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UAHuntsville President's Annual Report 2012

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UAHUNTSVILLE

PRESIDENT'S ANNUAL REPORT 2012

VIRTUAL WORLD

New research device
will be valuable tool

INSIDE: DIRECTION

Strategic plan
will give focus
to campus



UAVs

Adding value
to unmanned
vehicles



EXPANSION

Nursing
experiencing
growing pains



CYBERSECURITY: COMPLEX THREATS PROPULSION: THE HOLY GRAIL

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HUNTSMVILLE ADMINISTRATION**

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New days...

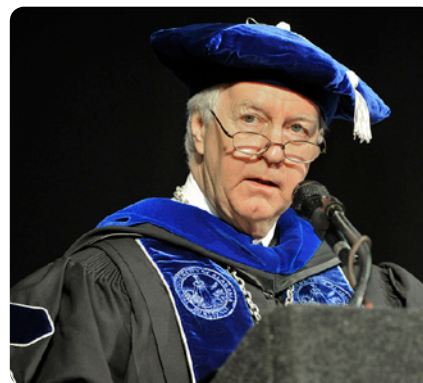
Welcome to our President's Annual Report, a culmination of campus activities during Fiscal Year 2012, and advances we are making as a university.

Our cover story demonstrates efforts for a new campus strategic plan. UAH has in the past embarked on a strategic planning effort, and various individual unit plans exist as well. However, it is important periodically to review plans, update them, and develop a cohesive plan, supported by complementary unit plans, that i) charts a direction, ii) allows efforts to be aligned around common objectives, iii) influences resource allocation decisions as appropriate, and iv) allows a competitive advantage to be articulated.

We expect to complete that plan in the coming months. You'll be hearing more about that process in the near future. Meanwhile, feel free to look at our progress thus far – <http://www.uah.edu/president/strategic-planning>.

This year's report will show you the progress and transformation we are making on the campus, in addition to featuring our growing partnerships with Redstone Arsenal, the state of Alabama and the greater Huntsville area. You will also see highlights of support we have received from friends as well as achievements of our faculty, staff and students. Finally, we are making great strides to improve campus life through the presence of our athletics program.

Campus transformation: UAH continues to evolve into a more traditional, residential campus, so we are adding features to accommodate this transition. Construction is under way on Charger Union, a



100,000-square-foot facility that will serve as a gathering spot for all students. Also, a greenway is nearing completion that will encourage more pedestrian and bike traffic through the middle of campus.

We are adding buildings to enhance education and research. Construction should begin later this year on the Severe Weather Institute and Radar & Lightning Laboratory, and soon we will also be starting construction on an expansion for our Nursing Building. The facility was designed for 250 students in the 1970s. Today, that program is now approaching 1,000 students.

Working for Redstone & Alabama: Make note of several stories that demonstrate our support of Redstone Arsenal and the state of Alabama. Our research and sponsored program expenditures are approaching \$90 million, and a great majority of our research is in support of the U.S. Army and NASA's Marshall Space Flight Center. That research is also crucial as it allows our students to obtain valuable knowledge as part of their educational experience while at UAH.

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Features

The campus saw progress with new construction, emerging partnerships and growing ties to the community.



Transforming the campus

Construction projects abound on campus. A greenway, a new student center, a Nursing expansion, Charger Park and the addition of a research building are bringing big changes.



Working for Redstone Arsenal

The university's ties to Redstone Arsenal continue to grow both in depth and breadth, helping solve critical issues for federal agencies located there.



Partnerships

UAH faculty and staff are active in the community, creating a broad scope of partnerships with the local community in an effort to improve the quality of life for area residents.



Highlights

Faculty, staff and students receive honors and national recognition for their creativity and achievements.



Athletics

UAH hockey program finds conference home. Other sports demonstrate success on the court and on the field.

6

Greenway

Pathway through center of campus will encourage more pedestrian traffic.

10

Charger 1

New research device may provide quantum leap in propulsion.

18

Cybersecurity

Interdisciplinary approach may have answer for advancing the science.

22

Second language

Education grant to help Huntsville City Schools with language instruction.

29

Fellowship

Shushannah Smith is one of 41 students nationwide to earn Ford Foundation Fellowship.

30

Impact

UAH economic impact measured at nearly \$700 million.

Strategic direction

Process will provide
focus for university
to meet expectations
of the Huntsville and
Redstone communities



President Altenkirch is leading the campus on developing a new strategic plan that will bring clear, concise goals to the university, in addition to the tactics that will allow The University of Alabama in Huntsville to reach the lofty expectations necessary for the campus to continue progress long into the future.

Dr. Altenkirch said UAHuntsville has in the past embarked on a strategic planning effort, and various individual unit plans exist as well. However, he noted it is important periodically to review plans and update them.

"Toward that end, we began a process a year ago to bring together individuals from across the campus and the Huntsville community to develop a broad, inclusive plan for the future," he said.

The plan will be unveiled at UAHuntsville's institutional presentation to the University of Alabama Board of Trustee's meeting in April.



“Progress in meeting established targets of the strategic objectives will be assessed periodically to determine progress.”



A cohesive plan, Altenkirch added, will be simple and supported by complementary unit plans that accomplish several tasks:

- **Chart a direction**
- **Allow effort to be aligned around common objectives**
- **Influence resource allocation as appropriate**
- **Create a clear competitive advantage**

The process consists of developing the following elements:

- **Mission: Purpose**
- **Vision: Desired end-state in the future**
- **Core Values: Guide behavior**
- **Value Proposition: What is promised to be delivered; why the university matters to constituents and customers**
- **Goals: What is to be accomplished in order to reach the university's vision**
- **Strategic Priorities: Define direction to accomplish stated goals**
- **Strategic Objectives: Guide fulfillment of strategic priorities; results can be measured**
- **Tactics: Actions required to meet strategic objectives**

The planning process consists of a planning steering committee of approximately some 30 members. This group is drafting plan elements



through strategic objectives.

At that point, a number of focused task forces, each consisting of approximately 10 or 12 members, have been established around strategic objectives.

The task forces are charged with reviewing the draft work of the planning steering committee, drafting tactics, which when executed, would result in strategic objectives being met, and making recommendations back to the planning steering committee.

Progress in meeting established targets of the strategic objectives will be assessed periodically to determine progress. This assessment will then be integrated into a balanced score card approach that allows an assessment of whether goals are being met and whether the strategic priorities need adjustment.

Evolution of the plan is chronicled at the link below and is updated as meetings and discussions of the planning steering committee take place.

www.uah.edu/president/strategic-planning





Greenway

“This infrastructure will make the campus safer by separating vehicular traffic from pedestrian and bicycle traffic.”

Construction is under way to create a greenway through the heart of campus.

The transportation corridor will be composed of walkways for pedestrians, bicycle lanes, covered bicycle storage, extensive landscaping and green space, as well as other pedestrian use amenities.

A federal grant secured by U.S. Senator Richard Shelby was instrumental in creating the transportation corridor.

The greenway is going to provide an interconnecting pedestrian/bicycle route between the north and south ends of campus, according to university officials.

“It is critical that Alabama’s universities have strong infrastructure in place to support students, faculty and community members as well as surrounding businesses,” Shelby said.

“The University of Alabama in Huntsville will use this grant to make improvements that are essential for efficient transportation on campus.”

Mike Finnegan, assistant vice president of facilities, said, “This generous grant by Sen. Shelby will improve the efficiency and safety of traffic on our campus.” “It will create more of a

demand for pedestrian and bicycle traffic, thus adding to our transition to a more traditional campus setting. This infrastructure will also make the campus safer by separating vehicular traffic from pedestrian and bicycle traffic.” He added that the corridor would also be helpful in meeting the needs of the university’s mobility-challenged students.

The corridor is adjacent to the campus Intermodal Facility in the center of campus. The north end begins at the Charger Union student facility under construction and runs south to Charger Way.

Facility will help grow world-class weather research



A \$7 million commitment from the state of Alabama will create an addition of a severe weather research lab at the National Space Science and Technology Center at UAH.

Construction is expected to begin later this year on a new \$7 million facility on the UAH campus that will bring new advances to severe weather research.

SWIRLL, a fitting acronym in a city full of projects, stands for the Severe Weather Institute and Radar & Lightning Laboratories.

The acronym was the creativity of Kevin Knupp, a leading severe weather research scientist at UAH and a professor of atmospheric science.

He said SWIRLL “was about the easiest and fastest one I’ve ever come up with. It fit the focus of the research.” He said he started the name with severe weather (SW). “The first word that came to mind was ‘swirl.’”

The \$7 million grant was made possible through the efforts of Alabama Governor Robert Bentley.

SWIRLL will build on the excellent and collaborative severe weather and radar expertise already in place on

campus, in the UAH Department of Atmospheric Science, UAH Earth System Science Center, National Weather Service forecasting office, NASA Earth Science research team, and the Office of the Alabama State Climatologist.

The Chronicle of Higher Education has ranked UAH’s Department of Atmospheric Science as one of the top 10 programs in the nation since 2007. The Earth System Science Center conducts about \$9 million a year in research in atmospheric science and ranked 12th in the nation in 2009 on federally funded research and development by the National Science Foundation.

The facility will consist of:

- A severe weather research campaign center to enable command-and-control direction of deployed mobile research assets in the midst of severe weather events
- A conference room facility for research, graduate education, operational planning meetings for

field campaigns, public outreach, and media coverage

- Office space and sustaining engineering labs for fabrication, maintenance and storage of mobile weather research instrumentation, including the MAX, M3V, and MIPS mobile research units
- Development lab space for work on weather instruments, electronics and computers
- A new location for the ARMOR severe weather research projects. Presently, they reside in a parking lot.
- And a weather balloon launch facility, to enable in-situ measurements during severe weather events, deployed directly from the campus. The facility is designed and will be constructed to be tornado proof.

UAH President Robert Altenkirch said the SWIRLL building will enhance the university’s reputation in scientific disciplines and will be a magnet for students.

Nursing program requiring expansion

Tremendous growth of students seeking a nursing degree, combined with an aging population and a national report advocating the need for nurses to obtain a four-year degree, is leading The University of Alabama in Huntsville to renovate the Nursing Building as well as construct an addition to that facility.

UAH is making efforts to meet the need for nurses in the north Alabama region by increasing enrollment from 967 students in Fall 2011 to 1307 students in Fall 2019.

