

RESEARCH CENTERS AND INSTITUTES



Texas A&M University

Corpus Christi

The Island University

<http://www.tamucc.edu>

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Texas A&M University–Corpus Christi is an urban, comprehensive university located on the South Texas Gulf Coast. The University focuses on the higher education needs of the South Texas region and the state, and on coastal and urban issues. A&M–Corpus Christi offers a wide range of undergraduate degree programs, master’s degree programs responsive to regional needs, and doctoral and professional programs in areas of particular institutional strength. The University also provides continuing education programs that serve the needs of area businesses and professionals.

Undergraduate programs prepare students for productive careers in their chosen fields and provide them with the intellectual, cultural and ethical foundations necessary to contribute effectively and positively to a changing global community. Graduate programs prepare students for leadership roles in the future development of the region and state through formal instruction and through research and other forms of scholarly activity. A&M–Corpus Christi emphasizes research endeavors that focus on solving problems related to South Texas urban and coastal regions.



Texas A&M University–Corpus Christi, the island university, as seen from Hans Suter Park.

A&M–Corpus Christi is committed to the pursuit of excellence in instruction, research and other forms of scholarly activity, and public service. Consistent with this commitment, the University seeks to identify, recruit and retain students who have high potential for academic success, especially those from groups who historically have been under-represented in higher education. To these ends, A&M–Corpus Christi recruits and supports faculty and staff who share its broad purpose and commitment to excellence.

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DIVISION OF NEARSHORE RESEARCH (DNR)

Coastal Monitoring

In 1989 the university began installing a state-of-the-art water-level measurement system along the Texas coast. Following a Texas legislative mandate in 1991, this system became the Texas Coastal Ocean Observation Network (TCOON).

TCOON's more than 40 stations obtain reliable water-level data according to NOS standards, and many also provide other data, e.g., wind speed and direction, and air and water temperature. Data received at the campus via packet radio, cellular telephone, are re-sent by satellite to a real-time online database system. TCOON maintains a bilingual website, where users can query data and view both recent and historical station information.

Data Applications

The primary use of TCOON data is to establish tidal datums for littoral boundary determination. Other uses include:

- Navigational and marine safety
- Channel dredging and maintenance
- Oil-spill response
- Hurricane and storm preparation
- Recreation and benefit to general public

Wave Climate Monitoring and Reporting System

Two data collection platforms located in the Gulf of Mexico near Port Aransas measure wave and environmental parameters. The two platforms serve as prototypes for future platforms planned for the Texas Coast.



Water Level Predictions for Coastal Flooding



Offshore Current Meter

Real Time Navigation System

The DNR Real Time Navigation System (RTNS) gathers and reports environmental data of specific interest to mariners along the central Texas Coast via a voice reporting system to disseminate that data to users.

DNR Harmonic Water Level Forecasting For the Texas Coast

Tidal forecasts are available only for a few stations with harmonic constants (HCs) supplied by the National Ocean Service (NOS). DNR has developed web-based software to generate HCs using NOS's harmonic analysis method and use those HCs to generate tidal forecasts which are used for the Texas Coast.

Water Level Forecasting for the Texas Coast

Two Predictive Models: Artificial Neural Network (ANN) and Persistence Benefits:

- Reliable short-term predictions of effects of storm events
- Effective for regular conditions and frontal passages
- ANN accounts for influence of wind forcing
- More accurate than tide charts
- Web-accessible

Nueces Bay Salinity

The Choke Canyon Reservoir was constructed on the Nueces River in 1985, altering the natural flow of freshwater into Nueces Bay. Realizing the need to manage freshwater inflow to the bay, the City of Corpus Christi funds DNR to monitor salinity and water quality at several locations in the Nueces River and Bay system. This data is used to schedule H₂O release from the watershed. Several area agencies also rely on the data to assist management of the ecology of Nueces Bay.

