Greyhound bus lines have routes along the coast, but do not come to SSC. Gulfport Airport provides flights to Atlanta via Delta and United Airlines and Houston via Continental Airlines. Carpools are also available. For information, consult the bulletin boards in Building 1100. Consult faculty and other students for information regarding locating a car and obtaining a driver's license if necessary.

Housing

You will be responsible for your own living accommodations. The closest available housing is 15 miles from SSC, and you will need to provide your own transportation or arrange to car pool. Most faculty and students live in the surrounding communities of Long Beach, Pass Christian, Bay St. Louis, Waveland, Diamondhead, and Picayune in Mississippi and Slidell, Louisiana (all of these towns are 20 to 30 miles from SSC). Monthly rental fees range from \$550 for a one bedroom apartment, \$600-\$650 for a two bedroom apartment, \$750-\$850 for a two bedroom house or >\$675 for a three bedroom home. For further information, consult a current student or faculty member.

Child Care Center

On site childcare is available to SSC personnel who have young children. The NASA Child Care Center, located on Road H, east of Building 2105, offers a unique developmental childcare program for younger children from 6 weeks to 5 years old. Both non-handicapped and mildly

handicapped children are accepted and encouraged to their fullest capacities. The center is open Monday through Friday from 6:30 A.M. until 5:30 P.M. and will be closed on all legal federal holidays. Though the center does not accept drop-ins, a parent may enroll for 2, 3, or 4 days a week, as well as 5 days (full-time). Contact the Child Care Center for current monthly tuition: x83224.

Dining Facilities

A cafeteria is located in Building 1100. Breakfast and lunch are served Monday through Friday. They serve hot meals, salad bar and sandwiches. A snack bar, with microwave, is located next to the cafeteria for fast foods, open from 8:30 to 4:30. The Cypress House is the only location at SSC where consumption of beer or wine is permitted. It is open from 3:30 p.m. to 7:00 p.m. The Visitor Center "Rocketeria" also serves lunch from 11 a.m. to 3 p.m. weekdays and Saturdays and from 12 p.m. to 3 p.m. on Sundays. S.O.S. provides a microwave and refrigerator in both Building 1020 and Building 1206 for student use. There are also vending machines located in almost every building for soda and snacks. You will need to "brown bag it" if you are planning to work after 4:30. Off site there are many fine restaurants along the Gulf Coast of Mississippi, in Slidell, La., and throughout New Orleans. Talk to faculty or other students for favorites.

Banks

Hancock Bank and Keesler Federal Credit Union have branch offices located in Building 1100 and both offer a full range of banking facilities for the convenience of all employees and students. Banking hours are 9:00 to 4:30 Monday through Friday.

Miscellaneous

A barbershop, travel agency, dry cleaners and clinic are located in Building 1100. A gas station, located on Road J is open until 5:00 p.m., if you need gas to get home - make sure you get there in time! They also provide limited service and maintenance.

Sport Activities

The SSC Wellness Center, located on Road H, offers aerobic exercise classes, Cybex and free weight training equipment, an outdoor track, and nutritional guidance. The fee is \$15/month or \$150/year. For further information, contact x83950. There are also volleyball fields, softball leagues, a tennis club, shooting range, basketball courts and running areas available on site. The Stennis Recreation Association (x82411) arranges various on and off site activities (e.g., radio club, gun and archery club, softball club, and wildlife conservation club).

Attractions and Entertainment

The Gulf Coast provides many attractions. We have a 26-mile man-made public beach, tours to Ship Island with Fort Massachusetts, canoeing along the Wolf River, great golf courses, and deep sea or bayou fishing, just to mention a few. Of course, New Orleans has a myriad of fun things to do, only one hour away. New Orleans is famous for the Aquarium of the Americas, the French Quarter, Audubon Zoological Gardens, New Orleans Opera, New Orleans Symphony, numerous museums and nightclubs. One of the best-known aspects of life in this area is Mardi Gras,

celebrated with parades and parties in the two weeks prior to Lent. Two hours east are Mobile, Ala., and Pensacola, Fla., where you can find clear water, large beaches and access by car to barrier islands.

Student Oceanographic Society

The Student Oceanographic Society is an organization that promotes the Department of Marine Science, acts as forum for student views, and fosters exchange of ideas for students in the career of marine sciences.

EMERGENCY/HEALTH CARE

Dial 911 for any emergency, including medical and fire. Security can be reached at x83636.

For medical emergencies during business hours, you can also go to the clinic in Bldg. 1100. (Note: the clinic charges the Department for its services, so this is not the place to go for routine care. Exception: free flu shots in the fall--highly advised!) For routine medical care, the Department recommends the USM Clinic on the Hattiesburg main campus. The only charge will be for X-rays, medications, and lab work. Supplemental "major medical" insurance is available through the University. Contact the Department of Human Resources at (601) 266-4050.