The college turns away approximately 120 qualified students each year due to lack of instructional facilities, lack of sufficient faculty and challenges in access to clinical training sites.

“As health care technology increases, as health care systems become more complex, as the population ages and as the incidence of chronic illnesses increases, the demand for nurses will continue to grow,” said Nursing Dean Fay Raines. “In addition to providing



The Nursing Building has not had an expansion since the original building was constructed in 1976. The structure had a capacity of 250, but today's nursing enrollment is approaching 1,000.

needed services to citizens of the region, health care is one of the largest contributors to the economy. Nurses comprise the largest component of the health care workforce.”

The Alabama Department of Industrial Relations projects that registered nurses are first on Alabama's list of high demand occupations from 2008-2018 with 1,530 anticipated openings per year. Of that total, 830 are new positions and 700 are projected to be replacement positions, according to the state agency.

A year ago, the Institute of Medicine released its landmark report on The Future of Nursing. The report recommends increasing the educational level of nurses with specific goals to bring the number of bachelor's prepared nurses to 80 percent of the workforce and to double the number of nurses with doctoral degrees. UAHuntsville is the only institution in northern Alabama that offers all levels

of degrees and is, therefore, uniquely positioned to provide leadership in meeting this goal, according to Raines.

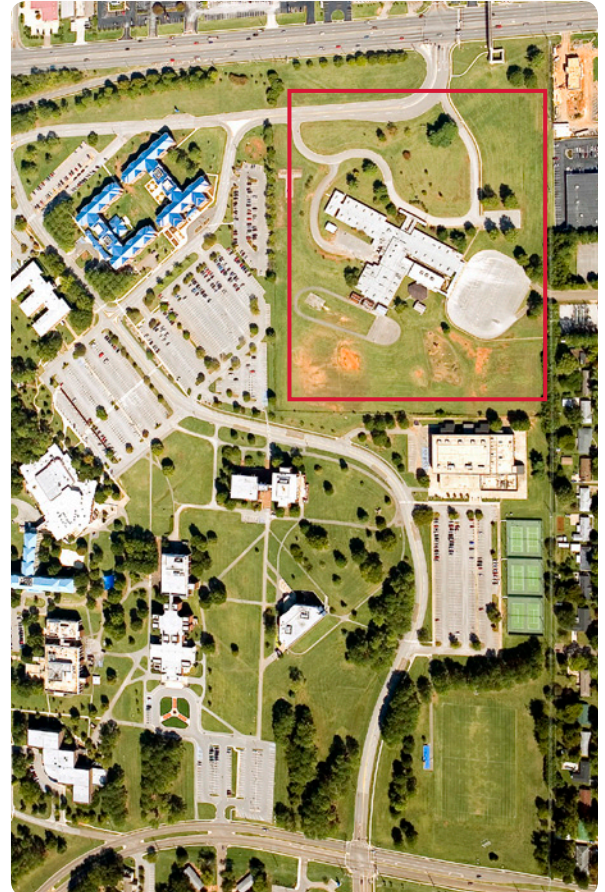
UAHuntsville offers bachelor's, master's and doctoral programs in nursing. The bachelor's program offers a track for students entering nursing as well as a track for registered nurses who have associate degrees and are returning to school to earn bachelor's degrees. The master's programs prepare acute care nurse practitioners, family nurse practitioners, nursing administrators and clinical nurse specialists. The doctoral program offers the professional doctorate.

The current Nursing Building, which was first occupied in 1976, is inadequate in size and technology for current and future needs, according to Dean Raines. In order to expand and meet the need for nurses in the region, improved and expanded facilities for instruction are essential, she said.

CHARGER PARK



University officials held ribbon-cutting ceremonies for Charger Park during 2012. A new concession stand, ticket booths and the UAH Chargers softball and baseball teams are all part of the new athletic complex in the southeastern quadrant of the campus. Pictured above is the women's softball locker room.



UAH campus grows by 30 acres

The University of Alabama in Huntsville will add another 30 acres to the campus through the purchase of University Place School.

The elementary school is located adjacent to the northeast corner of the campus. Huntsville City Schools is scheduled to build a new elementary school, and students from Terry Heights Elementary and University Place School will be moved to that new facility. The closing date on the purchase is October 1, 2014, with extension options to October 1, 2018.

There are no immediate plans for the property, but the addition of space will be necessary for the university's long-term campus needs.

UAH seeks propulsion ‘Holy Grail’

“We’re trying to come up with a system that will demonstrate ‘break even’ for thermonuclear propulsion.”

Can a device formerly used to test nuclear weapons effects find a new life in rocket propulsion research? That is the question to which researchers at The University of Alabama in Huntsville seek an answer.

A new massive device is now assembled at the university’s Aerophysics Research Center on Redstone Arsenal, where a team of scientists and researchers from UAH’s Department of Mechanical and Aerospace Engineering, Boeing and Marshall Space Flight Center’s Propulsion Engineering Lab are busy putting together a strange looking machine they’re calling the “Charger 1 Pulse Power Generator.” It’s a key element in furthering the development of fusion technology to drive the spacecraft of the future.



Ph.D. candidate Ross Cortez conducts propulsion research on the Charger 1 Pulsed Power Generator.

The huge apparatus, known as the Decade Module Two (DM2) in its earlier life, was used on a contract with the Defense Threat Reduction Agency (DTRA) for research into the effects of nuclear weapons explosions.

UAHuntsville was first informed about its availability in 2009, several years after the research contract for which it was originally designed came to an end.

Disassembling several huge pieces of industrial equipment, the components were delivered in five shipments to the university’s Aerophysics Research Center from San Leandro, Calif.

When assembled, the unit will tip the scales at nearly 50 tons, and will be “one of the largest, most powerful pulse power systems in the academic world,” according to university officials.

With all units now in place, UAHuntsville engineering professor and project head Dr. Jason Cassibry says the team is busy cleaning up the components, which picked up “a lot of dirt” after sitting in a lab for nearly 10 years, then being shipped across the country.

Refurbishment will include replacement of about 100 large resistors, and securing

15,000 gallons of transformer oil for the Marx tank, which holds the capacitors and prevents arcing between them. “That’s a big hurdle, but we’ll get there,” says Cassibry.

“We’re interested in deep space exploration,” Cassibry says. “Right now humans are stuck in low earth orbit, but we want to explore the solar system. We’re trying to come up with a system that will demonstrate ‘break even’ for thermonuclear propulsion.”

Despite the hydrogen bomb images this machine may evoke, Cassibry cautions it is completely safe. More importantly, research using the Charger 1 Pulse Power Generator could change the entire way rockets are propelled and revolutionize space travel.

Since the dawn of space-flight in the late 1950s, the world’s rockets have relied on chemical reactions of various fuels, such as kerosene or liquid hydrogen, to provide the thrust needed to launch and propel spacecraft.

Launch vehicles and rocket engines have to be designed to carry thousands of tons of fuel, along with the relatively lightweight payloads.

Fusion propulsion would reduce fuel needed to a few tons instead of thousands of



tons. More importantly, it could reduce a trip to Mars to six weeks instead of six months, which reduces bone density loss and other effects of prolonged weightlessness on crew members.

A launch would be somewhat like assembling the international space station, Ross Cortez explains. He is an aerospace engineering Ph.D candidate from Milton High School in Alpharetta, Ga. Multiple launch vehicles would put the required components into orbit, where

the spacecraft would then be assembled. The pulse fusion engine would then launch the spacecraft from this higher Earth orbit. After achieving mission velocity, the engines would then be turned off and the spacecraft would coast to its destination.

Crew members would feel the power as a series of pulses like a light tapping – not the common misconception of a full-throttle acceleration that would keep them pinned to the backs of their seats.

Cortez describes the fusion

principle as “taking two light atoms and smashing them together, which releases massive amounts of energy.” Similar to the process used by the Sun for billions of years, atoms of heavy hydrogen, or deuterium, combine with isotopes of lithium to release the energy required for thrust.

Another way to look at it, Cortez says, is to liken it to a lightning strike, when an electrical current blasts through the fuel to compress the atoms, which achieve the reactions needed.

“Taking two light atoms and smashing them together ... releases massive amounts of energy.”

Enhancing off-the-shelf helicopters

“We want to take these emerging technologies and apply them where we can get a 70 to 80 percent solution that we can use right now.”

What amounts to serious scientific research could, at first glance, be mistaken for students at The University of Alabama in Huntsville letting off a little stress with radio-controlled helicopters.

The air near the university's Optics Building is filled with the buzz of small helicopters hovering over parking lots, their tiny video cameras sending back amazingly clear images of a wide expanse of ground below.

It's all part of work being done by UAHuntsville's Systems Management and Production Center at Von Braun Research Hall. Directed by Dr. Gary Maddux, SMAP is the largest of the university's 15 research centers and institutes.

Under the program, several UAHuntsville students are working to develop micro-

UAVs that could provide low-cost surveillance while enhancing the variety of uses for these UAVs. The U.S. Army's Aviation and Missile Research and Development Center (AMRDEC) on Redstone Arsenal provided the original program funding.

Research scientists William Sabados and Norven Goddard direct a small cluster of students working to enhance the use of small, commercial, off-the-shelf helicopters to be more useful for both military and commercial purposes.

While the research is conducted at UAHuntsville and most student researchers are pursuing various UAHuntsville technical degrees, students from other north Alabama universities, and even a few from area high schools, have gravitated towards the program, said Sabados, who pairs students with research projects.

Those students span a wide range of technology curricula, from computer science and software engineering majors to aerospace, mechanical, and electrical engineering majors. Even graphic design majors are getting involved, which Goddard said adds an important dimension to the work of the student teams.

“They have the ability to put it on paper and see how the design actually flows together. Visual is the way to go,” Goddard said.

Terming the high level of technological capabilities of the student researchers “a state asset,” Goddard

said he believes most of the graduates will find employment for their skills and talents in Alabama.

Goddard calls the program a resource that allows the military and first responders to tap the knowledge, skills and abilities of students.

Their research supports the ongoing evolution of military intelligence, surveillance, and reconnaissance (ISR). ISR platforms are getting smaller and less costly, important in an era of increasing constraints on military R&D budgets. At altitudes of just a few hundred feet, they can peer down on enemy troops below while remaining practically invisible.

