UNIVERSITY OF HOUSTON SYSTEM








2011 CONGRESSIONAL BRIEFING:
UNIVERSITY PROFILES, INITIATIVES AND FEDERAL POLICY ISSUES


UNIVERSITY OF HOUSTON
IN TIME
System



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2011 CONGRESSIONAL BRIEFING

INTRODUCTION 2

FEDERAL POLICY ISSUES OF IMPORTANCE TO THE UH SYSTEM 4

UH SYSTEM INITIATIVES

Executive Summary of UH System Initiatives 5

University of Houston Energy Initiatives

Energy Research Park 7

Texas Center for Superconductivity Applied Research Hub 8

Institute for NanoEnergy 9

Program for Space and Defense Nano-Photovoltaics 9

Texas Diesel Testing and Research Program 10

Mission-Oriented Seismic Research Program 11

Smart Grid Energy Training Coalition 11

Consortium for Advanced Grid Materials at the Texas Center for Superconductivity 12

UH Health Programs and Initiatives

UH Center for Nuclear Receptors and Cell Signaling 13

Department of Health and Human Performance 13

Health and Biomedical Sciences Center 14

Virtual Reality Clinical Research Lab at the Graduate College of Social Work 14

Vision Research and Rehabilitation Associated with Traumatic Brain Injury 15

University of Houston Transportation Initiative

Multimodal Transportation Centers 16

University of Houston-Clear Lake

Center for Autism and Developmental Disabilities 17

Environmental Institute of Houston 17

UHCL Pearland Campus 17

University of Houston-Downtown

High Impact Educational Experiences 18

UH-Downtown Scholars Academy 18

University of Houston-Victoria

Forensic DNA Testing Laboratory 19

Centro Victoria: Mexican-American, Literature and Culture Curriculum 19

Nurse Educator Program 19

UNIVERSITY OF HOUSTON SYSTEM PROFILE 20



INTRODUCTION

The past two decades have been a time of profound change for the Houston metropolitan area. Our population has grown by more than one million people and in the next five years is projected to reach 6.5 million. We have also witnessed a remarkable shift in the economy toward one increasingly driven by the creation and exchange of new knowledge, where higher levels of critical thinking skills and educational attainment are paramount to successful participation in the workforce.

With the Houston metropolitan area representing 24 percent of the state's population and 33 percent of its economy, the future of Texas is dependent upon how well we educate the increasingly diverse and growing population in our region. As the only comprehensive university system in the region, the four UH System universities are inextricably linked to the success of Houston and the Gulf Coast area as the primary providers of educational and cultural opportunities, skilled employees and leaders, and innovative research.
The UH System includes:

- **University of Houston** – The largest university in Houston and the third largest in the state, UH is a nationally recognized doctoral degree-granting, comprehensive research university.
- **University of Houston-Clear Lake** – Located near the NASA Johnson Space Center, UH-Clear Lake is an upper level and master's institution situated in the heart of Clear Lake's high-technology community.
- **University of Houston-Downtown** – The second largest university in Houston and the most ethnically diverse university in the state, UHD is a four-year, primarily undergraduate institution that is now expanding its portfolio of graduate programs.
- **University of Houston-Victoria** – Located in the Coastal Bend region of Texas, UHV is an undergraduate and master's university that enrolled its first freshman class this fall and has one of the most dynamic online educational programs in the state.



In addition to its universities, the UH System includes five off-campus teaching centers in Sugar Land, Katy, Pearland, Northwest Houston, and the Texas Medical Center, as well as Houston's public radio and television stations (KUHF/KUHC-Houston Public Radio and KUHT/Channel 8-Houston Public Television).

Over the past several years growth at the UH System has been dramatic. This fall, each of the universities posted record high enrollments, and the University of Houston (and the system as a whole) posted record highs for research. Total enrollment at the UH System was 63,846 this fall, while total research awards last year were $124 million. By 2015, the UH System forecasts enrollment to exceed 72,000 and research to exceed $150 million.

To plan for this growth, the UH System Chancellor and Board of Regents embarked on a strategic planning process in early 2008. To date a new strategic framework for the system has been established that includes new goals and operating principles, new mission statements, annual progress cards, and four system-wide initiatives in the areas of health, global outreach, and student and faculty pathways. The next phase of this planning process includes the development of academic and campus master plans that chart a course for meeting our enrollment and research targets.

The UH System's over-arching vision is to become one of the nation's finest metropolitan university systems, with a Tier One research university at its center. Support from the federal government is essential to achieving this vision, as it has been in the progress made to date. Last year, the UHS universities received $89 million in federally funded research awards, $172 million in federal student aid, and $4 million in congressionally directed funding for important research and public service programs. The UH System's growth in both enrollment and research over the past several years would not have been possible without these resources.

Looking to the future, the UH System realizes that the federal government is facing enormous financial challenges that will be difficult to address in the coming years. Nevertheless, the UH System believes that continued investment in higher education is critical to maintaining the nation's global leadership in science and technology, the quality of its workforce, and its economic competitiveness. On the following pages are federal policy issues of importance to the UH System, profiles of the UHS universities and their recent accomplishments and some of the major initiatives they are undertaking to achieve their goals of excellence and maintain the nation's preeminence in higher education. The UH System recognizes that congressionally directed funding will not be available next year. Even so, we look forward to working with the Texas congressional delegation and the federal agencies to identify ways of moving these initiatives forward where there is an appropriate federal role.



FEDERAL POLICY ISSUES OF IMPORTANCE TO THE UH SYSTEM

The UH System encourages the federal government to maintain and increase (if possible) funding for the following:

Student Financial Aid

Federal funding for student financial aid, in particular Pell Grants and Perkins Loans, is essential to making a college education accessible and affordable for students across the nation. Approximately 30 percent of UH System students receive a Pell Grant.

