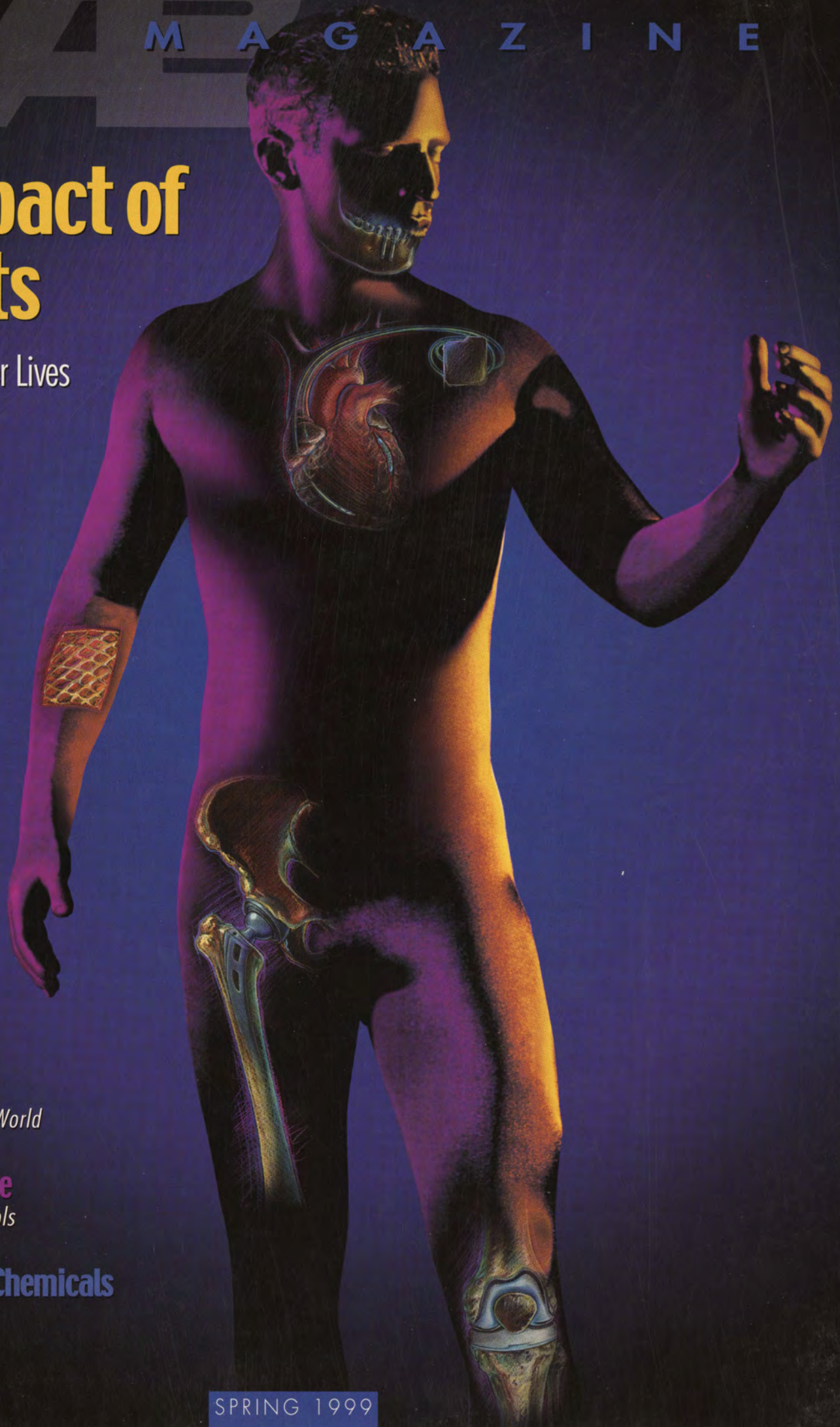


The Impact of Implants

Better Bodies, Longer Lives



In Search of Sleep

Navigating the Nebulous World

Digitizing the Muse

Computers as Creative Tools

Cancer-Blocking Chemicals

The Hunt Is On

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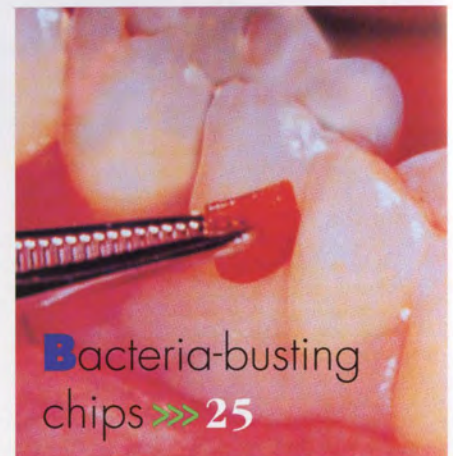


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“It’s hard to get through life with your values unchallenged—living in a bubble, so to speak.”

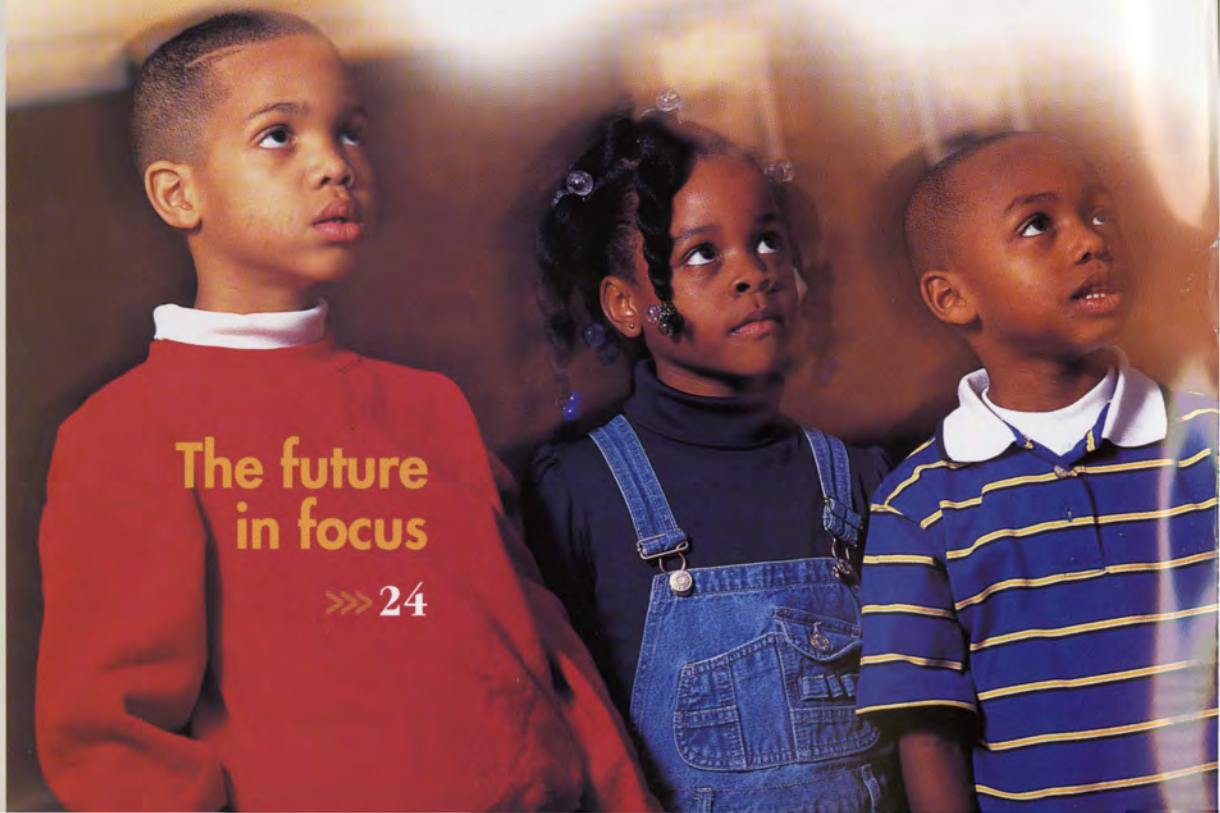
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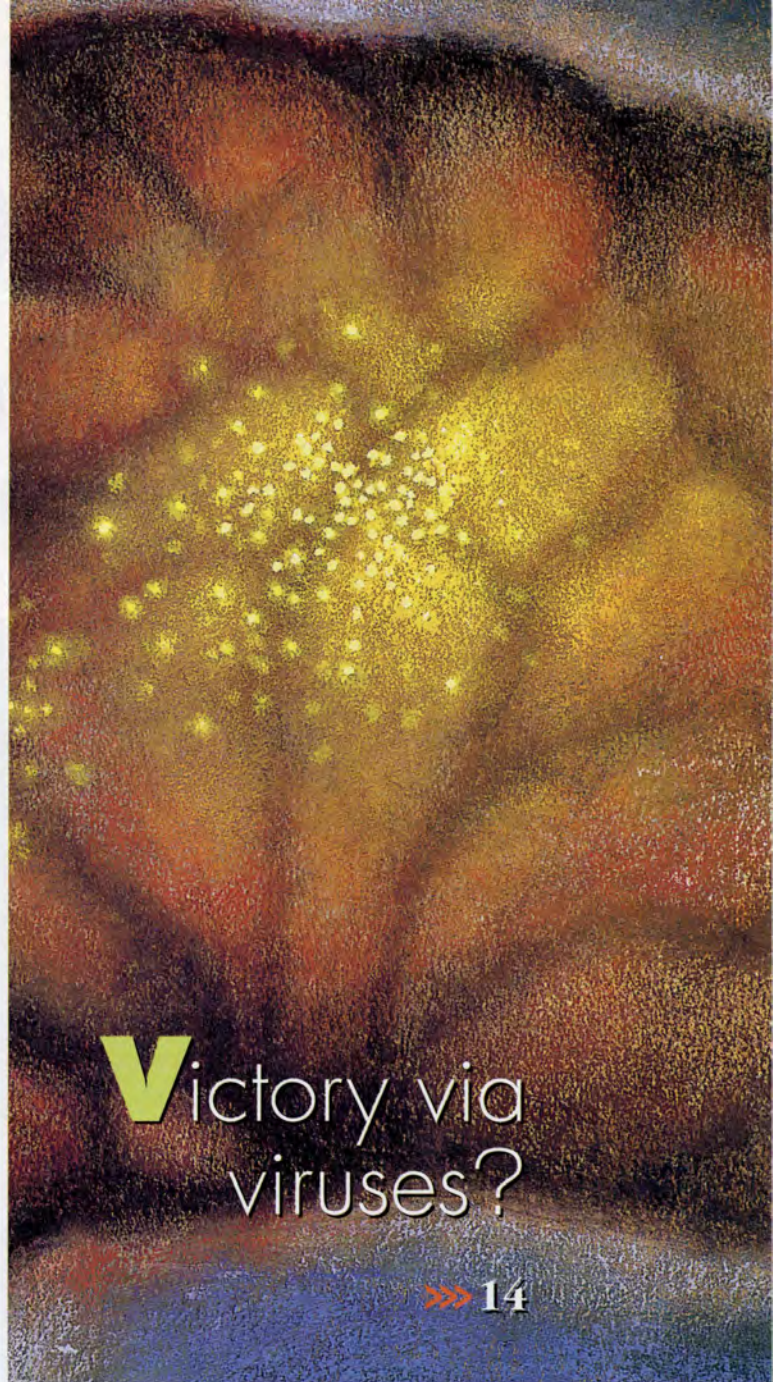
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The Impact of Implants

Better Bodies Longer Lives

BY DALE SHORT

Bionics.

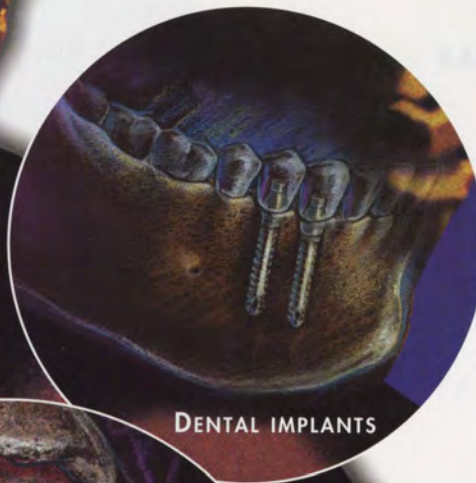
Today, it's a well-established field of science and medicine. But millions of Americans first heard the term in 1974, with the debut of a hit television series starring Lee Majors as "The Six-Million Dollar Man," whose body was rebuilt with mechanical parts after a catastrophic accident.

In the quarter-century since, life has imitated science fiction to a remarkable degree. Surgeons now routinely use manmade devices to replace or reinforce ailing body parts, and plans are on the drawing board for a whole new generation of increasingly sophisticated mechanical and electronic implants.

From Dental Devices to Defibrillators

Working at the very center of some of the most exciting developments in the field are researchers in the UAB School of Engineering's Biomedical Implant Center. Projects in the center range from new

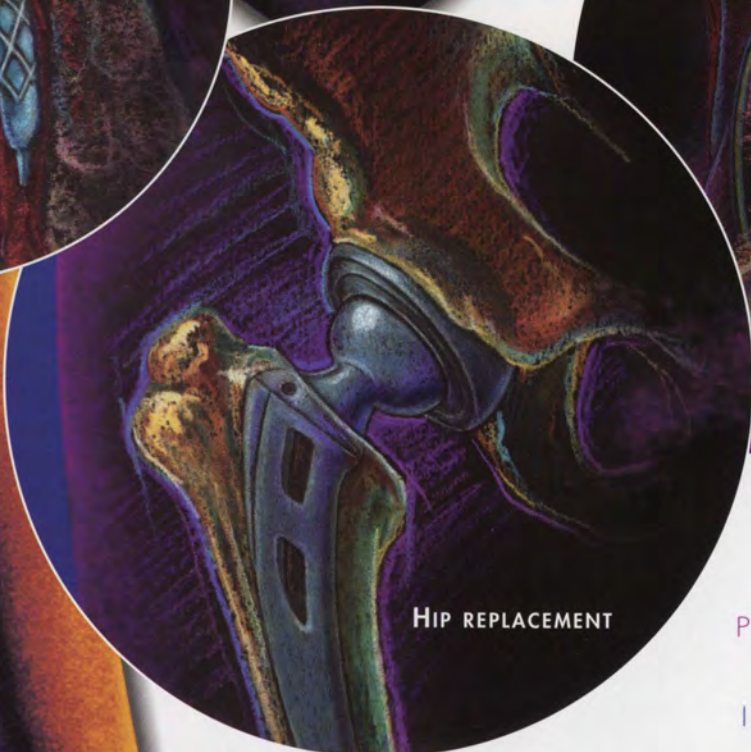
types of "tissue regeneration" products (which help wounded tissues repair themselves) to electronic devices that can sense cardiac fibrillation and restore normal heart rhythm.



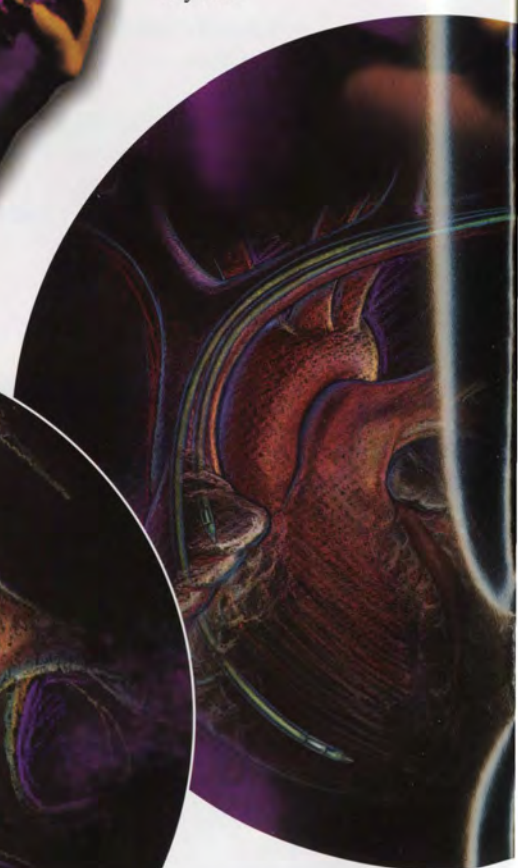
DENTAL IMPLANTS



CARDIAC STENT



HIP REPLACEMENT



PHOTOGRAPHY BY
RANDAL CROW

ILLUSTRATIONS BY
ART & SCIENCE

"Our research involves everything from orthopedics, fracture fixation, and total joint replacements for hips and knees to dental implants, stents, and pacemakers," says Linda Lucas, Ph.D., director of the center and chair of the Department of Biomedical Engineering. "We even have faculty who are working on a new generation of miniaturized devices—both internal and external—to monitor patients' circulatory and nervous systems as they go about their daily activities." Such devices, Lucas explains, can pick up warning signs of malfunctions that could lead to heart failure, seizures, or other disorders—and produce signals if life-threatening conditions arise.

Funded by grants from the National Institutes of Health (NIH), the National Science Foundation (NSF), and the Whitaker Foundation, the Biomedical Implant Center's ongoing projects involve a team of some 60 researchers and 80 students from six universities throughout the state. "We work with faculty from the University of Alabama in Huntsville, South Alabama, Alabama A&M, Samford, and Auburn universities," says Lucas. "It's a collaboration that allows us all to build on our shared knowledge and strengths."

Micromachines and Medical Marvels

Technically, the use of surgical implants is as old as human history, says Dale Feldman, Ph.D., associate professor of biomedical engineering. "It's fascinating to trace the evolution, all the way from the Stone Age to the present, of devices such as ligatures, which are threads or wires used to tie off vessels or ducts.

"Although there is evidence that the ancient Chinese actually fabricated natural gold fillings for teeth, the first real clinical application for implants dates back to about 1760, when a wooden peg and twisted thread were used to tie a blood vessel together.

"Practical implants used in surgery, as we know them today, first started to become standardized in about 1925. But the progress we've made in those areas in the last decade alone has been phenomenal, and the next decade holds even more promise."

Wound Wizardry

Feldman's own research involves a process known as "biomaterial-enhanced regeneration," which helps wounds repair themselves expeditiously—an advance of particular importance to severely burned patients. "Most of what I do relates to how biomaterials can help in the restorative

"We're trying to determine how cracks form between bones and implants so that we can reduce the risk of joint loosening."

process," Feldman says. "We're trying to use these biomaterials, in combination with various biological substances, to regenerate normal tissues.

"Interestingly, one of the materials we use is fibrin—the body's natural scaffolding (what scabs are made from). We concentrate it into a strong tissue adhesive. The dream is that if we can find just the right 'magic powder' to add to the fibrin, then damaged tissues, including skin, tendons, blood vessels, bone, and nerves, will use the fibrin as 'scaffolding' and grow back to normal. We're pretty close in some areas, such as skin, but success in other areas is down the road a bit."

Computing Cracks, Lessening Loosening

One Implant Center project could lead to the next generation of total joint replacements. With the help of a \$524,000 grant from the National Institutes of Health, Kenneth Mann, Ph.D., associate professor of biomedical engineering, and John Cuckler, M.D., director of the Division of Orthopaedic Surgery, are using engineering fundamentals, such as fracture mechanics, to create computer models of how bone joints function.

"It's similar to studying how cracks occur in bridges and ship hulls," Mann says. "We're trying to determine how cracks form between bones and implants so that we can find ways to reduce the risk of joint loosening."

In a related study, scientists are retrieving and analyzing metal-on-metal hip prostheses from patients in an effort to re-

examine that older technology, which was largely replaced by metal-polyethylene prostheses. Research now shows that after as long as 18 years in the body, the all-metal assemblies have no measurable wear, while polyethylene erodes at about one-tenth millimeter a year. That may not sound like a lot, but the cumulative wear can lead to loosening and pain, creating the need for repeat surgery.

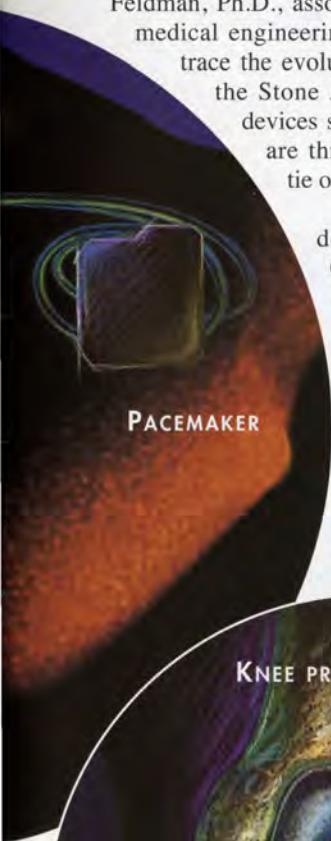
The Riddle of Rejection

Learning why implants sometimes fail is the focus of current research by Robert Kimberly, M.D., professor of medicine in UAB's Division of Clinical Immunology and Rheumatology. "Some problems are caused by mechanical failure of the implant itself, but a great number result from the body's biological response to the implant material. There's good evidence that the patient's immune system triggers this reaction in an attempt to drive out what it sees as a foreign object in the body.