Tighter budgets and the need to capture the benefits of emerging technologies also push the desire for what Goddard terms “the 80 percent solution.”

“We want to take these emerging technologies and apply them where we can get a 70 to 80 percent solution that we can use right now.”

From a military standpoint, he said this eliminates some of the need for costly R&D programs that might develop a technology to a complete solution, only to have that technology become obsolete when a solution is achieved.

Sabados explained that “disruptive technologies” such as mini-UAVs have the potential to change the way surveillance is done, both for soldiers in theater and for first responders or law enforcement authorities.



Today's mini-UAVs, Sabados said, are the disruptive technology that larger UAVs used to be. "Ten years ago, UAVs were considered a disruptive technology, but now you see them on the news every night," he said.

Everything in aerial surveillance is getting smaller, lighter and less expensive. The mini-copters often carry tiny

cameras that are marvels of miniaturization.

Student researcher Aaron Laney said a camera currently being used is about the size of a stack of three dominoes, and said the trend is for them to get ever smaller.

And while the military benefits are obvious, law enforcement and first responders are showing increasing interest in the

tiny aerial platforms with their advanced cameras and other sensors.

First responders could use them for low-cost surveying of post-tornado damage, or to survey the scene after a bad auto accident, according to Laney. Law enforcement sees uses ranging from looking for fugitives to finding missing persons such as small children.

"Ten years ago, unmanned aerial vehicles were considered a disruptive technology, but now you see them on the news every night."

EDGE of the Universe

Dr. James Hadaway inside the vacuum chamber at Marshall Space Flight Center's X-Ray and Cryogenic Facility with mirrors destined for the James Webb Space Telescope.

Photo: Jake Lewis, Ball Aerospace & Technologies Corp.

James Webb Space Telescope to view distant stars and galaxies

The mirrors that Dr. James Hadaway and his associates tested for NASA's next great space observatory look pretty much like he thought they should look 15 years ago.

Hadaway, a research scientist at the Center for Applied Optics, is leading the optical testing of the James Webb Space Telescope's 18 primary mirrors.

Testing of the mirrors took place at NASA's Marshall Space Flight Center's X-ray and Cryogenic Facility.

Subcontractors through Ball Aerospace Corp., Hadaway and Dr. Patrick Reardon have been part of a UAH team that has been working to

ensure that the Webb telescope sees everything it should see.

The observatory was designed to look at stars and galaxies on the distant edges of the universe.

The gold-coated mirrors for the Webb telescope must be tested at temperatures mimicking the extreme environment of space to ensure that the mirrors will be smooth and focused when they are put to work most of a million miles away from Earth.

Once they are cooled to the temperature of deep space (45 degrees Kelvin or about 378 degrees below zero Fahrenheit), the extraordinarily smooth

mirrors have to be warmed slowly over a period of several days to avoid damage, distortion or condensation, which could leave behind deposits on the polished gold surface.

Hadaway has been part of the James Webb Space Telescope program from its beginning, when he led the optical design team that came up with the initial layout for the telescope. With a mirror that is about seven times bigger than the mirror on the Hubble Space Telescope, the Webb will collect infrared radiation (energy that our bodies sense as heat) from the most distant stars and galaxies ever viewed.

“The final optical design is basically the same as my original design,” Hadaway said. “The optics weren’t too difficult to design. The hard part was making lightweight mirrors that will survive launch loads and then deploy properly.” The mirror development team led by Ball Aerospace included UAH, Brush Wellman of Ohio, Axsys Technologies of Cullman and L-3 Tinsley of California.

What would have been routinely challenging was complicated by the observatory’s working environment.



Infrared energy includes the same wavelengths created when sunlight warms a spacecraft. To avoid polluting weak infrared radiation from galaxies on the edges of the universe with energy absorbed from sunlight, the Webb telescope will be shaded from the sun. Sitting in that shade, the mirrors will operate at temperatures about 45 degrees Celsius above absolute zero.

When the mission was proposed, no one knew how telescope mirrors built on Earth at room temperatures might bend and distort at temperatures that are that cold.

During a meeting at NASA’s Marshall Space Flight Center, officials wondered where they might find someone with

the special knowledge and skills that are necessary to organize and conduct a mirror testing program under those extreme conditions.

Hadaway stuck up his hand.

“We can do that,” he said. After working with NASA to develop specialized mirrors used for X-ray telescopes, Hadaway was confident the CAO team could develop the tools needed to test mirrors designed to collect energy at the other end of the electromagnetic spectrum.



JWST is expected to produce images superior to these from the Hubble.

Using techniques that they developed, “we measured to see how each mirror deforms when it ‘goes cold,’ ” said James Hadaway.

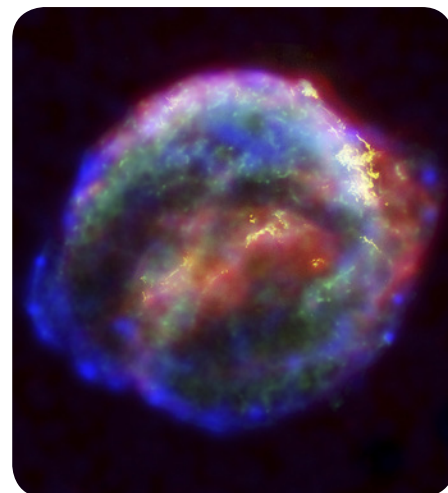
A house-sized cryogenic chamber in the XRCE, a facility built for testing the Chandra X-ray Observatory’s optics, was adapted for testing Webb mirrors at extremely cold temperatures.

Using techniques that they developed, “we measured to see how each mirror deforms when it ‘goes cold,’ ” Hadaway

said. “We send what we find to Tinsley Laboratories in Richmond, California, which polishes opposite distortions into the mirrors. If it was a bump when it was cold, they polish in a hole. Now it looks bad at room temperature, but it’s perfect in the cold.”

Perfect? The average imperfection allowed is the height of about 200 hydrogen atoms.

Testing mirrors in a massive insulated chamber requires Hadaway and his team to be flexible. “If it gets cold at



3 a.m., you go in at 3 a.m.,” he said. “You go when they’re cold. We try to work with the guys at Marshall so things work out in the daytime, but you just have to be there when it’s time.”

The mirror-testing program ended in 2012, although Hadaway expects to be involved in the Webb telescope’s ongoing testing, development and preparations for a launch in 2018.

During the 15 years he has been involved in the program, Hadaway’s team has received more than \$5 million in NASA funding to support UAH’s work.

“I was part of this program from day one,” Hadaway said. “My goal is to be there when it’s on orbit and certified to be operational.”

Political science professor leads university's plans for global understanding

Dr. Kathy Hawk has been chosen to lead the university's Global Understanding Initiative.

Sigmattech, through a gift to the university, funded the Baba Budha Chair to promote global education and understanding, and to serve all facets of the student community, to include undergraduate and graduate students, many of whom are or will be government employees at Redstone Arsenal in the areas of Security Assistance and Foreign Military Sales.

As a precursor to the recruitment of a world-class scholar to serve as chairholder, Hawk will coordinate efforts in the following areas:

- *Establish ground work for the Global Understanding Center of Excellence*
- *Leverage and strengthen political science, business, and engineering at UAH departments to develop curriculum and teach courses at the undergraduate and graduate levels to create greater global awareness*
- *Serve as liaison to her counterpart in India and other key universities/institutions to set up focused programs of interaction and establish new relationships*
- *Collaborate with the University of Alabama System in development of international partnerships and programs, including India and especially those with a focus on countries associated with U.S. Security Assistance programs*
- *Develop courses in security assistance*

at the undergraduate and graduate levels, including potential individual development certification programs for government employees following the Department of Defense (DOD) 3 Level model for certifications.

Sigmattech executives praised Dr. Hawk's appointment.

"Kathy is a natural to get this global understanding effort up and running," said CEO and President Maj. Gen. (Ret.) Joseph Bergantz.

"With the experience that Dr. Hawk brings with her on-the-ground international experience with the Department of Defense, we believe that she is well suited for the task and the responsibilities."

UAH Provost Vistasp Karbhari applauded the vision of Sigmattech and its founder, Dr. Gurmej Sandhu.

"The establishment of the Global Understanding Center of Excellence is an important aspect of the growing relationship between Redstone Arsenal and UAH," said Dr. Karbhari.

"We appreciate the confidence that Sigmattech is demonstrating in how our campus can serve in a leadership role to establish and grow strategic relationships with India and other national partners involved in U.S. security assistance programs.

"These partnerships with Redstone Arsenal define the university's special role in the Huntsville community, and how we can help shape the future of the role of this community and Redstone

Arsenal plays in global affairs."

Previously, Dr. Hawk served as the Chair of UAH's Department of Political Science. She is expected to continue to teach a variety of courses at the undergraduate and graduate level in international relations, U.S. foreign policy, U.S. national security policy and assorted regional studies courses for the College of Liberal Arts.

Dr. Hawk has an international background including an assignment in Egypt as a Foreign Service Officer, and on international defense issues under contract to the Air Force and the Strategic Defense Initiative Organization.

Additionally, as a Naval Reserve Officer, she commands a 40-member reserve unit that performs scientific and technical analysis for the U.S. Navy.

Her most recent active duty military assignment was with the Combined Joint Special Operations Task Force in Balad, Iraq in 2007-2008.

Dr. Hawk has been a member of the UAH faculty since 1995.

The Baba Budha Chair in Global Understanding is part of a dual chair concept with specialization in Indian studies originating at UAH.

The program, which was established as part of a \$1 million endowment from Sigmattech with the personal initiative of Dr. Sandhu, the chairman of Sigmattech, is designed to assist UAH in enhancing global understanding, as well as growing business opportunities in Alabama, and improving international relations.





Researchers create end-to-end supply chain metrics for U.S. Army

“What they wanted us to think about is how they conduct business from a logistics and supply chain perspective”

- Dr. David Berkowitz

You’ve heard the supply-and-demand adage “time is money.”

In the defense world, lag time could cost lives, disrupt training and create other logistical headaches for America’s military forces.

UAH researchers have wrapped up a study for the U.S. Army to integrate a more efficient system of managing literally tens of thousands of military parts and supplies.

The goal was to establish a suite of metrics that would assist in the management of the supply chain in multiple ways, such as creating indicators that could help U.S. Army managers predict a shortfall in supplies.