Research Agencies

The federal research agencies are the foundation through which new knowledge is created at U.S. universities. Support for the National Institutes of Health, National Science Foundation, Department of Defense (basic and applied research programs), NASA, and the Department of Energy Office of Science are especially important for the University of Houston, since their programs align with institutional research strengths. In addition, the UH System supports the reauthorization of the America COMPETES Act, which continues the goal of doubling funding for research in the physical sciences through the NSF and DOE.

Hispanic Serving Institutions

Funding for National Science Foundation and Department of Education programs directed to Hispanic Serving Institutions enables universities to address the needs of the growing number of Hispanic students in American higher education. Currently, UH-Clear Lake and UH-Downtown have been designated as HSIs, while both UH and UH-Victoria will likely receive this designation in the coming years.

UH SYSTEM INITIATIVES



Executive Summary of UH System Initiatives

Achieving its goal of becoming one of the finest systems of metropolitan universities in the nation will require the UH System universities to pursue bold initiatives that broaden and enhance the way they educate students and serve their communities, and that place them at the forefront of research and scholarship in their respective areas of strength. This is especially true for the University of Houston, as it continues to build its growing reputation as a nationally recognized Tier One research institution. Below are summaries of the UH System universities' major initiatives – already in progress or ready to launch – that will distinguish them from their peers both in Texas and nationwide.

University of Houston Energy Initiatives

Located in the center of the world's energy industry, the University of Houston has built partnerships with international energy companies and developed research programs that focus not only on oil and gas, but on electricity, alternative energy sources, conservation and air quality.

- **Energy Research Park** – A large office complex one mile from campus that UH is transforming into the nexus of energy-related research, educational, and economic development activities at the university.
- **Texas Center for Superconductivity Applied Research Hub** – Using superconducting materials to potentially revolutionize electrical transmission and generators – particularly in the wind industry – and develop new photovoltaics, thermo-electrics and solid state lighting.
- **Institute for NanoEnergy** – Partnering with the Naval Research Laboratory to develop pilot turbines, battery systems and solar cells from renewable energy power sources for Naval field operations.
- **Program for Space and Defense Nano-Photovoltaics** – Developing solar cells and nano-materials for use in U.S. space and defense operations (e.g., satellite communications, International Space Station, exploration of the moon and Mars).
- **Texas Diesel Testing and Research Center** – Researching, developing, and testing technologies focused on clean diesel and alternative fuels.
- **Mission-Oriented Seismic Research Program** – Developing new seismic direct imaging methods that improve oil drilling success rates, while providing for hazard avoidance (e.g., well blow-outs).
- **Smart Grid Energy Training Coalition** – Developing smart grid workforce training programs to prepare the next generation of workers in the electric power industry, as well as training programs for other network-centric industries (e.g., health care, port operations).
- **Consortium for Advanced Grid Materials at the Texas Center for Superconductivity** – Conducting applied research on early-stage superconducting technologies in order to create an essential link between user-inspired basic science and private sector commercialization.

UH Health Programs and Initiatives

Partnering with institutions in the Texas Medical Center, the University of Houston is developing nationally recognized research programs in the biomedical sciences and engineering. Areas of expertise include biomaterials, bio-imaging, and drug design.

- **UH Center for Nuclear Receptors and Cell Signaling** – Developing new estrogen-based drugs for hormone replacement therapy in women that don't cause cancer and that can be used to treat prostate-related conditions in men.
- **Department of Health and Human Performance** – Conducting a wide variety of human performance testing and research in support of the U.S. space program and other health-related endeavors.
- **Health and Biomedical Sciences Building** – Providing critical research, patient-care and animal-care facilities for the university's programs in the health sciences.
- **Virtual Reality Clinical Research Lab at the Graduate College of Social Work** – Addressing the mental health and social services needs of veterans suffering from post traumatic stress disorder (PTSD) and their families.
- **Vision Research and Rehabilitation Associated with Traumatic Brain Injury** – Addressing the vision loss suffered by Iraq and Afghanistan veterans (and others) as a result of traumatic brain injury.

University of Houston Transportation Initiative

- **Multimodal Transportation Centers** – Seeking federal support for three transportation centers near the UH campus that would connect into Houston's developing light rail lines and enhance community and student access to the university.

University of Houston-Clear Lake

- **Center for Autism and Developmental Disabilities** – Addressing the increased demand for direct services, professional training and research related to persons with autism and other developmental disabilities.
- **Environmental Institute of Houston** – Conducting research in pollution prevention, natural resource conservation, environmental public policy, and social/cultural issues related to the environment.
- **UHCL Pearland Campus** – Providing access to high-demand undergraduate and graduate programs in the rapidly growing Pearland community at a brand new campus.

University of Houston-Downtown

- **High Impact Educational Experiences** – Creating high-impact educational experiences where students work closely with faculty in research, outreach, and scholarly pursuits in order to improve student learning, retention and graduation.
- **UH-Downtown Scholars Academy** – Increasing the number of academically capable undergraduate students earning degrees in STEM fields and thereafter pursuing graduate and professional education.

University of Houston-Victoria

- **Forensic DNA Testing Laboratory** – Conducting DNA testing of criminal evidence for regional and state crime labs, as well as diagnosing genetic ailments.
- **Centro Victoria: Mexican-American, Literature and Culture Curriculum** – Improving the language skills and academic success of Hispanic students through a curriculum that emphasizes their cultural heritage.
- **Nurse Educator Program** – Increasing the number of faculty members in nursing in order to address the shortage of trained, practicing nurses.