"One way it does this is a process called bone resorption. We think of bone as being stable, but in fact it's very active tissue, with new bone continuously being made. The cement that holds the implant in place seems to activate the cells that absorb bone, so that on X-ray images you can see white areas where bone cells are moving away from the implant. This process of bone resorption can cause the implant to loosen."

Researchers are exploring the possibility of creating cements made of organic ingredients that would be less likely to trigger an immune response. Another promising avenue is the development of implants that encourage a process called "porous ingrowth"; such implants have surfaces that consist of a meshwork into which bone can grow and form a natural, cementless bond.

Progress in these areas will have a substantial impact because more than 500,000 total hip and knee replacements are performed in the United States each year. One breakthrough that may come within the next five years or so, Kimberly says, is a method for identifying in advance which patients are likely to biologically react to implants so that doctors can intervene with treatments to stave off the damage.



Priming and Pacing the Pump

A number of Implant Center projects offer promise for patients suffering from various forms of heart disease. For example, Raymond Ideker, M.D., director of UAB's Cardiac Rhythm Management Laboratory, is working with Richard Gray, Ph.D., assistant professor of biomedical engineering, to capture images of the "spiraling electrical field" that causes disruptions of heart rhythm. With the help of specially adapted high-speed video cameras, their research has already produced a patented algorithm that corrects the disruptions, known as cardiac fibrillation.

"Now that we understand the basic mechanics of fibrillation," Gray says, "we're looking at ways to improve its treatment."

Traditionally, emergency defibrillation has been done with the familiar electric "paddles" that are applied to a patient's chest to deliver a jolt of current that, in many cases, starts the heart beating regularly again. But because every second counts when patients go into cardiac fibrillation, the biggest factor in saving lives is emergency response time, which varies greatly from location to location. Victims of severe heart attacks in Seattle, for instance, have a 25-percent survival rate, while New York City's rate is only 2 percent. As a result, some 300,000 people in the United States die each year of sudden cardiac death (SCD).

But what if defibrillation could be performed almost instantaneously, by a small electrical device implanted in the chest? Researchers in the early 1980s took a big step toward this goal when they created implantable defibrillators. These early devices, however, were so bulky—about the size of a large radio—that they required major surgery, which many patients were too ill to undergo.

The newest implantable defibrillators are much smaller—about the size of a credit card and only a bit thicker. They also deliver smaller shocks. "Mapping the heart's electrical fields has helped show us where to put electrodes to get better results from a smaller shock," Ideker says. "Since the shock itself can damage the muscle, a weaker shock is much safer."

Navigating Narrow Passages

The devices known as "stents" made medical headlines some 15 years ago when the tiny, stainless-steel tubes were first used to reinforce sections of heart arteries that were either weakened, clogged with plaque deposits, or both. Stents are inserted into arteries via the same process that's used to perform balloon angioplasty, wherein a long, thin guide wire—only 14 one-thousandths of an inch wide—is threaded from the patient's lower body into the vessels of the heart.

The process has been refined continually ever since, according to interventional cardiologist Gregory Chapman, M.D., assistant professor of medicine. "We've come a long way," Chapman says, "to stents that are not only stronger but also small enough to be delivered into vessels that were previously considered too tortuous to navigate."

"There are two important benefits of these advances. Before, some 3 to 5 percent of balloon angioplasties caused complete closure of the artery, but with stents that's become a very rare occurrence. Another benefit is that stents help lessen the long-term

Breakthroughs in implantation are occurring at an opportune time, as longer life spans create an increasingly aging population.

regrowth of the blockage. Initially, some 30 percent of blockages grew back within six months of the surgery. Now that's down to between 10 and 20 percent. And we're testing new drugs and radiation therapy to enhance the body's acceptance of the stent."

The Ascent of Stents

In recent years, stents have branched out, so to speak, proving practical for opening up parts of the esophagus and colon obstructed by cancerous growths—a procedure that eliminates the need for colostomies in more than 80 percent of patients.

Stents are also being used increasingly to open up obstructed carotid arteries that can leave patients at high risk for strokes. Camilo Gomez, M.D., associate professor of neurology, and the UAB Neurovascular Angioplasty Team have performed more than 400 carotid stenting procedures in the past five years. Studies show that the surgery has a 98-percent success rate, with only 5 percent of the arteries becoming restenosed, or re-blocked, requiring replacement of the stent.

"Stroke is the third leading cause of death in this country and a primary cause of disability," Gomez says, "so the development of endovascular techniques for correcting carotid artery pathology is a very welcome addition to our tools in the fight against stroke."

Creative Cosmetics

Many people who follow news headlines assume that the breast-implant trend declined after recent litigation falsely claiming that silicone implant products leak and create serious health problems for many of the women who have them.

But, in fact, says Paul Gardner, M.D., assistant professor of surgery in UAB's Division of Plastic Surgery, breast augmentation is as popular as ever—though the preferred filler material is now saline rather than silicone.

"I'm constantly impressed by how well informed patients are when they come to us to talk about implants," Gardner says. "It's obvious they've given the subject a lot of thought. They've read the literature, they've searched the Internet, they've talked to other women who have them. By the time they see us, the vast majority are already very comfortable and reassured about their choice."

Ironically, after a federal judge hearing the breast-implant litigation assigned a panel of experts from around the United States to study the

claims, the experts concluded that there was no scientific evidence that silicone played a role in the women's illnesses.

"While that conclusion doesn't mean the FDA is lifting its moratorium on the use of silicone implants," Gardner says, "it does offer reassurance to the women who already have them that they're at no higher risk for health problems than the normal population."

The next generation of breast implants may be some organic substance—soybean oil, for instance—that is both safe and accurately replicates the feel of natural breast tissue.

Targeting Tooth Loss

For more than a century, dentures have been used to replace missing teeth. But today, engineers and materials scientists are developing a whole new generation of dental implants that can be anchored to the jawbones of patients who have lost teeth.

In the past, such implants were problematic because the bone beneath the gums is soft and porous. But BioHorizons Implants, Inc.—a UAB spin-off company founded by former UAB biomedical engineering professor Martha Bidez, Ph.D.—has developed "dilators" that compress the bone and increase its density at the implant site.

"The improved bone creates a foundation for anchoring the screw-threaded implants," explains Bidez. "Then porcelain or other prosthetic restorations can be attached over the implants."

This new implant system, says Bidez, actually "tricks" the bone into thinking a real tooth is still present; in so doing, it halts the process of bone loss and, in some cases, actually restores the jaw to normal health. In addition, the system is cost-efficient, because

Americans currently spend some \$150 million annually on conventional denture adhesives.

Reversing the Ravages of Age

Breakthroughs in implantation are occurring at an opportune time, Feldman says, as longer life spans create an increasingly aging population. "Because people will be much more active as they age, we'll be seeing more problems such as cartilage wearing out, the loss of tooth roots, and so on. There's a great need for new techniques and devices that will help reduce pain and improve function for older adults."

Another avenue that promises important advances over the next decade, says Feldman, is the use of microchips and other miniaturized devices—called micromachines, or nanomachines—inside the body. Can the term "machine" really apply to devices that are only one millimeter square or smaller? Definitely, Feldman says. "As small as these devices are, they're actual machines that really do things—everything from opening and closing little 'windows' inside themselves, to injecting drugs, to controlling electromagnetic fields. Another exciting prospect is the use of microchips within the body to collect and transfer data."

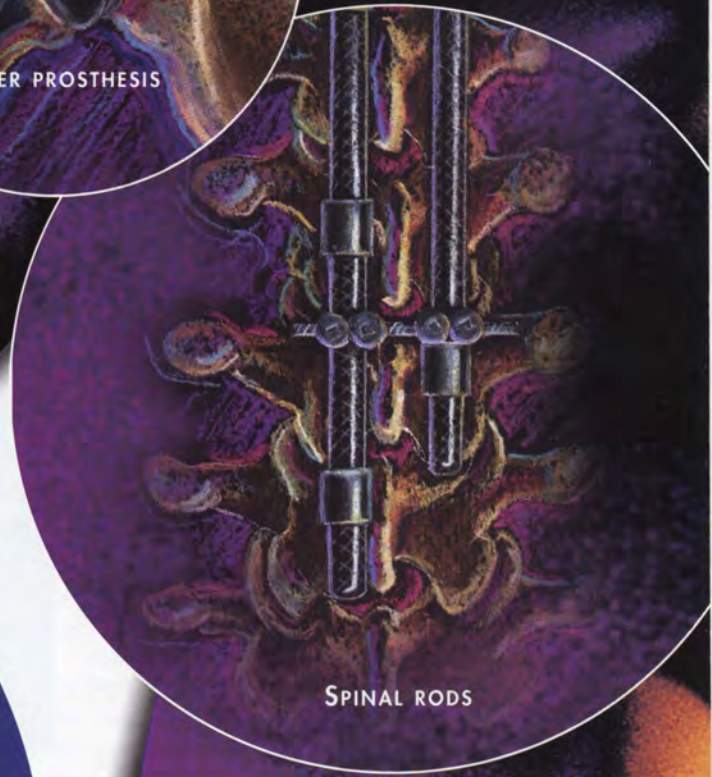
The possibilities are unlimited—almost. "When all's said and done," says Lucas, "nothing we do is as good as what Mother Nature has provided us to begin with. That's why we're concentrating, in the foreseeable future, not only on implantable replacement devices, but also on ways of getting the body to turn on, or turn off, its own processes—to regenerate what was already there."

"Loss of bone mass, for instance, is a serious problem for the elderly. Maybe five or 10 years down the road we'll be able to regenerate any tissue in the body, whether it is bone or healthy skin for burn patients. A great deal of our success will hinge on learning more about the natural biological response."

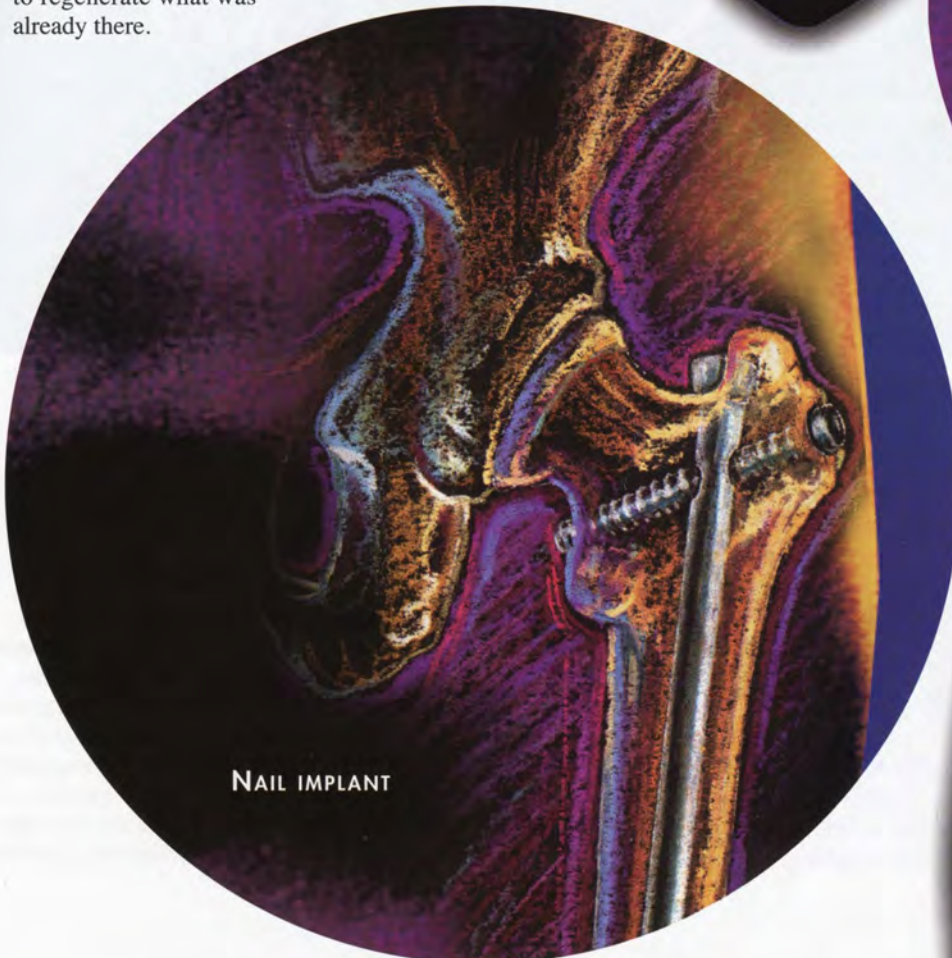
Feldman agrees. "As I get into the last few decades of my career," he says, "what's amazing to me is not only the advances we've made, but also the caliber of younger people—such as our graduate students—whose ideas are going to come to fruition in the 21st century. In an academic institution, that's what's most exciting about this field." **UAB**



SHOULDER PROSTHESIS



SPINAL RODS



NAIL IMPLANT

*I have come to the borders of sleep,
The unfathomable deep
Forest where all must lose
Their way, however straight,
Or winding, soon or late;
They cannot choose.*

—From "Lights Out,"

by Edward Thomas

MOST OF US SPEND ABOUT A third of our lives adrift in a land that we know little about—the “unfathomable forest” that we call sleep. While we walk willingly into those deep woods each night, we take no compass and can chart no course. Slumber transports us where it will—and sometimes we get lost along the way.

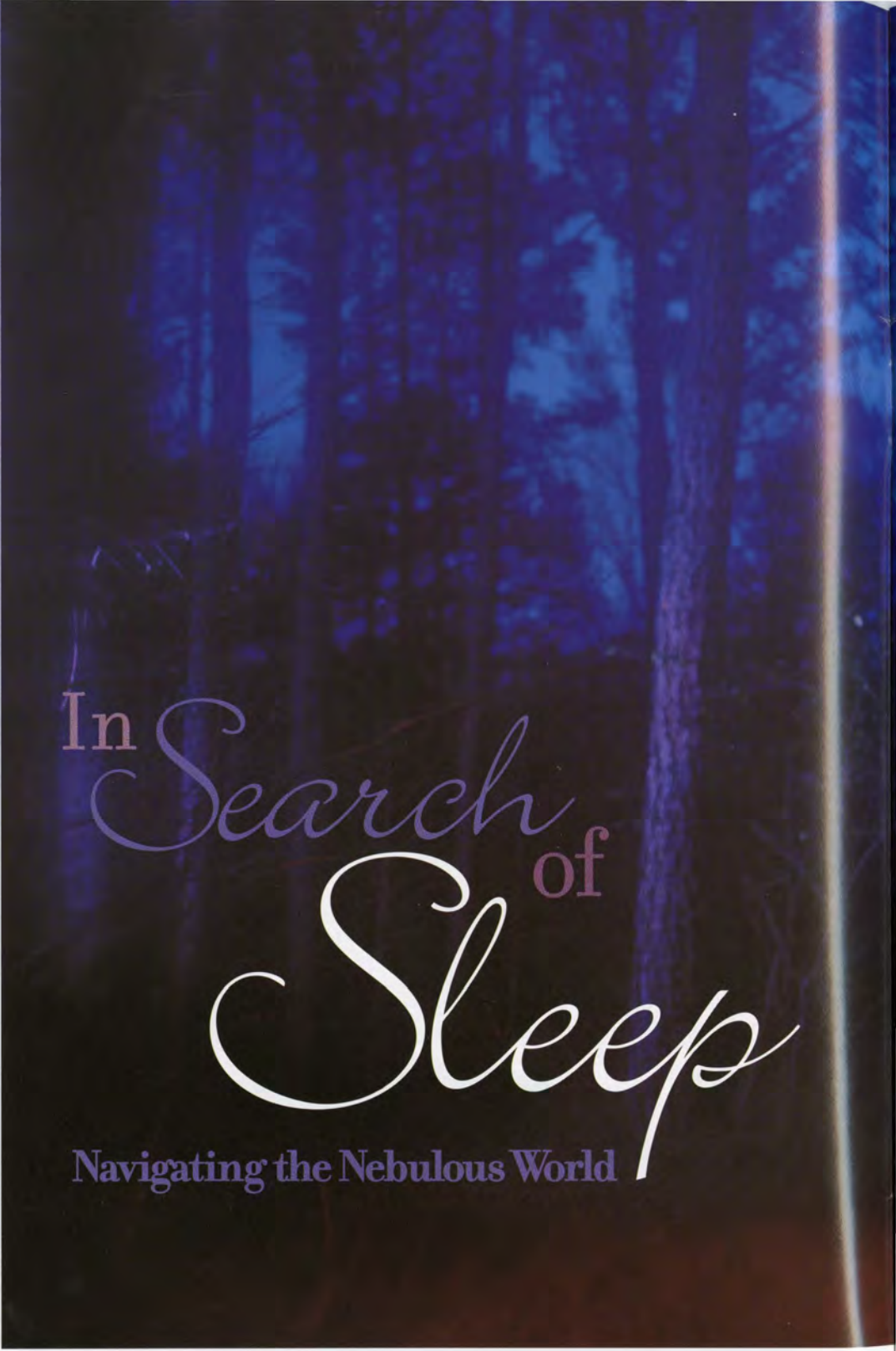
According to the National Commission on Sleep Disorders Research, 40 million Americans suffer from more than 70 debilitating disorders that can disrupt healthy sleep patterns. The National Sleep Foundation puts the number even higher, reporting that as many as 63 million Americans have a diagnosable and treatable sleep disorder—yet most of those maladies are never identified.

Diagnosis and treatment are vital because sleep disorders can lead to reduced productivity, decreased quality of life, and increased likelihood of accidents. In fact, the National Highway Traffic Safety Administration estimates that more than 100,000 vehicle crashes, 1,500 fatalities, and 71,000 injuries each year are the direct result of driver fatigue.

FROM APNEA TO EPILEPSY

At UAB's Sleep/Wake Disorders Center, researchers are learning more about the neurochemistry of sleep and helping patients navigate the “nebulous world.” Scientists in the center are diagnosing and treating patients with sleep disorders ranging from obstructive sleep apnea to sleepwalking to epilepsy.

The Sleep Center is accredited by the American Sleep Disorders Association, notes clinical psychologist and Center Co-Director Vernon Pegram, Ph.D., who has studied sleep disorders since the early 1970s. In fact, he says that Alabama now boasts the second-largest number of accredited sleep centers and labs in the United States, second only to California. “That’s remarkable,” he says,



In Search of Sleep

Navigating the Nebulous World

BY BARBARA WESTLAKE-KENNY

“because sleep, even today, isn’t taught much in medical schools, despite the fact that sleep disorders can have a profound effect on our lives. In this regard, UAB has been a pioneer, because sleep and sleep disorders have been part of the medical curriculum since the early 1970s.”

Pegram became interested in the phenomenon of sleep while working with pilots and their work/rest cycles in the Air Force. Later, he studied sleep cycles of animals in their natural habitats in Africa. “We’ve gone from humans to chimpanzees that went into space to rhesus monkeys and back to humans,” he

notes. “Human studies began in earnest only when we started monitoring patients overnight.”

A NIGHT IN THE LAB

The Sleep Center can monitor up to seven patients a night with infrared cameras and nocturnal polysomnography equipment—which simultaneously tracks sleep stages, eye movements, cardiac function, respiration, blood-oxygen saturation, leg movements, and sleep positions and patterns. Typically, a patient provides a medical and sleep history, undergoes a physical examination, and then



Maria Bonfanti

between 2- and 5-million Americans, including 8 percent of men over age 40.

During periods of obstructive sleep apnea, air cannot flow into or out of the sleeper's nose or mouth; these episodes may cause the person to stop breathing 30 or more times per hour. Although the person may not awaken fully, such frequent interruptions of deep, restorative sleep often lead to early morning headaches and excessive daytime sleepiness. As common as asthma, sleep apnea is particularly prevalent in overweight men and the elderly. The disorder increases a patient's risk of high blood pressure, heart attack, and stroke; it can also cause fatigue, personality changes, impotence, confusion, headaches, depression, learning difficulties, and insomnia. Many patients are able to find complete relief with a special positive-pressure mask, worn during sleep, that opens up the upper airway.

Other causes of excessive daytime sleepiness, says Harding, are idiopathic hypersomnolence (unexplained, excessive drowsiness), narcolepsy (sudden, uncontrollable attacks of sleep), and nocturnal seizures. According to Harding, many sufferers are unaware of what causes their constant fatigue.

SEIZURES AND SLEEPWALKING

Current sleep research points to a genetic component in sleep disorders, says neurologist John McBurney, M.D., who specializes in treating sleep disruptions and epilepsy. He says scientists now believe that sleep-related events such as enuresis (bed-wetting), sleep terrors, and somnambulism (sleepwalking) may actually represent nocturnal epileptic seizures.