“What they wanted us to think about is how they conduct business from a logistics and supply chain perspective,” said Dr. David Berkowitz, associate dean and principal investigator at the Integrated Enterprise Lab in the UAH College of Business Administration.

The study was initiated on behalf of the U.S. Army Aviation and Missile Command (AMCOM), and was escalated to the purview of the U.S. Army Materiel Command (AMC) midway through the project.

University researchers, including students and a team of other university faculty and staff, amassed data that studied the entire supply chain of reparable parts “from the factory to the foxhole.”

Their mission was to assess needed inventory based on demand for each

item in question and predictable wait times if parts needed to be shipped. Supply disruptions could be caused by breakdowns in the supply chain processes, or by unpredictable factors such as a massive power outage or in a breakdown at one of the Army’s third-tier suppliers.

“They needed us to show them how to look at their data and report it in a way that would give them some type of a forewarning,” Berkowitz said.

Whether it’s helicopter blades for helicopters in Afghanistan, guidance systems for missile weaponry, transmissions for heavy equipment or computer monitors for a U.S. Army field center, down time associated with waiting for parts for repairs can be devastating for the soldier.

Research literature said the goal of the supply chain analysis is to provide information to all levels of AMC supply chain management from senior leadership to item managers, enabling them all to manage the Army’s supply chain more efficiently.

To do that, they devised a new suite of “end-to-end supply chain metrics” that integrated multiple data systems into a single supply chain model (dubbed a “dashboard”) for analysis and reporting.

A bargain shopper at Best Buy won’t really be inconvenienced that much if a desired item takes a couple of days extra because it is out of stock. It’s a different story for the Army, especially in what could be dangerous or hostile settings.

To get a big picture view on parts delivery systems, members of the team visited a Ford Motor Co. factory in Michigan, a John Deere tractor manufacturer, an Army depot in Corpus Christi, Texas, and one of the Army’s transmission suppliers. They developed a scorecard for suppliers and established a grading system to evaluate customer wait times.

The study looked at primarily three elements in the supply chain: performance, focusing primarily on customer wait times, quality and reliability, and efficiency with regard to allocation of assets.

Researchers evaluated ‘problem areas’ that didn’t meet assigned tolerances and calculated the impact on the inventory for problems, such as the possibility of excessive wait times.

“You can never say with 100 percent certainty that it will work this way. All you can do is say these are the tolerances we set up, where it’s been violated, determine the root cause, and here is a workable solution to get it back on track,” Berkowitz said.

“It’s all about being able to manage,” Berkowitz said. “It’s all about being able to understand what those exceptions are going to be, and about putting a proactive plan in place to make your supply chain as efficient as possible.”

There were 22 students involved in the project, 11 of whom have gone on to jobs with the government or government contractors.

Interdisciplinary approach necessary for complex cybersecurity threats

“...UAH is in a unique position to address innovative research and instructional opportunities in the complex cyber domain.”

- Dr. Sara Graves



Evolving and increasingly complex threats have heightened the need on the part of government and industry to be prepared with a comprehensive response to cybersecurity.

The University of Alabama in Huntsville is responding to those threats through the establishment of government and corporate partnerships to advance research, and by offering an interdisciplinary degree in information assurance, as well as expanding cyber related topics in many other courses.

“The areas of cybersecurity and information assurance include an ever-increasing list of issues that span a spectrum of disciplines,” said Dr. Sara Graves, Director of the Information Technology and Systems Center. “Many issues require technological approaches as well as consideration from areas such as sociology and economics. UAH is in a unique position to address innovative research and instructional opportunities in the complex cyber domain.”

UAH’s innovative master’s degree program prepares graduates with the skills to secure and defend networks, manage data security as well as recover from security failures. The Master of Science in Information Assurance and Security is a multi-disciplinary program that involves the Colleges of Business Administration, Engineering and Science.

The efforts have been worthwhile. The National Security Agency and the

Department of Homeland Security have designated UAH as a National Center of Academic Excellence in Information Systems Security Education.

“Our graduates understand the business and technical underpinnings of the information assurance system life cycle, understand the statutory requirements, be able to perform threat analyses and neutralize threats, plan for continuity of operations and employ information security best practices,” said Business Dean Dr. Caron St. John.

The computer engineering coursework targets network vulnerability analysis and hardening techniques, while computer science courses focus on secure software, data and architectures. The information systems core, taught by the business college, targets systems analysis techniques, risk management and strategies for information security. These core courses give students a balanced introduction to the hardware, software, information systems and processes that frame the IAS challenge.

The university’s commitment can be seen across the campus. UAH research and faculty members are collaborating with Redstone Arsenal and other federal agencies on large system infrastructure issues. Research is under way for the U.S. Army Missile and Space Intelligence Center studying the military offensive use of cyber warfare, as well as the defense against cyber warfare attacks;

for the Army Space and Missile Defense Command involving physical weapons research in cyberwarfare; and for the Army Software Engineering Directorate, exploring protection of the military’s logistics and supply chain management infrastructure.

The European Command’s deputy science and technology executive has an office on the UAH campus to coordinate that command’s cybersecurity activities with the North America Command.

Also, the Information Technology and Systems Center is performing cross-domain research with NASA in data mining, semantics, information management and visual analytics techniques. Its research with the National Science Foundation and other agencies involves geospatial analysis, and adaptive processing with cybersecurity applications.

Integral to the university’s efforts are its collaborations with local corporations. UAH counts among its partners: Huntsville-based Dynetics; Pikewerks, a Raytheon Corp.; Booz, Allen Hamilton; Lockheed Martin; Radiance; and The Boeing Co.

The collaboration between Dynetics and UAH goes back to efforts to establish the master’s degree in engineering for a Concentration in Information Assurance Engineering. IAE is about developing computer networks and wired and wireless



communication systems that will remain dependable in the face of malice and error. IAE focuses on tools, processes and methods to design and implement systems and to adapt existing systems to survive a hostile environment.

Students learn about IAE through hands-on courses in the Cyber Chargers Laboratory. The laboratory is a replica of real-world wired and wireless computer networks infrastructure and is considered to be among the top facilities in the nation, giving UAH students opportunities to learn through hands-on education and research.

“Back in the 2004 timeframe when we established the information assurance master’s program, there was an insufficient supply of trained and certified information assurance graduates in our area,” recalls Dynetics CEO Dr. Marc Bendickson. As a result, he said government and commercial organizations in Huntsville have greatly benefited from the expanded pool of local talent available to tackle today’s ever-changing cyber challenges.

Dynetics has taken advantage of this larger supply of talent in its thriving cyber business. The company works alongside government and commercial customers to provide solutions that impact the integrity of cyberspace – whether for defending their own environments or taking the offensive.

Virtual environment

New research device promises to be a valuable tool

Imagine hovering midair at a level that puts you nearly at the top of Chicago’s Willis Tower, as less commanding skyscrapers fall away from you in all directions. Gaze along the city’s streets and avenues with Spiderman’s view.

Then click, and you are entering a furnished apartment, walking toward its large picture window with a view of Seattle’s Space Needle. Then click, and you are afloat in space, watching the approach of the International Space Station and ultimately walking along the edges of its solar panels.

Yet in your travels you’ve never left the UAH campus. What you’ve entered is the CAVE, or CAVE Automatic Virtual Environment, a three-sided virtual reality chamber of whatever your mind can imagine and a computer can plot, complete with directional aural effects courtesy of surround sound.

CAVE makes it possible to go where it is otherwise impossible to go, view what has not yet been built, try out what is still conceptual and train for situations yet to arise, and to do it all in a virtual reality that is close to authentic.

Funded by a \$500,000 NASA grant and built as the UAH Center for Modeling, Simulation, and Analysis expands the university’s new master’s and doctoral

level modeling and simulation degree program, the CAVE is a powerful tool for Huntsville, a city that in recent years has seen its national reputation for modeling and simulation prowess skyrocket, attracting attention from both government and the private sector.

Powered by a towering mainframe that commands four cameras, large mirrors and rear projection screens, the CAVE is “the first piece of equipment in what is to become an immersive visualization lab for the university,” said Gregory Reed, a UAH researcher and graduate student.

“The purpose of the CAVE is immersion,” said Reed. “You can pull up any sort of virtual environment and immerse yourself in it.” The device lends itself readily to training, gaming and virtual engineering applications.

Just put on the 3-D glasses and you can literally step directly into the environment in which you wish to study or train. Now the goal is to partner with government agencies and businesses in the CAVE to apply its potential.

“We are in the process of creating demonstrations to showcase the capabilities of the CAVE to the Department of Defense (DoD) and NASA,” said Joshua Ciardelli, a December graduate of UAH who earned a degree in computer engineering.

\$4.15 million Durkee gift among UAH's largest cash gifts



“The generosity Larry and MaryLou Durkee have demonstrated will be of significant benefit to our students and this campus for many, many years into the future.”

The University of Alabama in Huntsville has received one of the largest cash gifts in its history that will be used for a variety of programs for the campus.

The MaryLou Durkee Management Trust has provided a generous gift and property to the university valued at \$4.15 million. MaryLou and her husband, Larry, established several annuity trusts during the 1990s listing The University of Alabama in Huntsville as the beneficiary.

“It’s gratifying for us to receive such a generous gift from friends of the university,” said UAHuntsville President Robert A. Altenkirch. “The size of their gift matched the tremendous affinity that Mr. and Mrs. Durkee obviously had for UAH, our academic programs and athletics.

“The generosity Larry and MaryLou Durkee have demonstrated will be of significant benefit to our students and this campus for many, many years into the future.”

MaryLou Durkee supported UAHuntsville as an active member of the President’s Council by providing annual donations, and generously provided gifts to support the College of Business Administration. MaryLou, to honor the memory of her late husband, served as an honorary board member of the College of Business Administration’s Capital Management Group Advisory Council.

She believed in the nursing profession and was an active supporter of the College of Nursing and its students, stating: “You never know when you might need a nurse.”

MaryLou was also a dedicated benefactor to the university’s athletics program and demonstrated she was a sports enthusiast by attending sporting events regularly.

The Durkees had previously established the Larry and MaryLou Durkee Scholarships in 1995 to benefit a business student and student-athletes. The following year, they created a library endowment fund to benefit the M. Louis Salmon Library. The MaryLou Durkee Management Trust also established the Larry and MaryLou Durkee UAH Endowed Scholarship during 2009 along with the Larry and MaryLou Durkee Endowed Business Scholarship.

