

# Yale Medicine

winter 2003

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revealed

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The big move

Relocating 91 laboratories, a magnetic resonance center and the medical school's teaching facilities across Congress Avenue is like putting together the biggest 3D puzzle ever.

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# WINTER 2003

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The magnet for a 600 MHz spectrometer that will be used to analyze liquid protein structures awaited unpacking as the staff of the Magnetic Resonance Research Center prepared to move into new quarters in the Congress Avenue Building. Over the course of 48 consecutive days this winter, movers will transport more than 200,000 items from 38 separate locations around the medical center into the new building.

*Photograph by Frank Poole*

### BACKGROUND

As contractors worked on the final phase of interior construction in November, a set of plans showed details of the building's laboratory component. In all, the building contains 136,600 feet of wet-bench lab and lab-support space, as well as facilities for teaching and the care of laboratory mice.

*Photograph by Daphne Geismar*

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### On the Web

[info.med.yale.edu/yymm](http://info.med.yale.edu/yymm)

On our website, readers can submit class notes or a change of address, check the alumni events calendar, arrange for a lifelong Yale e-mail alias through the virtual Yale Station and search our electronic archive.

### The Yale System, in black and white

Congratulations on the autumn issue of *Yale Medicine*. The handwritten letters on the front and back covers convey the human quality and the personal and professional benefits of the Yale System like nothing else could.

*George S. Goldman, M.D. '29  
McLean, Va.*

Thank you so much for the issue on the unique Yale System. I learned much about its origins, development and problems that I never knew before.

For me, the Yale System was also crucial and affected me even before I entered medical school. I suppose as an extension of the system's philosophy, I was accepted after three years at the University of Michigan, with no degree and no major. I wonder if others were chosen with that background, or if I was a one-time experiment! If there are others like me among our readership, please let me know.

That confidence in me, and my idiosyncratic way of approaching requirements, helped me to later petition out of redundant residency requirements, subjective board certification, and to enter the managed care beast from an academic laboratory perspective. The latter has won me some recognition and respect as an objective assessor of managed care. Without the Yale System, I'm sure I would never have taken these risks.

*H. Steven Moffic, M.D. '71  
Milwaukee, Wis.*

### In praise of Milton Winternitz

I read the article adapted from Dr. Gerard Burrow's *A History of Yale's School of Medicine: Passing Torches to Others* with interest. While I haven't read his entire book or account of Dean Winternitz's career at Yale, I take it from this portion ["A Steam Engine in Pants," Autumn 2002] that he is acknowledging the unique and significant contribution Dean Winternitz made to the school.

While I am greatly relieved to see this, I also wish to add a footnote that I suspect he has omitted in his history.

During my tenure at the School of Medicine from 1984 to 1993, I became aware of the fact that, in spite of Dean Winternitz's enormously important work on behalf of the school, nothing at Yale is named for him. So, when it was decided to create a special medal to be given to individuals in honor of their contributions to the School of Medicine, I suggested that we create a Winternitz medal.

Burrow was dean then. In vain I argued on behalf of the "Winternitz medal," because in the end Burrow vetoed this idea, saying that Winternitz was too "controversial." As a result, the medal now contains the portrait and name of Dr. Peter Parker, an interesting person (and Burrow's suggestion) but, in my opinion and that of a number of alumni who actually knew Winternitz, not so worthy a person as Winternitz for this recognition.

I have always regretted this oversight, and I continue to hope that one day the Yale School of Medicine will repay the debt it owes Dean Winternitz by naming something of proper stature after him—perhaps, in part, because he dared to be controversial.

*Ann Pecora Diamond  
New Haven, Conn.*

### Remembering Gustaf Lindskog

On page 62 of your last issue, a good one, I read of the passing of G.E. Lindskog. As house staff, I scrubbed many times with Dr. Lindskog, who was chairman of surgery with a specialty in thoracic surgery. He taught me a lot and I learned to respect his demands for excellence. During the more than six years that I worked with him, he was very good to me and we became friends.

*Frank J. Lepreau, HS '45  
Westport, Mass.*

Sadly, the autumn issue stirs memories of my mother's terminal bout with lung cancer in 1952. With Dr. Lindskog's passing, I am reminded of the connections between them and with her willingness to be his experimental patient in radioactive colloidal gold treatments. It did help her through the last few months of her life—for that I was grateful.

*George M. Isbell  
Mount Dora, Fla.*

### The health of nations, the art of medicine

The article "A World of Difference" [Autumn 2001] caught my attention, though I've been slow responding. I have practiced "bush medicine" in Alaska, in rural California, in Lima, Peru, in 1960, etc., and had to rely on eye, ear, nose and palpation, auscultation, etc. The old (Osler) simpler techniques of physical diagnosis should not be forgotten or neglected.

How I would have enjoyed Yale's International Program! Keep it going!

*Elizabeth F. Elsner, M.D. '48  
Assonet, Mass.*



#### HOW TO REACH US

*Yale Medicine* welcomes news and commentary. Please send letters to the editor and news items to *Yale Medicine*, P.O. Box 7612, New Haven, CT 06519-0612, or via electronic mail to [yymm@yale.edu](mailto:yymm@yale.edu), and include a daytime telephone number. Submissions may be edited for length, style and content.

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**On the move on moving day**

When cardiovascular researcher Jeffrey Bender and hundreds of his colleagues unpack their labs and offices in the Congress Avenue Building later this winter and spring ["The Big Move," p. 20], a new chapter in the School of Medicine's history will begin in earnest. For the first time in a decade, the medical school's legendary space crunch will ease, at least for a time, and the occasion will mark the completion of a process that began in the late 1980s. The design of the new building has a special purpose behind it, that of knitting together basic biology, physics, chemistry and human health, of making clinical observations relevant at the molecular level (and vice versa) and, ultimately, of alleviating human suffering.

"We have the opportunity now to make an enormous difference in people's lives," Dean David Kessler says of the new building. "We have the world's best scientists and the world's best labs. This building will move medicine forward."

A faculty-led committee initially recommended a version of the Congress Avenue Building in the early 1990s. A dozen years, 560,000 bricks and \$176 million later, it is a reality. In addition to the 363 laboratory rooms shared by 91 research teams, it also contains state-of-the-art teaching space, an advanced facility for breeding and caring for transgenic mice (a research model invented at Yale in 1980) and a major new center for research employing magnetic resonance imaging and spectroscopy, another field pioneered significantly at Yale.

If you're curious about the new space and want to see architect Robert Venturi's sketches or recent photos of the construction, the school has a website full of wonderful detail. You can visit the Congress Avenue Building online at [www.med.yale.edu/cab](http://www.med.yale.edu/cab). It's just a click away, and there are no boxes to unpack.

Michael Fitzsosa  
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**SECOND OPINION BY SIDNEY HARRIS**



## Hoping for the best, preparing for disaster

The lessons of September 11, at the core of a new Yale course, put public health in the spotlight.

This past fall, Yale's School of Public Health introduced a new course on coping with disasters. Earthquakes, hurricanes and volcanoes are on the agenda, as well as famines, wars and epidemics. But the real focus is how to confront the ongoing threat of bioterrorism.

Since September 11, 2001, universities across the nation have been developing public health programs aimed at training students and professionals for future terror attacks and emerging health threats, including anthrax, smallpox and other methods of germ warfare.

Yale's new course is just a first step toward plans to develop a Yale Center

for Bioterrorism and Disease Outbreaks. Such a move would have been unimaginable a few years ago for lack of interest, necessity and—most important—funding. Today, however, public health is under a welcome spotlight, viewed with increasing importance as part of the Bush administration's goals for homeland security.

Of the government's \$2.9 billion budget for fighting bioterrorism, \$20 million was earmarked this year for developing a nationwide disaster response network of academic public health programs linked with state and community health agencies. Already, some 20 universities have received funds from the Centers for Disease Control and Prevention (CDC). In September, the Association of Schools of Public Health, in cooperation with the CDC, approved Yale's application for a grant to establish a Yale Center

for Public Health Preparedness, but has not yet decided whether to award nearly \$1 million in funding.

Heading up the Yale initiative is Brian P. Leaderer, M.P.H. '71, PH.D. '75, deputy dean of the School of Public Health and vice chair of the Department of Epidemiology and Public Health. Along with other leaders in public health, Leaderer is confident the focus on bioterrorism will spill over into more resources for disaster response in general.

"Bioterrorism looms as a real potential problem," Leaderer says. "But if you think about it, many of the competency areas in bioterrorism would apply to a large range of public health events."

In the classroom, students taking "Public Health Management of Disasters" get a broad overview of the practical consequences of disasters at home and overseas. They also learn about the complexities of orchestrating people and agencies that are involved in disasters—the police, the military, hospitals, fire departments, federal investigators, charities, support services, religious groups, families of victims, phone companies, electric companies and the media, to name only a few.

Public health, says course co-director Linda C. Degutis, M.S.N. '82, PH.D. '94, can provide leadership in disaster planning and emergency response. "Who's where, and what's everybody doing? Somebody's got to know," says Degutis, associate professor of surgery (emergency medicine) and public health. "Who are the players? What are their capabilities? What we're trying to highlight in the course is how public health can play that coordinating role."

Degutis, along with David C. Cone, M.D., associate professor of surgery (emergency medicine), tries to get students thinking about disaster relief from all angles. In Florida, for example, how do you handle a large elderly population in the aftermath of a hurricane? How do people dependent on Meals on Wheels get food when the roads are



TERRY DAGRA DI

Learning to direct people and health resources in a bioterror emergency is the focus of "Public Health Management of Disasters," offered at

the School of Public Health for the first time this year. From left, students Emily Cheung, Eli Blitz, Sarah Reese and Brian Stout.



washed out? How do you shelter older, more fragile people in a gymnasium?

Examining the lessons of September 11, for which scientific studies of disaster management of the aftermath are only now being completed or published, Degutis and Cone rely on anecdotal accounts by disaster workers, as well as media accounts such as *The New York Times'* detailed reporting on the structural collapse of the Twin Towers.

Guest speakers with nationally recognized expertise supplement lectures by core faculty. One guest, Eric K. Noji, M.D., M.P.H., is an epidemiologist with extensive field experience with disasters such as the Kobe, Japan, earthquake. Recently appointed as a special assistant for homeland security and disaster medicine to the U.S. surgeon general, Noji has been advising public health schools such as Emory's in starting up public health preparedness centers.

"Public health is a growth industry now for several reasons," says Noji. "Before, there was no career pathway for faculty; now there is. There was no money to support research; now there is. A lot of things which prevented programs like this are no longer the case."