"Recent studies of epilepsy show that clinical manifestations of nearly all seizure disorders are linked to sleep physiology," McBurney says. "In nearly 80 percent of cases, seizures occur predominantly during sleep or on arousal from sleep. Sleep-related epilepsy is often suspected only when patients complain of wet beds, bloodstained night clothes, sleepwalking, or night terrors."

Research suggests that about 5 percent of Americans suffer from clinically significant parasomnias, according to McBurney. Parasomnias, he explains, are disruptive phenomena that occur during sleep or that are exaggerated by sleep.

spends one night at the center's polysomnographic laboratory. Often, practitioners are able to diagnose and treat a patient's sleep disorder after that one night, says pulmonary and critical-care specialist Susan Harding, M.D., medical director of the center.

"Following a patient's stay, we may recommend a multiple sleep latency test [which measures how long it takes the patient to fall asleep] or psychological testing to refine the diagnosis," adds Harding.

The most common sleep disorder diagnosed at the center, Harding says, is obstructive sleep apnea, a breathing disorder characterized by brief, multiple interruptions of breathing during sleep. Sleep apnea affects

McBurney says, "although they can resurface during periods of psychological stress. For most people, episodes of sleepwalking and sleep talking are self-limited and don't require treatment.

"Some people, though, have clinically significant parasomnias—that is, their problems become persistent, problematic, or pose a risk of injury—sleepwalking through an open window, for example."

In such people, McBurney explains, the paralysis that usually accompanies rapid eye movement (REM) sleep breaks down and the sleeper begins acting out parts of dreams. If this "acting out" occurs frequently, the patient is diagnosed as having REM behavior disorder.

"These patients can engage in dangerous or violent sleep behaviors," McBurney says. He cites the case of a retired minister who dreamed of being attacked by a dog. As he struggled in the dream, he grabbed the dog by the throat. When he awoke, his hands were clasped around his wife's throat.

A MODERN MALADY?

Many Americans who report problems with sleeping are simply suffering from sleep deprivation brought on by fast-paced, pressure-packed lives or irregular schedules. Even with all of modern society's "time-saving" inventions, Americans have reduced their average sleep time by 20 percent during the past century, according to the National Sleep Foundation.

Not surprisingly, a large percentage—up to 90 percent, in fact—of rotating shift workers report sleep disruption because their irregular schedules play havoc with their natural 24-hour (circadian) biorhythms. Their most common complaint is the inability to sleep during daytime hours. Shift work is associated with sleepiness during work hours, resulting in reduced workplace performance and increased accidents and injuries. Napping, say sleep experts, may reduce fatigue and prevent the fall in reaction time and cognitive performance that frequently occurs in shift work.

Insomniacs often respond to regulation of their circadian rhythms with sleep restriction, relaxation techniques, exercise, light therapy, or changes in dietary habits. For some people, simply going to bed and getting out of bed at the same times every day, including week-

ends, brings relief. But for more serious disorders, nocturnal polysomnographic monitoring and daytime diagnostic tests are essential, Harding says.

"We can improve many patients' quality of life in a short time. It's extremely rewarding to guide people back to paths of healthy, restorative sleep." **UAB**

Sleep-related events such as sleep terrors and somnambulism (sleepwalking) may actually represent nocturnal epileptic seizures.

"Simple parasomnias, such as sleepwalking and sleep talking, tend to be more common in children and occur less frequently as the brain's sleep mechanism matures,"

A young man with dark hair is shown in profile, looking upwards with a contemplative expression. He is wearing a dark jacket. The background is a vibrant, abstract digital space with a color gradient from deep blue at the bottom to bright yellow and orange at the top. Floating in the air are several musical staves and notes, rendered in glowing, translucent colors like purple, blue, and yellow. The overall atmosphere is futuristic and artistic, suggesting the intersection of music and technology.

Digitizing

the Muse

In this corner, the artist—passionate, mercurial, driven, inventive, free-associating. In that corner, the computer—a cold, impersonal assembly of plastic, metal, and silicon that wouldn't recognize a human emotion if one were to kick it in its RAM. But in our increasingly Digital Age, these most unlikely of bedfellows are making beautiful music together—as well as visual art, graphic animation, text design, and theatre sets.

It's a far cry from the world of 1972, when shoppers in electronics stores around the nation stood transfixed in front of a primitive, black-and-white, two-dimensional video game called "Pong," watching two human opponents press buttons to volley an imaginary Ping-Pong ball back and forth across the small television monitor. What in the world would they think of next?

Between Steve Jobs, Bill Gates, and their thousands of cyber-whiz descendants, the answer was "a lot." And today, UAB's Departments of Art, Music, and Theatre are at the crest of the wave in using computers to produce new expressions of our most ancient art forms. Through these technologies, they're also collaborating across disciplines in ways that would not have been possible only a few years ago.

The Power of Multimedia

At the center of the concert hall stage, a young man stands in shadow, pleading his cause to the audience as ominous music swirls around him. "When someone stands against the way things ought to be," he says, "it is good and right to make them hurt."

On the wall behind him, video images begin flashing, faster and faster: Nazi storm troopers, heaps of corpses in a concentration camp, the face of Anne Frank, the face of Mahatma Gandhi, Martin Luther King, Jr., lying dead on a motel balcony, the Sixteenth

Street Baptist Church in Birmingham, the smoldering ruin of the federal building in Oklahoma City.

The man speaks more loudly as the crescendo of sound continues. "And I will do it again . . . and again . . . and again . . . and again." Suddenly, the video tightens into a close-up of the man's own enraged eyes, and the music is replaced by the sound of a time-clock ticking at thunderous volume.

Then darkness, and a long beat of silence before the audience's applause begins in UAB's Alys Stephens Performing Arts Center. It is the finale of a multimedia performance written in response to a subject uncomfortably close to home—the fatal bombing, only a few weeks earlier, of a women's clinic just blocks from where the performance is taking place.

The event—titled "Descent to Extreme"—was created to be "a sort of wake-up call to the fact that we're living in a dangerous time when everyone is vulnerable," says Michael Angell, D.M.A., assistant professor of music at UAB. "It's also intended to make the audience think about how they deal with their own opinions. In a time and place and city where people have very strong convictions, where do you draw lines about people acting on their convictions? At what point does one go too far?"

"It was a very emotionally charged evening for those of us who helped put it

together," continues Angell. "And it happened because we were able to pool the resources of three departments—music, art, and theatre—and to take advantage of cutting-edge computer technologies. It's the kind of collaboration we've been wanting to achieve for a long time."

In the past, Angell says, his computer music ensemble has also worked with poets and dancers in collaborative performances. "We're interested in learning new and bold ways of using the technology that's available to us. It's allowing us to create new and expressive media—including entirely new sounds in combination with traditional instruments."

Manipulating Music

Among Angell's other duties, he directs the UAB MIDI Ensemble—"MIDI" being the acronym for Musical Instrument Digital Interface, a system that represents sounds in a form that a computer can interpret, process, and manipulate. A typical MIDI concert brings together both live and computer-generated music and sound effects—a vocalist singing in combination with electronic sounds, for example, or a traditional acoustic instrument such as a flute, violin, or hornpipe with MIDI accompaniment by a computer.

"The technology is changing faster by the day," Angell says, "and we're able to mix media with greater and greater ease. For

BY DALE SHORT

instance, there are now software programs that let you essentially 'paint' sounds—converting an image into audio form—or vice versa. Students are also able to use the Web and e-mail to explore and exchange sounds with other students around the world.”

Angell is quick to point out that the high-tech aspect of music education isn't emphasized at the expense of traditional music training. “All of our students get the same training in musicianship, from music theory to the history of music. It's important for them to learn how today's music fits in with all that's come before.”

Angell himself is a classically trained musician who composes works involving computer-generated sounds, as well as music for acoustic instruments. The two forms are combined in a newly released CD featuring the work of Angell and local cellist Craig Hultgren.

“The bottom line,” Angell says, “is that the computer is just another tool—but a very powerful one.”

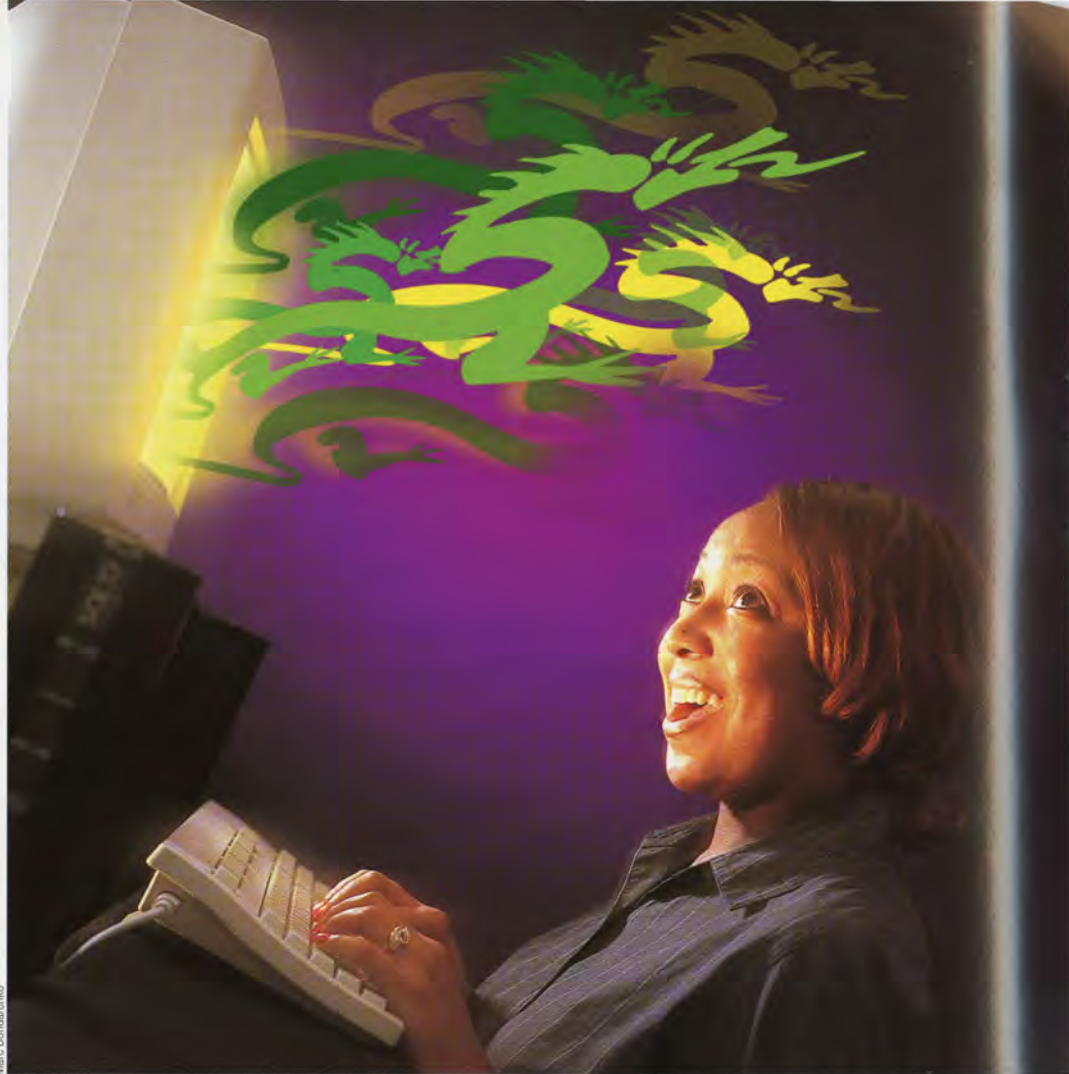
Designing Digitally

Less than a generation ago, the studio of a visual artist or designer was filled with the smells of glue, wax, gum erasers, paint, and ink, along with the sounds of paper cutters chopping and pencils being sharpened. Today, you're far more likely to find a studio teeming with large-screen computers instead—the clicking of keys and the whisper of a mouse on its pad the only sounds as the artists go about their work.

The career of Marie Weaver, associate professor of art at UAB, has spanned both worlds. “We're seeing a revolution in the way designers create and access information,” she says. “The changes are more massive and more profound than at any time since the first book came off of Gutenberg's printing press in 1450. One of the best things about this revolution is that it's making it easier for people to design publications that are cleaner, easier on the eyes.”

Weaver says that with the emergence of the Internet and Web TV, computers and television are beginning to merge. “Before long, TV will be our main device for delivering information,” she says. But she cautions that anybody who uses that fact to predict the demise of books and magazines is way off base.

“I think of the first boom years of television, when people in radio got very nervous, afraid that their whole medium was about to be made obsolete. Obviously that didn't happen. Television sliced into radio's market, making radio re-evaluate and re-invent itself in a number of ways. But radio and television are both still going strong, and I think the same will be the case for traditional print publications.”



Books: An Analog Art Form

Weaver fell in love with the design, texture, and smell of books as objects of art “way before I learned how to read them,” she recalls. One of her most recent exhibitions was, in essence, a tribute to the book as an art form at a watershed time in the evolution of where and how people read.

into women's makeup compacts—small and personal enough to be held in your hand—yet they were exhibited as digitally created photographic prints, 30 x 40 inches in size. For the same show, I also created a video installation about the process of designing the exhibition catalog. The video, edited on the computer, was yet another way to present a book.”

As the computer revolution continues, people in some circles fear that the creative standards of the graphic design profession will be lowered, because anybody with \$50 can buy a CD-ROM containing hundreds of pre-designed publication templates, type fonts, clip art, and photographs.

But Weaver thinks otherwise. “Technology has made design available to the masses, and it makes the average publication look better than it did—if the person using it can get past the razzle-dazzle of being able to use 12 different typefaces on one page, or the Tiffany font in all-capitals, or what-have-you. I'd say that most of the projects amateurs are creating now wouldn't have been given to a designer even before computers were available.

The project, titled “A New Codex: Books as Subject in the Digitized Age,” consisted of her reflections on “alternative ways of looking at the book,” she says. “Because technology is changing the way we access information, the book is already a transformed object. These pieces were sort of an exploration into how it holds up as an art object—inviting viewers to think of books in ways they normally don't.

“The books in the show connected thematically in that they were each designed to fit

“The changes are more profound than at any time since the first book came off of Gutenberg's printing press in 1450.”

"I also think it's wonderful that, for the first time in history, millions of people are becoming acquainted with what designers do. Twenty years ago, how many people knew what 'fonts' or 'kerning' or 'tracking' meant, much less how to use them? So, in many ways, it's made the profession of graphic design much more noticeable and more respected. It also makes people aware of just how important creative talent is when they want publications that are a cut above what people are doing by the cookie-cutter method.

"It's a question of balance. But, more and more, people are coming in to ask me about design as a profession. In the long run, I think that has to be good for everybody concerned."

The Cyber Stage

When the actors walked on stage in UAB's recent production of Tennessee Williams's *The Glass Menagerie*, the backdrop depicting the skyline of old St. Louis—and even the stage design itself—came out of a computer.

"Designing sets and printing backdrops from computers is the future of the theatre," says Lang Reynolds, associate professor of theatre. "Not only is it time-efficient, but computer modeling allows you to work some of the 'kinks' out of a set before you start building and lighting it."

This play's set was created on computer by scenic designer Darwin Payne, an internationally known author/designer at Wake Forest University who is working on the cutting edge of Macintosh technology, according to Reynolds. Appropriately enough, Payne sent Reynolds the finished stage design for *The Glass Menagerie* via e-mail—and the digital renderings were immediately put to use in building scale models of the set and printing scenic backdrops.

In fact, Reynolds says, a designer with a computer can create several different versions of a set to choose from, in less time than a single set rendering could be produced with traditional methods. "The computer simply gives you more choices. It doesn't 'replace' anything. Sometimes the computer images, ironically, can look a little too realistic. But often the trade-off can be worth it."

Reynolds reciprocated by helping Payne with backdrops for a recent Wake Forest production, and he hopes to cultivate similar relationships with other theatre departments in the Southeast.

"Theatre, like all of the arts, is about collaboration," Reynolds says, "and the computer allows us to collaborate far more effectively than ever before." **UAB**



Steve Wood

"I can sit in one small room and, with the twist of a knob, change the acoustics to the size of a concert hall," says Henry Panion (foreground).

Training Tomorrow's Musicians

"There's no doubt that technological advances have had a tremendous impact on every aspect of the music profession, from scoring to recording," says Henry Panion, Ph.D., professor and chair of UAB's Department of Music. Panion is the guiding force behind UAB's music technology program, which will be housed in the soon-to-be-constructed Stevie Wonder Center for Computing in the Arts—a one-of-a-kind facility that will feature interactive classrooms for music, theatre, and graphic design, a recording studio, and the most advanced computer and musical equipment.

"One of the most important things the explosion of technology has done for musicians is to enable more people to create, publish, and even distribute their own works," Panion points out. "Serious recording was once done only in large markets such as New York, Nashville, and Los Angeles—but today, you'll find fully equipped, high-tech recording studios in people's homes. I can sit in one small room and, with the twist of a knob, change the acoustics to the size of a concert hall or a football stadium. I can turn one singer into a choir.

"We're trying to equip our music majors with the skills they'll need in order to be competitive—and marketable—in a field that's becoming increasingly dependent on technology."

Panion says that the department has already had seniors accepted into graduate schools on the basis of resumes done completely in CD-ROM form. "CDs are not just for music anymore. You can add animation, videos, interviews with the band, any number of things. It allows the audience to see and feel the music being made, as opposed to just listening to it.

"We're becoming the program of choice for many, many students. Our ensembles are growing by leaps and bounds. It's an exciting time for us. There are some growing pains, such as needing more office space. But that's a wonderful problem to have."





CANCER- BLOCKING CHEMICALS

THE HUNT IS ON

We live in a sea of carcinogens. The air we breathe, the water we drink, the food we eat—all contain cancer-causing substances. But there is good news, according to UAB scientist Clinton J. Grubbs, Ph.D. We also live in a sea of chemopreventive agents, and those agents, with a little help from science, can thwart the many carcinogens in our world.

BY BOB SHEPARD

The Push for Prevention

“The term ‘chemoprevention’ was coined in 1977,” says Grubbs, director of the newly formed Chemoprevention Center in UAB’s School of Health Related Professions. “Simply put, a chemopreventive agent is a substance that helps prevent the onset or progression of a disease.”

Researchers in the field are particularly interested in finding substances to prevent cancer—and already their efforts are paying off. The anti-estrogen drug tamoxifen has been approved for use as a chemopreventive agent for breast cancer. “Tamoxifen is the first success story,” notes Grubbs. “It shows, for the first time, that chemoprevention can work in humans.”

Tamoxifen has produced a 40-percent decrease in breast cancer incidence in women at risk for the disease, says UAB surgical oncologist Samuel Beenken, M.D. It has also proved to be valuable as a therapeutic agent for women with breast cancer and can decrease the chance of recurrence.

“This is a breakthrough of sorts for women at high risk,” says Beenken, who oversees clinical chemoprevention trials for the Comprehensive Cancer Center. “Unfortunately, tamoxifen has side effects, so you can’t treat everybody with it. But it’s proof that a simple compound, taken by mouth, can definitely be effective in preventing a very common cancer.”

An Anti-Cancer Pill?

Such simple anti-cancer compounds are the Holy Grail for researchers in the Chemoprevention Center. Their ultimate goal is a universal cancer-preventing drug that could be given to all humans. That may sound far-fetched, but modern science has already yielded other universal preventatives. Adding iodine to salt, for example, guards against goiter, and putting fluoride in the water supply prevents tooth decay.

Grubbs says he’d like to find a similar “magic bullet” for cancer—but he admits that goal is elusive and perhaps not attainable at all. Creating a universal anti-cancer drug is fraught with formidable stumbling blocks. For one thing, different kinds of cancer develop and progress in different ways, so a single, effective preventive agent seems unlikely. In addition, a universal cancer preventative would have to be free of side effects, because it would be given to healthy people.

In the meantime, research efforts in the Chemoprevention Center will focus on preventing specific kinds of cancer in people who are at high risk. “We might focus on former smokers, for example, who are still at risk for a variety of cancers,” says Beenken. “We know they are at risk, and we know that they are a motivated population. That’s the kind of group we’ll target first.”

Research in the center is moving swiftly, largely because of the involvement of faculty

from many disciplines—from chemists to pharmacologists to dermatologists to oncologists. “An interdisciplinary team is essential for this kind of research,” Grubbs explains. “Chemists design molecules that they believe might have chemopreventive properties, and basic researchers from a variety of fields study the compounds in laboratory settings and in animal models. Then physicians take the most promising efforts into clinical trials in humans. Activities in the center form a whole chain of exploration and discovery.”

Victory with Vitamin A?

UAB chemists Donald Muccio, Ph.D., and Wayne Brouillette, Ph.D., work at the very beginning of the research chain. “We conceive new molecules,” says Brouillette, “and then we rely on others in the Chemoprevention Center to give us the necessary feedback so that we can go on to the next cycle of design.”