For building maintenance problems, contact the Stennis Trouble Desk at x83293. (Note: NASA is **not** responsible for maintaining the trailers.)

MARINE SCIENCE PROGRAM POLICIES:

Registration

Registration is held approximately one week before classes begin at SSC. It is the student's responsibility to consult with his or her advisor, select courses, and register in a timely manner. Failure to do so may result in late registration fees. (Contact Bridgett Harvey at 688-3175 for details on course offerings, registration time and place, and registration materials that are needed following advisement; books may be purchased at time of registration.) Early registration for continuing students can be accomplished by the use of S.O.A.R. See the Class Schedule Guide for registration by S.O.A.R. instructions or visit the Registrar's website at www.registrar.usm.edu.

Program Requirements

The Department of Marine Science offers a curriculum designed to familiarize the graduate student with the interdisciplinary field of marine science as well as allow for specialization in one of five major sub fields: biological oceanography, chemical oceanography, geological oceanography, physical oceanography, and remote sensing. A total of 34 hours of graduate level courses with a GPA of 3.0 or better must be completed in order to fulfill the Master of Science degree requirements. For the Doctor of Philosophy, the requirement is 84 hours of graduate work beyond the bachelor's degree or 54 units beyond the master's. You may not accumulate more than two C's in your course work.

All entering Marine Science students must complete the four core courses (Physical Oceanography and Marine Chemistry in the fall semester and Biological and Geological Oceanography in the spring semester) plus their associated labs, preferably by the end of their first year in residence. A grade of B or better must be obtained in all core courses to proceed with the degree program. Students receiving less than a B in a core course may need to repeat the course or take an additional exam: see your advisor or the course instructor for details. Additional program requirements are found in Appendix I.

For students working on a thesis or dissertation, open communication between faculty and students allows for creative development of elective course offerings to support individual thesis research projects. Course offerings for each semester are distributed about 2 months before registration. See Bridgett Harvey for an updated list. You are also permitted with the approval of your advisor to take courses offered on USM's main campus in Hattiesburg or the campus at GCRL, but be advised that it is a 1½ hour commute each way. See the USM Graduate catalog for these courses. Upon acceptance into the graduate program, you are responsible for obtaining a graduate catalog for that year. An electronic version can be downloaded from the main USM website. The courses and requirements listed for that year are the ones that you must fulfill to graduate.

Interim Faculty Advisor and Committee

Upon acceptance, students are assigned an interim faculty advisor and an interim advisory committee consisting of three additional faculty members, one from each of the four major disciplines: Biology, Chemistry, Geology, and Physics. Students should maintain **frequent** communication with their committee, especially their advisor! The purpose of the committee is to provide the student with advice regarding course work and possible thesis topics. In addition, the committee administers the oral Qualifying Examination, which is generally two weeks after the student has completed the four core courses.

Policy On Student Progress

Students are expected to make good progress toward completion of a degree. The department defines good progress as the timely completion of core courses, passage of the qualifying examination, formation of a thesis/dissertation committee, acceptance of a prospectus, completion of required and elective courses including language requirements where applicable, fulfillment of the residency requirement, completion of thesis/dissertation units, acceptance of the thesis/dissertation, and passage of the thesis/dissertation defense and comprehensive examination. Students will be reviewed annually at a meeting of the DMS faculty at the beginning of the fall semester and will receive written notice if they do not complete any of the above events when expected. The notice is intended as a flag to students whose progress is not on schedule. Repeated failure to complete requirements often results in student enrollment beyond the expected maximum time for completion of a degree as defined in this department. In general, full-time students are expected to complete a Master of Science degree in three years or less, a Ph.D. from a master degree in four years or less, and a Ph.D. from a bachelor's degree in six years or less. For part-time students, there may be an additional two to three years required to complete the program. Part time students especially should be aware of the university time limits discussed below.

Students who repeatedly fail to make good progress are subject to loss of privileges upon review by the faculty. Privileges include office and desk space, laboratory space, laboratory supplies and equipment, field equipment, and research and teaching assistantships.

Part-time and full-time students who do not use departmental resources are subject to time limits as stated by the Office of Graduate Studies. The Office of Graduate Studies requires that both part-time and full-time students complete a master's degree within six calendar years from the date of initial enrollment in a graduate program. The Director of the Office of Graduate Studies can be petitioned if more than six years is needed to complete requirements for a master's degree. The Graduate Director requires that both part-time and full-time students enrolled in a Ph.D. program complete course work and take their comprehensive examination within a period of six years after admission to advanced graduate standing. There is no time limit set by the Director for completion of the dissertation, but the research must be timely according to the judgment of the thesis/dissertation committee.