CENTER FOR COASTAL STUDIES

The Center for Coastal Studies, officially founded in 1984, is an interdisciplinary marine research institute. CCS conducts basic and applied research, ecological monitoring, public education outreach, and graduate-level education and research programs. For over 20 years CCS scientists and students have worked on marine topics from the local area to the farthest reaches of the Gulf of Mexico on Mexico's southeastern coasts. The efforts of this premier institute contribute significantly to our understanding of the marine environments on which much of the quality of our lives is dependent.

Artificial and Natural Reefs

Research of artificial and natural reefs includes trophodynamics of oil/gas platforms, affects of sea urchin populations on fouling communities of oil/gas platforms, monitoring overall "health" of the Flower Garden Banks National Marine Sanctuary, an assessment of the condition of the reefs of Veracruz, Mexico, and a series of studies at the reefs of the Sian Ka'an Biosphere Reserve, Quintana Roo, Mexico.



Dr. Marion Nipper collects sediment samples for Ecotoxicology studies in the coral reef of Mexico.

Coastal Ecology and Management

Coastal ecology and management research includes the use of GIS applications for surveying rookery islands, tidal flat ecology, shorebird and waterfowl ecology, riparian corridor characterizations, invasive species, rocky shores, benthic investigations in freshwater and coastal marshes, deltas, and estuaries, and wetland ecology, restoration, creation, and enhancement.

Ecotoxicology

Research in toxicology includes marine sediment analysis, effects of contaminants and environmental factors on behavior, growth, reproduction and survival of benthic organisms, and culturing test organisms.



Processing sediments from the bottom of Laguna Madre.

Water Quality

Water quality research includes trace metals investigations and analysis, nutrient loading, affects of water quality on benthic organisms, fecal coliform analysis, and stormwater and sewage treatment plant outfalls.

Education and Outreach

With our mission being to preserve and conserve our natural resources through education, we reach out to the public through:

- Center for Coastal Studies Aquatic Education Program
- Texas Marine Mammal Stranding Network
- Coastal Bend Land Trust
- Coastal Bend Bays Foundation
- National Ocean Sciences Bowl
- Cyberways and Waterways
- Public Seminars
- Educational Materials such as signs, pamphlets and other materials



Taking a Core sample from the bottom of Laguna Madre.

CENTER FOR WATER SUPPLY STUDIES

The Center for Water Supply Studies at Texas A&M University - Corpus Christi was organized in 1991 to initiate cross-disciplinary research on water resources and other water related issues in South Texas. The Center focuses on research and education to develop professionals and leaders who can recognize and address water issues. Through active new research the Center provides information needed to evaluate alternative strategies for local and regional management of surface and subsurface water resources.



Conducting ground conductivity survey using an EM31.

Current research at the Center is focused on several topics, artificial neural networks, creating three-dimensional visualization of subsurface freshwater resources, and modeling surface water quality. Artificial neural networks are being adapted to forecast water levels in aquifers and stream flows based on inputs such as previous precipitation and current aquifer water level or stream flow. Visualization of subsurface water quality and quantity is being developed in a geographic information system using geophysical data and based on a procedure developed by the Texas Commission on Environmental Quality Surface Casing Division. A non-point source loading model is being developed to help manage and understand high bacteria concentrations in a small watershed draining to Oso and Corpus Christi Bay.



Installing ground water test wells

Past projects include the development of regional numerical groundwater models for the Gulf Coast aquifer, review of a three-dimensional flow model of the Carrizo-Wilcox Aquifer, and subsurface contaminant investigation using geophysical techniques. The regional numerical flow model project was used to generate smaller models within the area of the regional model for specific applications such as Aquifer Storage and Recovery (ASR), the development of well fields, and the simulation of increased water demands on the regional system. The Carrizo-Wilcox aquifer model review revolved around the evaluation of aquifer recharge calculation methods and simulation of additional stress to the aquifer. Geophysical techniques (ground conductivity soundings) were used to map likely areas of contamination on abandoned oil and gas exploration and production sites. Additional groundwater flow modeling has been completed on local barrier islands.