UNIVERSITY OF HOUSTON

Overview

Founded in 1927 and led by President Renu Khator, the University of Houston is the leading public research university in Houston and the third largest university in Texas. This year UH will educate almost 39,000 students in nearly 300 undergraduate and graduate academic programs – both on campus and online. UH awards more than 7,000 degrees annually and has more than 250,000 alumni. The student body at UH ranks second in the nation among research universities for its ethnic diversity.

With $115 million in annual sponsored research awards and $90 million in sponsored research expenditures, UH is advancing its position as the third nationally recognized public Tier One university in Texas. Recently, the Carnegie Foundation for the Advancement of Teaching ranked UH among the top tier of universities nationally based on research activity – evidence that UH is well on its way to achieving its vision. Continuing this progress will require UH to make the investments in faculty and infrastructure needed to achieve its five-year research goal of $150 million. Rather than investing broadly, UH is allocating resources to specific research areas where the university is best positioned to succeed, hiring faculty in those areas only at the very highest levels of achievement, and developing research facilities to be shared by multiple groups of faculty with related interests. The university's top areas for research investment are energy and the health sciences, both of which represent areas of existing strength, are critical to the regional and state economy, and are imperative to the continued prosperity of the United States.

UH Energy Programs and Initiatives

UH Energy is a constellation of researchers, industry leaders and students whose innovative work is supported by a solid foundation of more than 15 institutes and centers involved in energy-related activities. Major areas of focus include renewables and alternatives, conservation and sustainability, subsurface resources, and energy management and policy. Key initiatives include:

Energy Research Park

To provide the facilities, equipment and other infrastructure needed by its energy programs, the University of Houston has purchased a large office complex (15 buildings on 69 acres once owned by the Schlumberger Corporation) one mile from campus and is transforming it into the UH Energy Research Park (ERP). The ERP is the centerpiece of UH's drive to become the world's premier energy university, and once completed will be the nexus of energy-related activities on campus. Major research programs located at the park include the National Wind Energy Center, the Texas Center for Superconductivity Applied Research Hub, and the Diesel Testing and Research Center. The university's energy workforce development program – the Smart Grid Energy Training Coalition – is also located at the ERP, as are corporate partners SuperPower, Inc. and the Power Technology Institute.

Future Direction and Needs

Over the next several years, the University of Houston will continue to transform the Energy Research Park's 580,000 square feet of office, warehouse and light manufacturing space into research labs, instructional space, and offices for UH energy programs and their partners. Renovations are being funded through a combination of federal, state, private and institutional resources. Progress to date has been incremental and will continue to be so depending on the availability of resources, more of which are needed if the university is to fully realize its vision for the park.

Texas Center for Superconductivity Applied Research Hub

The Texas Center for Superconductivity Applied Research Hub (TcSUH-ARH) was created in 2010 through a $3.5 million competitive grant from the state of Texas to support the work of UH Professor Venkat Selvamanickam and his corporate partner, SuperPower, Inc., in the development and commercialization of high-temperature superconducting (HTS) materials – that is, materials that conduct electricity with no resistance at liquid nitrogen temperatures. Of greatest importance, the Applied Research Hub has developed superconducting wires that have the potential to revolutionize the generation and transmission of electricity across the nation's power grid. To that end, the hub is currently participating in two large-scale, federally funded projects: (1) a $21.2 million DOE project to test an HTS fault current limiting transformer installed in the power grid of Southern California Edison and (2) a $4.2 million ARPA-E project to demonstrate an HTS magnetic energy storage device specific to the renewable energy industry. The Applied Research Hub and SuperPower are also exploring with the petroleum and wind energy industries the development of superconducting generators that produce 50% more power at less than half the weight and size of their conventional counterparts.

Future Direction and Needs:

Looking to the future, the Applied Research Hub and SuperPower are seeking federal funding to apply their HTS technology in two key projects (description follows) – one involving wind-based electricity transmission and generation, the other involving photovoltaics.

- **Offshore Wind Demonstration Project** – If wind is to become a truly effective and widely available energy resource, two major challenges that must be addressed are electrical transmission and efficient generators. Today, the lack of transmission capacity to move wind energy to large population centers, coupled with current size and power limitations of turbines, will hamper the nation's ability to achieve its wind power generation goals. To address this issue, $3 million in congressionally directed funding was included in the FY11 Energy and Water Appropriations Bill to investigate the effectiveness of using HTS wires in the transmission and generation of offshore wind-based electricity. Since these resources were not appropriated, the Applied Research Hub and its partners within the Wind Alliance intend to pursue competitive funding through the DOE's Offshore Wind Program. $5 million from the state of Texas is also being pursued as a match for federal awards made to Wind Alliance members for offshore wind projects.
- **HTS Photovoltaics Project** – Utilizing the foundational technology for HTS wires, the Applied Research Hub has also begun developing semiconductor energy applications such as photovoltaics, thermo-electrics and solid state lighting. For example, the epitaxial films placed on flexible, inexpensive substrates that the Applied Research Hub has successfully used for HTS wires are now being used to develop high-efficiency, low-cost solar cells. This technology directly supports the goals for photovoltaics articulated by ARPA-E and the DOE's Office of Energy Efficiency and Renewable Energy (EERE), where $7 million is to be requested from DOE's solar program to extend this transformational research. The University of Houston is also investing $3 million to renovate and equip a 13,000 square-foot laboratory at the Energy Research Park to support this line of research.