Student Petitions for Exemption from Required Courses

- 1) Any student may be exempted from a required course by demonstrating to the DMS faculty his/her knowledge of the subject matter of the course.
- 2) A petition describing the student's reasons for requesting the exemption must be given to the Director along with any pertinent documentation such as an official transcript and a course syllabus from another university. The student must also discuss the request with the DMS faculty member currently responsible for the particular required course.
- 3) Petitions will be approved on a vote of the DMS faculty **and with the consent of the instructor** of the required course.
- 4) Exemption of a student from a required course does not exempt that student from knowledge of the course's subject matter during the qualifying examination or other academic evaluations.
- 5) No credit hours are given with the exemption and exemption does not change the total number of credit hours a student must complete for graduation (Exception: previously approved transfer credit hours).

DMS Policy On Student Assistantships

1. Definitions. Graduate assistants provide support for teaching activities, research, and departmental administration. In general, teaching assistants (TA's) provide support for teaching and other departmental activities; research assistants (RA's) provide support for faculty research. Decisions on support are usually made in April for the following academic year.
2. Eligibility. Assistantships are awarded, in accordance with USM policy, only to full-time students in good standing who are making timely progress towards a degree. Award of assistantships depends on these conditions as well as the availability of funds. With the approval of the faculty and the Director of Graduate Studies, a conditional student may be eligible to be an RA.

3. Student Responsibilities. Students who accept an assistantship are obligated to perform 20 hours of work per week for the department (TA's) or the sponsoring faculty member (RA's). Failure to perform this obligation or failure to remain a student in good standing can result in termination of an assistantship.

4. Academic Year Support. Academic year assistantships cover the nine-month period from mid-August through mid-May. Graduate assistants are obligated to be available during the same time periods that faculty are available. As of AY 06/07, the assistantship levels will be: \$1,550/mo. for beginning Masters students, \$1,600/mo. for Masters students with approved thesis prospectus and beginning Ph.D. students, \$1,650/mo. for Ph.D. students who have advanced to candidacy. Note that students on departmental teaching assistantships may receive a slightly higher payment over an eight month period (September – April) during the academic year for a total amount equivalent to what would be received over nine months at the rates given above. These assistantship levels are adjusted periodically. Academic year support may come from departmental sources (TA's) or from a faculty member's grant funds (RA's). To maintain an assistantship a student must have an average of "B" or better each semester. General tuition and the non-resident fee are waived for graduate assistantship holders. To qualify for this waiver, students on assistantships must be registered for courses totaling twelve (12) hours each semester (nine hours during summer term). Courses taken as audit do not count toward these hours. Tuition for the 2006-2007 academic year tuition is \$2,297* per semester; thus, the full-year support is equivalent to \$25,491-\$26,691, depending on level. A non-resident fee of \$3,014/semester is charged in the fall and spring to out-of-state students not eligible for the tuition waiver. For the latest information on tuition and fees, go to <http://www.usm.edu/bizserv/studentexpenses.html>.

**The University must reserve the right to increase or modify fees and expenses without prior notice, but with approval of the Board of Trustees of State Institutions of Higher Learning.*

5. Summer Support. The summer is the three-month period from June through August. During the summer, assistantship levels are at the same monthly rates as during the academic year. Most summer support comes from faculty member's grant funds. Thus, students supported during the academic year on a teaching assistantship will need to inquire of their advisors as to the availability of summer funds. Note that it is the goal of USM-DMS to provide students with full-year funding. Supported students will also receive a summer tuition waiver. Students who have received a tuition waiver during the spring semester can receive a summer tuition waiver regardless of their summer financing status.

6. Time Limits. As noted above, continuance of assistantships depends on good progress towards completion of a degree (as well as availability of funds). Therefore, M.S. students will not be eligible for further support after their third year and Ph.D. students will not be eligible after their fifth year. An additional two semesters of support for M.S. students and three semesters for Ph.D. students can be awarded with approval of the Director and the student's advisor.

7. Outside Support. Although the College of Marine Sciences endeavors to provide funding for as many qualified students as possible, the total available support is limited. Students are therefore encouraged to work with their advisors to seek external funding such as scholarships, fellowships, and grants. Faculty members and the Office of Research & Sponsored Programs can provide information about funding sources.

8. Outside Employment. Assistantships are designed to allow students to pursue their studies and research full-time. If a student engages in outside employment it is likely to interfere with his/her good progress. Therefore it is required that students discuss outside employment with their advisors prior to accepting any outside position.

TABLE 1. GOOD PROGRESS TIME LINES*

Requirement Time Schedule for Master of Science Degree, Full-Time Students.