“Without this type of environment—with a strong medical school and Comprehensive Cancer Center—we would just be making compounds and doing basic kinds of evaluations,” says Muccio. “But here, we’re in an environment that allows us to get a new compound to a stage where it has promise.”

An example is a Brouillette/Muccio-developed compound called UAB 30, a vitamin A derivative that is nearing clinical trials. The challenge of vitamin A derivatives, Brouillette says, is that they can have chemopreventive characteristics, but they can also be toxic in the quantities required for prevention. “With that in mind, our goal is to modify the compound to separate out the toxicity while maintaining the beneficial effect, or even improving upon it,” he says.

Muccio and Brouillette designed UAB 30 to avoid reacting with certain cell receptors called retinoic acid receptors, which they believe are heavily involved in the process that makes vitamin A toxic. So they constructed UAB 30 to instead react strongly with a secondary class of receptors—retinoid X receptors, which the scientists think are more important for chemopreventive activity.

“In our experiments, UAB 30 proved to have low toxicity, which is what we were striving for,” says Muccio.

Pre-empting the Process

One of the challenges faced by chemoprevention researchers is the fact that some cancers develop slowly, so patients will have to be followed for years to see if a substance truly inhibits the onset of cancer.

“Our target is carcinogenesis, the process in which a cancer develops over many years,” says Beenken. “Typically, multiple genetic events must occur over time in order for cancer to form and progress. We’re trying to identify stages in this carcinogenic process and possible ways to intervene.”

One promising substance that Beenken is studying is a drug that targets transforming growth factor (TGF) alpha, which appears to be active in the formation of several different cancers. Beenken’s research shows that the new drug reduces the expression, or quantity, of TGF alpha in cells. When the drug is removed, TGF alpha returns to its over-expressed baseline.

“We haven’t made the correlation yet that the patient with reduced expression of TGF alpha is at reduced risk for cancer,” he says, “but we think it’s a very good possibility. It’s one of our building blocks.”

The Significance of Soy

While researchers concentrate on finding usable drugs in the fight against cancer, Grubbs says chemoprevention doesn’t have to come in a pill.

“People are modifying their behavior—not smoking and eating better,” he notes, adding that there are more than 20 classes of chemicals with chemopreventive properties. Many of these chemicals occur naturally in food, and others are synthetic antioxidants used as food additives. “That means diet may be one of the most important variables for science to examine—particularly differences in diet in different parts of the world.”

UAB pharmacologist Stephen Barnes, Ph.D., agrees. “People living in Asia have a lower rate of hormone-dependent cancers, such as prostate cancer, than corresponding people in this country,” he says. “It’s as if something is protecting Asian residents—because when they migrate to this country, the protection disappears.”

Barnes and his colleagues think that soy, which is prominent in the Asian diet, is the protective substance.

There is now some evidence that soy could help prevent heart disease and osteoporosis, as well as cancer.

“During the Vietnam war, autopsies were done on young men of both sides,” says Coral Lamartiniere, Ph.D., UAB professor of pharmacology and toxicology. “They found precancerous lesions in the prostates of both American and Vietnamese young men, suggesting that we all start out with precancerous lesions as teenagers.”

“So perhaps diet influences how rapidly the cancer proceeds,” theorizes Barnes. “The point is that precancerous lesions are distributed around the world, in all races, pretty equally. But death from cancer increases as much as 10- or 20-fold in some countries.”

Clues in Foods

Lamartiniere and Barnes are focusing their research on one component of soy, an isoflavone called genistein. In the prostates of animals, genistein seems to inhibit the expression of certain receptors that play a significant role in cell proliferation and differentiation—processes that are associated with the potential for cancer to develop.

Does this mean the average American needs to bulk up on soy? Barnes might say “yes,” particularly since there is now some evidence that soy could help prevent heart disease and osteoporosis, as well as cancer.

Beyond soy, many other vegetables and fruits appear to have anti-cancer agents. Grubbs notes, however, that it may not be possible to eat those foods in quantities sufficient to provide the preventive effect. “A good example is indole-3-carbinol, found in cabbage,” he says. “We know that it’s a preventive agent. We’ve extracted it and given it in the initial stages of cancer, and it knocks out 95 percent of breast cancers—but you’d never be able to eat enough cabbage to get the quantity you’d need.”

Grubbs says the key to chemoprevention will be to isolate food components that are chemically active and package them in high enough quantities to be effective.

A Budding Science

Chemoprevention is young, at least in the way time is measured by science, and scientists expect the search for effective chemopreventive agents to take time.

“I seriously doubt that, within the next couple of decades, we’ll be developing compounds that everybody will take to prevent cancer,” muses Brouillette, “because side effects are so variable among patients that even very safe drugs have toxic effects in a small percentage of patients. So we may never achieve a perfect compound that has absolutely zero toxicity in all persons. But I think we will develop compounds that are safe enough to provide a degree of prevention for patients at high risk.”

Beenken says this is an exciting time in chemoprevention, with a strong foundation laid and with real, meaningful discoveries tantalizingly within reach.

“We’re toddlers at this stage, just learning to walk,” he says.

For Grubbs, Beenken, and all those involved in the Chemoprevention Center, the day may not be too far off when they’ll be able to run. **UAB**



Herpesviruses

Missiles of Disease—and Deliverance?

BY CHARLES BUCHANAN

IN THE BATTLE FOR GOOD health, herpesviruses have historically been on the wrong side. At their weakest, these weapons of mass destruction cause pain and embarrassment. At their worst, they cause death. But new treatments developed at UAB are turning the tide. Even more remarkably, UAB researchers are beginning to transform this enemy into an ally—one that could lead to new therapies for brain tumors and other debilitating diseases.

An Ancient Adversary

Richard Whitley, M.D., a UAB professor of pediatrics, has been leading the charge against herpesviruses for more than 20 years. Like any good general, he is an expert on his opponent. "Herpes has been known since ancient Greek times," he says. "Today we can list eight separate viruses in the herpes family—and we haven't discovered all of them yet." The eighth herpesvirus was, in fact, discovered as recently as 1994.

As millions around the world know firsthand, this eight-microbe bloc is responsible for agonizing diseases. Though many people are familiar with herpes as a genital condition, herpesviruses also cause shingles, fever blisters, and eye and inner-organ infections. The worst incarnation is herpes simplex encephalitis, a disease in which the viruses attack the brain. "This is a devastating infection," Whitley says. "Seventy-five percent of its victims will die. Of those who happen to live, only 2 percent will return to normal function."

What makes these viruses—particularly the two herpes simplex viruses—so troublesome is that, after invading the body, they camp out in the nerve cells of the spine, which serve as a secure bunker. From this safe haven, the viruses can avoid the body's natural immune response; they can also reactivate at any time and infect other parts of the body. "Herpes simplex represents one of the more sophisticated microbes," Whitley says. "It has evolved to survive in spite of host defenses."

Blocking the Bullets

Whitley's war on herpes began in the mid-1970s, when he set out to find antiviral agents to treat herpes simplex encephalitis in infants who had contracted the disease from their mothers at birth. In 1977, his team of UAB scientists reported success with vidaribine, a drug that blocked the virus's ability to reproduce itself. Vidaribine was the first effective antiviral agent ever discovered—and it laid the foundation for the development of other anti-herpes drugs.

But even after the discovery of vidaribine, "we weren't accomplishing as much as we wanted to," Whitley says. So UAB Hospital became the first place in the world to test acyclovir, another drug that blocked replication.

In the future, viruses could be altered to treat cancer, Parkinson's disease, traumatic brain injury, and stroke.

The results were stunning. "We began to see healing in five to seven days, even in immunocompromised patients, which was unheard of."

Today acyclovir is used universally for the treatment of herpes simplex in all of its forms, and the number of deaths caused by the disease has plummeted. "And it all started here," Whitley adds.

From Foe to Friend

Whitley's latest offensive against herpes began a decade ago, when he, along with research teams at UAB and the University of Chicago, discovered that removing a particular gene from the herpesvirus would prevent it from reproducing or reactivating once it infected nerve cells. The scientists also found that the virus's genes could be replaced with

other, more beneficial genes. This led Whitley to speculate that herpesviruses could be transformed—through genetic manipulation—into tools for delivering therapeutic genes to tumors in the central nervous system.

Such genetically altered, non-replicating herpesviruses would not cause disease, he reasoned, but they would still "infect" nerve cells. So perhaps they could be used to insert "good" genes into the cells of brain tumors to fight the uncontrolled growth triggered by "bad" genes.

"When Dr. Whitley approached me with the idea that herpes simplex viruses might be used to treat malignant brain tumors," recalls Yancey Gillespie, Ph.D., a UAB professor of surgery, "at first I thought it sounded crazy.

But these are such therapeutically resistant tumors that I'll listen to almost anything, including using a virus that can produce lethal encephalitis."

To be certain that the genetically altered virus would not cause encephalitis, Whitley and Gillespie tested it in animal models.

They found that gene removal and replacement worked safely—an extraordinary result. "You couldn't kill a mouse by putting this genetically altered virus into the central nervous system," Whitley says. "That was the first time anyone had been able to achieve such a result."

From that point on, Whitley and his colleagues knew that it would be possible to transform the herpes simplex virus into a gene-therapy tool for humans—a weapon that could target tumors in the central nervous system and potentially save lives.

Creative Combat

Today the development of new herpesvirus anti-cancer "weapons" is under way in three projects being conducted at UAB and the University of Chicago. In one project, sci-

entists are genetically altering the herpes simplex virus to act as a “molecular scalpel” that will directly hit and kill tumor cells, according to Gillespie. In the second project, therapeutic genes are being added to the virus, which will act as a missile, or vector, to deliver those genes to tumor cells. The presence of the new genes will then amplify the body’s immune response against the tumor.

Researchers in the third project are using herpesviruses to sensitize tumors to radiation therapy, “to see if we can’t get a bigger bang for our buck,” says Whitley. The process involves exposing cancerous cells to altered viruses, which infect the cells and spread throughout the entire tumor, making the tumor particularly susceptible to radiation.

The three projects are funded by a \$4.3-million grant from the National Institutes of Health.

Disease Demolishers?

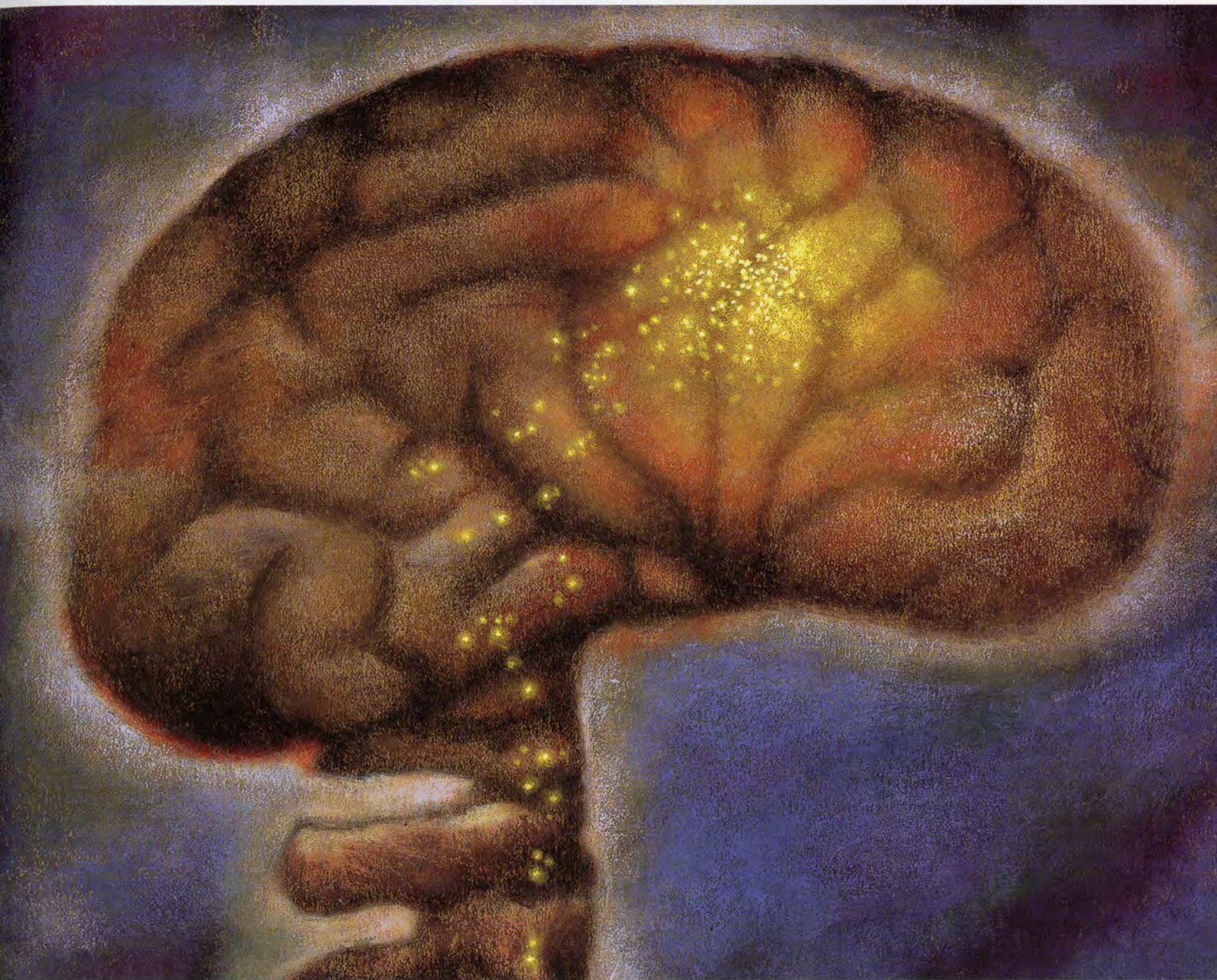
James Markert, M.D., an assistant professor of neurosurgery at UAB, is directing the first clinical trials using genetically altered herpesviruses to combat brain tumors in humans. Markert’s trial is a phase I study, which assesses safety and provides basic information about the therapy. If there is any evidence of an antitumor effect, phase II and phase III studies will further investigate the effectiveness of the treatment.

So far, according to Whitley, the seven volunteers in the study “have had no evidence

of encephalitis or adverse events that we can attribute to the administration of our potential therapeutic.” And at least one biotechnology firm has already expressed interest in the findings.

While Whitley and his colleagues await the results of the clinical trials, Markert is constructing new genetically altered herpesviruses that could lead to treatments for countless other diseases. Markert predicts that, in the future, viruses could be altered to treat breast, lung, and prostate cancer, degenerative diseases such as Parkinson’s, traumatic brain injury, and stroke.

Apparently on the verge of yet another breakthrough in their herpes research, Whitley and his colleagues say that these are the most exciting possibilities to date. **UAB**



Travis Tatum

Saving Our Cities

THE URGENCY OF URBAN REVITALIZATION

BY DALE SHORT



SOMETIMES THE BEST PLAN OF attack is a little bit of show-and-tell. One of Betty Bock's fondest memories is the day that her committee went to a Birmingham City Council meeting and asked them to expand a fledgling program of incentives for people to buy and restore empty, run-down houses in their neighborhoods.

"Issues like housing can be kind of abstract," says Bock, program coordinator of UAB's Center for Urban Affairs. "So we made the council a deal. When their meeting was over, we offered to drive them to a house that was one example of what the program was doing, serve them lunch, and have them back at City Hall by 1:30. They accepted."

"As the council members walked into the house, we showed them slides of what the dilapidated structure had looked like a year earlier—before its rehabilitation. The family who'd bought the house really had a knack for decorating, and they had made the place as warm and homey as you could imagine."

"After the council members toured the house, the chairman of the finance committee said, 'If this is what we're spending the city's money on, I'd say it's the best money we can spend.' Another councilman went back in the dining room to look at the slides again. He couldn't believe it was the same house. We got more mileage out of that visit than anything we'd done to date."

A Crusader with Credentials

Bock is an evangelist for neighborhoods and urban revitalization—literally. In addition to her other credentials, she's an ordained Baptist minister.



"Before" (above) and "after" (left) photos such as these helped convince the Birmingham City Council to expand a program to restore empty, run-down houses in selected neighborhoods.

A native of Missouri ("They don't call it the 'show-me state' for nothing," she says), Bock majored in elementary education and, after college, went directly for seminary training. "Having grown up on a farm, the idea of an urban ministry was the farthest thing from my mind at the time," she says. "But when I took a class on ministering in metropolitan areas, I got turned on to the needs and possibilities of inner-city families, and what I do has developed from there."

David Coombs, Ph.D., vice chairman of the Department of Health Behavior in UAB's School of Public Health, co-teaches a class with Bock on revitalizing neighborhoods. He and Bock both believe that the traditional focus on issues of city life has been far too narrow.

"You can have the best public-health programs and social-services agencies in the

"One of the most important things we can do is to help a community identify its assets as well as its deficiencies."

world," Coombs says. "But if the people can't, or don't, access them—because of poverty, lack of education, or whatever—then nothing is gained. A crucial part of what we do is getting the message out."

"You can't look at community-development issues without realizing how they intersect with behavioral and health-related issues, and vice versa. It all fits together. Whether you're talking about smoking, prenatal care, teenage pregnancy, drug abuse, violence of all kinds—they're each a part of the same picture, and context is all-important."

False Starts and Failures

Both Bock and Coombs believe that the topic of "urban renewal" has gotten such bad press in recent years that she prefers the term "urban revitalization" instead. "Unfortunately, a great number of people associate urban renewal with eminent domain, tearing down buildings, gentrification, and so on," says Bock. "That's not what we're about."

"There have been a lot of false starts around the country and also some major failures—which tend to get the most headlines," Coombs adds. "But I think it's only fair to say that the highest profile failures are mostly in the past." One example is a

huge and highly touted public housing project in Chicago, which, for a number of reasons, became virtually uninhabitable and was demolished. Closer to home, a master plan designed to make the city's downtown more pedestrian-friendly is seen by many, in retrospect, to have fallen short of its promise.

"But the cynicism and skepticism I hear about the kinds of revitalization projects we're involved in today come from middle-class people who live outside the city," says Coombs. "Talk to the president of any neighborhood association and he or she will tell you, very enthusiastically, about the results they're seeing. The people whose lives are affected by these programs aren't cynical—they're grateful."

"By and large, we've learned from our mistakes. We're seeing cities undergo some amazing transformations: Indianapolis,

Charlotte, Minneapolis, Chattanooga, Toronto. The list goes on. Birmingham is still a little behind the curve in that regard, but we're catching up quickly. That's because we have the resolve—and the commitment—to do so."

A Half-Full Glass

Bock has her list of success stories, too. "I think one of the most exciting things going on in our field right now is the work being done by John McKnight, a professor at Northwestern University," she says. "He's into what he calls 'asset-based community development,' which is based on the idea that we should see a neighborhood's glass as being half full, rather than half empty."

"That's because when a neighborhood starts to go downhill and develops a negative image, it's human nature for people who pass through the area to see only the bad things, the things that reinforce that negative image. As a result, the people in the neighborhood come to believe that those images are true."

"So one of the most important things we can do, going in, is to help a community identify its assets as well as its deficiencies. That doesn't make the deficiencies any less real, but at least you start out with a more balanced picture of the neighborhood's strengths and weaknesses."

Incentives for Industry

Bock and other UAB staff and faculty are leading a number of local urban-revitalization efforts. For example, UAB played a major role in an initiative called "Empower Birmingham," which submitted a proposal to the federal government for a 10-year, \$100-million grant to help nurture private enterprise and economic development in some 20 neighborhood zones across the city. One part of the plan was to offer tax credits to eligible employers within the zones, a \$20,000 tax



deduction to businesses that invest in the area, and up to \$3 million in tax-free facility bonds. While Birmingham was not selected as one of the 15 Urban Empowerment Zones, the city was selected as one of 15 “strategic planning communities.”

In addition, UAB’s Center for Community Outreach Development (CORD) is working with city officials to develop a grassroots strategy aimed at helping revitalize 20 neighborhoods in the Ensley, East Thomas, Smithfield, West End, North Birmingham, and Titusville areas.

“Birmingham officials have made a sincere effort to engage the major institutions in the city,” says UAB biochemist Stephen Hajduk, Ph.D., director of the CORD project.

A Pride-Building Partnership

UAB’s Center for Urban Affairs is also leading “Operation Pride—West End” and the Civitan International Research Center is leading “Titusville 2000”—two programs that are designed to help the citizens of target neighborhoods address their own needs, ultimately, without relying on outsiders.

“It’s a wonderful partnership with the community,” says Bock. “We tell people, going in, that they know far more than we do about their needs. In a typical session, we ask people at a community meeting to write

down on an index card what they think is needed for West End to achieve its fullest potential during the next three to five years.

