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The University of West Florida continues to add to its impressive record in sponsored research. In this annual report we highlight nine notable researchers and their accomplishments.

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Message from the President

John Cavanaugh

The University of West Florida research record is the envy of comprehensive universities across the country, and many of our peer institutions would be eager to achieve our level of sponsored research activity.

For the last three years, UWF sponsored activity has been at a level of about $20 million per year. With that solid foundation firmly established, UWF is ready to aggressively expand its research enterprise.

As I look across the spectrum of the university’s activities, I see a vibrant and enthusiastic thirst for creativity and knowledge from our students, faculty and staff. I am excited at the opportunities to leverage the core competencies of the institution into new venues and to reaffirm our commitment to engage faculty and students together in the pursuit of new knowledge through basic and applied research.

We can continue to accomplish this by:

* allocating more resources toward rewarding productivity,
* taking advantage of faculty turnover to focus our efforts in areas that match our regional strengths and contribute to national and international agendas, and
* aggressively pursuing funding to provide the necessary infrastructure.

To improve regional economic and cultural activities, it is crucial that we integrate the excellence clearly evident in our colleges, institutes, and centers with the broader educational mission of the university and its stakeholders.
Just off the nearby shores of Pensacola Beach, University of West Florida marine archaeologists have discovered a number of shipwrecks, yielding a wealth of information about 18th century Spanish colonial life.

Upon close inspection they soon determined their newest discovery was the Rosario, a Spanish frigate that met its demise in 1705.

Some of the most exciting research at UWF is in the Maritime Archaeology program. Only the third academic program of its kind in the nation, Dr. Judith A. Bense, director of the UWF Archaeology Institute and chair of the Department of Anthropology, and her team are making great strides to keep the program afloat and are, in fact, causing quite a splash.

Bense has gained national recognition for her media coverage on the subject of archaeology, as well as for the three books she's written. Under her direction, The University of West Florida now has the largest archaeology program in Florida.

In 2001 Bense saw an opportunity to complement the UWF archaeology research that was already taking place in the Gulf of Mexico. So, she packed her bags, and bags, and... bags and headed to Latin America.

Bense and UWF Archaeologist Margo Stringfield developed an exhibit of UWF archaeology, combined it with artwork from the West Florida Arts Council, and called it "Bridge Across the Gulf." The exhibit was shown in Mexico and Costa Rica and stole the show with the display of colonial Mexican artifacts that she and her team had found in Pensacola.

Bense says, "In Mexico, the colonial period is not as popular as pre-Spanish archaeology, primarily due to the oppression, slavery, and exploitation of the time." However, when Bense and Dr. John Bratten met with
Mexican and Costa Rican archaeologists, they found them to be very interested.

A keen Bense says, "My radar was up." With finesse she was able to implement a valuable trade with her fellow Latin American archaeologists. In July 2002, the top assistant for Mexico's Underwater Archaeology Program, Ms. Carmen Rojas, had her first open-water shipwreck excavation experience with the UWF team. And, UWF students will soon perform excavations in Mexico.

Bense says, "A collaboration among UWF and Mexican archaeologists and our students is developing, and it appears to involve little money in return for terrific hands-on experience and the preservation of rare heritage discoveries."

Bense has a fervent drive to "help develop these treasured discoveries in a way that can educate and produce trained young professionals to manage a wide variety of heritage resources to include: public archaeology, public history, and museum studies."

It's what keeps her ahead of the curve. Bense says, "Striking while the iron was hot," has been crucial to all of her cutting-edge research.

Although it's been a 22-year commitment for Bense, when she reflects on the UWF Archaeology Institute's current stance, she says, "we are absolutely on target," and it's doubtful she'll let any opportunity pass her by, no matter how far away it is.

Above, left to right: Dr. John Bratten, Dr. Judy Bense and UWF marine archaeology students examine an artifact recently discovered at the Rosario shipwreck.

Opposite page: Pottery sherds found in Pensacola were some of the artifacts of Colonial Mexico displayed in the "Bridge Across the Gulf" exhibit in Mexico and Costa Rica.
A native-born Englishman with a soft-spoken British accent, Dr. Patrick Hayes arrives to work each day donning sandals and loose-fitting casual clothes. At first glance, he blends in with any other "Joe" strolling down the sidewalk on his way to work.