Aside from the influx of funds, the other motivation for disaster management education has been student demand. Even before Yale started thinking about a public health preparedness center, Degutis and Cone were planning a disaster course: students, jolted by September 11 and an anthrax fatality close to home in Connecticut, had asked for one.

Neha Vibhakar, 24, a second-year student in environmental health sciences, reorganized her schedule so she could take the disaster management course.

"Hopefully, we won't have to use it," said Vibhakar, who plans to study medicine after finishing her public health degree. "But it's a tool that every doctor needs to have."

—Anne Thompson

## For AAP's voice on smallpox, vaccine question, especially for the young, is crucial

When the American Academy of Pediatrics' committee on infectious diseases reconvened for the first time after September 11, 2001, bioterrorism was a topic. Several people had died after coming in contact with anthrax-laced letters, and there was concern that future attacks would involve smallpox. The committee needed a pediatrician to serve as a liaison between the academy and the Centers for Disease Control and Prevention (CDC) in discussions of smallpox.

Robert S. Baltimore, M.D., volunteered and has since found himself the academy's main spokesman on the topic.

"I had no idea what I was in for," said Baltimore, professor of pediatrics and epidemiology, sitting in his office at the School of Medicine. Although he specializes in pediatric infectious diseases, Baltimore, like his peers in the academy, had no specific experience with smallpox. The virus had not been seen in the United States since 1949, when Baltimore was in grade school. His own research focuses on infections in newborns and hospital-acquired infections, and Baltimore studied smallpox only generally as an infectious diseases fellow in the 1970s at the Walter Reed Army Medical Center and the Army Institute of Research.

So Baltimore started educating himself, reading about the virus and collecting a grim photo archive on his computer showing the effects of smallpox on children. He had help from colleagues in the department's infectious diseases division, who met every two weeks throughout 2002 to discuss bioterror-related topics in their journal club. "The group wanted to make sure we had a very detailed knowledge," Baltimore said.

As the academy's representative, Baltimore holds conference calls with the CDC's "smallpox working group" and travels to Atlanta for CDC meet-



Robert Baltimore

ings. In addition, he has become embroiled in the debate over how best to vaccinate the public in the event of an attack. At issue are competing proposals of mass vs. "ring" vaccination—whether to inoculate everyone, or just those in the vicinity of people infected.

In the fall, CDC officials were moving away from the center's earlier support for a ring vaccination strategy and recommended making the vaccine available to the general public. [As *Yale Medicine* went to press President Bush announced plans to inoculate up to 500,000 frontline troops and 10 million civilian health care and emergency workers against smallpox, but advised against vaccination for the general public at this time.] Baltimore thinks mass vaccination would be a mistake, and on behalf of the academy has advocated the alternate approach. Children are more susceptible than adults to serious complications, he said. And there is the worry that individuals who avoid vaccination for health reasons might be exposed to the live vaccinia virus anyway, through contact with those who have been vaccinated.

*continued*

*continued from page 5*

There are three situations in which the vaccine could be fatal. In people with certain skin conditions, including eczema, the vaccine can spread, causing pustules to form over the entire body. Those with immune systems compromised by AIDS or chemotherapy, for example, may also become seriously ill from the vaccine. And in rare cases, some of those vaccinated will develop oozing, infected sores in the injection site that spread and invade deep tissues without healing.

In the first two instances, said Baltimore, children are more at risk. Many skin disorders disappear with adulthood, which means more children have them, and immune deficiency may not be apparent in young children.

For adults, the fatality rate for smallpox vaccine is about one per million. For infants, the rate is about 5 per million and there are serious adverse reactions in about 400 per million—a rate that decreases with age. The CDC has the antidote for severe reactions, an antibody-rich blood product known as vaccinia immune globulin, but current quantities are minuscule. Baltimore also is concerned about the vaccine itself. The CDC is diluting stockpiles of the old vaccine to stretch it while new vaccine is manufactured. But neither the diluted version nor the new one has been tested on children.

Even if at-risk children and adults are not inoculated, they can be infected through contact with people who have received or administered the vaccine and have it on their skin. “Mass vaccination carries with it risks that can’t be justified,” Baltimore said. “The information that all public health people have been given is that the chances of a smallpox outbreak are remote. Should there be additional information that says this isn’t true, we would say this should be reconsidered.”

—Anne Thompson

## **An appreciation of the human form, in the studio as well as the operating room**

From his house in Old Lyme, Conn., Wayne O. Southwick, M.D., surveys a green tidal marsh, and beyond, the blue waters of Long Island Sound. The breadth of that vista, punctuated by four former fishermen’s cottages near the water and two light-houses in the distance, reminds Southwick of the open spaces of his native Nebraska.

Southwick attributes his interest in art to the landscape of his childhood. In the town of Friend (pop. 1,100), box-cars and silos were the only embellishments, and “I thought of them as sculptures,” says Southwick, former chief of orthopaedic surgery at Yale. Now, as he looks out on Smith Neck marsh 32 miles east of New Haven, Southwick is surrounded by real sculptures—his own and those of his mentor, the Italian-born Bruno Lucchesi. Southwick also sees his own work when he walks down Cedar Street, where his bronze of a young

man and woman playing basketball, *An American Dream*, stands near the Jane Ellen Hope Building. And this winter, a show by members of the Yale University community includes his bronze of a woman nursing a 2-year-old, *Taking Nourishment*. Southwick is among 19 artists exhibiting work at the Yale Physicians Building Art Place. The show, running from October through March, includes works ranging from pastels to shadow boxes, quilts and jewelry.

Southwick says that the qualities that led him to pursue orthopaedics also drew him to sculpture. And sculpture, in turn, has influenced the way he sees the human body as a physician. Interning at Boston City Hospital after earning his medical degree at the University of Nebraska in 1947, Southwick discovered that he enjoyed treating broken bones. “I love the anatomy of the human frame,” he says. In medicine, he often felt he had little to offer patients, especially before the advent of penicillin. He chose orthopaedics, doing a residency at Johns Hopkins, because “I like doing things.”

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## **FOR AN EXPERT FROM IRAN, REASONS TO WORRY ABOUT AIDS**

**An emerging epidemic of HIV/AIDS in Iran could have disastrous consequences for the country and the region, according to Kaveh Khoshnood, M.P.H. '89, PH.D. '95, assistant professor of epidemiology at the School of Public Health and a native of Iran. Although 70 percent of Iran's 20,000 AIDS cases are drug users, according to UNAIDS, the government only recently lifted a ban on drug treatment centers, Khoshnood told congressional staffers in Washington on October 15. The briefing was organized by the American Iranian Council. “This shift in government policy created an opening for the Iranian medical and public health community to become engaged in a national debate regarding alternative approaches to drug addiction and the HIV/AIDS epidemic,” said Khoshnood, who along with Yale colleagues has brought Iranian physicians to Yale to study science-based models for treatment of opiate addiction and prevention of HIV infection.**

—John Curtis



Instead of going to the movies, he and his wife, Ann, wandered in museums and even went to Paris to see an exhibit of his favorite artist, Aristide Maillol, the 20th-century French sculptor of the female nude. But it wasn't until the early 1980s that Southwick began lessons in sculpture at Lyme Academy, not far from his home. There he met Lucchesi and began weekly trips to New York City to study with him.

Sculpting sharpened Southwick's powers of observation as a physician. Looking for scoliosis, "I could see the symmetry or asymmetry of the body more acutely after looking at models and various positions of the spine, but more than that—the other way round—I think knowing what's underneath the skin helps you think about sculpture."

Ironically, sculpting also requires suppressing anatomical knowledge. Southwick says sculptures work better if they exaggerate certain features, like the anterior superior iliac spine (the pelvic bones). The head should be smaller than in real life, the neck longer. These alterations "orient your view of things."

Southwick has retired from surgery (while his son, Steven M. Southwick, M.D., professor of psychiatry, carries on the family name at Yale). The senior Southwick and Lucchesi recently collaborated on a sculpture for the new Connecticut Hospice building in Branford, Conn. Southwick felt honored to work with Lucchesi. "In my mind, he's the greatest living representational sculptor." Lucchesi himself has three sculptures on the Yale medical campus, including a bronze of a mother and child in the atrium of Yale-New Haven Hospital.

Lucchesi appreciates that Southwick is using his talents to create realistic sculpture at a time when "everyone is doing a block with a hole in it." He describes Southwick's discovery of the art form as a revelation: "A neophyte finds a new religion: he finds sculpture—and he transmits that enthusiasm to other people."

As for the work itself, what does Lucchesi think? "He trained me," Southwick says with a laugh. "He thinks I'm better than I was before."

—Cathy Shufro



Orthopaedist Wayne Southwick's *Taking Nourishment*, on display in the current Art Place exhibit at the Yale Physicians Building, was inspired by the work of sculptor Aristide Maillol.

## et cetera ...

### YALE SCIENTISTS AMONG MOST CITED

Yale University ranks fifth among federally funded U.S. universities for the citation impact of its published research, according to a *Science Watch* survey.

The ranking was calculated by using publication and citation data to gauge how often during the past five years papers by Yale authors were cited by other scientists in 21 major fields of science and the social sciences. That number was then compared with a worldwide cites-per-paper average.

The four universities that ranked above Yale in the two-part survey were Harvard, which came in first, followed by Stanford, the Massachusetts Institute of Technology and the University of California, San Diego.

"We consider citations to be very significant," said Chris King, editor of *Science Watch*, a newsletter published by the Institute for Scientific Information in Philadelphia, "because they reflect what scientists themselves deem to be important. When they cite a paper, they're saying, 'This work is important. It's germane to what I'm doing.'"

—Jennifer Kaylin

### THREE JOIN INSTITUTE OF MEDICINE

Each year a few dozen select physicians and scientists are named to the Institute of Medicine of the National Academy of Sciences to serve as unpaid advisors to the government. Among those elected last October for their contributions to health and medicine were three Yale faculty members: Michael H. Merson, M.D., the dean and Anna M.R. Lauder Professor of Public Health and chair of the Department of Epidemiology and Public Health; Richard P. Lifton, M.D., PH.D., chair and professor of genetics and professor of medicine and molecular biophysics and biochemistry; and Michele Barry, M.D., HS '77, professor of medicine and public health. As members they will contribute their knowledge and professional judgment to the development of findings and the formulation of recommendations, most of which relate to public policy.

—John Curtis



JON CANNELL

## Brain scans reveal disruption in the neural circuitry of children with dyslexia

Using functional magnetic resonance imaging (fMRI), researchers led by a husband-and-wife team at Yale have found a neuronal short circuit in dyslexic children and identified an area of the brain that is linked to skilled reading. Their finding builds on a previous study that linked poor reading in adults with dyslexia to a specific region in the brain. “Because this finding coincides with findings in adults, it shows dyslexia is persistent,” said Sally E. Shaywitz, M.D., professor of pediatrics with an appointment in the Child Study Center and co-author of the study. “It shows there is an urgency for early intervention. And we were able to identify an area of the brain that correlates with skilled reading, the word-form area in the back of the left side of the brain.”