“So in a few minutes we’ve generally got somewhere between 30 and 50 ideas. We go through them one by one, write them on the blackboard, and discuss them until everybody has a chance to be heard. Then we vote to prioritize the ideas, and we divide into small groups to talk about them in more detail.

These programs are designed to help citizens address their own needs, ultimately, without relying on outsiders.

“When the blackboard is full, I tell them two things. First, that none of these are Betty Bock’s ideas; they are all from people who live there. And second, that we shouldn’t be too quick to discount anybody’s idea up front. Sometimes, things that first strike us as odd or trivial turn out to be very useful when we get below the surface.

“It’s exciting to see the look in people’s eyes when they realize just how many resources they actually have.”

Blueprints for Tomorrow

In October, the Fannie Mae Foundation awarded UAB a \$750,000 grant to help revitalize surrounding neighborhoods—one of the largest nonmedical grants the university has ever received. UAB’s proposal for the grant beat out 44 competitors, including UCLA, Michigan State, Yale, and the University of Illinois at Chicago to tie Pratt Institute of New York for the most money awarded by the Foundation’s University-Community Partnership Program. In awarding the grant, the Foundation said that UAB’s plan “has the potential to become a model for future university-based community development initiatives.”

Over the next four years, the Center for Urban Affairs will use the grant for a program called “HousingPlus,” which will provide funding to help low-income families purchase homes and to help individuals start residential construction businesses in the Titusville and West End communities.

In accepting the grant on behalf of the university, President W. Ann Reynolds, Ph.D., emphasized UAB’s integral ties to the

surrounding city. "UAB's educational prominence grew from deep roots in the city of Birmingham. We have a longstanding commitment to our urban neighborhood, but this grant marks a high point in our history of working together to provide truly meaningful programs and services."

Major partners in the community effort, in addition to Titusville 2000 and Operation Pride, include Neighborhood Housing Services, the Alabama Housing Finance Authority, the Birmingham Consortium of Residential Lenders, the City of Birmingham, and the Neighborhood Reinvestment Corporation.

"This is a true partnership with these communities," says Robert Corley, Ph.D., director of UAB's Center for Urban Affairs. "Their leaders helped us greatly to earn this grant, and they'll be critical to its implementation. UAB has been heavily involved with these neighborhoods through Operation Pride and Titusville 2000, but now we can have an even greater impact on their revitalization initiatives."

Benches and Ice Cream

Long before joining the staff of UAB, Bock was instrumental in the revitalization strategy for a neighborhood right in the university's backyard—Five Points South. "A lot of people don't remember how the area looked back in the 1970s," she says. "A third of the storefronts were vacant, there was an office building with 8-percent occupancy, and the space that's now occupied by Johnny Rocket's was a nightclub named 'Little Bombers Lounge,' where motorcycle clubs hung out."

In those days, Bock continually heard people say that they were afraid to go through the area after dark. "Among the

things we learned was that you not only need to make improvements, but you also need to make them as visual as possible, to catch the eye of motorists who drive through each day.

"To give the square the look of a 'people place,' we decided that we needed a lot of benches for people to sit on. The problem was, how could we get people to come sit there? So our most recruited business was an ice-cream shop, which would give people a reason to relax on the benches.

"You not only need to make useful improvements, but you also need to make them as visual as possible."

"In hindsight, it sounds simple. But anybody who's done planning knows how many hours it can take to come up with an idea like that."

Measurable Results

Bock is also excited about another UAB project that targets West End elementary- and middle-school children who are having behavior and learning problems.

Known as the Youth Enrichment and Support (YES) program—and funded by the Alabama Office of Juvenile Justice and Delinquency Prevention—the project allows UAB School of Education faculty to conduct academic assessments for students at Arrington Middle School and Hemphill, Lee, Jackson, and Powderly Elementary Schools. The faculty test each child's math and reading skills in order to develop strategies to help teachers guide the children effectively.

"Once we've conducted this extensive testing, we'll be able to diagnose what's causing each child's problems," says Bock. "This is the kind of program that has the potential to make a difference in people's day-to-day lives."

Yet another project known as BLISS—Becoming Learners in School and Society—targets sixth- to eighth-grade students at Arrington Middle School, where on-site UAB coordinator Michelle Sims organizes literacy skills training.

"This is a tutorial program aimed at students who have scored low on their functional literacy exams," explains Cecilia Morgan Pierce, Ed.D., associate professor of curriculum and instruction in the School of Education. "My undergraduate students use social

studies as a medium to develop activities that strengthen literacy skills." The BLISS program is now in its second year.

"Making a difference—with measurable results—is what it's all about," Bock stresses. "The days are gone when we could say, 'Gee, isn't it nice someone has this or that program.' To justify our funding, we increasingly have to put our programs under rigorous analysis to see what impact they're having.

"The biggest advantage UAB has is the multidisciplinary nature that's always been its trademark. The most fundamental concept of revitalizing neighborhoods is that you have to bring the insights of many different disciplines together in a holistic way, and we're doing that. It's just one of the many reasons I love my job." **UAB**



Toxic Spills

Ready to Respond

BY CHRIS MOHNEY

MOST LOCAL RESIDENTS wouldn't consider Birmingham a likely setting for an environmental disaster. Yet, in October 1997, a downtown warehouse fire ignited thousands of gallons of pesticide, spewing toxic fumes into the air over the city. Much of the pesticide also ended up in Village Creek and downstream in the Warrior River, washed there in the runoff from firefighters' hoses.

No humans died in the 1997 incident, but massive (and, in some places, total) fish kills did result from the spill. This accident wasn't as catastrophic as the Chernobyl nuclear disaster or the chemical release in Bhopal, India, but it illustrates an important reality about environmental accidents—they can happen anywhere.

"The possibility for accidents exists everywhere," says Steven M. Becker, Ph.D., of UAB's Department of Government and Public Service. "And fixed sites are not the only threat, since four billion tons of potentially hazardous materials are transported annually—and that's just in the United States. We have to be vigilant."

Intricate Impacts

Becker is one of several members of the UAB community who are probing all aspects of environmental accidents—from emergency response to social, psychological, and economic consequences. Their work is creating a new model for environmental-disaster preparedness and response.

In the past, preparation for the possibility of environmental disasters has typically been limited to evacuation and safety training. And, once a disaster happens, traditional response methods have focused on the immediate physical safety of those affected, cleanup of the mess, and measures to prevent the accident from happening again.

But Becker emphasizes that an environmental disaster has many kinds of impacts in addition to immediate, physical ones. Most major disasters, in fact, affect people's lives over the long term in ways that aren't usually factored into disaster-response plans.

"One of the most pronounced characteristics of environmental disasters is the social stigma that attaches to victims," says Becker. "After Chernobyl, for instance, adolescent women from the region tried to conceal their towns of origin for fear of being rejected as marriage partners. And, after a radiological accident in Goiânia, Brazil, bus drivers and airplane pilots wouldn't let people from that area on board."

"The overall impact of an environmental accident can be 10 times greater than its biological or physical impact."

Managing the Menace

Even the mere prospect of an environmental acci-

dent can have significant psychological effects on citizens who perceive their communities to be at risk. To measure such perceptions, Francis J. ("Sonny") Maher, a UAB doctoral student working with UAB environmental scientist Kent Oestestad, Ph.D., conducted a survey last year of about 400 people living near chemical weapons-storage facilities in Pine Bluff, Arkansas, and Anniston, Alabama.


Several thousand tons of chemical weapons have been stored for years at the Anniston Army Depot, creating concerns among some area residents about accidents, spills, and even terrorism. In addition, as the weapons are phased out of military readiness, the Army is faced with the task of safely disposing of them. The current plan is to incinerate them.

Maher's project is a risk-perception study. He will use data from the telephone survey to create a model of the psychological effects of living with the tangible possibility of an environmental accident.

The survey featured detailed questions about residents' demographics (including education, background, and economic level), proximity to the depot, and knowledge of the kinds of weapons stored at the facility. A major part of the survey was designed to find out if residents



Environmental disasters, says Steven Becker, affect people's lives over the long term in complex ways.



approved of the Army's plan for incineration—or if they thought other ways of disposal should be considered. According to Maher, people's perception of risk related primarily to gender. In general, women preferred alternative disposal options, while men were comfortable with the Army's choice of incineration.

Maher is still analyzing survey data and building his model, but his work promises to yield intriguing results. More importantly, it may help create greater understanding of how to deal with the grim specter of environmental disasters.

A Course of Action

Becker emphasizes that the complexity of the issue of environmental disasters demands cooperative, cross-disciplinary study. Since last year, he has been promoting just such an approach through a new Environmental Disasters course that focuses on the public health, social, psychological, economic, and public-policy implications of chemical and nuclear accidents. The course brings together students from diverse disciplines such as public health, social work, public administration, engineering, political science, sociology, nursing, environmental studies, and psychology.

Students in Environmental Disasters conduct intensive studies of several historical accidents, including Bhopal and Chernobyl. The centerpiece of the course is the forming of "disaster teams," which group together students from different backgrounds to study particular disasters and present their findings to the class.

"It's important for professionals from different fields to learn how to communicate and pool their expertise before a disaster strikes," Becker explains. "After an accident, when people are in the field, it may be too late to learn to work together."

In addition to giving students valuable experience in dealing with people in other

"One of the most pronounced characteristics of environmental disasters is the social stigma that attaches to victims."

fields, the course encourages them to get involved in community organizations that deal with disasters. "I learned even more than I expected," says Anastasia Seyer, a UAB graduate with a Master of Public Health degree in international health and epidemiology. "In fact, the course sparked my interest so much that I joined the local Red Cross Disaster Action Team when I moved to Ann Arbor, Michigan."

An Essential Effort


Environmental Disasters has become the first university-level course of its kind to be included in the Federal Emergency Management Agency's Disaster Education and Training Directory, and it has also attracted the attention of the United Nations Environment Program and the International

Red Cross. For example, Becker has been asked to help educate Red Cross personnel who work with communities affected by Chernobyl and similar accidents, and students in the course receive basic Red Cross disaster-response training.

Becker plans to continue building and promoting the course throughout the university and beyond. With support from a recent Dorah H. Sterne Endowment Fund grant, he will be able to purchase more library books, and he hopes to acquire advanced computer modeling software for student use. In addition, he has been given educa-

tional materials from international groups such as the United Nations Organization for Economic Cooperation and Development.

Underscoring its multidisciplinary appeal, Environmental Disasters is cross-listed in UAB's curricula for political science, geography, international studies, social work, and urban affairs at the undergraduate level, and political science, public health, and public administration at the graduate level.

"It's encouraging to get this kind of response to an area of study that's becoming so important," says Becker. "Dealing with the issue of environmental disasters can be draining, but I'm optimistic that we're on the right track." 

Headaches

PUNCHING OUT THE PAIN

BY DANIEL WILLSON

ASK MOST PRIMARY-CARE physicians what kind of pain their patients complain about most often, and they'll tell you it's headaches. According to the National Headache Foundation, more than 45 million Americans suffer from chronic headaches. But thanks to research into the mechanics of headaches, the outlook is brightening for most chronic headache sufferers—if they seek medical treatment.

"If someone is having to take pain killers for one or two headaches every week, it's time for that person to see a doctor," says Robert D. Slaughter, M.D., director of UAB's Headache Clinic and of the Multidisciplinary Headache Clinic, both located in The Kirklin Clinic. The Headache Clinic is designed for most headache sufferers, while the Multidisciplinary Headache Clinic treats patients whose dependence on analgesics is increasing and whose headache syndromes are associated with multiple symptoms.

It's All in Your Head

Most people, says Slaughter, assume that chronic headaches are caused by problems such as eyestrain, temporomandibular joint (TMJ) syndrome, sinus problems, and allergies. "But those symptoms usually are not responsible," he emphasizes. "Most people who have recurring headaches have a primary headache disorder—that is, the headache itself is the problem."

There are three main types of primary headache disorder—tension headaches, migraines, and cluster headaches. The most common of these are tension headaches, which can be either episodic or chronic in nature. "Tension headaches are typically described as feeling like a tight band around the skull," says Slaughter. They are nagging and annoying but generally not incapacitating.

"Migraines, on the other hand, are incapacitating and usually follow more of an episodic pattern—they come and go in an extremely severe and debilitating manner, and they're often worsened by activity." Migraine sufferers are particularly sensitive to light or noise and often experience nausea and vomiting. Their headaches, which frequently involve only one side of the head, are sometimes heralded by an aura—a group of telltale neurologic symptoms, such as hallucinations

of bright, blinking lights, or loss of part of their field of vision.

Cluster headaches are almost exclusively one-sided—generally behind the cheek and eye—and are associated with redness and

tearing of the eye, runny nose, and some forms of breathing abnormalities.

"In cluster headaches, the pain tends to come in clusters," says Slaughter. "People have one or more headaches every day for a period of time. This can happen daily for weeks and then disappear for months."

Triggers and Triptans

For many headache sufferers, Slaughter says, certain "triggers" can be identified and, in some cases, avoided. "Irregular sleep patterns and missed

meals can be avoided, for example, and so can foods such as MSG, processed meats, and aged cheeses. Other triggers can't be avoided; you can't change the weather, for instance, and a woman can't avoid her menstrual cycle. But it's important to find out what triggers your specific headache, since everyone is different."

Migraine headaches can be treated with new medications called "triptans," which are available in oral, injectable, and nasal-spray forms. Triptans block certain neurochemical receptors that are involved in the development of migraines. Many migraine sufferers have found relief using Imitrex® (sumatriptan) since its introduction in 1993. Injectables act fastest, because they speed the medication to a patient's bloodstream. One of the four triptans, Maxalt® (rizatriptan), is even available in a tablet that dissolves when placed on the tongue.

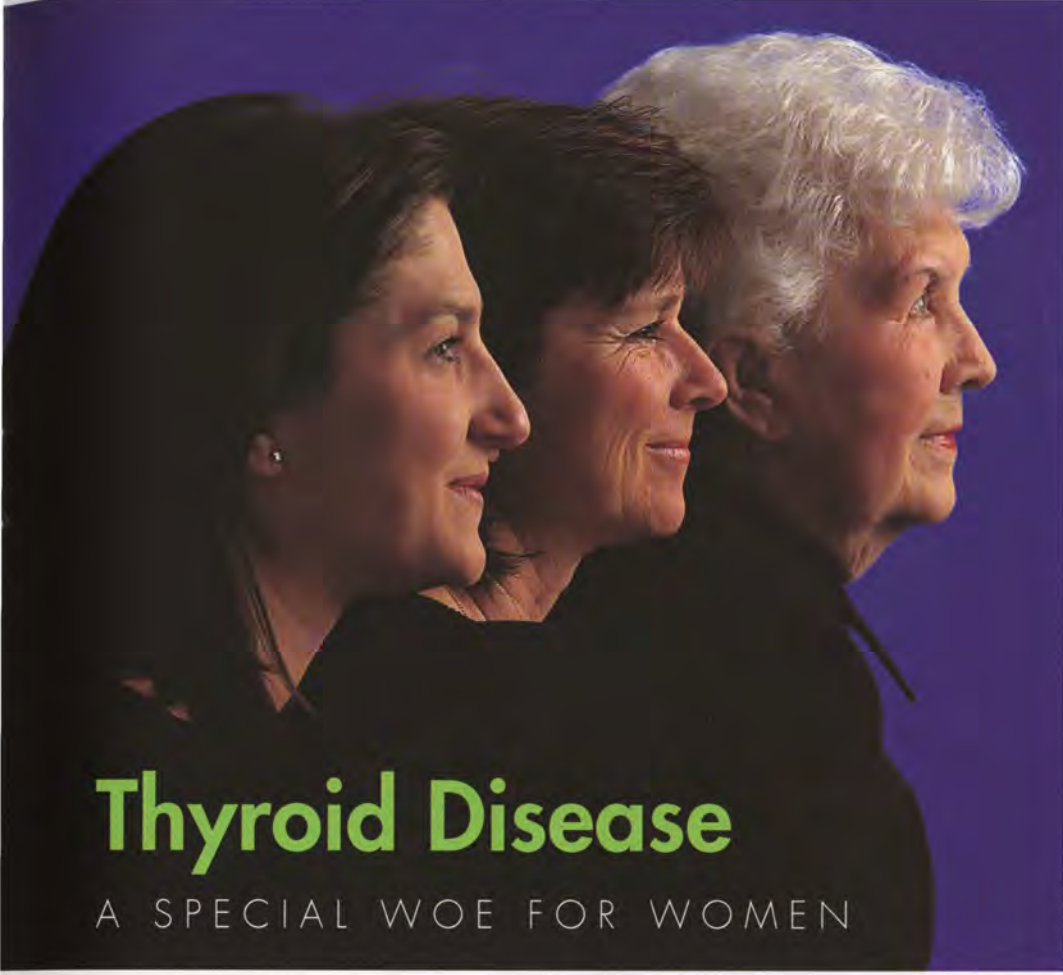
Another nasal spray, available under the trade name Migranal® (dihydroergotamine mesylate), is useful for treating both migraines and rebound headaches.

"Migraines have been called 'vascular' headaches in the past because dilated blood vessels were believed to be the cause of the headaches and other symptoms of migraine syndrome," says Slaughter. "But all of that is now felt to be secondary to what's actually going on in the brain. Migraines are actually neurological, rather than vascular, in origin."

For more information about the Headache Clinic or the Multidisciplinary Headache Clinic, call UAB HealthFinder at (205) 934-9999. **UAB**

"If someone is having to take pain killers for one or two headaches every week, it's time for that person to see a doctor."





Thyroid Disease

A SPECIAL WOE FOR WOMEN

BY NINA COSTOPOULOS

RENEЕ HAD EVERY REASON TO FEEL good about her life. She'd had a successful career and marriage, her kids were both prosperous and on their own, and she had a grandchild on the way. After three decades of working hard to realize their dreams of early retirement, she and her husband were planning their first vacation together as a retired couple.

But as she looked ahead, she didn't revel in the freedom that retirement would bring. Instead, she felt anxious and irritable. Rather than seeing retirement as a beginning, she lost ambition and hope and saw her life as a downward spiral.

Renee was also having trouble sleeping. She often felt flushed and noticed that her menstrual flow was decreasing—sure signs that she was experiencing the early stages of menopause, she thought. When her nervousness increased after their vacation, her husband finally convinced her to see a doctor.

Much to Renee's surprise, her doctor told her that she wasn't experiencing menopause at all. Rather, she was diagnosed with a disease called hyperthyroidism—an overactive thyroid gland. Like many Americans who have thyroid disease, she had ignored her symptoms because she assumed they were caused by advancing age.

Too Much, Too Little

Thyroid disease affects nearly 20 million Americans each year. Left undetected and untreated, hyperthyroidism can lead to heart disease, osteoporosis, and other serious health problems.

The thyroid gland, located at the base of the neck, produces hormones that regulate overall metabolism, or the rate at which the body produces energy from nutrients. With too little thyroid hormone in the blood, the body's metabolism slows down, creating a condition known as hypothyroidism. Patients with hypothyroidism experience weight gain, fatigue, depression, intolerance to cold, and, in women, heavy menstrual cycles.

Left untreated, hyperthyroidism can lead to heart disease, osteoporosis, and other serious health problems.

At the other end of the scale are patients, such as Renee, who have "thyrotoxicosis" caused by excessive thyroid hormones that speed up metabolism and affect virtually every system in the body. These patients are often nervous and irritable, their hearts tend to race, they develop an intolerance to heat, and they experience weight loss and, in women, scant menstrual cycles.

Although the symptoms of thyroid disease have been well documented, the mechanisms that lead to these abnormalities are not well understood, says UAB endocrinologist Richard Scott Rosenthal, M.D. "We do know that one thyroid gland disorder—Graves' disease—is an autoimmune condition," he says. "Patients with this disorder produce 'autoantibodies' that, ultimately, stimulate overproduction of thyroid hormones."

Who Is at Risk?

Women, says Rosenthal, are up to 10 times more likely than men to develop thyroid disease. In young women, pregnancy is often the trigger for the disease process. "Women have a 5 percent chance of developing a thyroid disease during the first six months after having a baby," he points out. "This happens because, during pregnancy, a woman's immune response is suppressed so that her body won't reject her baby. After she delivers, the immune system rebounds—sometimes so strongly that it triggers inflammation of the thyroid gland."

"Thyroid antibodies are present in the blood of 10 percent of postpartum women, and half to two-thirds of these women develop postpartum thyroid dysfunction," Rosenthal continues. New mothers often ignore their symptoms, he says, attributing them to postpartum depression—just as middle-age women attribute their symptoms to menopause.

By the age of 50, 10 percent of women have diminished thyroid hormone, and, by the age of 60, 17 percent have decreased levels of the hormone. "Women who develop thyroid disease later in life can be particularly hard to diagnose," Rosenthal says. "Younger women tend to come in with more symptoms and so are easier to diagnose."

Rosenthal notes that once thyroid disease is suspected, simple, inexpensive tests allow for accurate diagnosis.