Mrs. Durkee died in 2009 and was preceded in death by her husband’s death in 2003.



SAIC Corp. provides gift to UAH's College of Business Administration. From left, SAIC executives Chuck Lewis and Susan Myers, UAH professor Jeet Gupta, Business Dean Caron St. John and SAIC executive Neil Rodgers.

SAIC provides \$125,000 gift to business

Science Applications International Corp. in May provided a \$125,000 gift to the College of Business Administration to develop programs in enterprise resource planning using SAP software.

SAP software, which helps manage business solutions, is used in 12 UAHuntsville business college courses, including a course in business intelligence management. More than 1,800 students have taken these classes since 2006.

With more than 2,000 employees, Huntsville is SAIC's third largest location.

Dr. Caron St. John, dean of the College of Business Administration, said, "The

feedback we have received reveals that these classes give our students a unique advantage, and benefit the organizations that employ them."

SAIC has provided this grant annually, which also supports the development of student skills through SAIC internship programs, guest speakers and assistance with curriculum development.

UAHuntsville is part of SAIC's Strategic University Alliances program that focuses on campus activities in support of the company's strategic goals, particularly strengthening the science and technology core of SAIC.



Sanmina-SCI honors Olin King, adding gift to endowment

Sanmina-SCI's Defense and Aerospace Systems Division provided a \$50,000 gift to UAH in November to increase the endowment of a scholarship fund that was established in 2000 in honor of Olin B. King.

King was the founder and former CEO of SCI Systems Inc., and under his leadership the company grew into a Fortune 500 company that today provides multi-national electronics manufacturing services with multi-billion dollar annual sales. Sanmina merged with SCI Systems in 2001. Today, Sanmina-SCI employs more than 45,000 people around the world, including 1,367 in Huntsville.

King passed away in June 2012 at the age of 78.

Mike Underwood, president of Sanmina-SCI's Defense and Aerospace Systems Division, said King's legacy would remain a part of the Huntsville community by providing assistance to deserving UAH students seeking an engineering or science degree.

"Olin was a tremendous businessman and entrepreneur, and his leadership skills had a huge impact on Huntsville," he said. "He contributed greatly to the Huntsville area's development as a center of science and industry."



Boeing supports UAH

The Boeing Co. provided a \$20,000 gift to help UAH develop a pipeline of future engineering talent through educational programs at the university. Boeing also contributed a \$10,000 gift to give undergraduate business students scholarship opportunities to plan launches of new businesses. Boeing executives Dan Olberding, left, and Tony Jones, right, provide a check to UAH's Matt Turner and P.J. Benfield.

UAH teams with Huntsville to aid English learners

UAH's College of Liberal Arts has been awarded a grant from the U. S. Department of Education to support degree-training professional development activities for Huntsville City School personnel to facilitate the achievement of high standards of preparedness in working with English Language Learners (ELLs) in the area.

Dr. Jason O'Brien, assistant professor of Education, and Andrea Word-Albritton, director of the Intensive Language Culture Program, were recently awarded a \$1.23 million grant through the U.S. Department of Education's Office of English Language Acquisition. The grant is being funded under the National Professional Development Program, and will support Project HAPPENS, an effort between UAH and Huntsville City Schools.

Project HAPPENS will deliver coursework to in-service, and pre-service teachers as well as professional development opportunities for 120 in-service HCS administrators, and 300 in-service HCS teachers and para-professionals, prioritizing delivery to teachers in STEM disciplines as well as those serving in the Huntsville schools with the highest enrollment of ELLs.

A key component of the grant includes the use of the "coaching" model to provide sustained support for instructors as they implement effective instruction for ELLs. In addition, a dedicated website will be developed and will serve as both a clearinghouse for exemplary lesson plans focused on delivery of content to ELLs in HCS.



Second annual Latino/Latina Summer Institute

The university played host to the second annual Latino/Latina Summer Institute.

Approximately 40 Huntsville area middle school students attended the summer educational event. Students teamed with UAHuntsville faculty on projects such as robot building, GPS tracking, textual analysis and personalized research, as well as participating in recreational activities. A number of organizations and corporations from the Huntsville area participated in planned events, including NASA scientists, who assisted students in building and launching rockets.

In 2001, 18 middle school students from the Huntsville City School System marked the beginning of UAHuntsville's multi-year commitment to increasing the number of Latino/Latina individuals graduating from the university.

UAH sponsored program where students find solutions to challenges

UAH played host to Destination ImagiNation Inc., an educational program where student teams solve open-ended challenges and present their solutions at tournaments. Destination ImagiNation is for students in kindergarten through university level.

Approximately 400 students, third graders through high school seniors, plus their parents, siblings and supporters, assembled in the University Center, Roberts Hall, and Spragins Hall for tournament events in April.

DI began in the summer of 1999, when nearly 200 international volunteers united to create a global creative problem-solving program that would provide students with an exciting and supportive experience.

Today, DI has an extensive global network.

Opportunities exist for UAH faculty, staff and students to interact with tournament attendees, assisting with some of the logistical tasks including registration clerks, photographer, slide show coordinator, runners, coordination and organization of outdoor activities and awards ceremony assistance.

Certificates of appreciation are available for all volunteers and specifically for individuals needing official service hours for an honor society or student organization.

Local education sponsors for DI are Bob Jones High School and Discovery Middle School.



Army and UAH officials discuss the evening performance.

From left:

Chief of Staff Gen. Darrell Williams, Executive Deputy to the Commanding General John Nerger, AMC Commanding General Dennis Via and UAH Provost Vistasp Karbhari.



U.S. Army, UAH groups appear on stage together

The U.S. Army Materiel Command Band from Redstone Arsenal and the UAH Wind Ensemble and Concert Choir joined together on stage for the first time to perform “The Planets.”

This piece is a rare astronomy-themed suite of classical music written by Gustav Holst, an English composer and music teacher between 1914 and 1916. Each movement of the suite is named after a planet of the Solar System, with the exception of Earth, which is not observed in astrological practice.

The evening was a gala celebration of the Arts, Humanities and Social Sciences. In keeping with the space theme, “The Planets” performance was choreographed with spectacular images from NASA’s Hubble Space Telescope.

The October evening event came to a conclusion with a special performance of the “Battle Hymn of the Republic.”



PARTNERSHIPS



One of world's leading physicists speaks to community's scientists

Tom Kibble, a scientist noted for the co-discovery of the Higgs mechanism, and along with Gerald Guralnik and C.R. Hagen, development of the Higgs boson discovery, came to Huntsville to speak to UAH faculty and students as well as physicists from the Huntsville community.

Talking to a packed Chan Auditorium in the Business Administration Building, Kibble started with a description of theoretical physics after World War II, early gauge theories, obstacles to unification, the development of the idea of spontaneous symmetry breaking into gauge theories and the construction of the unified electroweak model.

Dr. Kibble is professor emeritus at Imperial College in London, and formerly served as chair of Imperial's physics department. He was also a co-chair of an interdisciplinary research program on cosmology funded by the European Science Foundation from 2001-2005.

Grassroots literacy campaign celebrates 10 years

The America Reads / America Counts Program, a national grassroots literacy campaign, celebrated 10 successful years by educators at The University of Alabama in Huntsville.

The program gives college students the opportunity to give back to the Huntsville community, by gaining work experience, and earning money. Student tutors are funded through federal and university work-study programs.

The goal of the America Reads/America Counts Program is to improve the reading and mathematics levels of youngsters in grades kindergarten through third grade. Each year, UAHuntsville sends approximately 25 trained students to selected Huntsville City Schools. The students provide several hours of

academic assistance to youngsters at no cost to the participating schools.

"The America Reads program is so rewarding for the students and the tutors. I will always remember how the program helped me grow as a person, and the feeling I get when I provide service in a desperately needed area. I can't wait to start again in the fall semester," said Matthew O'Hara, a junior majoring in political science.

Dr. Mary L. Piersma, chairperson of the Department of Education, directs the UAHuntsville program. "The America Reads/Counts programs have been tremendously successful in the Huntsville City Schools. Both the math and reading programs are part of a long-standing institutional commitment to community

service. Over the years, university students have provided more than five thousand hours of one-on-one tutoring to boost reading and mathematics scores of children who really need the help."

UAHuntsville senior electrical engineering student Lyndsey Holmes, who participates in the program, said: "At first the kids take some time to trust you, but once they do, they have a ton of questions. Any kind of interesting fact you can add about what they are learning, they love. By the end of the school year they are speed-reading and acing tests. The little bit that you can help the teacher makes a huge difference."

UAHuntsville students provide tutoring services to Morris Elementary and Rolling Hills Elementary schools.



UAH celebrates community's international diversity

Approximately 2,000 participants came to campus for the third annual International Festival of North Alabama to raise awareness of the region's cultural diversity.

The September event at Spragins Hall featured cultural performances, the parade of nations and tasting of international foods. There were free activities for children and college students, and an international dessert sampling. Additional activities included global performances with folk dances and performance of traditional instrumentals to ethnic songs and an around the world fashion show.

The event is co-hosted by the International Society of Huntsville and is open to the public. Additional sponsors for the International Festival include the UAHuntsville Office of Student Affairs, Office of Diversity, Office of Research, Office of Advancement, Louis Salmon Library, and the spotlight contributor is Asha Kiran.



Faculty & Staff Highlights

Glenn Haynes' ('79 BA Piano) academic and early life lessons that he learned while attending The University of Alabama in Huntsville helped to chart his course on the national music stage.

Recently, two of Haynes' compositions, *My Lord, What A Morning*, and *Five Miles From Home*, were aired on NPR's syndicated classical music radio program, *Performance Today*. Haynes' extensive experience has been based in church music, composing and conducting.

Dr. Sundar A. Christopher's book, "Navigating Graduate School and Beyond: A Career Guide for Graduate Students and a Must Read for Every Advisor," plots a course for graduate school and beyond that will be much smoother for students.

The book provides the framework for students to be successful in graduate school and in their prospective careers.

Christopher is professor and chair of the Department of Atmospheric Science and associate director of the Earth System Science Center. His research interests include satellite remote sensing, student

professional development, air pollution and climate change air quality.