The walls inside his office are embellished with dry erase boards coated with handwritten mathematical computations and diagrams. Minus the starched white lab coat, Hayes' disorderly hair, spotted glasses and math-ridden office walls could stereotype him as a "mad scientist." However, this eminent scholar and senior scientist is anything but mad, and he's certainly no "regular Joe." Hayes is one of 98 distinguished scientists who work with diligence at the Institute for Human and Machine Cognition to understand human thinking and to create tools to help people think more effectively.

As a young boy, Hayes had a passion for building robots out of Erector sets and was also successful in building a calculator. Years later, in the 1960s, his fascination with computers and thinking prodded him to pursue the then almost unknown study of artificial intelligence (AI).

He graduated with a Ph.D. in AI in 1973 from the University of Edinburgh located in Scotland's capital city — the first AI degree ever awarded at Edinburgh. In fact, Hayes' degree was one of the first-ever AI degrees awarded in the United Kingdom. He went on to direct one of the first cognitive science programs in 1981 and was editor of the AI Journal. He also served as president of several AI societies including the international committee, which organizes conferences all over the world.

Ironically, what he considers to be fun has proven to be a necessary study in the 21st century. Nowadays, AI software is used in thousands of applications. For instance, AI programs are used to make buy/sell decisions on the professional stock market and to carry out air traffic control tasks. AI is also responsible for noticing any unusual usage patterns on a credit card, thus, reducing theft. On a far grander scale, during the Gulf War, AI was used to make sure that tanks and their fuel got delivered to the same place at the same time. Hayes says, "The Army later said that the
operation would have been impossible without it."

Hayes and his colleagues are researching AI innovations from a new angle. Hayes says, "The concept is adapting machines to humans instead of the older idea of pitting machines to compete with human thinkers." One typical example is speech recognition. Every day people speak a number or words into a phone that "tells" the phone how to direct the call.

Although much of Hayes' work isn't tangible, it is evident in many projects. Currently, a revolutionary cockpit display named OZ is in the works at the institute, as well as a sensory flight suit. Hayes works closely with Drs. Dave Still and Anil Raj on these projects. The suit, designed for military pilots, communicates tasks via the sense of touch, and the cockpit display is designed to accommodate the human eye, allowing the adept pilot to perform faster and more accurately.

Consequently, after four decades of pioneering in the study of AI, the Cognitive Science Society presented Hayes with a singular honor. And, just like his Edinburgh graduation, Hayes is one of few. He is one of five senior scientists in the world to have been made an Inaugural Fellow of the society.

So, while it remains doubtful that anyone will ever see Hayes sporting around in a stiff, white lab coat with credentials monogrammed on the lapel, one thing is certain. He will continue as a pioneer in the study of AI, simply because he is fascinated with it and passionate about it.

Above, left to right: Drs. Anil Raj, Patrick Hayes and Dave Still collaborate on projects incorporating artificial intelligence at the Institute for Human and Machine Cognition.
Dr. Pam Northrup has stood in front of many classes of eager grade-school youth. The sight of a student’s face lit up when they “get it” has always assured her that she made the right career choice.

However, she is also a realist. Northrup, associate professor in The University of West Florida College of Professional Studies, is aware of what goes on outside the classroom. A teacher must devote long and tedious hours to “teach” a child, rather than simply “pass” him or her to the next grade. That’s precisely why Northrup has made it her mission to leave no child behind.

Northrup and her adept team of computer and education experts have been very busy building a Web-based performance support tool that will help K–12 teachers to reach each child in the classroom. The first subject that the program will tackle is science.

Why science? Well, beginning in 2003, science will be included in the state of Florida standardized testing, or FCAT. All along she has aimed to bring QuickScience™ to fruition with accuracy and haste, aiming to have it available to teachers well in advance of testing dates.