Shaywitz and her husband, Bennett A. Shaywitz, M.D., professor of pediatrics and neurology with an appointment in the Child Study Center, found that neural circuits in the word-form area, also known as the occipito-temporal area, are disrupted in children with dyslexia.

“By seeing the disruption on brain imaging it says to us as physicians and scientists that dyslexia is as real an entity as any other medical disorder,” said Bennett Shaywitz, co-principal investigator of the study and lead author of the paper in the July 15 issue of *Biological Psychiatry*.

Also contributing to the work was John C. Gore, Ph.D., now at Vanderbilt University.

This study follows one in 1998 in which the Shaywitzes and colleagues found a disruption in posterior neural systems for reading in the brains of dyslexic adults. That finding begged a key question. “We did not know if this disruption was just the end result of years of poor reading or if it was there from the beginning of the time a child should be able to read, which is around 6 or 7 years old,” said Sally Shaywitz.

The team used fMRI to scan the brains of 70 dyslexic readers and 74 nonimpaired readers ages 7 to 18 while they performed reading tasks with real words and “pseudowords,” made-up words that the children were asked to pronounce. The tasks mimicked the problems dyslexic children face in sounding out words. The team found evidence of a functional disruption of the neural systems involved in skilled reading, confirming the hypothesis that the defect is present at a young age.

“We believe dyslexic children are born with this disruption,” Bennett Shaywitz said.

The nature and cause of the disruption are not clear. “That’s the next step,” he said. With colleagues at Yale, he’s using magnetic resonance



BOB HAMBLEY

### AS THE SPERM TURNS, SUCCESS

Although intracytoplasmic sperm injection—in which a single sperm is placed inside a mature egg—increases the chances of a successful pregnancy, it also carries a risk of genetic abnormalities in children. Now two Yale scientists have devised a method for selecting genetically healthy sperm to lower those odds. Gabor B. Huszar, M.D., HS '76, and Attila Jakab, M.D., found that healthy sperm develop a receptor that recognizes an acid in the female reproductive tract; they then devised a method of using the acid to identify the most robust candidates. Huszar and Jakab presented their work at the European Society of Human Reproduction and Embryology's June meeting in Vienna.

—John Curtis

spectroscopy to study brain cells in the region that is disrupted.

According to the Shaywitzes, about one in five children has dyslexia, which affects children without regard to level of intelligence. Typically, dyslexics compensate by using other parts of the brain to read.

"Instead of being able to develop systems in the back of the brain they develop systems in the front of the brain, but it is very laborious," said Sally Shaywitz. "It's not that they don't learn to read at all, but it's harder to read."

Although symptoms appear as soon as children start to read, most dyslexic children are not diagnosed until they're in the third grade, she said. "There is absolutely no question that the earlier a child is identified, the more difference you can make," she said, adding that early placement in preventive

and remedial programs can help children with dyslexia. The programs use exercises, games and rhymes to help dyslexic children break up words into their individual parts. "If you start at the beginning you can have a good chance of helping that child in an efficient way. What we think—and we have some evidence to support this—is that we can help the area of the brain that is disrupted."

—John Curtis

## et cetera ...

### A CLOSER LOOK AT CLOT-BUSTERS

Clot-busting drugs are almost always administered to stroke patients incorrectly, sometimes with serious consequences, according to a recent Yale study.

Researchers reviewed the medical records of 63 patients who received thrombolytic therapy between 1996 and 1998. They found departures from recommended practice 97 percent of the time. "Major deviations from protocol were present in two-thirds of the cases and were associated with serious or fatal consequences," said Dawn M. Bravata, M.D., principal investigator of the study published in the *Archives of Internal Medicine*.

Errors ranged from incorrect dosages and delays in administering the drugs to giving them to at-risk patients. Responsibility for the drugs' misuse was widespread, the study found, and detours from protocol occurred all along the health care pathway. Why? "It's a hard drug to give properly," Bravata said. "It's not something doctors do every day."

—Jennifer Kaylin

### CATS AND THE PREGNANT WOMAN

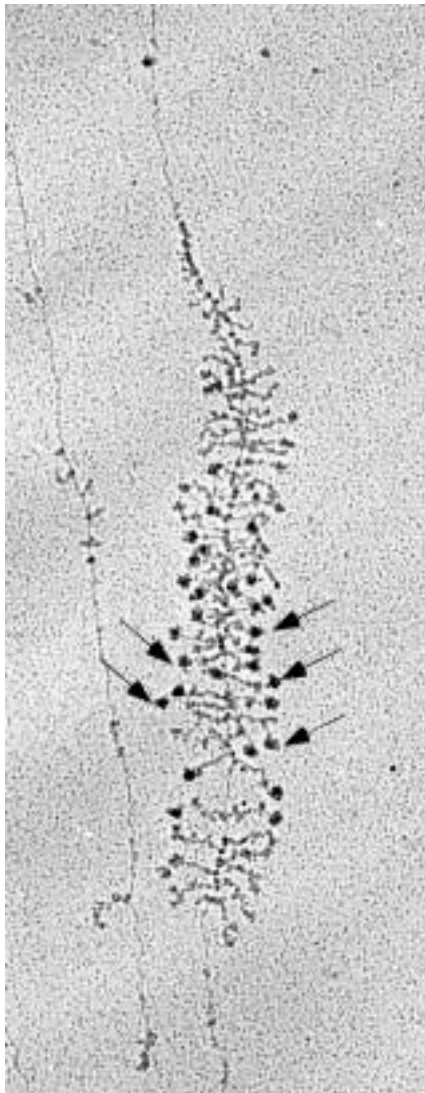
There's good news and bad news for pregnant women who live with cats. On the up side, they face little risk of contracting toxoplasmosis from their feline companions. On the other hand, there's one less reason to avoid cleaning the litter box.

Jeffrey D. Kravetz, M.D., an assistant clinical professor of medicine who has two cats, decided to review the literature about cat-related diseases after his wife became pregnant. He found that casual contact with a cat does not put a woman's unborn child at risk. "It's never been proven that toxoplasmosis (an infection that can cause miscarriages or damage to fetuses) comes from direct cat contact," he said. According to Kravetz it's much more likely a woman will get the infection by eating undercooked meat or digging with bare hands in contaminated soil.

Kravetz, whose review article appeared in the *Archives of Internal Medicine* in September, advises pregnant women who must change a litter box to do so daily, wear gloves and wash their hands afterwards. "Basically, use common sense and don't worry," he said.

—Jennifer Kaylin





ANN BEYER AND YVONNE OSHEIM/UNIVERSITY OF VIRGINIA

**Ribosomal DNA (center) forms the trunk of the “Christmas tree” in this electron micrograph of a chromatin spread from yeast. Ribosomal RNA forms the branches; each of the balls indicated by arrows is an ssU processome.**

## An unlikely assembly plant

**If the ribosome makes the body’s proteins, what makes it? Oddly enough, a giant.**

Imagine that you’re out for a stroll in your neighborhood, passing the same familiar landmarks you see every day, when you suddenly come upon an enormous factory. Now imagine how astonished you’d be to learn that the behemoth had been there all along, but no one had been able to see it until now. That’s about how surprised Susan J. Baserga, M.D. ’88, PH.D. ’88, was to find the cellular equivalent of an assembly plant hiding in plain sight.

Baserga and colleagues discovered and purified a new cellular entity, dubbed the ssU processome, which plays a key role in the making of ribosomes, the cellular machinery responsible for manufacturing all proteins. Surprisingly, the ssU processome, undetected until now, is nearly as large as a ribosome, about 80 Svedberg units.

“We were surprised to discover that it takes a complex as big as a ribosome to make a ribosome,” said Baserga, associate professor of molecular biophysics and biochemistry, therapeutic radiology and genetics. The ssU processome, a complex of RNA and many proteins, wasn’t detected until now because previous techniques used to look for RNA-protein complexes filtered out the larger ones, leaving only smaller material. “We were able to find it because we made our extracts—the starting material for purifying RNA-protein complexes—differently,” said Baserga. The mass spectrometry work of collaborator Donald F.

Hunt, PH.D., of the University of Virginia, also figured prominently.

The researchers, who reported their work last June in *Nature*, named the complex a processome “because it’s essential for processing the RNA that becomes part of the ribosome,” said Baserga. The “ssU” in the name stands for small subunit, because the complex is required for processing small ribosomal subunits, but not large ones. Though they’re not sure exactly how it functions, Baserga and co-workers believe the ssU processome and its proteins help fold ribosomal RNA into the proper configuration. It’s already known that the RNA portion of the ribosome is “the business end” that facilitates the ribosome’s protein-producing work, so properly processed ribosomal RNA is essential to the ribosome’s function, noted Baserga. The ssU processome appears to be so critical to cell growth and health, in fact, that Baserga suspects that defective processomes may be at the root of some diseases for which the causes are not well understood.

Researchers also are interested in the basic science behind RNA processing in all types of cells, Baserga added. “There’s pretty good reason to think that RNA was the first molecule, and that DNA and all the other molecules came from RNA. So studying anything that affects RNA metabolism brings you closer to understanding basic cellular processes.”

Next, the research team wants to explore how the ssU processome assembles into the huge complex it eventually becomes. “We think there’s a definite order of assembly,” says Baserga. Working with helicases—enzymes that fold and unfold protein and RNA—one of her students hopes to “freeze” the process in mid-course, providing a snapshot of assembly in progress. Baserga’s group will continue to tease out the exact details of how the ssU processome coaxes ribosomal RNA into the proper form. “That,” she said, “is going to be the next 10 years or so of work.”

—Nancy Ross-Flanigan

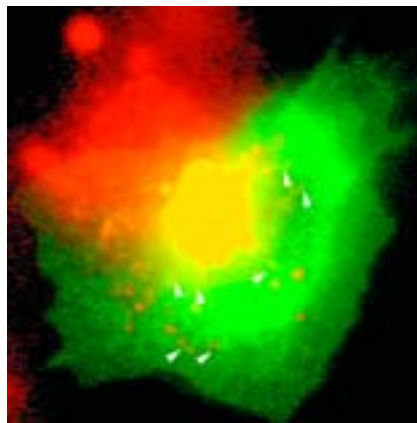
## Nature studies offer a new view of the immune response, from a dendritic perspective

When the body is under pathogenic attack, it is the long-armed dendritic cells in the skin that identify the foreign invaders and instruct the body's killer cells to fight them. Understanding how these multitasking sentinels operate could be central to producing the next generation of vaccines to combat diseases such as cancer and HIV, according to immunologists at Yale and Harvard who published their findings last August in *Nature*.