Core Courses	by end of 2nd semester
Qualifying Exam	by 2 wks after end of 2nd semester
Thesis Advisor/Committee	by beginning of 3rd semester
Thesis Prospectus	by beginning of 4th semester
Courses Completed	by end of 4th semester
Application for Degree	early in 6th semester
Acceptance of Thesis	by end of 6th semester
Thesis Defense	by end of 6th semester
Comprehensive Exam	by end of 6th semester

Requirement Time Schedule for Master of Science Degree, Part-Time Student

Core Courses	by end of 4th semester
Qualifying Exam	by 2 wks after end of 4th semester
Thesis Advisor/Committee	by beginning of 6th semester
Thesis Prospectus	by beginning of 6th semester
Courses Completed	by end of 8th semester
Application for Degree	early in 12th semester
Acceptance of Thesis	by end of 12th semester
Thesis Defense	by end of 12th semester
Comprehensive Exam	by end of 12th semester

Requirement Time Schedule for Doctor of Philosophy Degree from a Bachelor Degree, Full-Time Student

Core Courses	by end of 2nd semester
Qualifying Exam	by 2 wks after end of 2nd semester
Dissertation Advisor/Committee	by beginning of 3rd semester
Program of Study	by beginning of 3rd semester
Courses Completed	by end of 6th semester
Comprehensive Examination	by end of 6th semester
Dissertation Prospectus	by end of 7th semester
Language Requirement	by beginning of 7th semester
Application for Degree	early in 11th semester
Defense of Dissertation	4 weeks before end of 12th semester
Acceptance of Dissertation	2 weeks before end of 12th semester

Requirement Time Schedule for Doctor of Philosophy Degree from a Bachelor Degree, Part-Time Student

Core Courses	by end of 4th semester
Qualifying Exam	by 2 wks after end of 4th semester
Dissertation Advisor/Committee	by beginning of 5th semester
Program of Study	by beginning of 5th semester

Dissertation Prospectus	by end of 7th semester
Language Requirement	by beginning of 10th semester
Courses Completed	by end of 12th semester
Comprehensive Examination	by end of 12th semester
Residency Requirement	by end of 12th semester
Application for Degree	early in 15th semester
Defense of Dissertation	4 weeks before end of 16th semester
Acceptance of Dissertation	2 weeks before end of 16th semester

Requirement Time Schedule for Doctor of Philosophy Degree from a Masters Degree, Full-Time Students.

Core Courses	by end of 2nd semester
Qualifying Exam	by 2 wks after end of 2nd semester
Dissertation Advisor/Committee	by beginning of 3rd semester
Program of Study	by beginning of 3rd semester
Dissertation Prospectus	by end of 5th semester
Language Requirement	by beginning of 6th semester
Courses Completed	by end of 6th semester
Comprehensive Examination	by end of 6th semester
Application for Degree	early in 7th semester
Defense of Dissertation	4 weeks before end of 8th semester
Acceptance of Dissertation	2 weeks before end of 8th semester

Requirement Time Schedule for Doctor of Philosophy Degree from a Masters Degree, Part-Time Student

Core Courses	by end of 4th semester
Qualifying Exam	by 2 wks after end of 4th semester
Dissertation Advisor/Committee	by beginning of 5th semester
Program of Study	by beginning of 5th semester
Dissertation Prospectus	by end of 7th semester
Language Requirement	by beginning of 8th semester
Courses Completed	by end of 8th semester
Comprehensive Examination	by end of 8th semester
Residency Requirement	by end of 8th semester
Application for Degree	early in 11th semester
Defense of Dissertation	4 weeks before end of 12th semester
Acceptance of Dissertation	2 weeks before end of 12th semester

**Review Graduate Bulletin published the year you were admitted to determine the exact dates for all deadlines.*

FACULTY IN THE DEPARTMENT OF MARINE SCIENCE

VERNON L. ASPER, Ph.D., M.I.T./Woods Hole Oceanographic Institution, 1986. Professor. Research interests: production, distribution and fate of large particles, sediment traps; deep-sea camera systems.

CHARLOTTE A. BRUNNER, Ph.D., University of Rhode Island, 1978. Associate Professor. Research interests: paleoceanography, taphonomy, biostratigraphy and global climate change.

JERALD W. CARUTHERS, Ph.D. Texas A&M, 1968. Associate Professor. Underwater acoustics, bottom and surface scattering and propagation in the complex shallow-water environment. Naval Research Laboratory.

DAVID W. DODD, M.Sc., University of New Brunswick, 1994. Instructor, Hydrographic Science. Research interests: extending the range of Real-Time Kinematic GPS for use in offshore vertical positioning.