The Right Balance

Several treatments are available for thyroid disease. Hypothyroid patients generally require a synthetic thyroid hormone called levothyroxine sodium, which replaces the missing natural thyroid hormone. Available in pill form, this medication must be taken once a day for life and has few side effects.

For patients with hyperthyroidism, the goal is to reduce the excessive hormone levels. This can be accomplished by treatment with radioactive iodine, which is taken by mouth and over a few weeks shrinks the gland, or by taking antithyroid medication to suppress thyroid hormone production, or less commonly by surgically removing the gland, or a portion of it. "In many cases, however, these treatments lower hormone levels too much," says Rosenthal, "and so we have to prescribe levothyroxine to restore the levels to normal."

By heeding the warning signs and seeking treatment, thyroid patients can spare themselves numerous health complications in the future and can quickly enhance the quality of their current lives. Renee, for example—who has been on antithyroid medication for just a few weeks—says she no longer sees the years ahead as a colorless void, but instead as a rainbow of possibilities. **UAB**

Managing Myopia

THE LONG VIEW, THE BIG PICTURE



Brandon Robbins

BY MELANIE PARKER

WHEN A CHILD STEPS THROUGH the schoolhouse door for the first time, she enters a whole new world of possibilities. Her future, in many ways, will depend on what she learns in that new world. For children with vision problems, however, learning is difficult and the future unclear.

UAB optometrists hope to uncloud the future for many Alabama children through vision-screening programs and research into how young eyes develop. With two special outreach projects, they are targeting “refractive errors” such as myopia, or nearsightedness.

A CLEERE Picture

Refractive errors occur when light rays entering the eye do not focus correctly on the back of the eye, or the retina. For children with myopia, this improper focusing of light causes blurred images of distant objects.

Through the Collaborative Longitudinal Evaluation of Ethnicity and Refractive Error

(CLEERE) study, children in Greene County, Alabama—the fifth-poorest county in the nation—are being screened for myopia with free eye exams by UAB optometrists. The children, along with underserved kids in designated cities in Texas and California, are all

Children in Greene County, Alabama, are being screened for nearsightedness with free eye exams by UAB optometrists.

taking part in CLEERE—a \$6-million, multi-center study funded by the National Eye Institute (NEI). It is the first such nationwide study of the development of nearsightedness and growth of the eye in ethnic groups including African-American, Hispanic, and Asian children.

Optometrists will use CLEERE results to develop a profile of risk and predictive factors for myopia. In the general population, about 25 to 30 percent of children are nearsighted. If, as evidence suggests, myopia and other refractive errors vary among different ethnic groups, new guidelines may be needed for vision screenings and eye examinations.

“This is a landmark study of how children’s eyes grow and how myopia develops,” says Robert Kleinstejn, O.D., professor of optometry in UAB’s School of Optometry and coordinator of the project. Sandral Hullett, M.D., director of Family HealthCare of Alabama and member of the University of Alabama System Board of Trustees, is principal investigator of the study.

The Need for Knowledge

“Nearsighted children often have problems seeing in school and are sometimes misclassified as lazy or slow,” says Kleinstejn. “Often, they just need eyeglasses.”

Knowing that many nearsighted children in Greene County could not afford eyeglasses, Kleinstejn arranged for glasses to be provided at no cost by Family HealthCare of Alabama. “More than one-third of the first 500 children tested in Greene County were referred for eyeglasses,” he says.

As much a missionary for his cause as a researcher, Kleinstejn has driven with his colleagues Melvin Shipp, O.D., and Janene Sims, O.D., to five different schools in a day to test children in the study who had left the local Eutaw area. Parked for weeks outside Carver Elementary and Eutaw High Schools in Eutaw in a mobile office fitted with sophisticated instruments, they tested for visual acuity, refractive error, intraocular pressure, axial length, focusing ability, and curvature.

“This is clinical vision science. We’re analyzing data as we go along,” says Kleinstejn. “Conventional wisdom is that Asian children are more nearsighted than others, but the prevalence of myopia in other ethnic groups is unknown,” he says.

Kleinstejn says that CLEERE will lead to guidelines on when children should be scheduled for eye examinations and will help optometrists predict the manner in which refractive errors are likely to progress. “This study should alter our current national policies on the timing of vision screenings for children,” he says. “It will also help optometrists and ophthalmologists educate parents about their children’s eyes and how they are likely to change as they grow up.” **UAB**

The PerioChip®

Taking the Bite Out of Gum Disease

BY MELANIE PARKER

THE THOUGHT OF “CHIPS” between your teeth might make you want to reach for toothpicks or dental floss. But in the battle to control the bacteria that cause gum disease, chips are actually the latest weapon in the dental arsenal.

The PerioChip®, an amber-colored sliver that is implanted between gums and teeth, may be a boon to the 50 million Americans who suffer from periodontitis. And it comes by way of a national, multicenter clinical trial recently coordinated by the School of Dentistry at UAB.

A Plaque of Plaque

Next to the common cold, periodontal disease—a progressive infection of the gums and other tissues that support the teeth—is the most widespread human disease. The disease typically causes bone loss and can lead to loss of teeth, with associated health problems such as poor nutrition. In recent years, it has also been linked to cardiovascular disease and even low birthweight babies. Periodontal disease usually occurs in adults 35 or older, with some populations—including diabetics, smokers, and some minority groups—at particular risk.

Periodontal disease begins when the bacteria that thrive and multiply within dental plaque get out of control, causing the gum tis-

sues surrounding teeth to become inflamed—a condition known as gingivitis.

“As gum disease progresses,” says Sandra Haigh, clinical coordinator of the UAB PerioChip® study, “the gum tissues become swollen and begin to move away from the teeth. This process causes the formation of spaces, or ‘pockets,’ that fill with plaque and are difficult to clean. Deep within these pockets, bacteria flourish. With no treatment, the bacteria produce tissue-destroying toxins, which attack the bone and other structures that support the position of teeth in the mouth. Eventually, the infection forms abscesses and teeth become loose. In the most severe cases, teeth are lost.”

Bacteria Busters

The PerioChip® is a gelatin matrix containing a controlled-release antiseptic called chlorhexidine. Once the chip is implanted, it biodegrades and releases its bacteria-killing medication directly into the pockets enlarged by plaque. There, the antiseptic begins to kill off the microbes, and the gum pockets generally become shallower and the gums less inflamed. A healing process can then begin, preventing potential gum and bone loss.

Used in combination with conventional deep

tooth cleaning, known as scaling and root planing, the PerioChip® appears effective, says Marjorie Jeffcoat, D.M.D., chair of the Department of Periodontics and principal investigator of the trial. “This is a very promising medical treatment for adult periodontitis,” she says. “It reduces the depth of the pocket in people with mild to moderate periodontal disease.”

In a second UAB study, Jeffcoat and her colleagues are trying to determine if the PerioChip® might enhance periodontal regeneration, or the regrowth of bone around teeth. “We’re testing the hypothesis that the PerioChip®’s plaque-reducing action will allow us to regrow more bone,” says Jeffcoat.

The antiseptic found in the chip, Jeffcoat says, is available as a prescription mouthwash for patients with red gums or gingivitis, and other weaker agents are available in some new toothpastes. But toothpaste and mouthwash can’t deliver the antiseptic directly to the germs in gum pockets, as the chip does. “The PerioChip® kills the bacteria in the places where gum disease occurs.”

Life-Changing Chips

The PerioChip® is good news for patients such as 48-year-old Ginny Beck, who has battled periodontal disease since age 18.

“I had severe gum recession and a lot of pocketing that was getting progressively worse. I had to get my teeth cleaned four times a year,” says Beck, an administrative associate in UAB’s Department of Psychiatry and Behavioral Neurobiology.

Like other patients in the study, Beck came to the School of Dentistry for an initial deep cleaning. She also had chips placed in areas of deep pockets. Because her gums showed such improvement after the treatment, there was no need for further intervention, other than periodic check-ups to ensure appropriate follow-up care.

The PerioChip® was approved by the U.S. Food and Drug Administration last summer and is available through general dentists and periodontists, including UAB’s Faculty Practice and student clinic.

Eventually, says Jeffcoat, the chip could be of enormous benefit to people with limited or no access to health care, including those in developing nations and countries with high rates of periodontal disease, such as China and India. “It’s the ease of use that makes it potentially revolutionary,” she says. “The best approach, of course, is prevention—brushing, flossing, and regular dental visits.”

But when preventive maintenance isn’t enough, new technologies and medications developed through dental research will continue to be the best defense—and offense—against periodontal disease. **UAB**

Marjorie Jeffcoat (below, left) says the PerioChip® (inset) could help the 50 million Americans, such as Ginny Beck (below, right), who suffer from periodontal disease.



Steve Wood

PREPARING FOR A nursing shortage is a little like bracing for stormy weather, says Mary Nash, R.N., Ph.D. "If you know a hurricane is coming, you don't wait until the last minute to buy plywood to board up the windows," she warns.

That kind of vigilance is helping UAB gear up for a nursing-shortage storm that already is rocking health-care facilities in parts of Florida, Texas, and the western United States. Particularly understaffed areas across the country are critical care, labor and delivery, emergency care, and surgical nursing. Some hospitals in hard-hit regions are offering bonuses of up to \$10,000 to prospective nurses, and some are recruiting outside the country, especially in Canada and the Philippines.

Problems of Age

Shortages are not new for nursing. But experts say that demographic and workplace factors might make this one particularly severe and lengthy. The Division of Nursing of the U.S. Department of Health and Human Services projects a nationwide shortage of 114,000 registered nurses by the year 2015.

"This is an atypical shortage," says Rachel Booth, Ph.D., dean of the School of Nursing at UAB. "We've not had the usual interval between the end of the last one and the beginning of this one. We just came out of a shortage in 1994-95. Almost as soon as we came out of that one, another one started."

What are the reasons for the current—and coming—shortage? The nation has 2.5 million registered nurses, and the supply is increasing at what would normally be a satisfactory pace. But demand is about to skyrocket, fueled partly by 76 million baby boomers who are beginning to move into the 50-and-above age bracket. In addition, the growing emphasis on primary care is increasing the demand for nurses on medicine's front lines. The need for advanced-practice nurses, trained at the master's-degree level, already is soaring.

To compound the problem, all of these changes are occurring in a "graying" profession. The average age of registered nurses now is 44 years, and the average age of nursing educators is 49. Adding to these troubling

The Next Nursing Shortage

Dramatic Downturn Spells Trouble



Trena Tatum

BY ROGER SHULER

realities is the fact that a number of nursing schools, including the one at UAB, have had to decrease their enrollments in recent years because of budget limitations.

"Nurses are assuming new and different roles, primarily due to the type of health-care system we are developing under managed care," Booth says. "We're facing a shortage not only in health-care delivery, but also in nurse education."

To address the problem, the School of Nursing at UAB is stepping up its student recruitment activities. The school—which has the only doctoral nursing program in Alabama—is accelerating faculty recruitment through its close ties to the nation's 66 other doctoral programs.

Systematic Strategies

At UAB Hospital, Nash, who serves as chief nursing officer, helped form the Retention and Recruitment Oversight Committee in November 1997. That initiative led to the formation of several work groups that are studying compensation and benefits, staffing and scheduling, professional advancement, and other issues.

"If you're facing a shortage and can't manufacture more nurses, you want to hang on like crazy to the ones you have," Nash says.

One new effort, the Professional Partnership Program, matches experienced nurses from one unit with new nurses from other units. "The experienced nurse helps the new nurse learn his or her way around," says Cynthia Pavlakovic, Ph.D., R.N., clinical and professional development coordinator. "We want the new nurse to feel the confidence and fulfillment that comes from being part of the big picture."

The program already is paying dividends. In just one year, UAB Hospital has reduced its first-year turnover rate from 14 percent to 9 percent.

The hospital also is developing a professional advancement initiative—a career development system that gives nurses clear career paths. "Incentives that will help us keep 25-year-old nurses are different from incentives that will help us keep 50-year-old nurses," Nash says. "Our professional advancement initiative will focus on things an individual can work toward."

UAB Hospital also hopes to become one of the American Academy of Nursing Credentialing Center's magnet hospitals. That designation reflects a hospital's excellence in attracting and retaining nursing staff. Only 14 hospitals in the country have achieved the status, and UAB hopes to join the ranks by

spring 2001.

UAB Hospital wants to address the nursing shortage with long-term strategies, Nash says. "This is work that will be sustaining. In previous shortages, I've noticed that many hospitals tended to wait until the last minute instead of taking a careful, methodical approach. Then they reacted by throwing money at the problem—looking for a quick fix.

"We want nurses to come to UAB Hospital for the right reasons. And we plan to provide the kind of professional environment that will make them want to stay." **UAB**



The Tantalizing Talent of Sea Stars

Regrowing Limbs and Organs

BY NORMA BUTTERWORTH-MCKITTRICK

With McClintock's guidance and support, Vickery spent two summers at Friday Harbor Marine Laboratories on an island off the coast of Washington. There she extracted eggs from the gonads of adult sea stars and placed the eggs in gallon jars of seawater. Then she added "just the right amount" of sperm and "mothered" the fertilized eggs almost around the clock for days.

McClintock says that Vickery has a "green thumb for raising sea star larvae." She knows intuitively how much sperm to add to the egg mass for optimum fertilization, he says, as well as when to change the water to ensure an adequate supply of oxygen, how to maintain the proper temperature and salinity, and how much and what to feed the growing larvae.

"Perhaps I'd better write it all down someday," Vickery considers. But for the time being, she says she'd rather do it herself than try to explain the subtle nuances of the nurturing process.

From Half to Whole

When Vickery's sea star larvae were about two months old and measured approximately 2 millimeters, she surgically divided each one in half. Both halves of the severed larvae continued to swim and consume food just as the "intact" larvae had done. Within 12 to 14

days, both halves of the severed larvae not only regrew all their "missing" organs but also continued to grow overall at the normal rate.

"Nobody died," says Vickery, referring to the larvae she so carefully raised, dissected, and monitored during regeneration. Most significantly, McClintock emphasizes that "regeneration happened no matter what"—a powerful indicator of the long-term implications of Vickery's research. Since sea stars, which are echinoderms, are believed to share a common evolutionary history with humans and other chordates, this research points to the eventual possibility of human limb and organ regeneration.

In fact, Minako Vickery's husband, Michael Vickery, who is a graduate student under biologist Charles Amsler, Ph.D., has been monitoring severed sea star larvae to determine which genes are expressed during the regeneration process. His research could take her findings about regeneration one step closer to human application.

Years from now, if doctors are able to regenerate atrophied, injured, or missing limbs and organs, Minako Sugiyama Vickery, James B. McClintock, and their UAB colleagues will be ranked highly among the pioneers of organogenesis.

For now, though, Vickery is fully immersed in the basic science of sea star larvae regeneration. "I find echinoderms—and especially sea stars—absolutely fascinating," she says, "so I'm focusing on their unique regenerative capabilities for now. If our research should one day lead to human applications, that would, of course, realize our fondest dream." **UAB**

Minako Vickery (left), a doctoral student of James McClintock (right), has been encouraging sea stars to regrow missing limbs and organs.

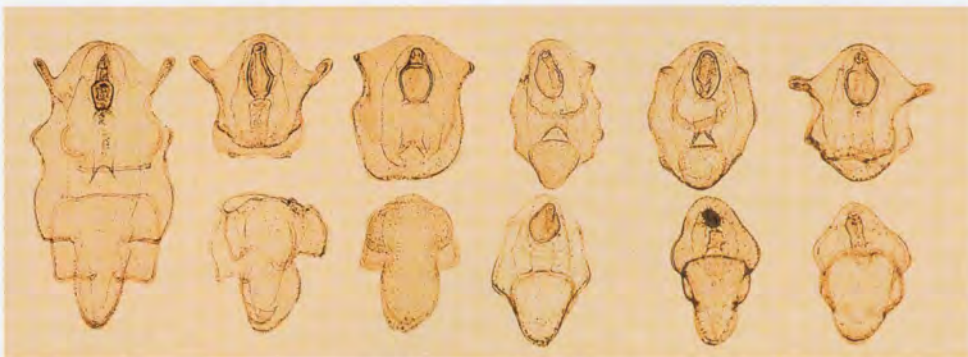
In sheer frustration, oyster fishermen used to grab the sea stars they inadvertently caught in their nets, rip the hapless creatures apart, and toss the pieces overboard. What the fishermen didn't know—and what they would be astonished to find out—is that the discarded sea stars didn't die. They simply regrew their missing limbs.

Those fishermen would probably also be amazed to know that, for the past two years, Minako Sugiyama Vickery has been encouraging sea stars to regrow not only missing limbs, but also missing organs. Vickery, a doctoral student of UAB biologist James B. McClintock, Ph.D., interim dean of the School of Natural Sciences and Mathematics, has demonstrated that when sea star larvae are surgically cut in half, they "rapidly and completely regenerate to form fully functional individuals."

Vickery and McClintock described their breakthrough finding in "Regeneration in Metazoan Larvae," a paper published in the July 9, 1998, issue of *Nature*, the world's most prestigious journal of natural science.

Reinventing Themselves

Although scientists have known for many years that adult sea stars can regrow missing limbs, Vickery was the first to figure out that a fully functioning larva can regrow as much as half of its missing body—including both limbs and organs. She was also the first to prove that the "fate," or specific biological function, of each cell is determined much later in the sea star's development than had previously been assumed.



Minako Vickery has demonstrated that when sea star larvae are surgically cut in half, they "rapidly and completely regenerate to form fully functional individuals."

Electronic Economics

A Web Site for Financial Forecasting

BY RUSS WILLCUTT

With the touch of a few keys, a map of the United States appears on his computer screen, each state a different color—a garden of greens, yellows, oranges, and reds. His hand passes over the keyboard again and the image comes to life, the states seeming to bloom like a time-lapse photo of flowers in spring.

"I created that image with data from the Bureau of Labor Statistics, with different shades representing periods of high and low employment in each state," says Ted Bos, Ph.D., an associate professor of economics in UAB's School of Business. "This is just for fun, though—a way of bringing the numbers to life."

A Hit in Class

Bos has found another, perhaps more productive way of bringing numbers to life. What started as a tool for a class project about two years ago has become the Economic Time Series Page (ETSP), an Internet resource that currently logs more than 20,000 hits a week from users all over the world.

"Back in 1997, I asked my students to pull together information for a class in applied forecasting," Bos recalls. "The number-one rule in forecasting is to look at the data first—but as I was conducting my own research, I found out how difficult that can be. There's plenty of information out there, but it's spread too far apart and is changing too quickly for one person to easily monitor."

So Bos decided to write software that would reach out across the Internet, gather the information his students required, and make it

all available on a Web site of his own design. The project was a natural for Bos, who had been a computer programmer for the Bureau of Economic and Business Research, as well as a computer consultant for econometrics at the University of Illinois at Urbana-Champaign, where he also earned his Ph.D. degree. Within just a few weeks, the ETSP was up and running.

"Without information, it's easy to get lost. With data at your fingertips, you can chart a course."

The site was an immediate hit with his students because it allowed them to access and manipulate a wealth of information. Very quickly, Bos realized that this access to information would position his students well for employment after their graduation from UAB.

"It's a great resource for students who are studying economics, of course," he explains, "but it's also helpful to those who are preparing to become financial planners, as well as marketing students who must know how to conduct in-depth research and accounting students who'll have to provide forecasts for large corporations. The applications for this type of information are endless."

Hits Online

Naturally, word of the ETSP spread quickly over the Internet, and Bos soon found himself with a growing list of professional users.

"I've had hits from England, France, Peru, even West Point," says Bos, who notes that users of the site are investment bankers, business professors and students, stockbrokers, and government employees, all seeking up-to-the-minute economic data for their businesses or for research. "But I don't have a clue how they found the site, since I don't really do anything to advertise it."

He doesn't have to, it turns out, since financial news organizations such as CNNfn—which has run a direct link to the ETSP—are hungry for new ways to pull together current economic information, and word spreads like wildfire once a new source has been found. Bos provides just such a source by accessing thousands of government and corporate economic data Web sites on a daily basis, crunching the numbers, and then making the results available at a single location.

Information posted on the ETSP is pulled from sources such as the Federal Reserve, the Bureau of Labor Statistics, the Census Bureau, and certain commodities markets. Visitors to the site are not only able to access "time series" data—statistical information distributed over time—but also to conduct searches for specific data in a particular state. The Alabama category, for instance, has nearly 950 links to everything from unemployment figures for the past 30 years to building permits issued as recently as last month. Larger states have more information, such as California's 3,763 links.