Discovered in 1868 by the German scientist Paul Langerhans, dendritic cells became of interest to immunologists in the 1960s but have only recently revealed their operational secrets. It took a novel imaging approach to observe the role the cells play in precipitating the body's immune response.

By tagging the relevant molecules with green fluorescent dye, the groups from Yale and Harvard used video imaging of cultured cells to chart the pathway of an antigen, a protein that stimulates an immune response. For the first time, scientists observed molecules moving in a live dendritic cell.

Dendritic cells reside in the skin, constantly feasting on the proteins that surround them. If a foreign antigen is present, it is consumed and trans-



Arrows point to the tubules found to carry foreign antigen and MHC class II molecules from the lysosome to the surface of a dendritic cell.

ported to an acidic compartment deep within the dendritic cell called a lysosome. Aided by enzymes, the lysosome chops the proteins up into more manageable chunks called peptides. Meanwhile the dendritic cell travels to the killer T cells in the lymph, which ultimately deal with invaders.

But how do peptides get from the enclosed compartment, the lysosome, at the cell's core—so impenetrable that Yale's Ira Mellman, PH.D., chair and professor of cell biology, calls it "Dante's seventh level"—to its surface, where they can interact with T cells?

Under Mellman's supervision, graduate student Amy Chow and associate research scientist Derek Toomre, PH.D., watched the growth of long thin tubules that became the peptides' escape routes. They begin emanating from the lysosome shortly after a foreign invader is detected, and finally fuse with the cell's surface. Chow saw the green-glowing carrier molecules drag the freshly chopped peptides along the tubules.

At the cell's surface, the carrier molecules display their cargo of peptides, flagging those that represent dangerous invaders differently from those that came from the body's own harmless proteins. T cells respond by self-destructing if the peptide is benign and by propagating if they must unleash their arsenal upon it.

"Dendritic cells sit at a critical nexus, deciding whether to respond or ignore a protein. Most immunologists so far have been T-cell-centric, but T cells can't do anything unless a dendritic cell instructs them," said Mellman. "Dendritic cells are like cellular psychiatrists. They bring out the deep-seated problems, wait for them to come to the surface and then interpret them."

Jacques Banchemer, PH.D., director of the Baylor Institute for Immunology Research in Dallas, said the unprecedented inside view of how dendritic cells operate offered by the *Nature* studies could pave the way to a more rational approach to vaccine design.

—Celeste Biever

## et cetera ...

### A PROMISING TARGET

Yale researchers have shown that an artificial gene switch can induce the growth of new blood vessels in a mouse model, a new approach to gene therapy that has implications for heart disease and cancer. The technique uses an engineered transcription factor to switch on inactive genes that are already present in the mouse and has the potential to spur the growth of new vessels in tissue that has a diminished blood supply. The principle could also be extended to control overactive genes that need switching off, such as those for cancerous tumor growth.

In previous gene therapy trials, patients have been injected with the genes that encode the growth factors that drive angiogenesis, the process of vessel formation. But Yale's Frank J. Giordano, M.D., and colleagues at Sangamo BioSciences used a viral vector to deliver the genes that code for the switch, a zinc finger protein transcription factor dubbed Vegfa-ZFP. The mouse then produced the transcription factor, which switched on the growth genes. Healthy blood vessels formed and wound healing was augmented, according to the paper, published online in *Nature Medicine* on November 4.

—Celeste Biever

### FROM THE MOUTHS OF TICKS

An anti-coagulant protein in the saliva of the deer tick allows it to suck blood from a single wound for days, according to Yale scientists. The identification of the protein, called Salp14, could lead to therapies for clotting disorders or vaccines against tick-borne diseases.

Mosquitoes and tsetse flies can feed for only a few seconds before clots form. Exactly how ticks bypass this natural defense had been a mystery. "Tick saliva has an array of potent pharmacologic functions," said Erol Fikrig, M.D., principal investigator for the study, published in the December issue of *Insect Molecular Biology*. Fikrig said Salp14 blocks the actions of prothrombin, a key participant in the cascade of reactions that lead to blood clots. "If we study it in more detail, it could be used to combat any disease where clot formation is a problem," said Fikrig. "But this is just the tip of the iceberg."

—Celeste Biever



### Telephone Medicine: A Guide for the Practicing Physician

edited by Anna B. Reisman, M.D., assistant professor of medicine, and David L. Stevens, M.D.

*American College of Physicians-American Society of Internal Medicine, (Philadelphia) 2002*

Designed to focus on reacting to calls from patients, the book is specifically developed for internists but is applicable to other primary care physicians. It covers medicolegal considerations and the challenges of the telephone interview. A clinical section of the book provides evidence-based guidance for the management of 13 common medical problems over the phone. The book also offers guidance on incorporating telephone medicine in the workplace and includes a teaching curriculum.

### The Quest for Drug Control: Politics and Federal Policy in a Period of Increasing Substance Abuse, 1963-1981

by David F. Musto, M.D., HS '67, professor in the Child Study Center and professor of psychiatry and the history of medicine, and Pamela Korsmeyer, former research associate in the Child Study Center

*Yale University Press (New Haven) 2002*

Between 1963 and 1981 various administrations attempted to deal with a rising tide of illicit drug use that was unprecedented in U.S. history. This book provides a close look at the politics and bureaucracy of drug-control policy during those years, show-



ing how they changed under presidents Johnson, Nixon, Ford and Carter and how much current federal drug-control policies owe to those earlier efforts.

Musto and Korsmeyer base this analysis on a unique collection of 5,000 pages of White House documents from the period, all of which are included on a searchable CD-ROM that accompanies the book. These documents reveal the intense debates that took place over drug policy. This investigation into the decision-making processes that shaped past drug-control efforts in the United States provides essential background for evaluating future approaches to the drug problem.

### Living Color

by Albert Rothenberg, M.D., HS '60, former clinical professor of psychiatry

*York Press Ltd., (Toronto) 2001*

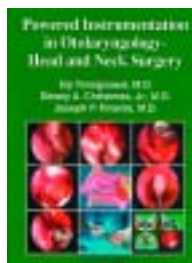
A knife is plunged into a famous huge red painting named *Who's Afraid of Red, Yellow, and Blue?* and a mysterious tale of creation and destructiveness unfolds. Morris, an alcoholic artist, his biographer wife, Marica, and a young idealist named Charles are all caught up in the meaning and purpose of the slashing, the real and created worlds of color and betrayal.

### Be Your Own Mentor: Strategies From Top Women on the Secrets of Success

by Sheila Wellington, M.P.H. '68, Betty Spence and Catalyt

*Random House, (New York) 2001*

All of us, from birth onward, learn by emulating others. Yet when it comes to our profes-



sional lives, we often forget that what we see, we imitate and what we imitate, we become. This is obviously a positive thing for those who have found successful, encouraging mentors in their fields, but finding those mentors is still much easier for men than for women. In *Be Your Own Mentor*, Wellington seeks to provide women not only with advice on locating appropriate mentors, but also with the tools to mentor themselves and the opinions, advice and encouragement of women leaders worth emulating.

### Powered Instrumentation in Otolaryngology: Head and Neck Surgery

by Eiji Yanagisawa, M.D., HS '59, clinical professor of otolaryngology, Dewey A. Christmas Jr., M.D. '65, HS '70, and Joseph P. Mirante, M.D.

*Singular, Thomson Learning (San Diego) 2001*

### and— Atlas of Rhinoscopy: Endoscopic Sinonasal Anatomy & Pathology

by Eiji Yanagisawa

*Singular, Thomson Learning, 2000*

These two recent books by Yanagisawa and colleagues vary in scope from the highly specific to the comprehensive. *Powered Instrumentation in Otolaryngology* provides details on mucosal preservation through powered instrumentation for such procedures as sinusotomy, polypectomy, anrostomy, rhinoplasty and liposuction. Also mentioned are the best approaches to rapid



healing using this technique for power dissection in the sinuses, nose, larynx and at the skull base, as well as facial plastic surgery. *Atlas of Rhinoscopy* is a full-color volume of outstanding photography detailing endoscopic sinonasal anatomy, pathology and surgery. It also illustrates the techniques of rhinoscopy, sinuscopy and nasopharyngoscopy. Yanagisawa includes useful clinical cases that illustrate the application of knowledge to real-life experiences, and covers new surgical techniques such as powered instrumentation and computer-aided endoscopic sinonasal surgery.

### A Primer of Transference-Focused Psychotherapy for the Borderline Patient

by Frank E. Yeomans, M.D. '81, John F. Clarkin and Otto F. Kernberg

*Jason Aronson (Northvale, N.J.) 2002*

Transference-Focused Therapy (TFP) is a psychodynamic treatment designed especially for borderline patients. This book provides a concise and comprehensive introduction to TFP that will be useful to both experienced clinicians and students of psychotherapy. TFP has its roots in object relations and it emphasizes that transference is the key to understanding and producing change.

*The descriptions above are based on information from the publishers.*

**SEND NOTICES OF NEW BOOKS TO** Cheryl Violante, *Yale Medicine*, P.O. Box 7612, New Haven, CT 06519-0612, or via e-mail to [cheryl.violante@yale.edu](mailto:cheryl.violante@yale.edu)





TERRY DAGRADI

**HAROLD VARMUS**

**A question worth answering: why don't cancer cells die?**

When cells become cancerous, they grow unrestrained and sometimes ignore signals that would normally induce them to die. "What are the genetic functions," Nobel laureate Harold E. Varmus, M.D., asked in a November 1 campus talk, "responsible for sustaining the life of cancer cells?" Varmus, president and chief executive officer of Memorial Sloan-Kettering Cancer Center and the former director of the National Institutes of Health, gave the keynote address at the 2002 Graduate Student Research Symposium, an annual event that brings speakers to campus and provides graduate students a venue for presenting research in progress.

In his address Varmus described how his laboratory has used new ways to study those genetic functions in mouse models of lung and ovarian cancers. Varmus and colleagues controlled expression of a mutant gene by dosing mice with the antibiotic doxycycline: in this way they could induce lung cells to become cancerous. Halting the drug dosages abruptly reduced the expression of that gene, *K-ras*, and triggered the death of the tumor cells, causing the cancers to melt away.

His laboratory is attempting to understand how genes like *K-ras* "protect cells from cell death" and what happens when the cells lose *K-ras* function and die. From there, the goal will be to figure out "how to trigger a similar response in humans," which, Varmus suggested, could prove key to developing new treatments for the deadly cancers.