Fortunately, Northrup is at an apex in the project’s growth, which only began in 2001. The timing of building this tool is providential, and teachers using it on a daily basis is of the essence. Northrup says, “With this tool, teachers can access standards-based science resources quickly to use with students. It can only help.”

Teachers won’t be pulling their hair out trying to figure out how to use QuickScience. The resources provided can be obtained through a simple three-step process, allowing teachers to access a database full of resources including Web-based science lessons, assessments, WebQuests, science experiments, activities, and news stories.
Perhaps the crux of QuickScience is to specifically provide teachers with Florida Sunshine State Standard-aligned resources. That element assures that the students receive the education they deserve. Just knowing that students will benefit from hands-on learning practices in a classroom setting is excitement enough for Northrup.

Furthermore, she also sees the program as an asset to other teaching professionals including those in the military. She says, "QuickScience is a very positive thing because the database can be populated with any subject. It will deter educators in any discipline from reinventing the wheel each time they teach a class."

Northrup believes in QuickScience and hopes it will help overcome the ever-changing, yet necessary, challenges of time, technological advances, and increasing educational standards. Northrup says, "Teachers are so busy trying to keep up with their day; this tool provides quick assistance for them." Teaching professionals can look for the implementation of the program in spring 2003.

More than anything, Northrup hopes that QuickScience will have an effect for a lifetime and light up many faces with the joy of learning.
Chances are slim to none that anyone can name a business research or economic development task that Dr. Christine K. Pierce would not tackle. Her energy level is off the scale and she loves every minute of her work.

A 16-year IBM marketing executive veteran, Pierce accepted a position as associate director for The University of West Florida Haas Center for Business Research and Economic Development in 1999. Located on the Fort Walton Beach campus, Pierce refers to her hub as the “Echo to the East.”

Although Pierce is a one-woman show and an hour away from the main Haas Center in Pensacola, news of her expertise is resonating throughout a far-reaching business community.

Business communities as far away as Franklin and Jefferson Counties, just south and east of Tallahassee, know Pierce and respect the center’s work. Clients from all over Northwest Florida often call upon Pierce for economic development support.

Pierce stresses that the Haas Center does not compete with private industry, nor does it choose to. Rather, the center works “with” private industry. Some of those clients are local public, non-profit institutions, and community organizations.

Pierce contends, “It’s not only about providing the public with answers, but it’s also about ‘teaching’ them how and where to find the necessary resources. Then, they are empowered to be independently successful.”

Most recently, Pierce was awarded a $200,000 grant from the State of Florida for the First Jobs Institute. This statewide project assists youth in obtaining a first job by compiling and digesting research and
then marketing best practices to regional businesses. After reviewing the 2000 census figures, she saw the inevitable evolution of an aging workforce. Needless to say, these baby boomers will be eager to retire in the near future. In answer to the obvious question, "Who will replace these people?" Pierce got busy.

Within one year, this intrepid businesswoman had the support of the Agency for Workforce Innovation and Workforce Florida, as well as her First Jobs Institute team, and was successful in developing a seamless plan. Her plan provides the business community, educators, and business professionals of tomorrow with the necessary tools to address and eliminate employment barriers for youth between the ages of 14 and 21.

According to Pierce, "I must believe in my product or service." In other words, conviction fuels her endeavors at the Haas Center's "Echo to the East" as she looks toward new challenges to take on.

Opposite page: First Jobs Institute research indicates that mentoring is a best practice for successful youth employment, as shown here at the Okaloosa Applied Technology Lab.

Above, top of page: Students participate in focus groups to discuss employment challenges for youth.

Left: Dr. Christine Pierce is a sought-after resource for economic development support in Northwest Florida.
Many people who live in Northwest Florida are wondering just how healthy it is to live here. Is it safe to breathe the air? Is it healthy to swim in area waters or to eat the shellfish that are harvested from it?

No, it's not an anthrax scare, but those very questions have caused enough concern that a new program has been launched to see if there is a connection to area health problems and the pollution levels in Northwest Florida. Dr. K. Ranga Rao, director of The University of West Florida Center for Environmental Diagnostics and Bioremediation (CEDB), is about to find out.