UAH's Atmospheric Science Program is in the top 10 in the nation based on the faculty productivity as reported by The Chronicle of Higher Education since 2007.

Jeffrey Evans, an engineering faculty member, has received the National Science Foundation Faculty Early Career Development Award.

Dr. Evans is an assistant professor in the university's Department of Mechanical and Aerospace Engineering.

This is the National Science Foundation's most prestigious award in support of the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization.

Timothy B. Boykin, an electrical and computer engineering professor, has been elected Fellow of The Council of the American Physical Society.

Boykin's research centers on the physics of quantum wells, superlattices, resonant-tunneling diodes, and other quantum-confined heterostructures. Most of his work has involved modeling these structures with empirical tight-binding techniques in order to include bandstructure effects.

Christine Sears recently published her first book *American Slaves and African Masters Algiers and the Western Sahara, 1776-1820*.

Sears, an assistant professor of history, teaches classes in the Atlantic World, Early American Republic, and comparative slavery. "I took an eye-opening class on comparative slavery as a graduate student," Sears said. "During that class, I discovered narratives Americans wrote about being enslaved in Africa, and the topic captivated my attention since then."

Evan Ragland, assistant professor of history at UAHuntsville, is the recipient of the prestigious 2012 Shryock Medal from the American Association for the History of Medicine.



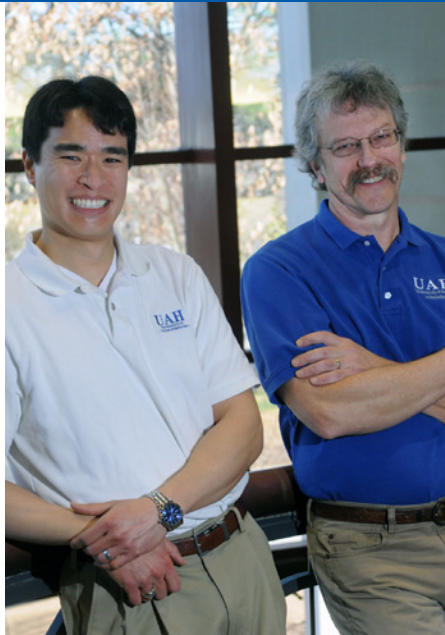
Dr. Rodrigo E. Teixeira of the College of Engineering has been featured on the March cover of *Green Chemistry* for his publication reporting the discovery of a new way to extract fuel from algae.

The tiny microorganisms have a tremendous, game-changing potential, according to algae experts, said Teixeira.

Algae capture sunlight to make fuels that can be used to power cars, planes and everything else, he said.

Green Chemistry is a prominent academic journal in the field of environmentally friendly chemistry.





Drs. Allen W. Wilhite and Eric Fong from the College of Business Administration were published in the prestigious journal *Science* for their investigation of an important issue in research ethics.

They co-authored a paper on the unethical practices of some journal publications, articulating results from their research to show that some editors coerce authors into adding unnecessary citations to articles in the same journal that is considering publishing the submission.

Journal editors want to increase the number of times articles within their

journals are cited by researchers because it raises the journal ranking and is used to make claims of prestige and importance.

The duo analyzed 6,672 responses from a survey that was sent to researchers in the fields of economics, sociology, psychology, and business.

"When we first learned about coercion we were stunned, but after asking around we found that several people were aware of this behavior," said Dr. Wilhite.

"This type of behavior hurts all of academia," said Dr. Fong, "and affects the integrity of academic publications."

The medal honors Richard Harrison Shryock for an outstanding, unpublished essay by a single author on any topic in the history of medicine.

Ragland's academic areas of expertise include the history of science, early modern Europe, history of philosophy and experiment, and the history of the senses.

Kenneth W. Sullivan, associate director of the Office for Enterprise Innovation and Sustainability at The University of Alabama in Huntsville, has been elected as a vice chair of the National Defense Industrial Association's Manufacturing Division. Dr. Sullivan most recently served as the chairman of the Manufacturing Division's Supply Chain Network Committee. He oversaw a survey of small- to mid-sized businesses regarding their participation in the aerospace and defense industrial base conducted by the committee.

Clarke Rountree, Chair and Professor of Communication Arts at The University of Alabama in Huntsville, recently published the book, *The Chameleon President - The*

Curious Case of George W. Bush. Praeger Publishers (Greenwood Publishing Group) published the hardcover, 287-page book in December. The book provides readers with 11 different views of George W. Bush. Rountree also published *George W. Bush: A Biography*, in 2010.

Rountree wrote all the chapters, drawing material from dozens of books and hundreds of news stories, speeches, and editorials. "I don't tell readers which view I endorse and, after writing different chapters, I have found myself switching views back and forth," he said.

Lori Lioce, clinical assistant professor of nursing, was elected as the Alabama state representative for the American Academy of Nurse Practitioners.

As an AANP representative, Dr. Lioce will actively serve as the contact person and liaison for nurse practitioner communications and legislative activities with members, and nurse practitioner groups regionally and nationally.

Mary Fleming, a procurement special-

ist for the Small Business Development Center, has been selected as Alabama's State Star for 2012.

She won the award for her outstanding and exemplary performance, and significant contribution to the small business community. The announcement of her award was made by Bill Cummins, state director of the Alabama Small Business Development Center Network.

She was chosen for her contributions to the North Alabama Region of Alabama, and showing a strong commitment to small business in the seven-county region.

Mark Cowherd, executive director of facilities, recently passed the examination for the Certified Educational Facilities Professional credential.

The CEFP is the advanced standard for the experienced educational facilities professional that recognizes mid-to-senior level professionals. This designation represents superior proficiency in the core competencies and professional strength in educational facilities management.

Student Highlights



Chris Heath, Stephen Doud, Jake Liu, Dr. B. Earl Wells, Douglas Kirby, and Dr. Emil Jovanov.

UAH computer engineering students have designed a tool that could revolutionize new ways of using electronic devices with just one hand.

It's called a Gauntlet Keyboard, a glove device that functions as a wireless keyboard. Instead of tapping keys on a keyboard, the user simply touches their thumb to points on their fingers assigned a letter or other keyboard function.

Conductive thread carries the commands to a matchbox-sized Printed Circuit Board (PCB) affixed to the back of the glove.

The printed circuit board transmits via Bluetooth, whether to a computer, a mobile phone, music synthesizer, video game or military device. Think of the Gauntlet as a touch screen that works by tapping your fingers to your thumb on a gloved hand.

Four senior engineering students at UAH made the glove their senior design project for a computer engineering class led by Dr. B. Earl Wells.

The students are now seeking a patent to market the product. The project won a \$20,000 prize in October from the Best Buy Innovator Fund among hundreds of entries from across the United States.

Jonathan Sullivan has been awarded the 2012 Gopi Podila Memorial Scholarship by the Partnership for Biotechnology Research. Sullivan is a junior majoring in biological sciences. He has a 4.0 grade point average in his major and an overall GPA of 3.73. He is also a member of the UAH Honors Program.

His parents are Robert and Janice Sullivan of Madison. Jonathan is a 2010 graduate of Bob Jones High School.

The Partnership for Biotechnology Research is dedicated to drive growth and diversity of biotechnology in the greater Huntsville area. By facilitating professional networking, workforce and professional development, research opportunities,

Partnership for Biotechnology Research events serve to increase community awareness of biotechnology.

Kristen Ann Lackeos & Brian Sweeney were named graduate fellows for the NASA-funded Alabama Space Grant Consortium Fellowships and Scholarships.

The Alabama Space Grant Consortium (ASGC) is a member of the NASA National Space Grant College and Fellowship Program. In Alabama, more than \$500,000 is awarded in Space Grant Scholarships and Fellowships each year.

They were awarded \$37,000 in fellowships each, as well as one teacher

education scholarship. Additionally, four undergraduate students will receive scholarships of \$1,000 each. Lackeos is majoring in physics while Sweeney is a mechanical engineering major.

The four undergraduate students are:

- Elinor Crook, Earth Systems Science
- Brittani Renee Searcy, Aerospace Engineering
- Lindsay Megan Shine, Industrial & Systems Engineering
- Samantha Marie Shine, Industrial & Systems Engineering

Emily Foshee, a UAH graduate student, won a NASA Earth and Space Science Fellowship for 2012-2013.

Foshee, a student in the atmospheric science master's degree program, was the only student from a university in Alabama to win an NESSF award during 2012.

Her research project continues work on studying potentially damaging wind events that blow through mountain passes or gaps around the world, with the goal of developing methods for forecasting these dangerous storms.

A team of UAH students grabbed the top spot in the 19th annual NASA Great Moonbuggy Race at the U.S. Space & Rocket Center.

The collegiate and high school competition included 600 engineers, drivers and mechanics on 80 teams from 20 states, Canada, Germany, Russia, India, Italy and the United Arab Emirates.

Finishing behind UAH was the University of Puerto Rico at Humacao and Purdue University in third place.

Seven students from The University of Alabama in Huntsville boarded a modified Boeing 727-200 to test their miniature satellite in a microgravity environment.

But that flight will be tame compared to what they will experience as they find out how strong their stomachs are on multiple flights aboard NASA's "Vomit Comet."

The modified airplane will carry the Space Hardware Club members on multiple microgravity flights in order to test the club's first "cubesat," designated ChargerSat1.

The small cubic satellite measures only about 10 centimeters on each side and weighs 950 grams, slightly more than two pounds. At that weight, the cubesat falls



Shushannah Smith is pursuing an advanced degree, and has a clear view of how that degree will fit into her future.

Smith is aspiring to earn her Ph.D. in mechanical and aerospace engineering, and she hopes to become a university professor and serve as a director of a minority education program focused on STEM (Science Technology Engineering and Mathematics) majors.

Smith is well on her way to a promising career. She was one of 41 college students in the nation to be awarded the prestigious Ford Foundation Fellowship.

UAH students won two awards during a 2012 modeling and simulation competition.

Students from the university's Department of Computer Science and the Center for Modeling, Simulation, and Analysis won the Pitch Interoperability Award and the Board of Directors Award at the "Simulation Interoperability Standards

Organization Smackdown," a NASA-sponsored event.

The Pitch Interoperability award was given to the UAHuntsville team for superior collaboration with the other teams, and the Board of Directors award was provided for effective use of the interoperability protocol standard.

into the "picosat" category – nanosatellites that weigh more than 100 grams but less than 1,000 grams. "If we keep it under 1,000 grams this can become the first picosat to successfully deploy a gravity gradient boom," said Matt Rodencal.