—Marc Wortman



**MARIA MARCHETTI-MERCER**

**A disheartening view of AIDS in South Africa**

"I will give you a picture that will sound a bit bleak," Maria C. Marchetti-Mercer, PH.D., told an audience at a lunch sponsored by the Center for Interdisciplinary Research on AIDS in September. Marchetti-Mercer, head of the department of psychology at the University of Pretoria in South Africa, proceeded to paint a landscape of social and political turmoil and its relationship to the growing HIV/AIDS pandemic. With the end of apartheid in the 1990s, political violence gave way to criminal and domestic violence. The country has seen increasing incidents of "family murder," the killing of all family members by a parent. Added to this mix is the impact of HIV/AIDS, which is estimated to have left at least 660,000 orphans and reduced families to poverty as breadwinners die or become incapacitated.

"Poverty doesn't cause AIDS," Marchetti-Mercer said. "But it does create a context where people are more vulnerable."

People with HIV/AIDS are stigmatized, and society offers little in the way of social, economic or psychological support. As a result, Marchetti-Mercer said, poverty and crime will only increase. "I think we are moving toward another lost generation," she said, referring to the orphans the epidemic has left. "This whole cycle of poverty and criminal and domestic violence will go on because of the impact of HIV/AIDS."

—John Curtis



**EUGENE SHINN**

**African dust brings nutrients—and toxins**

For centuries winds have carried dust from Africa and deposited it on islands in the Caribbean and locations in Florida and South America. The dust provides essential nutrients to the upper canopy of the Amazon rain forest and, in the Bahamas, contributes to the formation of red soils known as pineapple loam.

As early as 1846, however, Charles Darwin was complaining about the pernicious effects of African dust as he traveled through the Canary Islands. In recent years the dust has carried traces of fertilizers, pesticides, mercury, arsenic, bacteria and a fungus called *Aspergillus* that has devastated sea fans on Caribbean coral reefs.

According to Eugene A. Shinn, PH.D., a geologist with the U.S. Geological Survey in St. Petersburg, Fla., the dust also has implications for human health. "It causes lung infections," Shinn told students at the School of Forestry & Environmental Studies in November. He also believes African dust is linked to increases in asthma throughout the Caribbean.

Since the 1970s deforestation and drought in Africa have caused huge dust storms. When they reached the Caribbean, the effects were obvious. "In San Juan, Puerto Rico, people could feel it in their chests. They had headaches," Shinn said.

Shinn is working with microbiologists and physicians to study the problem, but as he cautioned at the start of his lecture, "This is a bad-news/bad-news story."

—John Curtis



JOHN CURTIS (3)

**ANDREA TONE**

**In history of birth control, a male influence**

Although birth control is widely viewed as a women's issue, men have played a large, if unrecognized, role in reproductive rights, Andrea Tone, PH.D., professor of history at the Georgia Institute of Technology, said at a History of Medicine and Science lecture in December. "If you examine sources not usually considered vital to the history of birth control—arrest records, credit reports, trial transcripts, patent applications, post office records, military investigations, FTC and FDA records and men's letters—you encounter a cast of characters who are not only fundamental to the history of modern contraception, but who are also often men," said Tone, author of *Devices and Desires*, a history of contraception from 1873 to 1973.

Among those men was Julius Schmid, who, in 1883, found a use for animal intestines beyond making sausages. He did what Europeans had been doing since the Renaissance and turned the delicate but impermeable membranes into condoms. To skirt laws against such devices, condoms and diaphragms were marketed as "French goods and medicines."

Late-19th-century physicians favored condoms as an effective means of birth control. And, letters of that time reveal, contraception was on the minds of husbands as well as wives. "Men discussed how anxious they were to protect their wives' health and welfare from the toll of uninterrupted childbearing," Tone said, "and they worried how they, as breadwinners, could afford to feed another mouth."

—John Curtis



## A monstrous notion

by Rachel Engers

Exhibit on Frankenstein looks at the intersection of scientific knowledge, creative power and human arrogance.



**ABOVE** Physician Giovanni Aldini (1762-1834) conducted experiments using electricity on newly executed criminals that produced an opening of the eyes, a quivering of the jaw and contortion

of muscles. This illustration from his essay on galvanism shows doctors reanimating corpses. Shelley made explicit references to galvanism in her revised 1831 edition of *Frankenstein*.

**TOP** Films from the 1930s produced this enduring image of Victor Frankenstein's monster, here on a U.S. postage stamp.



With his flattened pate, horrid scars and a set of neck bolts to keep his head on straight, the monster popularly known as “Frankenstein” is a lurching, grunting, remorseless killer. This image, made famous by a series of 1930s films starring Boris Karloff, can be seen on everything from cereal boxes to postage stamps and has come to represent the notion of science out of control. Any new technology that calls into question our traditional understanding of what it means to be human, from cloning to xenotransplantation, seems inevitably to raise the specter of author Mary Wollstonecraft Shelley’s hideous monster. Nearly two centuries after its creation, *Frankenstein* continues to haunt us.

According to Susan E. Lederer, PH.D., associate professor of the history of medicine, the story continues to maintain its hold on the popular imagination. “It’s alive and it’s escaped,” says Lederer. “These represent primal fears about human agency and responsibility for creation.”

Lederer was the chief curator of “Frankenstein: Penetrating the Secrets of Nature,” a 1997 exhibit at the National Library of Medicine (NLM), and mounted a modified version of the show this summer in the rotunda of the Cushing/Whitney Medical Library. From the Yale archives, she added rare books on galvanism and the supposed reanimation of the dead that influenced Shelley’s 1818 novel. The exhibit examines how the author used the “scientific advances and controversies of her era as a metaphor for issues of unchecked power, self-serving ambition and their effect on the human community.” It also looks at how playwrights, filmmakers and cartoonists have transformed the image of the monster and how Frankenstein’s monster continues to emerge in debates about modern science. Over the next four years the traveling exhibit, drawn from the exhibit sponsored by the NLM and the American Library Association, will visit 80 libraries across the country.

While the idea for *Frankenstein* came to 18-year-old Mary Shelley in a dream, the monster reflected the curiosity of physicians and natural philosophers of her era in reviving the drowned and reanimating dead tissue using electricity. These researchers, according to the exhibit text, aimed to benefit humankind and end death and disease through their investigation into the mysteries of nature.

Assembled in secret from body parts gathered from graveyards and slaughterhouses, scientist Victor Frankenstein’s creation has flowing hair, black lips and shriveled yellow skin, which “scarcely covered the work of muscles and arteries beneath.” Despite his grisly appearance, the nameless monster is intelligent and sensitive. He seeks human companionship and educates himself by reading the works of Homer, Milton and Goethe. Only after his maker rejects him does the creature turn to rage and murder. The tragedy of the story is Victor Frankenstein’s arrogance and failure to take responsibility for his creation.

The monster in the novel is different from and more complex than the version that has been popularized. The collection of artifacts shows an 1823 English playbill for “Presumption, or the Fate of Frankenstein,” which portrayed the monster as a speechless brute. This marked the beginning of the simplification of the author’s tale that continues in films and commercial culture today.

The exhibit also explores the novel’s often-forgotten subtitle, *The Modern Prometheus*. This figure in Greek mythology was a symbol of optimism to Mary Shelley, who noted that he used “knowledge as a weapon to defeat evil by leading mankind beyond the state where they are sinless through ignorance, to that in which they are virtuous through wisdom.” Thus despite Victor Frankenstein’s utter failure, the exhibit points out, the author suggests the possibility that we can make responsible choices about scientific discovery.

Rachel Engers is a freelance writer in Branford, Conn.



TOP A portrait of Mary Shelley writing.

ABOVE References to Frankenstein continue to shape public debate and fears about new scientific advances, such as cloning, interspecies organ transplants and genetic engineering. Opponents of genetically altered foods created this postcard.



# Long road to Cedar Street

**The first grandmother to enter medical school at Yale, 40-year-old Karen Morris is where she's always wanted to be: on her way to becoming a physician.**

By Cathy Shufro  
Photographs by Terry Dagradi

For first-year student Karen Morris, the path to the human anatomy lab included careers as a cosmetologist, a secretary and then an associate's-level nurse while she worked toward her bachelor's degree at night.

You might say Karen Sarena Morris' cover was blown at the White Jacket Ceremony. As young as she looks, the first-year medical student could no longer sustain the fiction of being an ordinary student the moment her four daughters and 2-month-old grandson arrived to watch the annual rite of passage. Morris, 40, may have been on the accelerated track for becoming a grandmother, but it took her a long time to get her white jacket.

Morris had set her sights on medicine as a child. At age 11, she decided to become a doctor so she could take care of her ailing grandmother, who died while Morris was still a teenager. Motherhood at 16 and marriage to a man who frustrated her attempts to enroll in college deflected Morris from her goal. She ran a beauty salon, worked as a secretary and eventually earned a nursing degree. But although she found a certain measure of fulfillment as a nurse, her desire to study medicine never waned. Under the tent on Harkness Lawn on that warm August afternoon, Karen Morris began to realize a dream deferred.

The daughter of an office worker and a police officer in Harrisburg, Pa., Morris was a strong student who seemed destined to be the first in her family to attend college. She did manage to finish high school in 1980 after giving birth during her junior year to daughter Nikki (now 23). But after Morris married the man who had been her boyfriend since fifth grade, now a machinist, she discovered that he opposed her plans to go to college. She studied cosmetology instead, and ran a beauty shop out of their home. Each fall, she proposed starting college, and each fall, she said, her husband pressured her to wait—until the children were older, until finances were less strained.

"As bright as I am, it took me about nine years to realize he was never going to say OK," Morris recalled during a lunchtime interview at Marigold's, the medical school dining hall, a few weeks into the fall semester.

By then the mother of five children, Morris at age 29 quietly enrolled at Harrisburg Area Community College. When her husband interfered with her studies, she said, they separated. After working all day as a secretary, Morris would do homework alongside her children at the kitchen table and continue on while they slept, surviving on four hours of sleep. She chose a nursing major, telling herself, "You have five kids. Let's be realistic: you can't be a doctor anymore." She completed her associate's degree summa



**As she wrote down her age and listed her children on each application form, Morris thought, “They’re just going to laugh this application off the desk.”**

cum laude in 1996, and with her children’s encouragement, she enrolled at nearby York College to work toward her bachelor’s degree in nursing.