LAODONG GUO, Ph.D. Texas A&M University. 1995. Associate Professor. Research interests: Biogeochemical cycling, aquatic colloids, isotope geochemistry, interactions at land/ocean, particle/water, and biota/water interfaces, climate and environmental changes.

STEPHEN D. HOWDEN, Ph.D., University of Rhode Island, 1996. Assistant Professor. Research interests: remote sensing of the ocean and atmosphere; general ocean circulation.

VLADIMIR M. KAMENKOVICH, Ph.D., Doctor of Physical-Mathematical Sciences, P. P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia, 1969. Professor. Research interests: general ocean circulation; mesoscale eddies; coastal currents.

STEVEN E. LOHRENTZ, Ph.D., M.I.T./Woods Hole Oceanographic Institution, 1985. Professor. Research interests: microbial dynamics, comparative studies of phytoplankton and bacteria, physical-biological interactions.

DMITRI NECHAEV, Ph.D., Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, 1989. Assistant Professor. Research interests: physical oceanography; data assimilation into numerical ocean models, large-scale ocean circulation and coastal dynamics.

KAREN ORCUTT, Ph.D., University of Wales, Swansea, 1999. Assistant Professor. Research interests: nitrogen fixation, iron acquisition by phytoplankton.

DONALD G. REDALJE, Ph.D., University of Hawaii, 1980. Professor. Research interests: phytoplankton physiological ecology and biochemistry, mass culture of algae.

ALAN M. SHILLER, Ph.D., Scripps Institution of Oceanography, 1982. Professor. Research interests: trace element geochemistry, carbon dioxide system, estuarine geochemistry.

KEVIN M. YEAGER, Ph.D., Texas A&M University. 2002. Assistant Professor. Research interests: Sedimentary processes, terrestrial and aquatic contaminants, roles of science in public policy, application and development of radiochemical and geochemical methods in geology, geomorphology, limnology, and marine sciences.

ASSOCIATE GRADUATE FACULTY

Robert A. Arnone, M.S., Georgia Tech., 1974. Remote sensing and ocean optics. Naval Research Laboratory.

Richard H. Bennett, Ph.D., Texas A&M University, 1976. Geotechnical properties of seafloor sediments and interdisciplinary research in clay microstructure, microfabric modeling and physicochemistry, and biogeochemistry using tools of electron microscopy (TEM and SEM) and environmental cell technology.

Cheryl Ann Blain, Ph.D., University of Notre Dame, 1994. Ocean dynamics. Naval Research Laboratory.

Kevin B. Briggs, Ph.D., University of Miami, 1994. Geological and biological effects on sound scattering from the sea floor; underwater photogrammetry. Naval Research Laboratory (Seafloor Sciences Branch).

Derek Burrage, Ph.D., University of Delaware, 1986. Physical Oceanography, remote sensing of sea surface salinity roughness and topography, river plume dynamics, simulating microwave radiometers, modeling ocean circulation, internal waves and currents. Research Scientist, Naval Research Laboratory.

Chris J. Byrne, Ph.D., Florida State, 1980. Environmental chemistry, trace organic analysis, trace metal analysis. Environmental Protection Agency.

Richard L. Crout, Ph.D., Louisiana State University, 1983. Analysis and interpretation of satellite data, shallow-water dynamics. NOAA National Data Buoy Center..

Peter Fleischer, Ph.D., University of Southern California, 1970. Marine sediments and depositional processes, side-scan sonar. Naval Oceanographic Office.

Richard W. Gould, Jr., Ph.D., Texas A&M University, 1987. Biological oceanography, remote sensing, and ocean optics. Naval Research Laboratory.

Harley E. Hurlburt, Ph.D. Florida State, 1974. Physical oceanography, numerical ocean modeling. Naval Research Laboratory.

Gregg A. Jacobs, Ph.D. University of Colorado Boulder. Geophysical fluid dynamics, satellite altimetry, Rossby waves. Naval Research Laboratory.

James M. Kaihatu, Ph.D. University Delaware, 1994. Ocean surface wave dynamics, nonlinear wave-wave interactions, surf zone dynamics, nearshore circulation, wave modeling. Naval Research Laboratory.

Ashok Kalra, Ph.D., University Calif. Berkley, 1971. Marine geophysics and underwater acoustics. Naval Oceanographic Office.

John C. Kindle, Ph.D., Florida State, 1979. Physical oceanography, numerical modeling & dynamics of tropical and coastal systems. Naval Research Laboratory.

Thomas D. Leming, Ph.D., Louisiana State, 1998. Physical and satellite oceanography applied to fisheries problems. National Marine Fisheries Service.