The Center is currently seeking funding for several new projects concerning a desalination test facility, coastal water resource issues, and other groundwater related subsurface investigations. Saltwater intrusion on groundwater resources is a coastal concern that becomes an issue with increasing water demands on coastal aquifers and as canal construction intersects the fresh water table aquifer. These concerns address both deep and groundwater exploration using magneto-telluric geophysical techniques to better define available water resources and to locate and monitor both shallow and deep saltwater intrusion. Other water resource issues are groundwater loss through phreatophytes and groundwater surface water interactions.



Gauging flow in Oso Creek

COMMUNITY OUTREACH

The Office of Community Outreach builds successful community-University partnerships and programs serving a diverse group of citizens and organizations. Outreach staff also participate in a number of community and economic development activities. Recent accomplishments include the coordination of 29 summer camps for children aged 3-17 during summer, 2003 serving over 2,000 kids. In addition, Community Outreach received \$750,000 from Office of Minority Health for an after-school and summer program for at-risk middle schoolers. It hosted a national conference on workshop development issues, and the launching of GO Centers at Moody and West Oso High School. It assisted the City of Corpus Christi to win the All American City award through its work to promote clean air. Other activities included the design and set up of portable bilge pump-out stations in smaller communities, and the procurement of \$250,000 for a vehicle emission program.



All of the 2005 MathCounts participants and their coaches.

Business Assistance

Business and economic development programs including customized training, executive development, continuing education, workshops, seminars, conferences, and consulting services

Environmental Outreach

Environmental education, technical assistance, and activities for businesses, educators, children and individuals to improve Corpus Christi environment and keep it as the only industrialized U.S. city meeting EPA standards

Family Life Center

Year-round leadership program targeted at enhancing the development of at-risk students



Professor Phillippe Tissot showing the fun sides of science during a West Oso campus visit at the NRC.

Professional Development/Continuing Education: Continuing Education (CEU) credits for professional development activities, including meetings, conferences, workshops, and others

Educator Training: Educator training for teachers, counselors, and other district staff in all disciplines including career counseling, environmental education, and leadership/management skills

Events-Facilities Use: On-campus event coordination for use of auditoriums, conference rooms, classrooms, recreational facilities, videoconferencing facilities, satellite transmissions, and computer labs

Non-Profit Partnerships: Collaboration and grant-writing assistance; locating volunteers and staff/faculty expertise to serve the needs of non-profit organizations

Youth Programs: Programs for children ages 7-18 interested in topics from writing to sports to environmental education



Customized training programs enhance local workforce skills.



Photography student working with foster children as part of a service-learning project

THE NATIONAL SPILL CONTROL SCHOOL

With nearly thirty years of experience, the National Spill Control School (NSCS) at Texas A&M University-Corpus Christi has earned an excellent reputation for its training and spill planning programs. The School began oil spill training in 1977, developed hazmat/hazwaste classes in 1980 and added OSHA Hazwoper in 1989. The National Spill Control School gained national recognition when it was written into the Oil Pollution Act of 1990 as a training and research resource for the National Response Team. In 1998, the School was recognized by the state of Texas for its Leadership in Protecting the Environmental Quality of Texas Coastal Waters.

The school has an excellent reputation for providing training in emergency response and clean up of oil and hazardous chemical spills with many repeat clients and with recognition from both federal and state agencies.

Although involved in many endeavors, the School's primary activity is to provide up-to-date oil and hazardous materials/wastes spill prevention, response and safety training. Our students come from a wide variety of backgrounds including full time college students, state and federal environmental regulatory agencies, military, hazmat teams, oil spill responders, industrial and municipal personnel and many others from across the nation and around the world.

Due to the requirements for spill response exercises evolving out of the Oil Pollution Act of 1990, various state laws and international regulations, the School is actively involved in developing response plans and designing and conducting on-site spill response exercises for a number of organizations throughout the country. Since 2001, we have incorporated GPS, GIS and digital imagery into our Spill Management Team and Response drills and exercises.