Finding jobs first at a state psychiatric hospital and then at a prison with 3,000 male inmates, Morris enjoyed nursing but craved more responsibility. “It’s one thing to follow through on a treatment plan, and it’s another being the one responsible for formulating that treatment plan,” she said. Her 40th birthday loomed as a deadline in Morris’ mind, and she had only a few years to go. She realized, “If I don’t try this, I’m going to regret it. My heart was set on being a doctor.” And so, while pretending even to herself that her goal was a master’s in nursing, she began taking the prerequisites for medical school. She was too embarrassed to approach the college pre-med advisor, so she searched the Internet to assemble a list of course requirements. She did well in science.

It was online that she first heard of the MCAT. She also discovered the Minority Medical Education Program, a summer enrichment course for prospective medical students. The six-week program is funded by the Robert Wood Johnson Foundation and offered on 11 campuses including Yale’s. As an African-American, Morris qualified, and in July 2001 she left her hometown and her children for the first time to attend the program in New Haven. By

then, she and her former husband were on good terms, and he stayed with their children.

When she took the MCAT a few months before, Morris hadn’t even finished organic chemistry, and she hadn’t had the money for a prep course for the exam. She dreaded getting her scores and was pleasantly surprised when they fell within the competitive range she was shooting for. But as she wrote down her age and listed her children on each application form, Morris thought, “They’re just going to laugh this application off the desk.”

Morris lacked the money to travel to faraway interviews, so she applied to only four schools—and got into three. She chose Yale over Penn State and Pitt; Johns Hopkins rejected her. Morris earned her bachelor’s degree magna cum laude in June and now lives in New Haven with her two youngest children, 16-year-old Shar-Dae and 14-year-old Ashley. (Firstborn Nikki is a college graduate with a degree in information systems, and Morris’ 62-year-old mother just started community college in Atlanta.) Morris is financing her education through grants and a loan.

She is awed by the talents of her well-traveled, multilingual classmates, but she reminds herself of her own strengths, including years of experience taking care of patients and confidence gleaned from coping with difficult

1986



Karen Williams married Gregory Morris at Martin Luther King Baptist Church in Harrisburg, Pa. Although they later divorced, they are now on good terms.

KAREN MORRIS (3)

1996



Morris’ children threw a party when their mother graduated summa cum laude with her associate’s degree in nursing from Harrisburg (Pa.) Area Community College and received the school’s award for outstanding achievement in nursing. Here Morris poses with Shar-Dae (kneeling), Ashley, Nikki, Amber and Gregory.



**“It’s remarkable,” Assistant Dean Forrester Lee says of her mid-life career change, “that she would say, ‘This is what I want to do’ and go back and do it.”**

situations, such as trying (without success) to resuscitate a naked male inmate in a shower room and caring for a prisoner with AIDS awaiting permission to go home to die, word that would come one day too late.

“Even though there are times when I felt really inadequate listening to some of their experiences,” she said of her classmates, “I know that the path I took also gave me so many rich experiences that are going to help me in my practice.”

Cardiologist Forrester “Woody” Lee, M.D. ’79, HS ’83, said Morris was one of just a handful of students who stood out among the 100 participants at the summer program for minority medical school candidates. “It wasn’t just because she was older,” said Lee, who is assistant dean for multicultural affairs and director of the summer program. He said Morris’ enthusiasm and curiosity had enlivened the entire group. When Morris received her certificate at the end of the course, Lee said, “the whole group spontaneously stood up and clapped. Everybody was almost in tears.”

Lee said most people considering a demanding career change in mid-life would decide it was too late. “I think it’s remarkable that she would have the presence of mind to say, ‘This is what I want to do’ and go back and do it. I don’t know where that kind of strength comes from.” He said Morris has what Sir William Osler called *aequanimitas*,

a “calmness amid storm” that serves physicians well. As Lee describes Morris, “Nothing seems to faze her. She’s steady and sure with her voice, with her presence, with her vision of what she wants to do.”

As far as anyone knows, Morris is the first grandparent to matriculate in medicine at Yale, but she’s not the first Yale medical student to begin her studies at 40. According to Associate Dean for Student Affairs Nancy R. Angoff, M.P.H. ’81, M.D. ’90, HS ’93—who herself started medical school at age 39—“what makes her unique are her incredible drive and commitment and the odds she’s been up against to come here. ... She understands life, and she knows what it means to work hard and face adversity and keep on going. I think she’s going to be a great leader.”

For Morris, how she experiences the daily life of a medical student “depends on the day.” Case conferences are easy to follow; biophysics is not. “Sometimes I think, ‘I can do this.’ There are other days when I think, ‘I don’t have a clue what they’re talking about!’” But those days don’t get her down. “All in all, I am still in awe that I am here, and I’m enjoying it.” **YM**

Cathy Shufro is a contributing editor of *Yale Medicine*. Terry Dagradi is a photographer with Med Media Group at the School of Medicine.

2000



**LEFT** Morris is surrounded by her children (clockwise from lower left): Ashley, Gregory, Nikki, Shar-Dae and Amber. Shar-Dae, now 16, and Ashley, 14, moved with their mother to New Haven last summer when she started medical school.

**RIGHT** Karen Morris gestures toward her grandson, Ronyay, after the White Jacket Ceremony last August. Sitting behind the baby is Morris’ mother, Betty Williams. Ronyay’s admirers include Dean Forrester Lee, to left of Morris, and Dean Nancy Angoff, holding a folder.

2002



TERRY DAGRADI





Relocating 91 laboratories, a magnetic resonance center and the medical school's teaching facilities across Congress Avenue is like putting together the biggest 3D puzzle ever.

By Marc Wortman  
Photographs by Frank Poole and  
Daphne Geismar



# The big move

Laboratory flasks in the Boyer Center lab of cardiovascular researcher Jeffrey Bender, kept company by a colorful soap dispenser, await packing in late autumn. Over a 48-hour period this winter, crews will move the entire contents of the Bender lab, packed into 2,450 cartons and onto dollies. Bender is one of 91 principal investigators moving into the new building.



**Jeffrey Bender stands in empty lab space that will house his Program in Vascular Disease and Cardiology. The new arrangement will bring together scientists now doing related molecular work in scattered locations and make collaboration easier. “The daily interaction,” he says, “will be a huge advantage for everyone.”**



The laboratory of Jeffrey R. Bender, M.D., MS '83, stretches east along the top floor of the Boyer Center for Molecular Medicine on College Street and toward the New Haven Green. Here Bender, a professor of cardiovascular medicine and immunobiology, directs a program investigating how inflammatory events in blood vessels cause atherosclerosis.

It is the kind of work that could one day lead to new ways of treating or preventing stroke, heart attack and the rejection of transplanted organs.

Over the decade that his laboratory has occupied its Boyer Center space, it has filled up to bursting with the specialized tools and materials of molecular biology. Among them is a supply of costly reagents in Revcos, special deep freezers that hum along at minus-80 degrees Celsius. The laboratory also maintains a supply of radioactive isotopes and uses closet-sized biosafety cabinets for working with hazardous and sterile materials. Then there are five refrigerator-sized CO<sub>2</sub> incubators precisely calibrated to keep the millions of cells floating in petri dishes within them alive. The vital core of the laboratory, those cells have been isolated from normal and diseased humans and mice. Many of the cells have been genetically manipulated to study the biological mechanisms that underlie atherosclerosis. The cells

represent a lifetime of work. “It would be devastating,” said Bender, “if we lost them.”

At some point this winter, a team of movers will pack nearly every single item in Bender's laboratory—the contents of 700 shelves and drawers and larger discrete items according to the mover's count—into 2,450 cartons and put them on dollies for easy transport. The laboratory staff will transfer the contents of the freezers and incubators into transport coolers designed for the task while a team from the Office of Environmental Health and Safety decontaminates, wraps and seals the laboratory's equipment. Then the movers will load some of the material into trucks. What does not get shuttled by truck will be pushed, dolly by dolly, along a carefully mapped, 3,100-foot-long route through five separate medical center buildings and across a new pedestrian skybridge into the north wing of the new Congress Avenue Building. The movers will pass through the north wing and cross another bridge over the new building's lobby into the south wing. Eventually they will arrive by elevator on the fourth floor and head down the hall to what is now pristine, empty laboratory space.

Once there, every item will be unpacked and put in its designated spot. The biosafety cabinets, freezers and incubators will be checked for contamination and then plugged in, and their environments will be tested and recalibrated as necessary. All of the frozen reagents, living



FRANK POOLE

cells and radioactive isotopes will be returned to their storage units. If everything goes according to plan, 48 hours after the move begins Bender's laboratory will be up and running in its new home.

Now, multiply that scenario by 91. That is how many principal investigators, scattered throughout the medical school, will be moving into the new building over the course of 48 consecutive days starting in mid-winter. In total, the movers will pack up more than 200,000 individually tagged pieces of equipment, shelf- and drawer-loads and other items from 363 laboratory rooms in 38 separate locations around the medical center. All of it should arrive at precisely pinpointed locations in 180 rooms in the new space. With a schedule planned to within 15-minute intervals, from 8 a.m. until 7 p.m. six days a week (Sundays are reserved for any problems that arise), effectively one quarter of the medical school's research laboratories will be packed, hauled, pushed and trucked to new quarters in the new building. "It is an enormous, three-dimensional puzzle," said Caroline Freeman Tunis, president of Freeman Enterprises, a New York City-based relocation management consulting firm planning the move. "A move of this type puts a faculty member's life's work at risk. We have to work for perfection." Perfection is a tall order. Nothing in Yale's history—and little in the history of any medical center—compares to the scale and complexity of the move.

#### **"A remarkable opportunity"**

The new, 457,000-square-foot Congress Avenue Building is by far the medical school's largest facility and Yale University's largest new building in 70 years. (Among Yale buildings, only Payne Whitney Gymnasium and Sterling Memorial Library are larger.) More than a decade in the making and brought to fruition under the leadership of Dean David A. Kessler, M.D., and Yale President Richard C. Levin, the \$176.6-million structure is a big part of Yale's half-a-billion-dollar commitment to expand and renew its medical facilities over the next decade. (The space vacated by the move will gradually be renovated for other uses, including a planned neuroscience research center.) The new Center for Drug Discovery, built as an extension of the B wing of Sterling Hall of Medicine, is the latest structure in the expansion of the medical school.

"We're all a bit nervous, a little intimidated by the logistics of moving to a new place," said Carolyn W. Slayman, Ph.D., Sterling Professor of Genetics and deputy dean for academic and scientific affairs. "But people understand it's a remarkable opportunity. Everyone who tours it is excited."