Institute for NanoEnergy

The United States Navy has been tasked, in alignment with other federal agencies, to reduce its energy consumption using traditional methods and generate 25% of all energy by 2025 from renewable resources. Currently, the UH Institute for NanoEnergy, in partnership with the Naval Research Laboratory (NRL), is developing the following renewable energy technologies for use by the U.S. Navy:

- Small test blades for pilot turbines that are capable of rapid assembly and deployment
- Lightweight battery systems for field operations
- Lightweight plastic solar cells for deployment in desert and humid environments

Each of these technologies is being developed with the intent that they can be hand-carried into operational regions and deployed immediately, irrespective of environmental conditions. Doing so fits within the Future Naval Capabilities goal of producing "technology to enhance the future naval war fighter's ability to execute expeditionary maneuver warfare and the Global War on Terrorism with special emphasis on naval ground force capability enhancements." This program is currently funded through a $1.6 million congressionally directed grant from the Department of Defense (*Carbon Composite Thin Films for Power Generation and Energy Storage in Military and Civilian Settings*, RDT&E, Navy, PE-0602123N, Line 5).

Future Direction and Needs

Since the program's inception, technology development has moved from initial conceptual phases to forming and demonstrating active devices. Increased funding is needed as the Institute for NanoEnergy looks to make these devices into production ready systems – moving them from academia to manufacturing and consequently completing the mission of this program. During the FY11 appropriations process, $800,000 in congressionally directed funding was included in the Defense Appropriations Bill. Without this funding, the University of Houston and its partners at the Naval Research Lab must identify another funding source to complete work on this program.

Program for Space and Defense Nano-Photovoltaics

The expansion of man's role in space – in the enhancement of satellite-based communications infrastructure, the productive utilization of the International Space Station (ISS), and the exploration of the moon and Mars – has brought with it the urgent need for new sources of electrical power. In particular, next generation solar cells will require photovoltaic materials that are lighter in weight, more robust, and provide significantly better energy conversion. Building on its relationship with NASA and the Department of Defense, the Program for Space and Defense Nano-Photovoltaics, based at the University of Houston's Center for Advanced Materials, will advance the nation's capability in high efficiency energy generation and utilization for both space and terrestrial environments through the development of nano-structured thin-film solar cells. Specifically, the program will focus on the development of the following interrelated and potentially game-changing technologies:

- Low mass, high power density solar cells for use in space
- Radiation tolerant space solar cells
- Nano-materials developed in the ultra-vacuum of space
- Thin film solar cell materials developed on the International Space Station
- High efficiency nano-structured solar cells for space and terrestrial application

Future Direction and Needs

Planning for the Program for Space and Defense Nano-Photovoltaics has already taken place, and the partnerships needed to implement the program have already been established (with the NASA Johnson Space Center, NASA Glenn Research Center, Air Force Research Lab and Naval Research Lab). What remains is the identification of a funding source to launch the program. $2 million was included in the FY11 Defense Appropriations Bill (Program for Space and Defense Nano-Photovoltaics, RDT&E, Navy, Power Projection Applied Research, PE- 0602114N-1319N, Line 4). Absent this appropriation, the University of Houston will work with the Department of Defense and NASA to determine other ways of moving forward with the program.

Texas Diesel Testing and Research Center

The Texas Diesel Testing and Research Center (TDTRC) researches, develops, and tests technologies focused on clean diesel and alternative fuels. The center has capabilities spanning bench scale development of emerging technologies to full scale testing of diesel vehicles. The main focus of the testing activities is on retrofit technologies to decrease NOx and particulate matter emissions from vehicles and equipment. Research activities focus on advanced catalytic after-treatment technologies, synthetic fuels and additives, and biofuels in terms of emissions, fuel economy and sustainability. Since its expansion in 2008 and 2009, the center has focused on promoting its capabilities to industry and government agencies with the overall objective of sustaining a high level of funded activity.

The TDTRC is carrying out several new projects funded in the past year. These include four projects totaling $4.3 million from the Environmental Protection Agency focused on the demonstration and testing of near commercial-ready diesel emissions retrofit technologies. The center is also conducting basic research on new diesel emissions after-treatment technologies with two grants from the Department of Energy totaling $3 million and a recent grant from the National Science Foundation for $400,000. Additional projects funded and in progress include research on the conversion of algae to liquid fuels and the catalytic conversion of natural gas to higher hydrocarbons. Looking forward, the center is negotiating with several international companies to fund both testing and research activities in the areas of clean diesel and clean fuels.

Future Direction and Needs

The expansion in scope to both natural gas and bio-based fuels is intended to leverage the center's expertise in catalytic reaction engineering research and testing. This is a strategic move, encouraged by the UH Energy Advisory Board, that is intended to accelerate the use of domestic natural gas as a transportation fuel to supplant imported petroleum. As part of its intended expansion into testing of natural gas vehicles, the center plans to seek approximately $15 million in external funding, which would approximate a similar investment previously made by the Texas Commission on Environmental Quality that provided the center with its full range of diesel testing capability. In addition, the center is seeking an additional $2 million to seed sustainable annual funding of an equal amount for research, development and testing of clean fuels synthesis and conversion, as well as advanced power-train and emission after-treatment technologies for local, state, and federal governments and the fuels, engine and after-treatment industries.

Mission-Oriented Seismic Research Program

In the ultra-deep waters of the Gulf of Mexico there are particularly daunting technical and environmental challenges that require significant improvements in technology to achieve safe, cost-effective and environmentally friendly production of petroleum reserves. Whereas in less costly and challenging areas ten wells were standard and acceptable for field development, today in the Gulf's ultra-deep waters three wells are expected to deliver the same type of production. Only one in nine attempts to drill in this environment successfully reach the target and can be considered drilling successes, with one in four attempts terminated due to potential "blow-out" conditions. While blow-out preventers have been used successfully in shallower waters, recent events in the Gulf of Mexico point to the need for additional technology that provides for avoidance of hazards, such as high pressure gas pockets during the drilling of these wells. Also, at $150-200 million per exploration well, the one in nine success rate is economically unsustainable.