Level A Hazmat response exercise near Oso Bay

Community Involvement

In our local community, NSCS is represented on the Local Emergency Planning Committee, and the South Texas Coastal Zone Area Committee for oil spill prevention and response planning. NSCS is also actively involved in the public schools and other community activities.

Education

National Spill Control School staff also provide teaching and research opportunities in the University's Environmental Science degree programs. Courses developed include Environmental Regulations, Oil Spill Management, Chemistry of Hazardous Materials, Hazardous Waste Operations and Emergency Response, and Environmental Assessment.

Comprehensive Response Action Plan for Oil Spills

A Comprehensive Response Action Plan for Oil Spills was developed for the Port of Corpus Christi, Texas. It included identification of staging areas, resources at risk, and a booming and recovery scheme based on dominant wind and current patterns in the Port. The school assisted U.S. EPA Region VI in the development of an Integrated Electronic contingency plan now available through the Region VI website.



"Booming the Niña" in the Corpus Christi Marina

C.E.D.E.R.

The Center for Educational Development Evaluation and Research (CEDER) for the College of Education at Texas A&M University - Corpus Christi facilitates and coordinates grants, research, publications, symposia, new initiatives and evaluations for other educational agencies. CEDER is governed by a board comprised of representatives of all the departments in the College of Education.

Research

In 2002, CEDER completed a contracted project for the Texas A&M System entitled a "Survey of Texas Citizens Attitudes on Teaching as a Profession." This study replicated a national survey of citizens conducted by the Harris Poll organization. This project along with a variety of topical projects include studies for the development of improving adult literacy.



Dr. Salas and a College of Education student work with students in the Early Childhood Development Center as part of her study *Write On! An After-School Writing Tutorial Program*



Dr. Lon Seiger and Dr. Debbie Kanipe conduct their study *Rhythm-Based Wellness: The Effects of Drumming on Stress* with students at the Early Childhood Development Center.



Dr. Tomas Linton oversees the Harris Poll Survey phone bank.

Publications

In 2002, a 234 page yearbook was published describing the research and program development that had been done at the Early Childhood Development Center. It is a model laboratory school for children age three through grade three located on the Texas A&M - Corpus Christi campus. Two other yearbooks have since been published, *Developing Vocabulary in Young Children* and *No Student Left Behind*.

Symposia

CEDER annually hosts a conference covering a variety of topics important to educators.

New Initiatives

Under the aegis several courses in the Educational Leadership Doctoral program were made available on line and evaluated.

Evaluations

In 2002, CEDER completed a \$ 96,600 evaluation project for an Academics 2000 grant. CEDER is routinely designated as the evaluation agency on projects for both internal and external entities. In 2006 a major evaluation project was completed for the Coastal Bend Bays and Estuaries foundation.

THE SOCIAL SCIENCE RESEARCH CENTER

VISION

The vision of the SSRC is to be a regionally and nationally recognized research, planning, and education resource center. The SSRC will be interdisciplinary, engaging faculty, staff, students and community partners in research that serves the intellectual, cultural, social, environmental, and economic needs of the region. The services of the SSRC will enhance and provide momentum to the mission of the College of Arts and Humanities and the University as a whole.

MISSION

The mission of the SSRC is to provide the highest quality services supportive of excellence in research to the University and community. The SSRC serves as a primary resource available to the University and community for the conduct of all forms of research.

GOALS

To accomplish its mission the SSRC will:

- design its research services to foster integration of research, teaching, and service activities of the University,
- encourage disciplinary specific and interdisciplinary research efforts that engage faculty with faculty, staff, students, and community partners;
- facilitate and promote information exchange within the University community and between the University and its many constituencies,
- develop new services and seek new resources to maintain an excellent quality of support to University researchers as the nature of research at the institution evolves,
- encourage innovative research efforts,
- provide students with well supervised research assistantships and internships that contribute meaningfully to the student's education and effectively accomplish research tasks, and
- develop and offer continuing education classes, research forums, workshops, and conferences to develop research, planning, decision-making, and management skills in the region.