The excitement is for a building with the complex mission of incorporating, enhancing and expanding the central research and teaching missions of the medical school. Slayman and faculty colleague Arthur E. Broadus, M.D., Ph.D., chaired the committee that planned the building. Designed by famed Philadelphia architect and former Yale

Douglas Rothman, director of the Magnetic Resonance Research Center (MRRC), stands in one of the massive steel boxes that will shield the center's powerful magnets. Two million of the 7 million total pounds of steel in the new building are found in

the MRRC's research floor. With the new equipment, Yale scientists will gain as much as a 16-fold increase in image resolution, says Rothman: "We'll be able to move from imaging systems down to imaging actual biological processes."





School of Architecture faculty member Robert Venturi and the Boston firm Payette Associates, the tripartite building is composed of two block-long wings skewed at slight angles and meeting in a large lobby facing the corner of Congress Avenue and Cedar Street. A narrow central courtyard stretches back from the lobby to Howard Avenue (See *A Building for the 22nd Century*, p. 26). The football-field-and-a-half-long complex stretches from Cedar Street to Howard Avenue and is squeezed into a short block between Congress Avenue and Gilbert Street, occupying the site of the former nursing dormitory at 350 Congress Avenue and several smaller buildings. Already the Congress Avenue and Cedar Street corner has formed a new center of gravity for the campus.

That shift reflects a real change for the medical school. Many important activities will move to the new building. The six-story south wing will house some 700 researchers, while the three-story north wing will contain six teaching laboratories in anatomy and histology for the 136 first-year medical and physician associate students, along with a 152-seat auditorium and six seminar rooms. Space beneath the lobby and courtyard houses new core research facilities serving the entire university. These include the Animal Resources Center, with facilities for production of transgenic and knockout mice and vivarium space for 74,000 rodents, and the Magnetic Resonance Research Center (MRRC), eventually to house nine magnets for imaging studies of humans, animals and cells.

Just as important as the expanded and more modern research and teaching space, the new building brings together previously far-flung scientists to encourage collaborations among different disciplines. It will be home to nine distinct research programs, two in basic science and seven in disease areas (See *Of Mice and Magnets*, p. 29). The basic science programs were selected to complement the clinical programs and to encourage research translating basic science discoveries into medical advances. “The building,” said Slayman, “is mapped out so that basic researchers are next door to clinical researchers. There will be hallway conversations, people going in and out of each other’s labs, sharing equipment, borrowing reagents. There will be an upsurge in communications that we expect will speed discovery.”

The new building will also allow clinical research to grow. Bender will direct a new Program in Vascular Disease and Cardiology. Investigators now scattered in laboratories in four different buildings will share a large common laboratory area. Sitting in his present Boyer Center laboratory, which opened just over a decade ago, Bender said, “I am currently in what is considered premier research space at Yale, with outstanding colleagues. I don’t need better, but the opportunity to bring together a group of investigators focused on cardiovascular disease is great. The daily interaction will be a huge advantage for everyone.” And, as space opens up in existing buildings after the move, other fruitful juxtapositions are being created in what is known around campus as the “backfill” process.

### Seven million pounds of steel

The basic science programs include a new Program in Human Genetics and Genomics, to be headed by Richard P. Lifton, M.D., PH.D., a Howard Hughes Medical Institute investigator and chair of genetics. Created to promote the use of genetic approaches in the study of human disease, this new program will sit on a middle floor to foster collaborations among scientists throughout the building. Under the direction of Richard A. Flavell, PH.D., the other basic science program—the Section of Immunobiology—expects its previous focus on the basic biology of the immune system to expand into disease-oriented studies in its new home. Interactions among colleagues working in rheumatology, pulmonary disease and infectious disease are expected to grow.

Magnetic resonance imaging of biological activity has become a front-line research method. Yale has pioneered work using the imaging technology to study diabetes and psychiatric and neurological disorders in children and adults. The Congress Avenue Building will house a greatly expanded MRRC serving the entire campus. Six of the multi-ton magnets now housed beneath Fitkin Memorial Pavilion will be rolled, craned and pulled to the new center, which sits beneath the new building’s courtyard. Three new imaging systems will be installed as well, including a 23-ton, 4-tesla human magnet, which arrived late one night last September from Germany, to great fanfare and fears for its safe passage over the last few, and most treacherous, feet to its new home.

Along with a rigging crew, security guards, the construction manager, a New Haven police officer and a crowd of curious, late-night onlookers, about 15 engineers and scientists from the lab and their spouses were on hand as the delicate magnet and its housing were hoisted off a flatbed truck by a seven-story crane and lifted over 50 feet into the air to clear electrical and telephone wires. After it was successfully lowered into the loading dock at midnight, those on hand toasted it with champagne. Over the next four hours, riggers inched the magnet down a 30-foot corridor and into its room in the MRRC. It had to be positioned in the room with an accuracy of better than 10 millimeters, or it could not be successfully used, according to Douglas L. Rothman, PH.D., director of the MRRC and an associate professor of diagnostic radiology. “They accomplished this feat,” he said, recalling the building of the ancient Egyptian pyramids, “using a panoply of wedges, ramps, skates, blocks and tackles, ropes and levers that would have made a Pharaoh proud.” (Plans call for the addition of a state-of-the-art, 11.7-tesla animal magnet and, funding permitting, a 7-tesla human magnet.)

The magnet’s destination was an iron and copper-lined room specially constructed for the purpose. Much of the design work was done by Terry Nixon, director of facilities at the MRRC. According to Nixon, even the slightest

## A building for the 22nd century

When the planners and architects set out to create the Congress Avenue Building, they needed to think 100 years ahead, since the expectation is that the new structure will still be around and contributing to medical science a century from now. That's hard to do when even a year can bring huge changes in science.

The building's architect, Robert Venturi, head of the Philadelphia firm Venturi, Scott Brown & Associates, said, "You're changing, always changing in science. We purposely designed it in the tradition of the general American loft

building, a simple form and space to make it as flexible as possible."

That flexibility had to take into consideration Yale's need for a major increase in research and educational space and the limits of the long narrow building site between Cedar and Howard streets. The result is two slender, elongated wings that extend two stories underground. The complex packs an enormous amount of space—nearly half-a-million square feet—into a single city block. While meeting space and programmatic needs, the new building needed to fit in with the largely Georgian, low-scale buildings along Congress Avenue. The three-story north wing com-

plements the other buildings and reduces the street-level impact of the six-story south wing behind it. Venturi said he chose a varied palette of colored and patterned brick and limestone above the new building's granite base to break up the surface rhythm of the structure's 700 huge windows, "so it would not appear so big and would seem more cheerful."

The entry to the building's lobby is a concave opening intended to correspond to the entrance to Sterling Hall of Medicine and is the only sculptural form in the structure. It opens into a three-story-high, sunlit atrium, the complex's centerpiece. A glassed-in skybridge passes overhead between

the wings and a large staircase leads out to the courtyard.

To ensure that the building will be around to contribute to science in the 22nd century, according to Reyhan T. Larimer, AIA, the Yale project manager in charge of the building's construction, "no expense was spared in making it watertight." A watertight membrane wraps the entire building. "Every piece of stone, every piece of material," she said, "was made to shed water and to make sure water will not go into the cavity of the building." A century from now, scientists and students should still be working comfortably in what is today's most advanced medical sciences facility.



MATT WARGO (2)

The Congress Avenue Building, seen from the south (above) and east. Altogether the structure packs 457,000 square feet into a single city block.

radio frequency in the environment creates background noise that washes out the signals picked up by the ultra-high-sensitivity imaging magnets. Containing the magnetic field—80,000 times stronger than the earth's—required building the MRRC rooms out of 11-inch-thick steel plates. Two million of the 7 million total pounds of steel in the new building are found in the MRRC's research floor. (The floor above brings together faculty members currently housed in disparate locations around campus.)

Reflecting the growing demand for imaging studies, new faculty are being recruited to the recently formed Section of Bioimaging Sciences, which united imaging research faculty within the Department of Diagnostic Radiology. The present yearlong waiting list for magnet time should all but disappear. The new magnets will also greatly enhance what those experiments can “see,” offering as much as a 16-fold increase in image resolution. “We’ll be able to move from imaging systems down to imaging actual biological processes,” said Rothman. “For instance, as opposed to saying a region of the brain is not functioning properly in neural imaging studies, we could say which specific neuronal circuit or neurochemical pathway within that region is not functioning.”

#### **A large space for small groups**

For years, students in first-year gross anatomy and histology courses have attended classes in overcrowded laboratories originally intended for 50 students and lacking modern air-removal and computer systems. Now, they will move to spacious, state-of-the-art laboratories. “It’s not just that it looks nice and doesn’t smell bad,” said Herbert S. Chase, M.D., professor of medicine and deputy dean for education. “There is a strong basic science component to our curriculum and an emphasis on dialogue. The Congress Avenue Building is symbolic. It represents Yale’s unified commitment to science, education and clinical medicine.” Students will also benefit from proximity to researchers. The classroom facilities in the north wing will bring students into everyday contact with research faculty. “Students will bump into somebody who just gave a lecture on the way to his or her lab,” said Chase. “That won’t be lost on the students. Rubbing shoulders with scientists will shape the way students think about the curriculum.”

During the past two years, the faculty has moved to structure the curriculum increasingly around small-group learning and use of technology. “We’ve cut out 25 percent of the time in the classroom in the past two years,” said Chase. “Students learn much faster, and small groups help students become independent thinkers. However, the lack of conference rooms with computer facilities has made it hard to switch.” The new facilities should speed the transition.

Chase believes that in the new building “the curriculum will be much more richly textured. We’ll move students

along more quickly in doing the same old activity of sitting in the room with the professor.” William B. Stewart, PH.D., chief of the Section of Anatomy and Experimental Surgery, believes that access to computers will greatly enhance students’ experiences in gross anatomy. Computers will be mounted above each dissection table. Teaching spaces will also have large screens and projectors as well as Internet connections at every work space. “Anatomy and the computer are a perfect marriage,” said Stewart. “Students will have the chance to feel the bile duct, look at an X-ray and look up information about it on the Web all at once.”

Moving the current anatomy program over to the new building presents a number of thorny issues. “We have a large number of specimens that we’re scratching our heads about,” said Stewart. “They’re unique and priceless.” Movers face the challenge of bringing them through the halls while ensuring minimal disruption of normal activity. Stewart is confident that “nearly everything will be able to go.”

Making sure that Stewart is correct is the responsibility of Freeman Enterprises, which has hired a moving firm experienced in handling complex hospital and laboratory moves. Tunis’ colleague Shellie Peck has been working on-site at Yale since January 2002 to inventory the contents of all the facilities to be moved and to plan the move sequence. She and the staff of the Office of Environmental Health and Safety have tagged every item according to a numerical and color coding system that indicates the type of handling it requires and the exact time and pathway for its move. Each tag also serves as the address to which every piece of equipment goes in the new building. “We have databases within databases that keep track of each item,” said Tunis. “We all identify a move with moving a household, but a lab move is very different. If something arrives at the wrong place, it can extinguish a lifetime of work.”