The University of Houston's Mission-Oriented Seismic Research Program (M-OSRP) has developed an entirely new direct imaging method that has the capability to significantly improve drilling success rates while providing for "hazard avoidance." Currently, M-OSRP industry sponsors contribute in excess of $1 million annually to conduct this research.

Future Direction and Needs

M-OSRP intends to submit funding requests over the next 3-5 years of approximately $400,000 per year from both NSF's Collaboration in Mathematical Geosciences (CMG) program and DOE's Basic Energy Sciences (BES) program. While the major source of M-OSRP's funding has been from industry, this supplemental government funding would significantly accelerate development and implementation of critical imaging technology in support of ultra-deep water and other complex geological drilling and production operations located around the world.

Smart Grid Energy Training Coalition

The Houston metropolitan area is engaged in significant build-outs of smart meters and intelligent grid systems that require attention to workforce training issues. To address these issues, the University of Houston has organized the Smart Grid Training Coalition, which includes UH, CenterPoint Energy, San Jacinto College, the Power Technology Institute, SkillsNET and the Texas Business and Education Coalition. Funded through a $2.5 million Department of Energy grant, the coalition is developing smart grid workforce training programs to prepare the next generation of workers in the electric power industry. The programs will focus on activities that support electricians, line workers, technicians, system operators, power system engineers, cyber security specialists and transmission planners.

Future Direction and Needs

The development and implementation of "smart" technology and networks extends far beyond the electric power industry and will require customized training similar to what UH and its coalition partners are developing for the smart grid workforce. To that end, the University of Houston is planning to expand its curriculum development and workforce training project to accommodate an array of industries that possess network-centric environments, including several industries that are key to the Houston economy (e.g., wind energy, health care, port operations). The university is seeking an investment of $2.5 million to expand the project.

University Consortium for Advanced Grid Materials at the Texas Center for Superconductivity

The Texas Center for Superconductivity at the University of Houston (TcSUH) is the premier multidisciplinary university-based superconductivity and advanced materials research center with over 200 faculty, postdoctoral fellows and students. TcSUH members from the departments of chemistry, physics, chemical engineering, electrical and computer engineering, and mechanical engineering create and develop high temperature superconducting (HTS) and advanced materials and further their fundamental understanding and applications. The Center encompasses four major research divisions: Superconductivity and Related Materials, Energy Materials and Applications, Biomedical Materials and Applications, and Nanoscale Materials and Applications.

Future Direction and Needs

Currently, TcSUH is in discussions with the Department of Energy and university partners at Ohio State, Stanford, and Florida State to establish a crosscutting University Consortium for Advanced Grid Materials. The consortium mission is to conduct research on HTS materials as related to applications in electric power, high field magnets and other materials relevant to the performance and efficiency of the electricity grid. As conceived, consortium programs would advance the discoveries made by the Energy Frontier Research Centers toward commercialization and would provide critical longer-term R&D for ARPA-E successes. Currently, the level of commercialization has not reached the point where U.S. industry can completely support the applied research that is needed. Further government support is required for the U.S. to reap the benefits of its innovation and past investment in this technology. In short, the consortium will provide an essential link between user-inspired basic science and commercialization – the so called “Valley of Death” where many promising research initiatives falter for lack of government funding or commercial backing. Consortium members will collaborate closely with other university groups, national labs and industry in all aspects of each project. Industry buy-in at project onset would be a requirement, and the projects chosen would be beyond the capability of industry alone. TcSUH is seeking $25 million over five years to launch the consortium.

UH Health Programs and Initiatives

Over half of the University of Houston's research funding is generated through programs in the health sciences, in areas of expertise that include biomaterials, bioimaging and drug design. As a full member of the Texas Medical Center, UH is poised to capitalize on its partnerships with other TMC institutions for even greater success in the future. Key initiatives include:

UH Center for Nuclear Receptors and Cell Signaling

In 2009, the University of Houston, in partnership with The Methodist Hospital Research Institute, secured a $5 million grant from the state of Texas to launch the UH Center for Nuclear Receptors and Cell Signaling. Led by Dr. Jan-Ake Gustafsson M.D., Ph.D., an internationally recognized hormone researcher from Sweden, the center conducts basic, translational and clinical biosciences research with the goal of finding new treatments for an array of diseases, such as cancer, diabetes and obesity. In its first year of operation, the center received a $3.2 million grant from the Environmental Protection Agency to lead a collaboration with the Texas A&M Institute for Genomic Medicine and Indiana University examining how environmental toxins affect human health.

Future Direction and Needs

Dr. Gustafsson and his team have made an important discovery about the way estrogen functions that is enabling them to explore new treatments for uterine, breast and prostate cancer. Key to moving forward with this research project are core facilities in genomics, proteomics and imaging. Access to the most recent equipment in these areas is an absolute prerequisite for rapid advances in basic and medical sciences. To that end, the University of Houston has identified $4.1 million in core facilities needs for the Center for Nuclear Receptors and Cell Signaling. Once in place, these facilities will not only be available for use by UH scientists but also for their partners in the Texas Medical Center, including The Methodist Hospital, Baylor College of Medicine, MD Anderson Cancer Center and others.

Department of Health and Human Performance

The UH Department of Health and Human Performance (HHP) conducts a wide variety of human performance testing, including exercise testing, muscle strength assessment, motor coordination/motor performance testing, and learning/memory assessment. For example, control of posture and locomotion are complex functions that rely on coordinated interactions between the nervous system, the musculoskeletal system, the cardiovascular system and the environment. To study these functions, HHP brings together interdisciplinary research teams with expertise in engineering, physiology, clinical medicine, psychology, human factors, physics, mathematics, and computer science. Partners involved in HHP research projects include the Texas Medical Center, NASA and other investigators throughout the world.