NASA set up the Cubesat Launch Initiative in 2009 to provide research opportunities for small satellites to piggyback on planned launches as auxiliary payloads.

Experiments are geared to explore areas of science, technology development, exploration, education or spaceflight operations. Last year, UAH's cubesat experiment was selected as part of a "third batch" of 33 nanosatellites to fly in 2013 or 2014. The experiments are designed to test and verify in-flight performance.

Josh Walters has won a national award for his work in optical design and engineering research. He was among the winners of the 2012 Robert S. Hilbert Memorial Optical Design Competition.

Walters was awarded accolades for his project, titled "Non-Sequential Modeling of Multi-Aperture Lenslet Array Spectropolarimetric Imager."

The goal of Walters' design is to reduce crosstalk in an imaging system that uses an array of lenslets, so that the resulting image is clearly distinguished.

This work will aid those researching the benefits of non-traditional imaging systems, similar to the compound eye found in insects.

UAH's value: 7,773 jobs \$684 million

The economic impact of UAH is nearly \$700 million annually, a national consulting company reported last year.

UAH had an economic impact of \$684.4 million during 2009-2010, and that impact led to the creation of an estimated 7,773 jobs statewide, says a 2012 report by Tripp Umbach, a nationally recognized consultant.

The university affects business in Alabama in two ways: 1) Direct expenditures for goods and services by the university, its employees, students and visitors. This spending supports local businesses, which in turn employ local individuals to sell the goods, and provide the services needed by the university's constituents. 2) Induced or indirect spending within the state of Alabama. The businesses and individuals that receive direct expenditures re-spend this money within the state, thus creating more jobs.

The university's direct impact for the study period was \$297.6 million, and indirect impact was \$386.8 million for the total impact of \$684.4 million.

"This study shows tremendous direct and indirect economic impact that our campus has on the greater Huntsville area," said UAH President Robert Altenkirch. "But the influence of the campus extends beyond those dollars. The campus is at the center of an 'econsystem' that has positive streams of influence throughout our area."

For instance, the econsystem includes:

- *Earning power of college graduates: Students who possess a bachelor's*

degree earn \$900,000 more during their career, or \$20,000 annually. This is an extra \$375 million paid a year to our nearly 19,000 alumni in Alabama

- *The Small Business Development Center assists local companies by signing federal contracts worth about \$1 billion using the center's services.*
- *Researchers, through the development of lean manufacturing techniques, help Alabama manufacturers be more competitive in the global economy, thus helping preserve thousands of jobs.*

"UAH recruits the best minds and retains the brightest young local scholars, thus serving as the center for intellectual development of the community," Altenkirch added. "This role is crucial for our area."

UAH received \$43.1 million in state appropriations during 2009-2010. The university was able to leverage those dollars and generate an additional \$15.88 in the state economy for every \$1 invested by the state of Alabama.

Through local spending, as well as its direct and indirect support of jobs, UAH stabilizes and strengthens the local and statewide tax base. The university generated \$35 million in tax revenues to state and local governments.

Both directly and indirectly, UAH supported 7,773 jobs in the state — 3,109 direct jobs and 4,664 indirect jobs.

Research and sponsored project expenditures at UAH have grown from \$65 million in 2008 to \$82 million in 2010. During the past five years, UAH research scientists have performed

more than \$200 million in contract and grants, supported 700 graduate students, received 11 patents and created \$1 million in licenses and royalty fees.

UAH also attracts millions of dollars to the state in government- and industry-sponsored research and projects. The university's \$78.8 million in sponsored research alone translates into significant economic impact. The current economic impact of UAH's research is \$168.1 million (\$70.9 million direct and \$92.2 million indirect.)

Research operations make tangible and quantifiable economic contributions, according to the report.

Along with creating jobs for research and staff personnel, UAH scientists are contributing to new product development and technology commercialization. That knowledge and technology transfer helped start commercial ventures that promote entrepreneurship, economic development and job creation.

Since 2005, UAH has received more than \$19 million in royalty income from technologies developed at the university. Numerous Alabama companies have also been created as a result of research conducted on the campus.

Among the companies formed as a result of the university's technology transfer: TerraSpace, iXpressGenes, Gene Capture, Alamanda Polymers, Halo Monitoring, InQ Biosystems, Dawn Research, Rogue IP, Synergia, AT Decision Innovation, Morcam Inc., Stronghold Defense and Southern Cord.



UAH's value is part of the university's role in Huntsville's "econsystem."

Cummings Research Park

UAH, Foundation played key role in its early development

Envision rolling hills, picturesque pastures with row crops dotting the landscape in an area that makes up the western boundary of Huntsville in the late 1950s. Today, in that same location, what you find is a collection of buildings and a network of roads that connects 285 companies and 25,000 employees. That is the transformation that has taken place since the creation of Cummings Research Park five decades ago.

Cummings Research Park celebrated its 50th anniversary in October 2012 after months of preparation.

Cummings is now the second largest research and technology park in the United States, and fourth largest in the world. The internationally recognized research park is home to some of the most prominent high-tech businesses in the world, including 20 Fortune 500 companies as well as numerous local companies. The Association of University Research Parks recognized Cummings as the Most Outstanding Research Park in the world in 1997.

UAH and its nonprofit foundation, the UAH Foundation, were instrumental in the establishment and nurturing of Cummings Research Park, and continue to play a major role today through enhancing and promoting the site, and providing the intellectual capital for future development.

It's a partnership that most people today concede as being the driving force behind Huntsville's growth and success.

"Cummings Research Park has had a profound effect on our community," said Ray Jones, the former longtime chairman of the UAH Foundation.

The U.S. Army brought Wernher von Braun and his team of rocket scientists to Huntsville to develop a national



"Cummings Research Park has had a profound effect on our community," said Ray Jones.

missile defense, and then later in efforts to help America win the space race and land the first human on the moon.

Dr. von Braun encouraged local leaders to abandon the recruitment of smokestack industries and focus more on high-tech industries. It was an approach that forever changed Huntsville and UAH.

The strategy led to the creation of the UAH Foundation, an entity to provide credibility and the important nonprofit status. The foundation was charged with developing the property and marketing it to potential industrial prospects.

Cummings Research Park was established in 1962, known then as Huntsville Research Park. It was named after Huntsville businessman Milton Cummings after his death in 1973.

"The foundation was started to support the vision von Braun brought and was embraced by the community," Jones said. "We did all we could to complement that vision, but it was successful because everyone was working for one theme."

There are 3,843 acres in the park today, with the UAHuntsville campus situated as the anchor tenant.

Another key component of UAH taking an active role in the effort was the need for the foundation to be affiliated with the university. The foundation remains a separate entity, but the affiliation has attracted professors and students who have excelled in researching and developing technological advances.

It is this partnership that has led to many successful pursuits, said current UAH Foundation Chairman Dag Rowe.

"In an environment where most university foundations function as 'hat-in-hand' solicitors and passive managers of alumni donations, the UAH Foundation, through creative initiatives, partnerships, and investments, has nurtured this research venue, which is second to none as both an economic engine, and as an incubator for pioneering research and breakthrough technologies," Rowe said.

"The synergies with the exceptional research and teaching at UAH can't be overestimated."

This successful model was the type of partnership envisioned by Dr. von Braun when he addressed the Alabama Legislature in 1961 in an attempt to get financial assistance from the state in building the research institute at UAH, which would make the Huntsville campus unique from other campuses in the University of Alabama System.

"It's the university climate that brings the business," Dr. von Braun told the legislators. "Let's be honest with ourselves. It's not water, or real estate, or labor or cheap taxes that bring industry to a state or city. It's brainpower."

ATHLETICS



UAH secured its home in the new landscape of college hockey as the Western Collegiate Hockey Association voted to extend an invitation of membership to the program.

“We’re pleased that our ice hockey team is going to have the opportunity to compete and grow in an NCAA Division I conference,” said UAH President Robert Altenkirch.

Athletic Director E.J. Brophy and President Altenkirch worked throughout 2012 making inroads to league presidents to be included in the WCHA. Their presentation led to the league’s presidents voting to welcome the Chargers to the

conference. UAH’s membership is effective this fall.

President Altenkirch said community support is important to building a strong program. “Today, we cleared one hurdle. We look toward expanded community support to help us meet the challenge of creating long-term sustainability for our ice hockey program.”

The WCHA is recognized as a premier hockey conference. Other teams are: Alaska-Anchorage, Alaska-Fairbanks, Bemidji State, Bowling Green, Ferris State, Lake Superior State, Michigan Tech, Minnesota State and Northern Michigan.

The men’s basketball team enjoyed much success on the court during 2012. The Chargers’ successful regular season led to UAH serving as the host of the Southern Regional NCAA tournament, which the Chargers captured.

Lennie Acuff’s squad would make their second straight appearance in the NCAA Elite Eight before dropping an 82-73 decision to Bellarmine.



Roy Heinz’s women’s basketball team finished their 2012 season with a record of 23-7. It was the second-most victories in program history.

UAH’s softball team ended its 2012 campaign with a close loss in the NCAA South tournament. UAH’s record for the season was 42 wins against 16 losses.

During the season, Coach Les Stuedeman earned her 800th career victory when UAH swept West Alabama in 9-1 and 5-2 victories. All of her victories as a head coach have been earned at UAH.



3

UAH Propulsion Research

Center gains national acclaim being named the third

“MOST AWESOME LAB”

- by Popular Science magazine

AMONG
THE TOP 50

.....
best values for a public
college education in the
nation in a report from
.....

- *USA Today and
The Princeton Review* in 2011

**UAHuntsville is listed among
Tier 1 national universities**

- by U.S. News & World Report

The College of Nursing's
undergraduate online program
was ranked 21st in the nation by
U.S. News & World Report.

UAH is among the nation's top public
research universities being classified
as a **“very high activity”** institution
by The Carnegie Foundation for the
Advancement of Teaching.

UAH has 14 research programs
ranked in the Top 20 nationally by
the National Science Foundation.