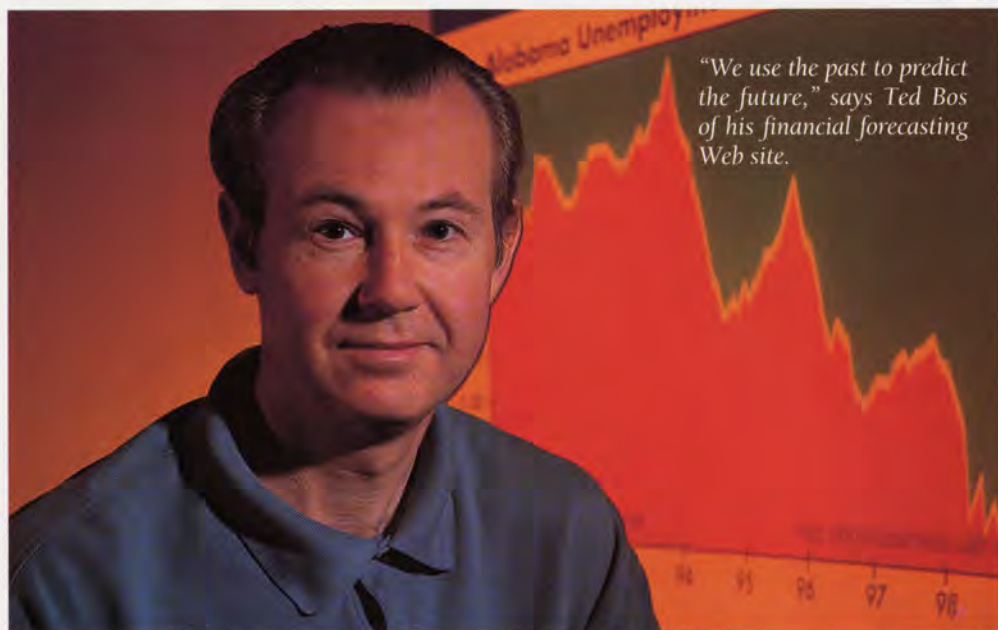
Bos points out that users can display the information as charts, manipulate the time periods shown, and even download the figures directly into spreadsheet files. "I wanted to try to make sense of something that would, to many, be absolutely incomprehensible but invaluable if they could find a way to use it."

See Your Past, Be Your Future

Although most of the users who access the ETSP are students and business professionals, Bos makes it clear that the information he provides can also have value in people's everyday lives. Churches considering mounting a capital campaign, for example, could use the site to determine whether the time is ripe for such an effort, and developers could use it to identify the best location to build a supermarket or a movie theater. Bos says it's mostly a way of seeing more clearly through the financial fog.

"We use the past to predict the future," he says simply. "Without information, it's easy to get lost. With data at your fingertips, you can chart a course."

To access Bos's Web site, go to [bos.business.uab.edu/data]. **UAB**



Steve Wood

Some people may view the study of philosophy as irrelevant to everyday life or as the province of intellectual elitists. But when we consider German philosopher Friedrich Nietzsche's now-famous ethical declaration that "God is dead," then, for many of us, philosophical thought becomes more germane.

What prompted Nietzsche to make such a shocking proclamation? Does an omniscient, omnipotent God exist? If so, why is evil permitted? Are human beings free or is our fate predetermined? Those and other "big questions" about the nature of existence are explored in *Philosophy Then and Now*, a critically acclaimed anthology published by Blackwell Publishers, England. The book is the collective effort of the UAB Department of Philosophy faculty, including departmental chair George Graham, Ph.D.; N. Scott Arnold, Ph.D.; Theodore M. Benditt, Ph.D.; Harold Kincaid, Ph.D.; G. Lynn Stephens, Ph.D.; James Rachels, Ph.D.; and Gregory Pence, Ph.D.

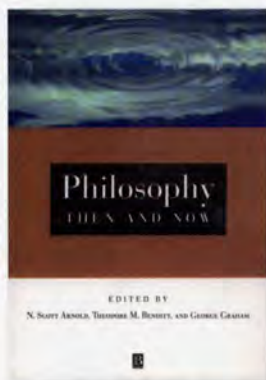
The text has been hailed by peers, including Alex Rosenberg, Ph.D., director of the honors program in the University of Georgia's Department of Philosophy, who said in a telephone interview: "The fact that a publisher would ask the members of one department to author a text gives some indication of the high standing that UAB's philosophy faculty enjoy in international philosophical circles. It's a unique event in higher education."

Learning to "See Up"

Philosophy Then and Now was written at varying levels of sophistication, with the neophyte in mind. Its eight main sections present eight major philosophical "schools" and reflect the areas of expertise of individual faculty members.

"Some of the featured philosophers are deep but difficult writers," Graham says. "Therefore, we tried to find selections that were not recondite but still challenging. For example, the philosopher W.V.O. Quine is one of the most important English-speaking philosophers of the 20th century, and he's a wonderful writer—but only for the aficionado, not for the novice."

"One of the objectives of the book is to get people into the discipline in such a way that they can 'see up.' In other words, students can read a less difficult philosopher and then look up and see Quine, and think, 'Maybe I can read that if the instructor will help me.' Or they might develop an aptitude for reading a more complex philosopher from the past, such as John Locke."



A new book by UAB philosophy faculty explores the nature of existence.



THE BIG QUESTIONS

Have They Changed?

BY JO LYNN ORR

Ted Benditt says he had two goals in mind for his chapter on government. "I wanted to introduce the central questions of political philosophy and look at some of the historically important answers that have been given. I also wanted to focus on Locke's views, because a lot of our modern political ideas derive from his thinking. I wanted to query students on whether the political issues that have surfaced over the past 200 years can be resolved in Lockean terms."

Breaking the Bubble

Even though *Philosophy Then and Now* was written and designed for accessibility, the editors were adamant about not "dumbing down" the material. "There are philosophy books out there that have cartoons in them, with perhaps two or three pages of reading, followed by puzzles," Graham says incredulously.

Moreover, philosophy department faculty hope the book will encourage their students to get a well-rounded education—perhaps even consider a major or minor in philosophy. "In the last two years, we've doubled the number of philosophy majors in the department—from 30 to 60," Graham says.

Graham believes that the advantage of a good liberal arts education is the gaining of new values. "An awful lot of people go into school and come out with nothing but a credential. They remain unchanged as people—retaining the same values, the same preferences. Philosophy is not like that; it tends to change people."

Early Greek philosopher Socrates stated that the "unexamined life is not worth living." Graham prefers to restate that as "the unexamined life is very hard to live."

"It's hard to get through life with your values unchallenged—living in a bubble, so to speak. So the question then becomes, 'What kind of events do you want to break your bubble?' Do you want the accidents of birth and death and illness and disease to break the bubble? Or do you want a more deliberate, disciplined, somewhat nurturing way of having your beliefs challenged? Or, to put it more colloquially, do you want to get zapped by 'the slings and arrows of outrageous fortune,' or do you want to get zapped by a philosophy professor?"

Graham believes that, given a choice, most people would choose to get zapped by a philosophy professor. **UAB**

ALUMNI SPOTLIGHT



Steve Wood

Erika Ludwig Burk, M.B.A.

Combining Corporate Cultures

BY RUSS WILLCUTT

and a Ph.D., Germans address the person as doctor-doctor, in effect. It was hilarious listening to people who had been on such a formal basis their entire careers suddenly stumbling over each other's first names. You wouldn't think it would be so hard to say 'Hi, Bob,' but, for them, it really was."

Such formality was just the first of many challenges for Ludwig Burk and the rest of the PMI team. Although the company's production platform will remain relatively unchanged—except for streamlining purchasing practices and certain other procedures—the integration of two very different corporate philosophies can be a formidable task.

"What you have here is the merger of two very successful companies," says Ludwig Burk, "so it's important for information to be exchanged at all levels. From a human resources standpoint, we've spent a great deal of time explaining concepts such as cultural diversity—which exists in both the United States and Germany, but with different backgrounds. Another challenge is the difference between the Americans with Disabilities Act and German laws for the disabled. Disabilities are defined differently in each country."

Ludwig Burk likes the fact that she's cast in the role of a teacher in her work at DaimlerChrysler, because one of her goals has always been to teach at the university level. Through the influence of one of her UAB instructors, Sanjay Singh, Ph.D., an assistant professor of management in the School of Business, she has also begun teaching an MBA class at the University of Esslingen in Stuttgart.

"Believe it or not, it's one of the things I'm most excited about," she says. "There's just something about the degree of interaction—seeing the excitement when students are interested in something you are teaching them. I really like that."

The students in her class come from all over the world, and their average age is around 30, she says. "These are people who have already spent time in the workforce, so our classroom discussions are very engaging."

As for her personal life, Ludwig Burk recently participated in a little merger of her

"When Germans and Americans speak in English, it makes for an interesting intercultural study."

own. "I was married not long ago in the chapel of a hilltop fortress near Stuttgart," she says, smiling. "I've got to admit that it sounds like something out of a dream."

She and her husband, Oliver Burk—a mechanical engineer at DaimlerChrysler—spend their free time exploring the markets where fresh fruits and vegetables are trucked in from the countryside each morning. They also enjoy attending various local festivals.

"Germany is very America-friendly," she says, "so there are American theaters and movie-rental shops. The only things that might shock people from the United States are that the supermarkets close at 8 o'clock each evening and very few gas stations are open 24 hours a day."

As for her future with the company, Ludwig Burk recently accepted a manager-level position and will remain in Germany. "I truly enjoy what I'm doing here," she says. "This is a very big wheel that's just starting to turn, and I want to be around to see where it's headed." **UAB**

A little more than a year ago, Erika Ludwig Burk was living in Hoover, Alabama, working at the Mercedes-Benz manufacturing facility as an employment specialist. Today, she resides in Stuttgart, Germany, and is part of a human resources team that's overseeing the historic union of two automaking giants.

"It's been a pretty busy year, to say the least," she says, smiling, "but definitely an exciting one."

Ludwig Burk—who received her M.B.A. degree from UAB in 1997—is working for DaimlerChrysler as a member of the Post-Merger Integration (PMI) Project, a team of human resources professionals charged with providing cultural and organizational support during the merger of the two world-class automakers.

As the only American on the nine-person team, Ludwig Burk, who speaks fluent German and has lived in Austria and Switzerland, says her multicultural background has given her a distinct advantage. Although English is the official corporate language, Ludwig Burk spends much of her time speaking German.

"When Germans and Americans speak in English, it makes for an interesting intercultural study. The German language is quite formal compared to English," Ludwig Burk explains. "If a person has two degrees, such as an M.D.

For the past two years, Jeremy Lucas has devoted much of his life to protecting the rights and welfare of individuals—and not only of the human variety.

A lawyer who specializes in handling personal injury and worker's compensation cases, Lucas realized in 1997 that he wanted to do more than look out for his human clients' welfare—so he began to volunteer at the Alabama Wildlife Rehabilitation Center (AWRC). From that experience, he has networked his way into many venues as an animal advocate.

Lucas, who graduated from UAB in 1993 with a double major in history and political science, says that he has always loved animals. His involvement in the AWRC was triggered when he and his wife, Penny, began to notice that many wild animals near their Cahaba River neighborhood had been hit by cars.

"Uncontrolled growth was running the wildlife out of its natural habitat and into traffic," he says. "We knew we couldn't stop 'progress,' so we decided to help the animals we could through the wildlife rescue center." Today, as the AWRC's volunteer coordinator, Lucas puts in 15 hours a week training volunteers to care for injured and orphaned wild animals and educating the public about wildlife. "Educated volunteers are the voice of the public," he says.

Lucas is the AWRC's representative on the Animal Disaster Planning Advisory Committee, a new county-wide committee that seeks to help animals—both wild and domestic—during natural disasters. "We're working with the Jefferson County Emergency Management Association, law enforcement, humane societies, and animal control to put together plans," he says. "We'll recruit people who will go out and find animals after disasters such as tornadoes. We'll also be doing some public education on things you can do before a disaster strikes to prepare yourself and your pets. In addition, we want to identify pet-friendly shelters—including hotels and motels—that will let people who are displaced from their homes take their pets with them. For victims of natural disasters, having their pets with them can bring some peace of mind."

Lucas is also interested in rescuing pets from disasters of another kind—abusive home environments. "Domestic abuse encompasses more than women and children," he points out. "Usually, if there are pets, they are part of the abuse, too. More than 70 percent of women who enter shelters report abuse to their pets. Abusers will use animals as pawns; they'll threaten to injure or kill them if the women don't cooperate with them."

Lucas has asked members of his congregation at St. Francis of Assisi (the patron saint of animals) Episcopal Church to serve as foster parents for pets that are coming out of abusive homes. In addition, he is working with the YWCA shelter for battered women and the

Jeremy Lucas, B.A., J.D.

Lawyer, Volunteer, Animal-Welfare Advocate

BY BARBARA WESTLAKE-KENNY

Greater Birmingham Humane Society to establish a Safe Haven Program—which will allow abuse victims to bring their pets with them to Safe House. From there, the Greater Birmingham Humane Society will find temporary homes for the pets while their owners get their lives together.

"It gives abuse victims peace of mind to know that their animals are safe. For many battered women, their pets are their only companions—their only true friends who will give them unconditional love. Because the women love their pets, they're reluctant to leave them behind where they may be harmed."

Lucas is also helping set up the First Strike Program, which will coordinate efforts among police, the Department of Human Resources, and the Humane Society to educate the public on how violence toward animals correlates to violence against humans. "There is a link between people who are cruel to animals and people who are cruel to people," says Lucas, who is a member of the California-based

Animal Legal Defense Fund and serves as Alabama's legal contact in cases of animal welfare and cruelty. "The FBI's Behavioral Science Unit has shown that animal cruelty is a red flag. The First Strike Program will encourage the public, the police, and district attorneys to take animal cruelty seriously."

Lucas clearly takes seriously the many kinds of dangers to animals and wants to help reduce those dangers. "My work for animals is a labor of love," he says. "Just as with my human clients, I'm committed to protecting those who aren't able to protect themselves." **UAB**

"Domestic abuse encompasses more than women and children. Usually, if there are pets, they are part of the abuse, too."



Steve Wood

THE SCENE



CAMPUS NEWS

UAB RESEARCH FUNDING CLIMBS

UAB moved up two notches in the *Chronicle of Higher Education's* list of universities receiving federal research-and-development funding for fiscal year 1997.

UAB was ranked 28th, with \$150.5 million—a 20.4 percent increase from the previous year's \$125.8 million.

UAB continues to be the only Alabama university included in the top 100 schools listed by the *Chronicle*. In the Southeast, only Duke University (24th with \$155.89 million) and the University of North Carolina at Chapel Hill (25th with \$153.98 million) rank higher than UAB.

UAB PHYSICIANS EARN RECOGNITION

The 1999 edition of *The Best Doctors in America* includes more than 140 physicians from UAB.

A total of 259 Birmingham physicians are included in the listing, which is published every other year by Woodward/White, Inc.

The *Best Doctors* guides are intended to recognize doctors whose superior clinical abilities may or may not already have drawn national attention. Editors of the guide interviewed more than 30,000 doctors, asking the question, "If you or a loved one needed a doctor in your specialty, and you couldn't treat them yourself, to whom would you refer them?"

CHEST PAIN CLINIC OPENS

With the February re-opening of the Chest Pain Unit in UAB's Emergency Department, UAB Hospital has become the first hospital in Alabama routinely using a new technology in an emergency setting to help diagnose heart attacks as they occur.

Known as myocardial nuclear perfusion imaging (MPI), this diagnostic tool uses a special camera to photograph the heart's circulation. MPI allows the emergency department to identify low-risk patients who may be treated as outpatients and safely sent home.

Five million adults arrive each year at the nation's emergency departments with chest pain, and the symptoms of heart attack can be hard to diagnose. Some 487,000 will die of heart attacks in 1999, half within the first hour of the onset of symptoms.

"Time is muscle" is a medical reality," says UAB cardiologist John Canto, M.D., medical director of the UAB Chest Pain Unit and co-director of the Coronary Care Unit. "There is a direct relationship between rapid treatment and heart muscle salvage."

UNIVERSITY FORMS ARTS PARTNERSHIPS

UAB has formed professional affiliations with two distinguished arts organizations, as part of its continuing commitment to community outreach in the arts.

The Julliard School in New York City has accepted the invitation of UAB President W. Ann Reynolds, Ph.D., to join the Departments of Music and Theatre and the Alys Robinson Stephens Performing Arts Center in presenting a concert version of the opera *Così fan tutti*.

In addition, the Department of Art and Art History has formed a professional affiliation with the Birmingham Museum of Art.

"These partnerships make great sense because they enhance the outreach and communication efforts of everyone involved," says Jane Milley, Ph.D., interim dean of the School of Arts and Humanities.

UAB already has professional affiliations in place with the Alabama Ballet, the Alabama Symphony Orchestra, the Alabama School of Fine Arts, and the Alabama Humanities Forum.

MINORITY BUSINESS ACTIVITY REACHES NEW HIGH

UAB spending with minority- and women-owned businesses reached a new high of \$13.8 million in fiscal year 1997-98. That figure represents 8.81 percent of available UAB dollars spent with all providers of goods and services.

Figures provided by the university's Minority Business Development Program reflect a 30-percent increase from the \$10.6 million spent with minority- and women-owned businesses in the previous fiscal year.

"In only 10 years, we have gone from a fledgling program to one of the very best minority- and women-owned business development programs in the region," says George Perdue, assistant vice president for financial affairs and administration.

The total number of minority- and women-owned firms doing business with UAB rose 34.9 percent, from 570 in 1996-97 to 769 in 1997-98.

VIVA EARNS ACCREDITATION

VIVA Health, Inc., has earned New Health Plan Accreditation from the National Committee for Quality Assurance.

NCQA New Health Plan Accreditation surveys consist of an on- and off-site review of the organization by a team of physicians and managed care experts. This team evaluates the new health plan's quality improvement activities, its processes for credentialing providers, its practices and processes in the areas of medical management and member services, its preventive health activities, and the quality of the medical records maintained by its physicians. The review also evaluates the plan's oversight of any functions or services that are provided by other entities.

VIVA Health, with 41,175 covered lives in 29 counties, began providing coverage to Alabamians in April 1996. Viva's application for accreditation was accepted in February 1998.

NCQA's Accreditation of New Health Plans Program is based on a core set of standards from the Standards for the Accreditation of Managed Care Organizations. These standards apply to health plans that are less than two years old and make the program distinct and different from NCQA's Accreditation of MCOs Program. The accreditation is effective for two years.

HEALTH SYSTEM IS AMONG "MOST WIRED"

The UAB Health System is included in a listing of "Healthcare's 100 Most Wired" in the magazine *Hospitals and Health Networks*.

Hospitals were judged on the use of technology to serve constituents—patients, doctors, nurses, employees, suppliers, and insurers. The most-wired hospitals use computers to allow physicians to check or order patient tests or allow patients to perform billing functions via computer. At UAB Hospital, physicians are able to perform a host of clinical functions online.

"We're very proud of our information infrastructure," says Martin Nowak, interim executive director of UAB Hospital. "Computer technology enables us to provide physicians and nurses with fast and accurate clinical data, which can be immediately applied to patient-care decisions."

TWO NEW CENTERS ESTABLISHED AT UAB

The University of Alabama System Board of Trustees has approved UAB centers in gene therapy and joint replacement.

The Gene Therapy Center, directed by David T. Curiel, M.D., professor of medicine, will be a coordinating point for all research related to gene therapy. The center will develop novel gene-therapy approaches for human disease, with the goal of rapidly moving those approaches into clinical treatments. The center will be housed administratively in the UAB Department of Medicine, with funding from the School of Medicine and the National Institutes of Health and private industry.

The Center for Joint Replacement, directed by John Cuckler, M.D., professor of orthopaedic surgery, will focus on state-of-the-art surgery for hip and knee, as well as improving patient education and patient satisfaction. A wing of the orthopaedic surgery floor is set aside for patients undergoing elective joint-replacement surgery.

GLENN'S FLIGHT HAS A UAB FLAVOR

Three UAB experiments were aboard the space shuttle *Discovery* that recently returned U.S. Senator John Glenn to space.

The experiments originated in the Center for Macromolecular Crystallography, and the 77-year-old Glenn worked with one of the experiments alongside fellow payload specialist Pedro Duque.

All three UAB projects involved growing crystals of specific proteins, such as those found on the surface of viruses. Glenn worked on a project to determine the variety of structures that make up human insulin. His assignment during the mission was to activate the temperature gradient that began the experiment.

The other UAB projects aboard *Discovery* involved a protein derived from the Venezuelan equine encephalitis virus and a protein that could lead to the development of new antibiotics.

NEW CENTER MIXES SCIENCE AND ETHICS

UAB has created a new center to promote research, public discussion, and the teaching of ethics in science.

Harold Kincaid, Ph.D., professor of philosophy, is director of the Center for the Study of Values and Ethics in the Sciences, which is funded by grants, course fees, and resources from the School of Arts and Humanities.

Other major U.S. institutions have established successful ethics centers, Kincaid says, but UAB's is the first center devoted to general issues of ethics in the practice of science. "Such issues are becoming more visible due to the commercialization of research, increased demands for accountability, and the growing competition for scientific research funding."