Future Direction and Needs

The UH Department of Health and Human Performance is a partner in the Texas Medical Center's National Center for Human Performance, which was designated in section 1208 of the NASA Authorization Act of 2010 as an "Institution of Excellence in Human Performance." Given the physical demands placed on astronauts, the University of Houston believes that the research conducted by its own Department of Health and Human Performance and the Medical Center's National Center for Human Performance is critical to the future of NASA's human space flight program. Therefore, the university encourages NASA and Congress to allocate funding for this important work.

Health and Biomedical Sciences Center

The University of Houston suffers from a major shortage of health sciences research facilities given the extent of these activities on campus. To address this issue, UH broke ground this fall on the Health and Biomedical Sciences Center. Upon completion, the 166,000-square-foot center will serve as one of the university's core research facilities. Programs to be housed in the new building include an ambulatory surgical center, laser center, and research labs for the College of Optometry; animal care facilities; research labs for neuropsychology and neurosciences; and programs associated with the Texas Institute for Measurement, Evaluation, and Statistics (one of UH's most productive research centers).

Future Direction and Needs

Construction of the Health and Biomedical Science Center is scheduled to be complete in fall 2012. To date, $57 million of the $70 million needed to build the facility has been secured through institutional resources, state funding and private gifts. The university plans to fund the balance through additional fundraising, grants, and institutional resources as needed.

Virtual Reality Clinical Research Lab at the Graduate College of Social Work

Established in 2002, the Virtual Reality Clinical Research Lab at the UH Graduate College of Social Work serves as a testing ground for the development of virtual reality (VR) applications for addictions and mental health disorders. Beginning with its first NIH grant to develop an assessment system for nicotine addiction, the lab has continued to grow, with funding to develop VR environments for smoking, alcohol and marijuana dependence. Through the use of MRI technology, faculty members also are exploring brain activity in response to drug and alcohol craving and conditioned behaviors.

Future Direction and Needs:

Currently, the Virtual Reality Clinical Research Lab is expanding in scope through the establishment of the Empowering Eagle Clinic, which will use VR technologies to treat soldiers returning from Iraq and Afghanistan who suffer from mental health problems such as post-traumatic stress disorder. Social services treatment will also be provided to family members, as they must cope with the results of PTSD, as well. The Empowering Eagle Clinic is being developed in partnership with the Walter Reed Army Medical Center and the Uniformed Services University Hospital. As a result, UH is exploring ways in which Department of Defense funding can be secured to develop the clinic ($5 million over 5 years is needed). In addition, UH has established an alliance with similar programs for returning soldiers and their families at Baylor University and Texas State University. Joint planning is underway to ensure that the programs are complementary and integrated from both a patient services and research perspective.

Vision Research and Rehabilitation Associated with Traumatic Brain Injury

Visual disorders associated with traumatic brain injury (TBI) are common among troops deployed in Iraq and Afghanistan and affect another 1.4 million Americans who suffer brain injuries each year. The clinical and rehabilitative team at the UH College of Optometry currently sees approximately 1,000 brain-injured patients per year. About one-third of these patients are referred by the Memorial Hermann/Texas Institute for Rehabilitation and Research (TIRR) in Houston. In the case of some combat injuries, patients are also referred as part of Project Victory, which is funded by the California Community Foundation for Iraq/Afghanistan injuries. Patients frequently present with light sensitivity and/or double vision and eye movement problems. Others "neglect" a blind portion of their visual field, which causes problems with mobility. Neuro-optometrists at UH and the VA Hospital in Houston have been devising therapies for these disorders, including the use of filters for light sensitive patients and innovative use of prism eyeglasses for the neglect cases. However, for practically all of these disorders, rehabilitation would be improved by better evaluative tools, better characterization and understanding of the visual disturbances, and better rehabilitative strategies.

Future Direction and Needs

Looking ahead, the UH College of Optometry seeks to expand services for and develop improved ways to evaluate, manage and rehabilitate patients with visual disturbances associated with traumatic brain injury. Reaching this objective requires increases in clinical personnel, research on visual disorders of brain-injured patients, and new instrumentation for evaluation and rehabilitation. The estimated cost for these activities is $1.5 million. The College of Optometry has secured support for the project from the Department of Defense (Telemedicine and Advanced Technology Research Center, Medical Research and Materiel Command) but has yet to locate the funding needed to move it forward.

University of Houston Transporation Initiative

In addition to the major research programs described above, the University of Houston has one other important initiative for which support from Congress and the federal agencies would move the university closer to achieving its goal of becoming a nationally recognized, Tier One university:

Multimodal Transportation Centers

In conjunction with Houston's light rail initiative, UH has developed plans for three multi-modal transportation centers that would greatly facilitate access to campus for students and the community. These centers will be included in the Houston-Galveston Area Council (HGAC) Regional Transportation Plan and Transportation Improvement Plan. Support through the Transportation Equity Act reauthorization would greatly facilitate this endeavor.

UNIVERSITY OF HOUSTON-CLEAR LAKE

Overview

Led by President William Staples, the University of Houston-Clear Lake enrolls more than 8,000 students in the Houston-Galveston area and beyond through upper-level undergraduate and graduate programs. Located adjacent to the NASA Johnson Space Center, UH-Clear Lake is situated in the heart of Clear Lake's high-tech community. UHCL is committed to supporting the region's commercial, engineering, human services and trade sectors, especially in the computing, medical, petrochemical and aerospace industries. The university's numerous institutes and centers, including the Environmental Institute of Houston, Center for Autism and Developmental Disabilities, Center for Educational Programs, Psychological Services Clinic and Center for Advanced Management Programs help fulfill these needs.