2

NASA-funded
R&D in
computer
sciences - National
Science Foundation

3

UAH graduates
earn the third
highest mid-career
salaries in the
southeastern U.S.,
according to
payscale.com

4

According to
National Science
Foundation
rankings, UAH
has four research
programs ranked
in the top 10

RANKED
AMONG
THE TOP 10

.....
in the nation in 2012
for Atmospheric Science
.....

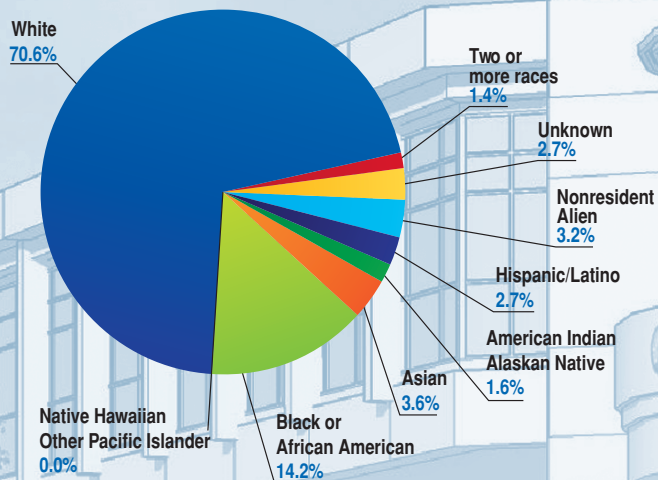
- *The Chronicle of Higher Education*

DATA POINTS

Enrollment

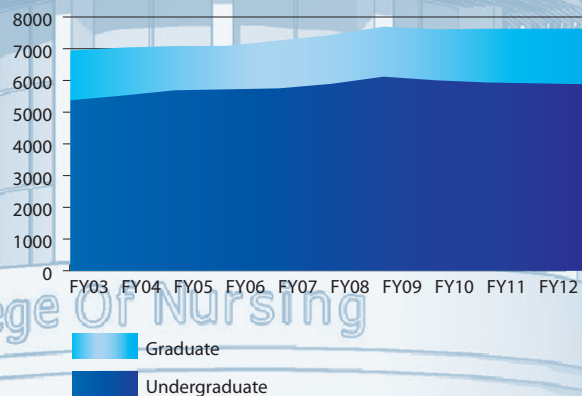
Undergraduate Student Composition

FY12 (Fall 2011)



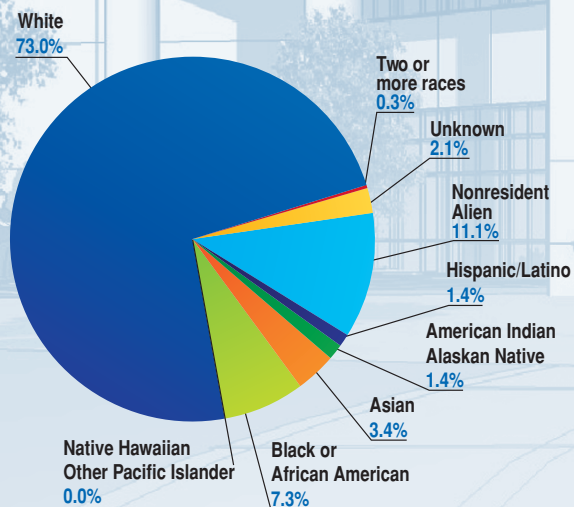
Enrollment

FY03 (Fall 2002) to FY12 (Fall 2011)



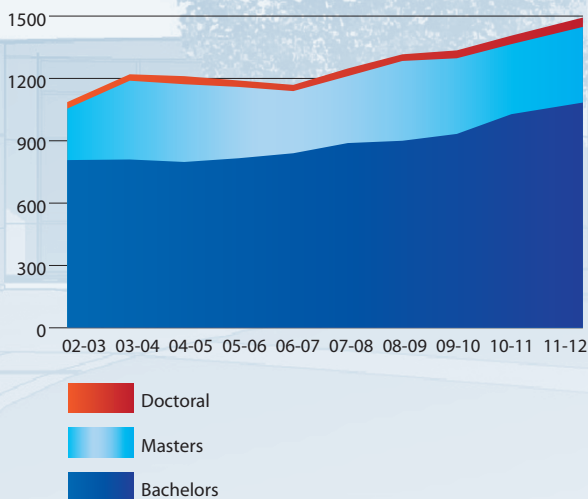
Graduate Student Composition

FY12 (Fall 2011)



Undergraduate & Graduate Degrees

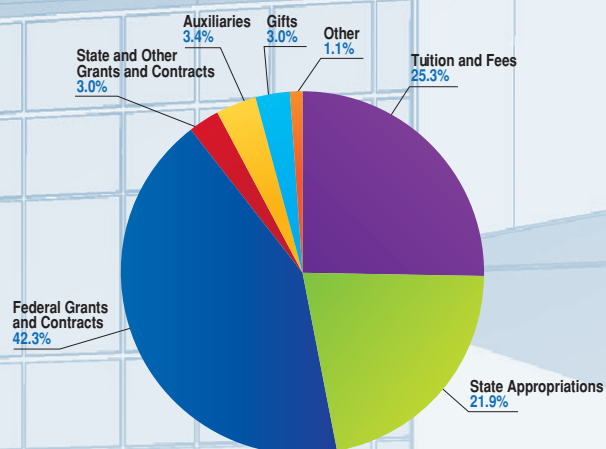
AY02-03 to AY11-12



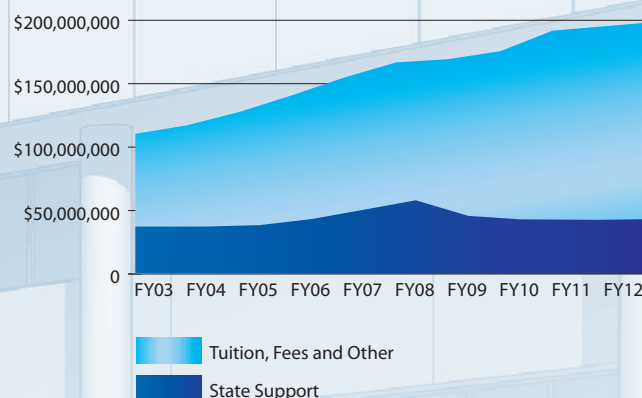
DATA POINTS

Revenue & Expenditures

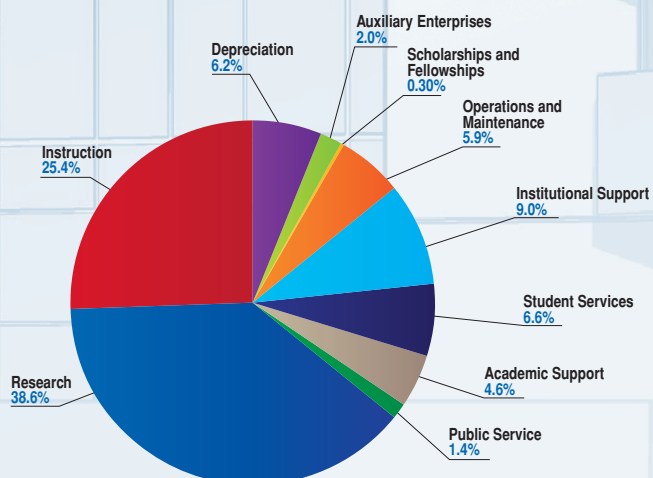
FY12 Revenue \$197,769,564



Operating Revenue FY03 to FY12



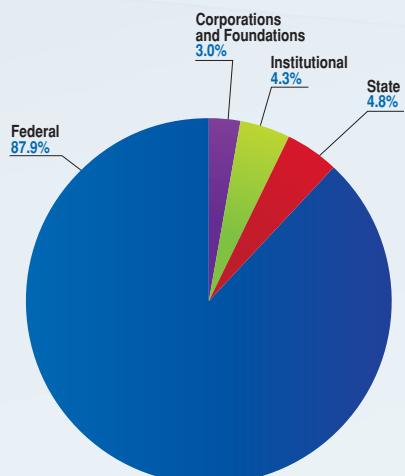
FY12 Expenditures \$197,769,564



Direct Research Expenditures FY03 to FY12



FY12 Direct Research Expenditures by Source \$76,373,523



LOOKING BACK



Jim Ashburn and President Altenkirch unveil an historic marker in front of Wilson Hall. Above, Ashburn and Professor M.K. Wu replicate the discovery in 1987.

DISCOVERY

University celebrates 25th anniversary of worldwide superconductivity discovery by physics graduate student Jim Ashburn

Like many young men from Alabama, Jim Ashburn's path to fame involved football, good timing, a fair dose of serendipity (or good luck, if you prefer), timely coaching and a strong team.

Ashburn's path also included a love of science, especially mathematics.

All of those factors were in play 25 years ago when Ashburn, then a first year physics graduate student at The University of Alabama in Huntsville, created the formula for the world's first "high temperature" superconductor.

The material he formulated from yttrium, barium, copper and oxygen was the first to become a superconductor at a temperature warmer than liquid nitrogen, a scientific milestone akin to running the four-minute mile or breaking the sound barrier. (A superconductor lets electricity flow through without any resistance.)

His role in creating the "123" superconductor earned him a seat (in the audience) at the circus-like announcement at a scientific meeting of the UAH team's success, known now as the "Woodstock of physics," and a place on one of the most-cited scientific papers in the physics literature. His superconductor was also the subject of Ashburn's doctoral dissertation.

In mid-December 1986, researchers at IBM's laboratories in Zurich, Switzerland, discovered a material that is a superconductor at about 30 Kelvin -- about 405° below zero Fahrenheit.

That discovery sparked renewed interest in laboratories around the world, including Dr. M.K. Wu's physics lab at UAH. Wu, Ashburn and graduate student C.J. Torng were working on a NASA research project, studying possible superconducting metal alloys that would

be processed in a space environment.

After NASA agreed to let them change their research to the new superconductors, things moved quickly. In the scientific equivalent of a sprint, UAH's research took only six weeks from starting in December 1986 to the discovery in late January 1987.

The new superconductor was the first "high temperature" superconductor, the first to be a superconductor in liquid nitrogen.

The formula for the compound is $YBa_2Cu_3O_7$, ergo the "123" superconductor.

The potential benefits include revolutionizing solid-state electronics and high-speed computers, optical detectors like those used on satellites, or large-scale applications such as levitating trains or superconducting ships' engines.

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