The 2000 EPA Toxic Release Inventory ranks Escambia County as the 14th highest toxic-releasing county in the nation. Findings show that 55.2 million pounds of toxins from Escambia County and 1.2 million pounds of toxins from Santa Rosa County were released in 2000.

Rao and his colleagues at the CEDB have stepped up to the plate to evaluate the potential impact of environmental pollutants by doing what they do best — research.

That's right...research. Pollution can't be remedied unless we can specifically identify the problem. Those who live in Northwest Florida are all too aware of the eight Superfund sites located there, as well as the controversy surrounding them. However, the sites are not exclusively the problem.

This region is rich in natural resources including beaches, estuaries, coastal dunes, forests, and flat plateaus ideal for agriculture. However, industry discharges, sewage treatment, and storm water runoff are contributing to the contamination of these natural resources. Practices which produce contaminants need to be changed, and the 412,000 residents of Escambia and Santa Rosa counties need to be informed.

Rao proposed the PERCH project (Partnership for Environmental Research and Community Health) as the starting point. And, like a perched observer, Rao is
the overseer of the project. Rao stressed urgency in his proposal stating, "Corrective actions will grow increasingly more complex and much more expensive. We need to address these issues NOW!" He plans to play a catalytic and omniscient role in providing coherent, logical, and foresighted information that will prevent a future unmanageable environmental dilemma.

Rao has served as project director of numerous grant-funded projects over the past three decades. He has recently been awarded $1.7 million for PERCH through the Environmental Protection Agency and the Centers for Disease Control and Prevention for environmental health studies in Northwest Florida. Approval of this funding only confirms a need to rectify a serious problem.

Rao has brought together a team of 32 regional partners to research the extent and nature of pollution, routes of exposure, and the relationship between exposure to pollutants and community health indicators.

Recognizing the need for expertise in diverse areas, Rao has invited nationally recognized researchers from the University of South Florida and The Georgia Institute of Technology to collaborate. Rao plans to enable graduate and undergraduate students to gain valuable field experience, working alongside these experts.

Rao has covered all bases and is eager to improve Northwest Florida's environment. Rao says, "prevention is worth several pounds of cure."

Above: Dr. K. Ranga Rao, right, oversees PERCH with the goal of providing coherent, logical, and foresighted information that will prevent a future unmanageable environmental crisis in Northwest Florida.
Richard Sites

Dr. Richard Sites remembers growing up around teaching professionals his entire life. After all, he is a fourth-generation educator. But Sites is taking education to a level that his ancestors never attained. Not because they weren't innovative enough, but because they didn't have 21st century technology readily at their fingertips.

Sites believes that's where it's at — the fingertips, that is. If a teacher has a keyboard and knows how to use the Web, he or she has an instant "personal assistant." For the past year Sites, director of the Office of Educator Performance at The University of West Florida College of Professional Studies, has made terrific strides toward the completion of an Internet-based instructional performance tool called ibinder™.

This Internet binder (hence the name ibinder) is a resource to help teachers learn, collaborate, and perform and is tailored to assist instructors across the nation based on each state's educational standards. Those standards can be found directly on the Web site at www.ibinder.uwf.edu.

Educational issues have always been dinner-table conversation for Sites. Therefore, he is very cognizant of the education standards reform movement of 2000. He is happy to know that his product is already filling the gap between performance and compliance.

Sites thinks teachers will appreciate the effective, daily, formal and informal assessments that ibinder can provide. And, he knows they will be pleased that those assessments will correlate with their state's educational standards. In a sense, Sites will have done some of the teachers' homework for them. He's also done his own homework. Current data reveals that thus far 52,000 new users have created
accounts and are using the tools provided. More than 2,100 PLANright documents have been created and more than 14,000 STEPS lessons have been created in ibinder. Sites' data collection shows that since the inception of the program, more than 8,000 users have taken advantage of ibinder.

Although it's crystal clear that the product is filling a need, Sites still sees room for improvement. He is planning to further the design and direction of ibinder.uwf.edu by continuing to use the $2 million that Congress appropriated for the continued enhancement of the project.