UHCL is a community-minded, partnership-oriented university that was recognized for its community engagement programs by earning a spot on the 2009 President's Higher Education Community Service Honor Roll – the highest federal recognition a university can receive for its commitment to volunteering, service-learning and civic engagement. The university also gained recognition with its selection for The Carnegie Foundation for the Advancement of Teaching's 2008 Community Engagement Classification. In addition to being recognized for its community service, UHCL's distinctions include designation as a Hispanic-Serving Institution (HSI) by the Hispanic Association of Colleges and Universities. Additionally, Hispanic Outlook in Higher Education Magazine ranked UHCL among the top 100 institutions for Hispanics based on the number of degrees awarded.

Major University Programs and Initiatives

Center for Autism and Developmental Disabilities

The need for research and services for individuals with autism has exploded both nationally and locally. A recent report by the Centers for Disease Control and Prevention found that approximately one in 152 children eight years of age have an autism spectrum disorder. According to statistics available from the U.S. Department of Education, the prevalence of children with autism in Texas public schools increased by 594% from 1992 to 2003. The UHCL Center for Autism and Developmental Disabilities provides services to children with autism and other developmental disabilities, as well as their families, through partnerships with area school districts and community organizations. Since 2005, UH-Clear Lake has secured more than $400,000 in contracts from local school districts, private schools, and state agencies to provide treatment, training, and services to individuals with autism and their caregivers. To meet the needs of an increased number of children afflicted with autism and other developmental disabilities, UHCL is pursuing $1.5 million in additional funding to expand its services.

Environmental Institute of Houston

The Environmental Institute of Houston (EIH) supports research, professional development for teachers, and broad-based participatory efforts for environmental issue resolution. EIH provides funding for research efforts in pollution prevention, natural resource conservation, environmental public policy, and social/cultural issues related to the environment. EIH includes faculty from both UH-Clear Lake and the University of Houston, with expertise in biology, chemistry, environmental engineering and management, geography and geosciences, as well as science education and teacher training.

UHCL Pearland Campus

UH-Clear Lake and the City of Pearland broke ground on the Pearland campus in May 2009, with classes beginning this past fall. UHCL shares the 31,000-square-foot facility with the Pearland Economic Development Corporation. The university's space includes classrooms, a library, a student lounge, teaching labs, offices and a faculty suite. Students at the Pearland campus can complete junior, senior and graduate courses in high-demand disciplines such as business, education and psychology. As the campus grows, so too will its program offerings.

UNIVERSITY OF HOUSTON-DOWNTOWN

Overview

The University of Houston-Downtown is an urban university located in Houston's central business district with more than 12,000 students and 2,000 graduates each year. Led by President William Flores, UHD draws students from throughout the greater Houston area and is the most ethnically diverse university in Texas, a distinction that reflects Houston's wealth of cultures, languages and nationalities. To facilitate student access, UH-Downtown also offers classes at the University Center in the Woodlands, the UH System at Cinco Ranch (in Katy), and at various campuses of Lone Star College.

UH-Downtown is an open admissions, commuter institution, with students from a variety of backgrounds. Many work full- or part-time while pursuing their degrees and are often the first generation of their families to attend college. In addition, many UHD students have transferred from community colleges and other higher education institutions. Baccalaureate degrees are offered in 43 disciplines, including signature programs in Criminal Justice, Purchasing and Supply Management, Safety and Fire Engineering Technology, Insurance and Risk Management, and Security Management. UHD offers four master's degree programs in Professional Writing and Technical Communication, Security Management for Executives, Criminal Justice, and Teaching.

Major University Programs and Initiatives

High Impact Educational Experiences

As an urban university that enrolls a large number of at-risk and first generation college students, UH-Downtown faces significant challenges with respect to student retention and graduation. To address this issue, UHD is implementing a new program of high-impact educational experiences where students work closely with faculty in research, outreach, and creative pursuits. Examples include:

- A UHD student and faculty member working on a Homeland Security grant in visual analytics with students and faculty members from Purdue University.
- Education students teaching homeless children and, under faculty guidance, testing various curricular methods to determine which are most effective.
- Students collaborating with faculty members in mathematics, information systems, and English to construct a scholarly paper that analyzes air-pollution in Mexico City.
- With faculty support and guidance, a Humanities student directing a full-length play that is presented to the public
- Students and faculty members from UHD and three Polish universities conducting geological research in West Texas

Projects such as these will increase student engagement in the academic life of the university and have a positive impact on student learning, retention and graduation.

UH-Downtown Scholars Academy

The UHD Scholars Academy is an academically competitive program in the College of Science and Technology that promotes scholarship and student success for undergraduates majoring in science, technology, engineering and mathematics (STEM). An important part of the Scholars Academy mission is to increase the number of academically capable students graduating with degrees in STEM fields, and to increase the number of students pursuing graduate and professional degrees. Scholars Academy students enroll in small mathematics and science classes taught by selected full-time faculty, and they participate in academic seminars, field trips to STEM-related sites, and research internships. Each student is awarded a scholarship ranging from $3,200 to more than $5,000 per academic year (the average is $4,000). Summer stipends are also given for research participation for specific scholarships. The Scholars Academy is funded by the Brown Foundation, National Institutes of Health, National Science Foundation, U.S. Army Research Office, U.S. Department of Education, Welch Foundation, and UHD donors.