Brenda J. Little, Ph.D., Tulane, 1983. Chemistry and microbiology of corrosion. Naval Research Laboratory.

Joanne Lyzkowski-Schultz, Ph.D., University of Maine, 1980. Marine fisheries, mariculture. National Marine Fisheries Service.

Doug May, M.S., Penn State, 1982. Satellite remote sensing data applications to operational activities. Naval Oceanographic Office.

Richard Miller, Ph.D., North Carolina State, 1984. Biological oceanography, remote sensing, image processing, statistics. NASA.

Keith D. Mullin, Ph.D., Mississippi State, 1988. Distributional ecology of marine mammals in the Gulf of Mexico, the western North Atlantic, and the Caribbean Sea and its application to marine mammal conservation and management. National Marine Fisheries Service.

Richard A. Park, Ph.D., University of Wisconsin, 1966. Geology with minors in Invertebrate Zoology and Plant Ecology. President, Eco Modeling, Diamondhead, Mississippi.

Michael D. Richardson, Ph.D., Oregon State, 1976. Laboratory and remote measurement of shear and compressional wave velocity and attenuation, benthic process in deep sea, coastal marine and estuarine environments, high-frequency acoustic-bottom interactions. Naval Research Laboratory.

Chung-Chu Teng, Ph.D., Oregon State, 1986. Marine measurement systems, statistical and data analysis, ocean surface waves, hydrodynamics of marine structures. National Data Buoy Center.

Grady H. Tuell, Ph.D., Ohio State University, 2002. His current research is in the area of sensor fusion with a particular emphasis on its application to marine surveying and coastal mapping problems. Optech International.

Alan D. Weidemann, Ph.D., University of Rochester, 1985. Optical oceanography; propagation of ultraviolet, visible, and near-IR electromagnetic radiant energy in oceanic environments; relationship between inherent and apparent optical properties. Naval Research Laboratory.

APPENDIX I

Students must meet the general requirements set forth in the Graduate Bulletin of the University of Southern Mississippi. The Department of Marine Science offers a curriculum designed to familiarize the graduate student with the interdisciplinary field of marine science as well to allow for specialization in various sub fields including: biological oceanography, marine chemistry, geological oceanography, physical oceanography, remote sensing and hydrographic science. A total of 34 hours of graduate level courses (18 hours of 600 level or higher) with a minimum GPA of 3.0 or better must be completed in order to fulfill the Master of Science degree requirements. For the Doctor of Philosophy, the requirement is 84 hours of graduate course work beyond the bachelor's degree or 54 units beyond the master's. You may not accumulate more than two C's in your course work.

MARINE SCIENCE PROGRAM REQUIREMENTS:

All entering graduate students must complete the four core courses (Physical Oceanography and Marine Chemistry in the fall and Biological and Geological Oceanography in the spring) plus their associated labs, preferably by the end of their first year in residence. A grade of B or better must be obtained in all core courses in order for the graduate student to proceed with the degree program. Students getting less than a B in a core course may need to repeat the course or take an additional exam: see your advisor or the course instructor for details.

The admissions committee will assign each new student a four (4) member interim advisory committee. This committee will consist of one member from each of the four (4) sub disciplines, with the member from the student's major emphasis acting a chairman. The chairman of the interim advisory committee will advise the student, plan the course work with the student, and approve the student's course work each semester until the thesis committee is formed.

For the Master's degree, other program requirements include six (6) hours of Thesis (MAR 698) and at least two (2) hours of Seminar in Marine Science (MAR 689). The required courses account for 23 of the total 34 hours; the remaining 11 hours (course numbers 600 and above) must be chosen by the student from elective courses after consultation with the student's advisor.

Ph.D. students also take the four core courses and 2 credit hours of Seminar in Marine Science (MAR 689). It is recommended that the student take the two credit hours of seminar prior to taking the qualifying exam. The Ph.D. student is required to take twelve (12) hours of MAR courses at the 600 level or above. MAR 691, MAR 791, Directed Research in Marine Science, MAR 697, MAR 797, Independent Study and Research, MAR 698, Thesis in Marine Science, and MAR 898,

Dissertation in Marine Science, **do not** count toward this requirement. The Ph.D. student is required to take twelve (12) of MAR 898, Dissertation in Marine Science. The student is required to register for at least one (1) hour during the semester in which the student defends her/his dissertation.

In addition, all students must have at least 10 days' participation in an approved field activity (e.g., shipboard experience, field work, etc.).