The Social Science Research Center (SSRC) performs survey research and secondary data analysis in a variety of areas.

Public Opinion Polls

citizen/customer satisfaction and needs
public service provisions and needs

Social Issues

crime and juvenile delinquency
family management, family conflict and family violence

Education/Service Issues

economic/market conditions
labor market, workforce, employer, and occupation characteristics
educational attainment and school district/student characteristics

Environmental Issues

beach utilization
beach re-nourishment

Transportation Issues

transportation services
motor vehicle driver attitudes and behaviors
motor vehicle occupant protection device use

Other areas of research include government and non-profit service availability, housing availability, causes of traumatic injury and death, population characteristics, and program evaluation of social services.



Dr. Philip Rhoades and Dr. Jo Marie Rios with several SSRC Graduate Assistants.

CENTER FOR BIOACOUSTICS

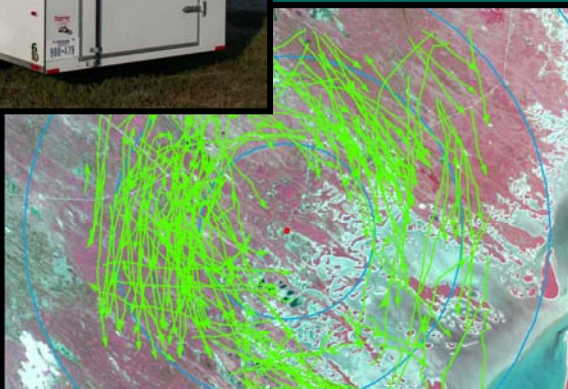
The Center for Bioacoustics shares a dedication to the development and dissemination of knowledge in many fields. The Center aspires to preeminence in education, research and service through the science and technology of bioacoustics.

In support of this mission, the Center carries on an active research program, develops and offers continuing education and outreach programs, and acts as a scientific and community resource for issues involving sound in the natural environment. Additionally, the Center provides a service by maintaining a growing and accessible systematic collection of digital audio recordings of natural and human-made sounds. The Center's collection is available to researchers throughout the world.

Past research projects include studies of the effects of highway noise on endangered species, sonar systems of Amazon River dolphins, and the evaluation of industrial noise in the Gulf of Mexico. Recently, the Center's activities have expanded to radar and acoustic studies of the effects of wind farm development on migratory birds and the characterization of underwater background noise at harbors and ports.



Radar Avian Trailer



A Radar Display of over 3 hours of bird Targets using the Avian Radar Trailer

THE CENTER FOR INFORMATION ASSURANCE, STATISTICS, AND QUALITY CONTROL

The Center for Information Assurance, Statistics, and Quality Control (CIASQC) is a comprehensive center of university experts working together with community leaders to meet the ever-increasing demands for secured information environments and improved quality of education, government, health care and business. The mission of CIASQC is to become the primary South Texas and Gulf of Mexico resource of information assurance, modeling, statistical and quality improvement services, and software engineering for the education, government, health care, and private sectors.

The National Security Agency (NSA) has issued a call for more qualified faculty and students in the area of information assurance and information security. It is estimated that thousands of trained information assurance professionals are required to satisfy a growing national demand in both government and private sectors. The Center will increase research and consulting work in information assurance in order to meet the needs of South Texas and Gulf of Mexico organizations.



Dr. Alex Sadovski and Dr. Dulal Kar

CONRAD BLUCHER INSTITUTE FOR SURVEYING AND SCIENCE

The Conrad Blucher Institute for Surveying and Science (CBI) was established in 1987 by a private endowment from the Conrad Blucher family. The Institute encourages scientific research and education, with a special emphasis on surveying via the Geographic Information Science Program in the College of Science & Technology. The CBI conducts innovative research and encourages scientists and professional engineers to develop and apply technology solutions relevant to surveying, scientific measurements, and to the issues in the Gulf of Mexico region.