Even more exciting, ibinder may just put UWF on the map for producing a commercial product that is used nationwide. UWF is currently seeking publishers to package ibinder and market it directly to school districts across the country.

So, whether it be destiny, fate, or dinner-table conversation that led Sites down the same path that his ancestors followed is unknown. It is evident, however, that he is not stopping here, and his contribution to the future of education may just put him in a history book.

Above: Dr. Richard Sites did his homework in creating ibinder™, a Internet-based instructional performance tool for grade-school teachers.
Dr. Wynn Teasley never thought he would have a job painting by numbers. But, the data he has collected and the numbers he has crunched in the past three years have contributed to the re-development of once blighted communities, adding a fresh coat of paint to refurbished neighborhoods.

Teasley, the executive director of The University of West Florida Whitman Center for Public Service, has worked primarily as a teacher in the public administration arena. When he took the helm of the Whitman Center his expertise in strategic planning, government administration, quantitative applications, research, and knowledge of public policy added splashes of paint to the canvas of his career.

Teasley says when he came aboard in 1996 he saw an opportunity to broaden the center's reach. With the help of a grant from the United States Department of Housing and Urban Development, Teasley and several community organizations have made great strides in putting new life back into dying neighborhoods by forming the Community Outreach Partnership Center (COPC).

It all began with a survey. Teasley's role wasn't to patrol the streets or knock on doors. Instead, he collected data and studied demographics. Identifying the problems enabled him to seek out solutions to improve quality of life in underprivileged local communities.

Some of the problems he identified were obvious. They included high crime rates, poor housing conditions, vacant lots, and a lack of new businesses. The solution to these diverse problems boiled down to money. According to Teasley, "To help redevelop neighborhoods, you must adjust the economics of impoverished areas."

He then shared his work and began to collaborate with local governments and other community organizations. 2002 marks the finale of the funding he has secured, and the results have paid off
Although the current COPC has been a lot of work, Teasley has goals for the future to link inner city communities with technology. His newest proposal is called, CABEL — Community Asset and Business Enterprise Laboratory.

While the Community Outreach Partnership Center is one of Teasley’s most prized and complex accomplishments, the Whitman Center also conducts applied research and delivers leadership and professional development programs throughout the region. It’s an unending process, but he’s not tiring. Teasley will continue to “paint by numbers” to help improve quality of life in the Northwest Florida region.

Above: Dr. Wynn Teasley, second adult from the right, visits a “Weed and Seed” facility in downtown Pensacola, pictured left. The program provides increased police surveillance and a safe haven for youth and residents in high-crime neighborhoods.
Jim Bezdek

Just as a physician uses magnetic resonance images (MRIs) to produce a visual image of brain activity, laser detection and ranging (LADAR) sensor imagery can enable detection of surface-to-air missile launchers and tanks.

Eminent scholar and computer science professor Dr. James C. Bezdek researches automatic target recognition problems based on LADAR imagery. He believes that some of the most important advancements in the next decade will involve image processing. That explains why his ongoing research and work with algorithms for pattern recognition and image processing are exciting and fun to him.

Bezdek came to The University of West Florida as an applied mathematician in 1989. He has continued down that path, often using externally funded grants to support his research. Bezdek has not been without external funding his entire career. His formula for success is simple. He says, "I just work hard."

A portion of that funding has allowed Bezdek to recently complete a six-year study for the Office of Naval Research located in Washington, D.C. In June 2002, Bezdek and fellow colleagues reached their initial objective of describing a target detection system based on fuzzy detection theory. In layman's terms, Bezdek and his colleagues join hundreds of automatic target recognition (ATR) researchers who work to move the Office of Naval Research closer to an effective use of visual assessment imagery in warfare.

The recent year has not only rewarded Bezdek with satisfying findings in LADAR, but he was also the 2001 Fuzzy Systems Pioneer Award recipient from the IEEE Neural Networks Society. Although this outstanding scholar has a vita filled with awards, publications, technical reports, and successful funding initiatives as thick as a small book, he says he is most proud of this honor.