UNIVERSITY OF HOUSTON-VICTORIA

Overview

Located in the Coastal Bend region of Texas, UH-Victoria enrolls more than 4,000 students and confers approximately 870 degrees annually. Under the leadership of Interim President Don Smith, UHV offers undergraduate and graduate degrees in four schools: Arts & Sciences, Business Administration, Education & Human Development, and Nursing. Programs are offered both face-to-face and online at the Victoria campus in addition to two Fort Bend County teaching centers in collaboration with the other UH System universities. UHV serves transfer students through dual admissions programs with The Victoria College, Wharton County Junior College and other area community colleges.

Legislation signed into law in 2009 allowed UH-Victoria to enroll freshmen and sophomores for the first time in fall 2010. This expansion, combined with the university's development of six athletics programs, the construction of a new student dormitory (Jaguar Hall), and the development of the Center for Publishing (which includes several internationally known literary enterprises), are enabling UHV to achieve its goal of becoming a residential, destination university.

Major University Programs and Initiatives

Forensic DNA Testing Laboratory

In DNA labs across the country, there is a significant backlog of samples to be analyzed and cases to be addressed. With the number of cases in which DNA analysis is utilized increasing annually, reducing the backlog is of the utmost importance. To address this issue, UH-Victoria is working to create a forensic DNA testing laboratory. A university-associated lab and teaching program would help alleviate the backlog of samples to be analyzed and cases to be addressed. By working with university scientists, forensic experts, and trained students, government crime labs would be better able to serve the public in a timely manner. UHV partners in this initiative include the Victoria County Police Department, the Victoria County Sheriff's Department and the South Texas Coastal Sheriffs Alliance, which encompasses 23 sheriffs' offices from across South Texas. To support this venture, UHV is pursuing $2 million to construct and equip the lab.

Centro Victoria Mexican-American, Literature and Culture Curriculum

Part of UHV's Center for Publishing, Centro Victoria aspires to be a national center for Hispanic literacy, literature and culture. Centro Victoria's aim is to increase public understanding of Hispanic literature and culture through a variety of outreach initiatives, one of which is the Mexican American, Literature and Culture Curriculum. This curriculum addresses the issues facing Hispanic students struggling with reading, writing and language skills by incorporating cultural knowledge and differences into the learning process. The curriculum can be used nationally to increase participation of students in the classroom, which will increase their interest in education. The long-term outcome will be students who succeed in school and aspire to reach their educational and career goals. UHV is seeking $900,000 to implement this program on a two-year pilot basis in heavily Hispanic school districts.

Nurse Educator Program

As has been widely documented, the shortage of qualified nurses is critical. Less widely known, however, is the critical shortage of qualified nursing faculty (needed to educate more nurses), which is predicted to worsen over the next 3-15 years as an estimated 70% of current faculty members become eligible to retire. UHV is the only university providing baccalaureate and graduate nursing education in the underserved regions of Victoria and suburban Houston. UHV currently offers an RN-BSN program, an MS in Nursing with an emphasis in nursing administration, and an accelerated BSN program for individuals with a bachelor's degree in any discipline who wish to become nurses. While these programs are together adding to the number of nurses with baccalaureate and graduate degrees, they do not address the nursing faculty shortage. Thus, UHV has created another master's degree program with an emphasis in education, intended to prepare already qualified nurses for the role of faculty members. With increased funding the program can be expanded to additional sites and produce more graduates. To train master's level students to be educators, the university must employ faculty with doctoral degrees. UHV has very limited resources for providing the necessary salaries and support for such highly qualified nursing faculty members, especially since the university must first produce credit hours before receiving formula funding from the state. Therefore, start-up funding of $500,000 per year over three years is needed.



UNIVERSITY OF HOUSTON SYSTEM PROFILE

Fall 2010 Enrollment

UH	38,752
UH-Clear Lake	8,099
UH-Downtown	12,900
UH-Victoria	4,095
TOTAL	**63,846**

FY 2010 Degrees Awarded

	Baccalaureate	*Total*
UH	4,778	7,230
UH-Clear Lake	1,124	2,167
UH-Downtown	2,359	2,403
UH-Victoria	512	864
TOTAL	**8,778**	**12,664**

Fall 2010 Faculty

	Tenured/Tenure Track	*Total*
UH	936	3,364
UH-Clear Lake	218	744
UH-Downtown	265	631
UH-Victoria	96	194
TOTAL	**1,515**	**4,933**

Fall 2010 Student to Faculty Ratio

UH	23:1
UH-Clear Lake	15:1
UH-Downtown	19:1
UH-Victoria	18:1

FY 2011 Staff

UH/UH System Admin.	3,574
UH-Clear Lake	568
UH-Downtown	592
UH-Victoria	247
TOTAL	**4,981**

FY 2010 Research Awards *(in Millions)*

	Federal	*Total*
UH	$83.5	$114.8
UH-Clear Lake	3.0	3.6
UH-Downtown	2.5	2.8
UH-Victoria	0.1	2.9
TOTAL	**$89.2**	**124**

Fall 2010 Enrollment by Ethnic Group

	#	%
African American	10,124	15.9%
Asian	9,800	15.3%
Hispanic	16,251	25.5%
International	4,507	7.1%
Native American	232	0.4%
White	21,654	33.9%
Unknown	1,278	2.0%
TOTAL	**63,846**	**100%**

FY 2011 All Funds Budget *(in Millions)*

	Operations	*Capital*	*Total*
UH	$874.4	$135.7	$1,010.1
UH-Clear Lake	105.2	9.0	114.2
UH-Downtown	149.1	0.8	149.9
UH-Victoria	49.3	4.6	53.9
UH System Admin.	14.1	0.0	14.1
TOTAL	**1,192.1**	**150.1**	**1,342.2**

UNIVERSITY OF HOUSTON SYSTEM

UNIVERSITY OF HOUSTON • UH CLEAR LAKE • UH DOWNTOWN • UH VICTORIA

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