The Conrad Blucher Institute for Surveying and Science Building at the Texas A&M University-Corpus Christi Campus

DIVISIONS OF THE BLUCHER INSTITUTE

1. Division of Nearshore Research (DNR) Director, Dr. Gary Jeffress

The DNR measures and predicts coastal and ocean phenomena, works to ensure safe navigation, and serves the Texas public in many other ways:

- Protecting Texas Submerged Resources
- Understanding Water Level Change and Variability
- Fulfilling Weather and Water Information Needs
- Supporting Commerce and Transportation

2. Texas Height Modernization

The Texas Height Modernization program, located in the Harte Research Center, was established by a Federal Grant in the amount of \$665,318 first year funding. The Height Modernization project will conduct leveling between the extensometers in Houston, TX to the Louisiana border. It will also provide height determination in the NAVD 88 system for Continuously Operating Reference Stations in Texas. Among other directives is to perform high accuracy surveys of road profiles in support of Texas Hurricane Evacuations Routes. The Texas Spatial Reference Center will be established through this program.

3. Academic Geographic Information Science Program

Academic instruction will lead to a professional career through our Geographic Information Science (GIS) Program. In addition to the instruction we have extensive programs of research for our students. Our program is nationally recognized as the top program in the country.



Surveying Beach Profiles

HARTE RESEARCH INSTITUTE (HRI)

The Harte Research Institute (HRI) for Gulf of Mexico Studies is a newly endowed and developing institute at Texas A&M University-Corpus Christi. Its mission is to support and advance the long-term sustainable use and conservation of the Gulf of Mexico. HRI will encourage a tri-national responsibility and approach to understanding the Gulf of Mexico ecosystem, including the United States, Mexico, and Cuba, and it will promote excellence and innovation in interdisciplinary scientific research, public policy initiatives, and education of the public. Cooperation and collaboration with Gulf and tri-national partners will be a hallmark of HRI activity. A \$46 million endowment was given by Mr. Edward H. Harte, and the State of Texas provided an additional \$18 million to build a facility to house HRI. Several projects already underway include Veracruz and Florida reef studies; biodiversity of the Gulf of Mexico; Gulf of Mexico GIS; and, GulfBase, a Gulfwide research database website.

GulfBase

GulfBase is one of many projects supported by the Harte Research Institute. One of the main goals of the HRI is to promote and support research focused on the long-term sustainable use and conservation of the Gulf of Mexico, a task requiring knowledge of current available resources (infrastructure and human) including our neighbors and colleagues from the USA, Mexico and Cuba. Visit GulfBase at www.gulfbase.org.

State of the Gulf Symposium

HRI will sponsor a symposium on the State of the Gulf of Mexico every three to five years. This conference will engage scientists, natural resource managers, policy makers, businesses and industry, military, and all other stakeholders, as well as the general public, interested in the long-term sustainable use and conservation of the Gulf of Mexico.



Harte Research Institute Building at Texas A&M University-Corpus Christi

Exploration of the Gulf of Mexico

HRI will attempt to partner with other interested entities each year to sponsor exploratory expeditions into and around the Gulf of Mexico.

Biodiversity of the Gulf of Mexico

HRI will lead an initiative to determine the total biodiversity of the Gulf of Mexico. This multi-year project will engage scientists from the United States, Mexico, and Cuba, and it will include abundance, distribution, and habitat of each species in a relational database. This on-line searchable database will be accessible and usable by anyone.

Gulf of Mexico GIS

HRI will lead an initiative to develop a Geographic Information System for use by all entities interested in the long-term sustainable use and conservation of the Gulf of Mexico.



Dr. Robert Furgason explains how to operate the mini-submersible "DeepWorker" to a crowd of bystanders during the "Veracruz Reefs Expedition" kickoff.



Mexican Navy Oceanographic Institute research vessel "Antares." submerses the "DeepWorker" mini-submersible.