A future goal of Bezdek's is to research satellite imagery that can detect impending terrorist attacks. With the threat of bioterrorism now at the forefront of national attention, Bezdek is particularly interested in focusing on crops that may be exposed to attacks by harmful chemical and biological agents.

Above: Dr. Jim Bezdek's research in automatic target recognition problems based on LADAR imagery has helped the Office of Naval Research move closer to an effective use of visual assessment imagery in warfare.
Recently becoming a new mother, Dr. Melanie A. Sutton has a vivid image of how precious life is. As a woman with the appropriate formal education to explore breast cancer detection, her passion for life and for improving women's lives is her guiding light.

Sutton's dissertation involved research in the computer vision field of object recognition. And only three years later, Sutton was awarded a $208,000 grant for research in the development and assessment of ways to improve digital mammography.

She says she couldn't be working with a better team than the Northwest Florida radiologists she's currently involved with. The three-year project is very tedious, but should prove to enhance the current automated techniques for digital mammograms.

What does this mean, you might ask? Well, it's obvious to everyone that early detection is key to curing breast cancer. Current campaigns are in force all over the nation to raise the awareness of getting regular mammograms. Fortunately, it's working.

However, there is always a "flip side." Radiologists are looking at many more digital images with the hopes of ruling out cancer or catching it early. Can you imagine looking at these images for hours upon hours? Fatigue becomes a factor that could lead to human error.

Sutton says, "Automation techniques in this area have incredible potential, because unlike humans, when computers look at large volumes of information repeatedly, they aren't as apt to miss something."

As part of the research project, X-ray images are digitized with a commercial scanner and then enhanced in various ways. The enhancements can be used to verify a radiologist's initial assessment, or serve as a second reader. Having an experienced mammographer in the loop as the first reader to interpret the images "eases the minds of many who would rather trust a human being to oversee their test results," Sutton says. But, even better, women will be better served by the digital mammograms.

Sutton believes the best hope for success is through the collaboration of talented students and professionals in diverse fields. And, she continues to "rally" this future support team. After all, her research is instrumental in preserving a most precious gift — life.

Left: Dr. Melanie Sutton explains how automated assessment of digital mammography can act as a safeguard and backup for experienced, but overloaded, radiologists.
This collection of vignettes from a selection of our research units and individual departments across the campus demonstrates the depth and breadth of activity that you would normally expect to find at larger, research-focused institutions. At UWF individual faculty contribute to their disciplines through research while working closely with both graduate and undergraduate students.

Ultimately, a university's reputation is only as good as the collective reputation of its faculty. It is clear at UWF that our faculty excels at both teaching and research productivity. Figure 1 displays research award dollars per full-time faculty across time and other state universities. UWF is consistently outperformed only by the Carnegie classified Doctoral/Research-extensive universities (UF, FSU, and USF). UWF is classified as a Carnegie Master's I (along with FAMU, UNF, and FGCU) and is on a path for reclassification to Doctoral/Research- Intensive (joining UCF, FAU, and FIU).

State of Florida tax collections and resulting legislative allocations provide and support the research infrastructure at UWF. It is through research projects funded from both private and public sources that those taxpayer investments are recovered in the form of indirect costs charged to sponsored projects. Figure 2 shows indirect cost recovery and that UWF has recovered a record.
level (approximately $2.5 million) of taxpayer investment dollars for two years in a row.

Approximately half of that recovery is attributable to the Institute for Human and Machine Cognition (IHMC). Over the last decade the University has invested heavily in IHMC, and it is pleasing to realize a return that can be used to provide support for strategic growth in other areas of the University.

Data displayed in Figure 3 indicate that UWF’s current-year awards, in excess of $20 million, did not change significantly from the prior year. Figure 1 illustrates the distribution of award sources. Award dollars are mainly from government sources (96%) with 63% of the total from federal agencies. Research expenditures, as seen in Figure 5, increased dramatically in 2000 and has leveled over the last three years at an average of $22.5 million per year.

This level of expenditure, coupled with UWF research expertise, has had a significant economic impact on Northwest Florida.
UWF Researchers

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Dr. Elizabeth D. Brickley, Archaeology Institute
Dr. Wayne Bennett, Biology
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