Course Offerings:

Elective courses have been separated into four groupings on the basis of applicability to each of the four major sub fields of marine science - Biological, Chemical, Geological, and Physical Oceanography. However, due to the interdisciplinary nature of the field of marine sciences, students are likely to take elective courses in more than one sub field. In addition, courses from outside the basic and applied sciences, such as mathematics, computer technology, planning, etc., may be applicable to a particular student's graduate study program. All graduate students enrolled in the degree program in each of the four sub fields will conduct individual thesis research projects. Research interests can be strongly individual, requiring that the course work chosen by the student in consultation with the advisor be unique to the particular student. See course offerings on-line at <http://www.usm.edu/marine/marsci/courses.html>; also, see current semester offerings on-line at <http://www.usm.edu/marine/marsci/schedule.html>.

Qualifying Examination

This exam takes place upon completion of the four core courses. The purpose of the exam is to evaluate the student's ability to proceed with the degree program and to provide the student with advice and instructions in that regard. The student is responsible for the material covered in the core courses with emphasis on the student research interests. The exam can also cover the student's previous education and experience. The exam is primarily concept-oriented and meant to determine the student's ability to integrate ideas and correlate facts. It lasts about 2 hours and must be passed with the agreement of all four committee members. If only three out of four committee members agree, some conditions may be imposed such as additional readings or reports due to the committee. The exam may be repeated once and this second exam may be written. The student should consult their advisor, their other interim committee members as well as graduate students who have already taken the exam for more information. The Student Oceanographic Society maintains a file of Qualifying Exam questions.

Note that there are somewhat greater expectations of potential Ph.D. students than M.S. students in the Qualifying Exam. In general, potential Ph.D. students will be asked to complete a Master's degree first, though exceptional performance can result in this requirement being waived. If the student has a master's degree from this department, the master's comprehensive examination may supplant the Ph.D. qualifying examination. The Registrar's Office and the Graduate School must be notified in writing by the interim advisor and/or the department chair of the results of the qualifying examination.

Thesis/Dissertation Advisor and Committee

At some time during the first year, the student should enter into an agreement with a faculty member to serve as the student's thesis advisor. An advisory committee should be chosen by the beginning of the second year in residence or upon completion of the qualifying oral exam. For Master's students, the thesis committee must consist of at least three faculty members, one of whom may be an adjunct faculty member.

For Ph.D. students, the student and major advisor will choose a dissertation committee which will consist of the major advisor and at least four (4) additional members. The committee will have a minimum of one (1) and a maximum of two (2) non-DMS regular or adjunct faculty. A non-faculty member may serve as co-chair with the graduate dean's approval. This committee is recommended by the department chair and appointed by the graduate dean. All members of the committee must be approved at the appropriate responsibility and level of authority by the Graduate Council. Non-USM members with the appropriate training and experience must be approved at the Doctoral Committee level by the Graduate Council. The dissertation committee and the student will plan the remainder of the student's course work, including the tasks to fulfill the language requirement, before the student has completed 34 hours course work. The major advisor must approve the student's course work each semester, planning sheets will be distributed to the student and the entire dissertation committee.

Advancement to Candidacy: Ph.D. Students Only

Advancement to candidacy only occurs on completion of all the requirements for the degree except the dissertation. Satisfaction of Research Tools requirement (see later section) and acceptance of the research prospectus by the dissertation committee need to be filed with the Graduate School prior to advancement to candidacy. Two copies of the Application for Candidacy must be filed by the student with the Graduate School and one copy filed with the major advisor at least one semester prior to graduation.

Thesis/Dissertation Prospectus

A formal thesis prospectus is required and must be submitted to, and approved by the thesis committee as soon as possible after research goals have been established. The student should consult with your faculty advisor for information on form and content of the prospectus. Several drafts may be necessary. The prospectus should include the following sections:

- a) an introduction briefly stating the nature of your proposed thesis work,
- b) a background section documenting the relevant literature and highlighting the study area to which your research will contribute new information,
- c) a brief statement of objectives and hypotheses,
- d) a detailed experimental plan,
- e) a timetable for completion of your research and writing of the thesis,
- f) references.

Your advisor and committee may suggest other modifications. The completed prospectus represents an agreement between you and your committee as to what will constitute your thesis/dissertation. If you change aspects of your experimental plan, be sure to do so with the approval of your advisor and committee. For Ph.D. students, the Graduate School must be notified in writing by the major advisor and/or the department chair when the research prospectus has been approved.

Comprehensive Exam

A comprehensive exam is required for all students. This exam is administered by the thesis/dissertation committee and is a rigorous evaluation of the student's knowledge and abilities. For Master's students this is an oral exam given immediately following the public presentation of the thesis. For Ph.D. students, the exam may have oral and written parts and is administered following completion of all formal course work. For Master's students, the exam is the final requirement for the degree and will tend to focus on the thesis work. For Ph.D. students, the exam is an important step in becoming a degree candidate. As such, it will focus on the student's intellectual ability to pursue the dissertation topic. A Ph.D. student should expect to complete formal course work by the end of the third year and to take the comprehensive exam soon thereafter. A student failing to pass the comprehensive exam may repeat the examination only once. This examination must be completed within six (6) years of a student being admitted to the program. The Registrar's Office and the Graduate School must be notified in writing by the major advisor and/or the department chair of the results of this examination.