MEDIA CENTER OFFERS LANGUAGE IMMERSION

UAB's Department of Foreign Languages is developing a media center that will give faculty and students computer access to interactive foreign-language resources.

The School of Arts and Humanities has set aside \$75,000 to create UAB's Foreign Language Media Services, which will allow students to experience "virtual immersion" in foreign languages and to access authentic cultural-source material using digitized audio and video clips, CD-ROMs, foreign-language software, and Internet resources.

"This center will be an environment in which students have to use the language," says Dirk Van Ziegert, Ph.D., director of the center. "We're doing this not to replace teachers, but to prepare teachers to better use technology."

SPECIAL EDUCATION HAS NEW CURRICULUM

A new curriculum in UAB's School of Education prepares teachers to work with children who have a variety of disabilities.

The Collaborative Teacher Program is a response to a national and state trend toward inclusion of special-needs children in regular classrooms. In previous years, special-education teachers were trained in specialized categories, such as learning disabilities, emotional conflicts, or mental retardation.

"This is a new program initiated by the State Board of Education," says W. Boyd Rogan, Ed.D., chair of the UAB Department of Leadership, Special Education, and Foundations. "Our goal is to meet the needs of local school systems, which have long been advocates of this approach."

STUDENTS JUMP ON THE MATH FAST TRACK

A new mathematics program at UAB is designed to provide gifted undergraduates the background they need to succeed in higher education and industry. The Mathematics Fast-Track Program, an accelerated research and study program, encourages talented young students to consider pursuing research careers.

According to Lex Oversteegen, Ph.D., and John Mayer, Ph.D., co-directors of the program, high-school students and UAB undergraduates who have shown aptitude in math are recruited and challenged with classes appropriate to their skill levels. Students receive individual attention in their coursework, and faculty mentors work closely with them on research projects.

The Department of Mathematics has set aside \$80,000 to support the program. Scholarships are available, funded through a three-year, \$48,000 grant from the National Science Foundation and \$110,000 in matching funds from the School of Natural Sciences and Mathematics.

RESEARCH OFFICE SETTLES INTO NEW HOME

The Office of Clinical Research (OCR), a new component of the School of Medicine, has opened its doors in newly renovated space at the Eye Foundation Hospital at UAB.

The 10,000-square-foot facility houses 13 patient beds and six exam rooms, plus lab and office space for physicians who assist with clinical trials.

Formerly known as the University Consortium for Clinical Research (UCCR) and housed in Medical Towers, the facility functioned under the auspices of the provost. Responsibility now has shifted to the dean of the School of Medicine.

The OCR, which primarily conducts industry-sponsored research, is distinct from the General Clinical Research Center, which assists primarily with research funded by the National Institutes of Health.

EDUCATION OFFERS ALTERNATE ROUTE TO COUNSELING

A new program in the UAB School of Education enables teachers who are interested in becoming counselors to do so in an accelerated program.

The new program, administered by the Department of Human Studies, offers teachers who already have master's degrees the option of earning a certificate in school counseling by completing an additional 33 credit hours. The program saves teachers the time and expense of pursuing an additional master's degree in counseling, which requires 49 credit hours at UAB.

Area school systems are supportive of the program, says Larry Tyson, Ph.D., assistant professor of education. "They have teachers who already know the students, the neighborhoods, and the schools. If the schools can keep them as counselors, these teachers will be better professionals."



RESEARCH

UAB SCIENTISTS TRACE ORIGIN OF AIDS

A team of international scientists, led by UAB's Beatrice Hahn, M.D., has discovered the origin of HIV-1, the virus that causes AIDS in humans.

Pan troglodytes troglodytes, a subspecies of chimpanzee native to West-Central Africa, now is known to be the natural reservoir for HIV-1. The discovery ends the 20-year-old quest for the origin of the AIDS epidemic that currently afflicts some 30 million people worldwide. Hahn, professor of medicine, presented her findings January 31 at the 6th Conference on Retroviruses and Opportunistic Infections in Chicago.

"We need to study the animals to find out why they are infected with the virus but are not affected by AIDS," Hahn says. "It is quite possible that the chimpanzee, which has served as the source of HIV-1, also holds the clues to its successful control."

Hahn and her colleagues hope that as a consequence of their research, there will be additional measures taken to discourage chimpanzee poaching and to preserve this and other endangered primate species. "It took us 20 years to find where HIV-1 came from, only to realize that the very animal species that harbors it is at the brink of extinction."

Feng Gao, M.D., research assistant professor of medicine, was the paper's lead author. "We have long suspected a virus from African primates to be the cause of human AIDS, but exactly which animal species was responsible was unknown," Gao says.

GENETICS DETERMINE HIV PROGRESSION

UAB researchers working with international scientists recently discovered genetic reasons why some people infected with HIV develop AIDS more quickly than others.

Led by Richard Kaslow, M.D., UAB professor of epidemiology, and Jianming Tang, Ph.D., UAB assistant professor of geographic medicine, the research team published their findings in the March 1 issue of the journal *AIDS Research and Human Retroviruses*. The study found that people with the same forms of certain human leukocyte antigen (HLA) genes developed HIV-related illnesses faster than those with different forms of the genes.

"For the first time, we seem to have identified a genetic factor that can be widely applied to human populations. HLA genes determine

the body's immune responses to infection," says Tang. "These findings may eventually assist clinicians and investigators in determining which patients are less equipped to handle such an infection."

VEGF OFFERS NEW HOPE FOR CHEST PAIN PATIENTS

UAB is participating in a multicenter clinical trial investigating a natural protein that promotes formation of blood vessels.

Vascular Endothelial Growth Factor (VEGF) induces new blood vessel growth, and researchers anticipate increased blood flow and function in previously diseased areas of the heart. VEGF-induced endothelial cell proliferation may improve the outcomes of angioplasty and stent placement. Treatments using VEGF may be a new option for patients whose coronary artery disease is so severe that they cannot undergo revascularization procedures.

"Often, transplantation seems the only option for patients who cannot undergo revascularization procedures," explains Raymond Benza, M.D., principal investigator of the study. "If VEGF succeeds, we can provide optimal therapy without transplantation, reserving donor organs for recipients who have no other alternatives."

DEFECTIVE ENZYME MAY BE KEY TO ILLNESSES

A special mouse that has trouble metabolizing its food may give researchers crucial information about a puzzling group of illnesses known as fatty acid oxidation disorders.

Philip A. Wood, D.V.M., Ph.D., professor and chair of comparative medicine, and graduate student David Kurtz are leading an effort to study the metabolism of fatty acids, which the body converts into energy. Before fatty acids can be used by the body as energy, they must go through a process called oxidation. Several enzymes are involved in oxidation, and if the system goes awry, the result is sickness and often death.

The study, published in the December 22, 1998, issue of the journal *Proceedings of the National Academy of Sciences*, demonstrates the importance of the enzyme LCAD (long-chain acyl-CoA dehydrogenase), which starts the oxidation process. The UAB researchers have developed a specially bred mouse that has a defective version of LCAD. Studying the defective enzyme might lead to methods for repairing the defect.

TORNADO DAMAGE OFFERS ENGINEERING CLUES

David Olowokere, Ph.D., associate professor of civil engineering, is studying the structural damage from tornadoes that devastated the South last year. He hopes the information will lead to safer, more durable structures.

Tornadoes killed more than 30 people and destroyed or damaged more than 500 homes in west Jefferson County, Alabama, in April 1998. Eight days later, tornadoes roared through downtown Nashville, damaging more than 100 buildings.

"We are looking for patterns of structural failure, as well as studying those structures left intact," Olowokere says. "By looking at what works, and what doesn't, we can make recommendations for future building design."

PROMISING AIDS DRUG UNDERGOES MORE TESTING

Researchers have expanded testing of an experimental, UAB-pioneered drug that has been heralded as the first in the next generation of AIDS drugs.

The new drug, called T-20, could one day help patients who fail to respond to standard HIV therapies, researchers say. Existing HIV therapies prevent the virus from replicating once it enters the cell, but T-20 essentially blocks the virus from infecting the cell in the first place.

"The results are exciting because this is a different approach to HIV therapy and viral infections in general," says J. Michael Kilby, M.D., medical director of UAB's 1917 Adult HIV Clinic.

T-20 was developed by researchers at UAB and Duke University in collaboration with Trimeris Corporation of Durham, North Carolina.

"Currently, there are limited drugs to treat HIV infection and only two broad classes of drugs," says Michael Saag, M.D., associate director of the UAB AIDS Center. "Many people cannot tolerate those drugs due to their side effects, or they have developed resistance to them. There is a great need for drugs with a novel mechanism of action."

ALZHEIMER'S HAS FINANCIAL MANAGEMENT IMPLICATIONS

Daniel Marson, J.D., Ph.D., associate professor and director of the Division of Neuropsychology in UAB's Department of Neurology, is studying the effects of

Alzheimer's disease on everyday financial abilities. He hopes to establish guidelines to determine when individuals with Alzheimer's can no longer manage their personal and family finances.

"Patients with Alzheimer's early on begin to lose the ability to manage their money and make sound financial judgments," Marson says. "In addition to forgetting to pay bills, they could inadvertently throw away their life savings. Such patients are also extremely vulnerable to financial exploitation by others."

As America grows older and more adults experience dementia, family conflicts will increase regarding the competency of aging

family members, Marson says. "We live in a society with a lot of second- and third-generation family members with many opportunities for generational battles over health-care and financial issues."

LOCALS FORM THE HEART OF SEPARATIST MOVEMENTS

Violent separatist struggles throughout the world can best be understood by observing the rank and file who support them, says a UAB anthropologist.

Thomas McKenna, Ph.D., is the author of a new book, *Muslim Rulers and Rebels:*

Everyday Politics and Armed Separatism in the Southern Philippines. He argues that international mediators seeking political solutions for armed, separatist conflicts should look to local concerns to defuse ongoing violence.

"The vast majority of separatist rebellions that are not militarily crushed end in some sort of political compromise," McKenna says. "Such compromises might be reached more quickly if the primary focus of international mediators were on providing solid guarantees for the protection of life, land, and cultural practices in local communities in the contested region."



PEOPLE

DELUCAS NAMED TO 21ST-CENTURY LEADERS LIST

Larry DeLucas, Ph.D., O.D., director of UAB's Center for Macromolecular Crystallography, has been named by *The Sunday Times* of London as one of the prominent scientists and engineers expected to shape the next 100 years.

DeLucas was one of 18 researchers cited in the list, titled "The brains behind the 21st century." The list was compiled with input from leading figures in the scientific community.

DeLucas was described as "a leading expert in viruses and bacteria whose work on the International Space Station will help provide new treatments for diseases from AIDS to influenza."

MCCLINTOCK RECEIVES ANTARCTIC HONOR

A point in Antarctica has been named in honor of James McClintock, Ph.D., interim dean of the UAB School of Natural Sciences and Mathematics.

The U.S. Board on Geographic Names christened McClintock Point, which is at the north entrance of Explorers Cove, about 50 miles northwest of McMurdo Station, the largest antarctic research station at the South Pole.

McClintock, who first went to Antarctica in 1983, has made numerous dives near the point to collect marine invertebrates during recent expeditions. In March 2000, he will dive off the Antarctic Peninsula to begin a three-year, \$500,000 study of the chemical ecology of marine macroalgae and invertebrates. His Antarctic research is supported by the National Science Foundation.

NUTRITION GROUP HONORS HEIMBURGER

Douglas Heimburger, M.D., professor of medicine and nutrition sciences, is the 1999 recipient of the Dannon Institute Award for Excellence in Medical/Dental Nutrition Education from the American Society for Clinical Nutrition (ASCN).

"This is the highest national award given in recognition of outstanding work in the field of nutrition education for physicians and dentists," says Roland Weinsier, M.D., Dr.P.H., chair of the Department of Nutrition Sciences.

Heimburger directs UAB's Cancer Prevention and Control Training Program, which provides advanced educational opportunities for researchers and teachers in cancer prevention and control.

THAILAND HONORS NURSING DEAN

Rachel Booth, Ph.D., dean of the School of Nursing, is the first foreign nurse to receive an honorary doctoral degree in nursing from Thailand's King Bhumibol Adulyadej.

Booth received an honorary lifetime membership in the Chiang Mai University Alumni Association. She has worked with the nursing faculty of Chiang Mai for 10 years to develop long-term plans for the Thai university's educational program in nursing.

More than 40 nurses from Thailand have studied at UAB as visiting scholars or graduate students. The relationship between Thailand and UAB was initiated in 1951 by then UAB President Joseph F. Volker.

MEDICAL ALUM FUNDS SCHOLARSHIPS

M. Hayne Kendrick, M.D., a native of Luverne, Alabama, has established nursing and medical scholarships at UAB for deserving students from Crenshaw County.

"These scholarships are my way of giving something to future generations of young people from Crenshaw County," Kendrick says.

The first scholarship is the Margaret Parks Kendrick Memorial Nursing Scholarship, named for Kendrick's mother. The second scholarship, the Hayne Kendrick Medical Scholarship, is for students applying to the School of Medicine and will be available for the 1999-2000 school year.

FOUNDING DIRECTOR RETURNS TO ALYS STEPHENS CENTER

Caron Thornton (née Van Gilder), founding director of the Alys Robinson Stephens Performing Arts Center, has returned to UAB as a consultant during the university's search for a new center director.

Ann Dumaresq, who succeeded Thornton, recently announced her resignation. A committee is conducting a national search to identify candidates for the permanent post.

"Caron was a dynamic force in overseeing the opening of the Alys Stephens Center and establishing it as one of the premier performing arts centers in the nation," says Shirley Salloway Kahn, Ph.D., interim vice president for development, alumni, and external relations. "We are most fortunate that she was willing to share her expertise during this transition period."

Thornton joined UAB as the first ASC director in 1995 and was responsible for programming its first season and overseeing the final stages of construction and the opening of the facility. In 1997, shortly after her marriage to Knoxville businessman John Thornton, she became development director of the Knoxville Museum of Art. She will continue in that capacity through her consulting company, Arts Partnership, Inc.



CAMPUS SPOTLIGHT



Steve Wood

ESTRADA PARSE THE CODE, PLEASE

BY DANIEL WILLSON

Many of us navigate two worlds now—the physical world and the World Wide Web, a rapidly expanding frontier created to support our endless quest for information. Beginning with an estimated 50 Web servers in 1992, the WWW grew into a worldwide phenomenon by 1995, and it currently doubles in size every five months. But who are the dreamers shaping the future of this new medium? People such as Dimitri and Tanya Glazkov, the husband-and-wife team who, along with Robin Snow, designed UAB's Web site-development platform, Estrada.

"Tanya and I have always talked about better ways to publish information on the Web," says Dimitri, an information systems specialist with the UAB Web Center. "Estrada is essentially a global information network—but that makes it a great Web-development platform, too."

Taking its name from the Russian word for "stage" or "platform," Estrada is an object-based content-management system that allows each university department to maintain its own Web site using nothing but a browser. This ease of maintenance is one of Estrada's key advantages, says Snow, director of UAB's Web Center. For most universities and large corporations, Snow explains, maintaining a large Web site can be a nightmare because of the need to post the latest information as soon as it is available. This

can require a dedicated webmaster or a group of webmasters who are constantly repackaging and retooling the site as the information changes—not to mention maintaining the site's hardware.

Estrada, on the other hand, breaks a Web site into small units, making it easy for the webmaster to replace parts of pages—not entire pages—when the site needs to be updated. "With Estrada, you think in terms of objects, which makes more sense when you consider how a site is built," says Dimitri. "Essentially, Estrada is a database holding all of these objects in a format that the machine understands.

"Someone needs to write a book and say, 'There is no way to finish a Web site. Don't look at it like a paper document, because you never finish a Web site. It's like an ongoing business, as opposed to a book that you write edition by edition and continually update.'"

With Estrada, each of the university's 418 departments can create its own site without coding in Hypertext Markup Language (HTML), the metalanguage behind the WWW. Departmental webmasters are able to focus on content rather than technical aspects of Web site development, because navigational buttons and design templates are maintained by Estrada's developmental platform. Within each site on the platform, "bricks" of information can be grouped together into useful "portal sites" that organize information for students, patients, and other potential visitors. This distributed information architecture is the key component of the Estrada Web site management system.

To help university staff in the transition to this new system, the UAB Web Center is offering free Estrada training classes, unlimited free server space, free technical support and site consultation, and a public image library filled with high-quality images of university and health system activities.

For Dimitri, the greatest reward came from working with Tanya on the project. "She essentially developed Estrada," he says. "In two months, she did all of the coding for an early version of the software. Whenever I tell this to programmers, they just simply don't want to believe it. It's quite an accomplishment."

Estrada has been copyrighted, trademarked, and patented by the UAB Research Foundation. For more information on Estrada, access [www.uab.edu/estrada]. **UAB**

CALENDAR OF EVENTS

JUNE

June 26-July 16 • Paintings by Mark Messersmith • Visual Arts Gallery

JULY

July 1 • UAB Summer Choir Sing Along • Jeff Reynolds directing • 8:00 p.m. • Alys Robinson Stephens Performing Arts Center

July 4 • UAB Summer Band Outdoor Concert • 8:00 p.m. • Bartow Arena

July 10 • UAB Day at Visionland • Call (205) 934-8001 for more information

July 16-17 • UAB Gospel Music Workshop • Kevin Turner coordinating • Alys Robinson Stephens Performing Arts Center • Call (205) 934-7375 for more information

July 17-25 • Alumni Tour Down the Amazon River*

July 23 • Alumni Night with the Birmingham Barons* • Dinner 6:00 p.m., Game 7:00 p.m. • Hoover Met

AUGUST

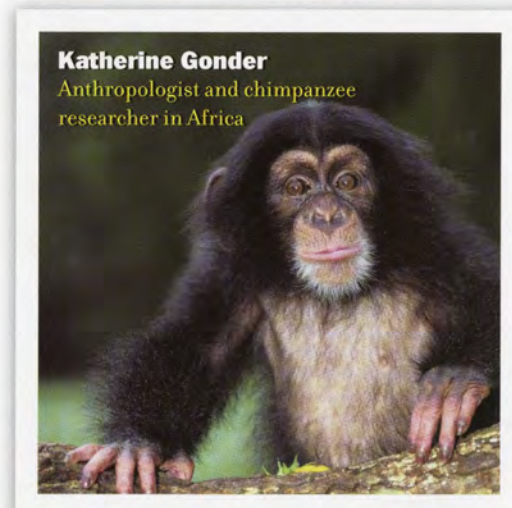
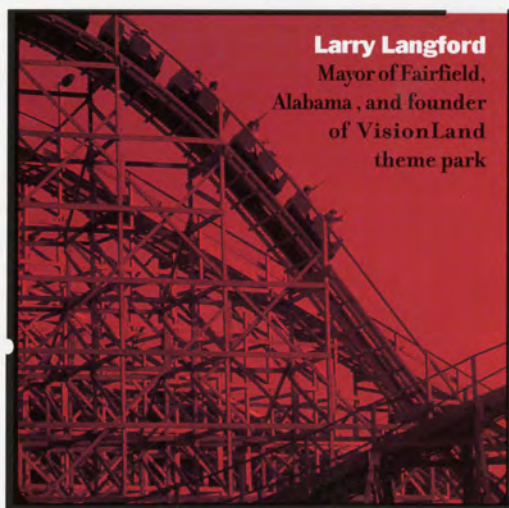
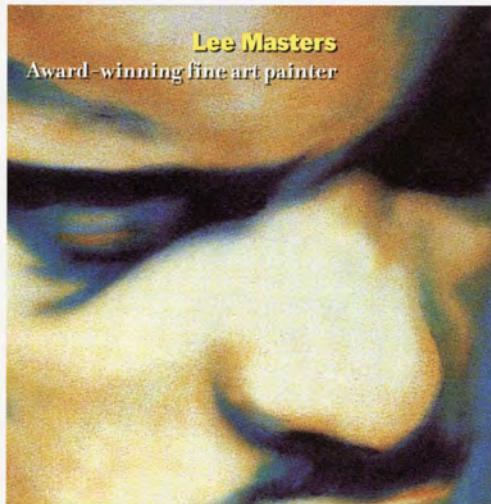
August 2 • UAB Gospel Choir • Kevin Turner directing • 7:00 p.m. • Alys Robinson Stephens Performing Arts Center

*UAB National Alumni Society Events
Call (205) 934-3555 or (800) 898-ALUM for more information

Clarification:

The winter 1999 *UAB Magazine* article titled "Gypsies Today" inadvertently omitted attribution to Marlene Sway, Ph.D., whose book, *Familiar Strangers: Gypsy Life in America*, was an important source for the article. Sway is a sociologist who has published numerous scholarly articles on Gypsies, minority business, and the Holocaust. She has held faculty positions at the University of Utah, the University of Alabama at Tuscaloosa, and UAB, and she has been a Distinguished Visiting Lecturer at the University of Nebraska (Lincoln and Omaha) and the University of Hartford, Connecticut. She currently resides in Los Angeles.

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