Department of Marine Science Research Tools Requirement (Ph.D. Students)

The Research Tools Requirement for Marine Science doctoral students should be tailored to the specific tools and skills needed by the student for his/her dissertation research and/or future career, and should be significant in nature. The mechanism for determining the nature of the Tools Requirement will involve both the student and the Dissertation Committee. The doctoral student and the dissertation advisor will propose a mechanism for meeting the Research Tools Requirement to the full Dissertation Advisory Committee for their approval. The approved Research Tools proposal will then be submitted to the Department Chair for approval. The Graduate Dean will be notified of the approval of this mechanism and again after the requirement has been satisfied.

Guidelines for the Research Tools Proposal are as follows:

1. Completion of 9 semester hours or the equivalent of formal course work or other training that provide the student with tools or skills that would not ordinarily have been part of the student's graduate curriculum. These hours may be for undergraduate (if appropriate) or graduate courses and will not count toward the minimum degree requirements. Possible courses might include, but would not be limited to, those dealing with scientific ethics, teaching or communication skills for science, remote sensing, software applications, statistics, computer sciences, mathematics, and/or numerical modeling. In some cases, a foreign language may be appropriate. Other training might include short courses or workshops run by commercial vendors, government agencies, USM, or other universities or academic/research institutions. Such training exercises would not be taken for credit, but would be allotted an equivalent amount of semester hour credit, as determined by the student and Advisory Committee, toward the 9 hour Research Tools requirement. The Advisory

Committee may require the student to demonstrate learned skills or to submit a written report summarizing the instruction received in any short or non-credit course with examples of the applied use of learned skills.

2. Students could take some number of semester hours of MAR 791 (Directed Research) to learn material from his/her advisor, another committee member, or another DMS or USM faculty member that would be specific to that individual. This course would provide the student with a specific set of Research Tools that could not be obtained easily through other mechanisms.

3. A student may propose to the Advisor that some credit be allotted for prior work-related experience or previous course work that is directly relevant to the student's dissertation research or career goals. In this case, the student would submit a written proposal to the advisor requesting that some portion of the 9-hour Research Tools requirement be met based on previous work-related experience or course work. As part of this proposal, the student must provide evidence that the experience and course work is relevant to his/her research or career goals, documentation that he/she received a grade of B or better in all suggested courses, and/or documentation as to the student's proficiency in the skills or tools acquired through the previous work-related experience.

The Department of Marine Science feels that it would be most beneficial to Marine Science doctoral students for the Research Tools Requirement to be as broadly-based and flexible as possible and yet provide significant learning opportunities to make our doctoral program graduates better able to succeed in their subsequent endeavors.

Ph.D. Dissertation

Each Ph.D. student will write a scholarly dissertation based on his/her original research. The research topic must be approved by the student's dissertation committee. See also "Graduate School policies for preparing theses and dissertations" for information outlining requirements for dissertation preparation.

A final, oral examination on the dissertation will take place at least four (4) weeks prior to the end of the semester that the student plans to graduate and will consist of two parts. The first part is a seminar on the dissertation research that will be open to the public; the second part will follow immediately and will be a closed, oral examination on the dissertation. At least two (2) weeks prior to the examination the student will present an acceptable copy of the dissertation to the members of the dissertation committee. The entire examination is open to the graduate faculty and is conducted by the dissertation committee and any member of the faculty designated by the graduate dean. The Graduate School must be notified in writing by the major advisor and/or department chair of the results of the final examination.

Application for Degree

The student must file two copies of the Application for Degree, properly stamped by the Business Office, with the Graduate School preceding the semester that the student plans to graduate. This application is filed at the same time or after the Application for Candidacy.

When completed, the student's file in the Graduate Office will contain statements from the major advisor and/or departmental chair verifying the successful completion of the qualifying examination,

appointing the dissertation committee, approving the dissertation prospectus, verifying the successful completion of the comprehensive examination and the final dissertation examination, statements of language proficiency, the Application for Candidacy and the Application for degree.

Thesis/Dissertation Defense

The student must present an acceptable copy of her/his thesis to the thesis committee at least 30 days prior to a public presentation and defense of the thesis. In addition, the graduate school dean must be notified by formal memo from the student's advisor prior to the defense. The defense will consist of an oral presentation of the thesis research followed by a period of questions and discussion open to the public.