Inventorying contents was not the only job. Faculty members needed to be reassured that their laboratory property would be handled with appropriate care and understanding. “P.I.s [principal investigators] are possessive and rightfully so,” said Reyhan T. Larimer, AIA, the Congress Avenue Building project manager in the School of Medicine’s Project Management and Construction office. “You have to get their trust first.” Larimer has been working closely with Tunis, Peck and their 10-member team in preparing the new building for the move. The building was designed with generic laboratory space which will then be customized for the needs of the individual investigators as they move in. Everything in the Freeman Enterprises’ inventory had to be matched up with the new space into which each laboratory will move to make sure that all equipment would fit and have the proper plumbing, power, communications and air-handling systems available. Should a freezer or incubator arrive at a site that could not handle its needs, research could be interrupted, or worse.



Anatomy professor William Stewart stands in the education wing's dissection room, which will have Internet connections at every work space. "Anatomy and the computer are a perfect

marriage," says Stewart. "Students will have the chance to feel the bile duct, look at an X-ray and look up information about it on the Web all at once."



### Across the street and 1,840 miles away

Following Freeman Enterprises' detailed choreography, the giant dance of the move will proceed with a daily crew of 48 to 60 movers. Every carton or piece of equipment will be placed on dollies and either rolled into 26-foot trucks that will shuttle back and forth at the rate of three to five trips per hour or be pushed through the hallways. The farthest single push will be through more than 3,800 feet of hallway. The movers' feet may ache by the end. According to Freeman Enterprises' estimates, the movers will push the contents of the Yale laboratories more than 1,840 miles in total, the equivalent of walking from New Haven past Denver.

In some cases, the most direct route is not available because the hallways are used by medical center patients. Moreover, many items that might be moved more efficiently by truck cannot leave the interior of the medical school because of safety and health regulations. These include a variety of hazardous materials such as radioactive isotopes, contaminated equipment and so-called "select agents," biological materials such as certain highly toxic bacteria and infectious viruses strictly controlled by the federal government. Robert C. Klein, associate director of the Office of Environmental Health and Safety, has worked closely with faculty, Larimer and Freeman Enterprises to prepare for the move. He said, "You need to make sure the wrong things don't get moved and the right things aren't moved in the wrong way." He points out that the medical school routinely moves hazardous materials. "The hazard doesn't change [with a project this size]," he said, "just the volume." Most hazardous items will either be placed in special sealed carts designed to capture any inadvertent spill or leakage or be carried personally by Klein and his staff or laboratory staff.

Shortly before the movers arrive in Bender's laboratory, Klein and his staff will have decontaminated and sealed all the equipment that previously contained hazardous materials. The movers will move quickly through the laboratory, packing tagged items into cartons. Bender is confident about the move. "I'm not overwhelmed by the logistics," he said. "They will be surmountable with good organization." If all goes according to plan, his laboratory's contents will arrive at their new destination on schedule and intact. Despite the move's complexity, he anticipates losing no more than two days' research productivity. "Moves are always unsettling," he said, "but it's definitely worth it." Two days after Bender closes the door to his laboratory in the Boyer Center for the last time, he plans to walk into his new laboratory and start up exactly where he left off, alongside a host of new neighbors and colleagues. **YM**

Marc Wortman is a contributing editor of *Yale Medicine*. Frank Poole is a photographer based in New Haven. Daphne Geismar is a graphic designer based in New Haven.

### Of mice and magnets: what's inside the Congress Avenue Building

When admissions candidates toured the medical school in recent years, their student guides didn't go out of their way to show off Yale's overcrowded and poorly ventilated first-year gross anatomy and histology laboratories. That will be changing. "We will be putting the new building on the tour," said Associate Dean for Admissions Thomas L. Lentz, M.D. '64, professor and vice chair of cell biology. "Hopefully it will help in recruiting." A tour of the new building should also help attract the faculty who are expected to join the expanded research programs it will house.

What visitors to the north wing will find are **three floors of new teaching facilities**. The new anatomy and histology laboratories have been designed to improve interaction among students and faculty, with a U-shaped configuration replacing the traditional straight line of workbenches. The new building also provides computer network connections at every laboratory and seminar-room work space, as well as wall monitors and other audiovisual display systems. The small-group teaching focus at Yale will be enhanced by the six seminar rooms dispersed among the student laboratory spaces. A 152-seat auditorium adjacent to the large atrium lobby will bring students and faculty together for lectures and conferences.

Core research facilities serving the entire Yale campus fill a warehouse-sized space two floors below the lobby level. The **Animal Resources Center** will offer services for production of transgenic and gene-knockout mice, which are used as animal models in disease studies. On the two floors above, the Magnetic Resonance Research Center will serve investigators throughout Yale with nine powerful imaging magnets. Bioimaging faculty will have a large, open area for working together on advanced computational studies. Douglas L. Rothman, Ph.D., director of the center, notes one pleasant advantage for him in moving from the center's current home in the Fitkin Memorial

Pavilion basement: "It will be the first time I've had a window since 1985."

The six floors of the massive south wing will house nine research programs. The two basic science components, the **Section of Immunobiology**, chaired by Richard A. Flavell, Ph.D., and a new **Program in Human Genetics and Genomics**, directed by Richard P. Lifton, M.D., Ph.D., will be neighbors of seven clinical research programs. They are:

**Arthritis and Autoimmunity**, under the direction of Joseph E. Craft, M.D., HS '77, a group that has, among other accomplishments, developed new tools for early diagnosis of lupus and is testing second-generation vaccines for Lyme disease;

**Asthma and Lung Diseases**, which is directed by Jack A. Elias, M.D., and has recently been credited with identifying two genes that cause pulmonary emphysema;

**Diabetes and Bone Diseases**, composed of three groups, one working on the causes of type I diabetes and led by Robert S. Sherwin, M.D., a second, directed by Gerald I. Shulman, M.D., Ph.D., focusing on understanding the molecular basis of insulin resistance in patients with type II diabetes, and a third group looking at bone development, under the leadership of Arthur E. Broadus, M.D., Ph.D.;

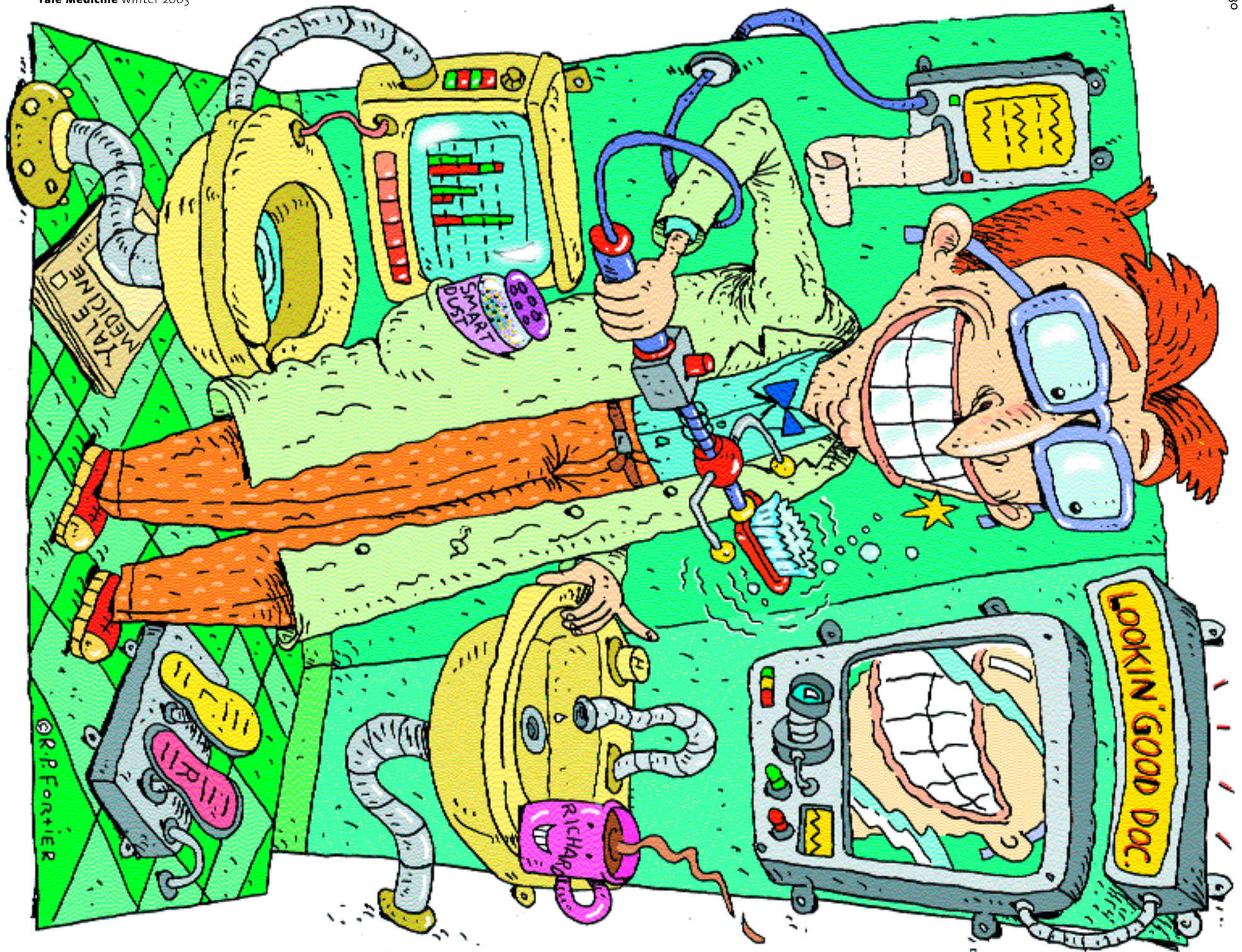
**Digestive Diseases**, directed by Henry J. Binder, M.D., recently won an NIH core grant to support its wide-ranging studies of the gastrointestinal tract and liver;

**Hypertension and Kidney Failure**, which studies the causes of diseases that affect 50 million Americans, under the leadership of Peter S. Aronson, M.D., and in close collaboration with Lifton;

**Infectious Diseases**, led by Keith A. Joiner, M.D., focuses on how parasites live in their host cells in the hopes of developing drugs to kill the pathogens causing such widespread diseases as malaria and toxoplasmosis; and

**Vascular Disease and Cardiology**, headed by Jeffrey R. Bender, M.D., HS '83, will bring together previously scattered researchers working on the genetics of heart disease, the leading cause of death in the United States.







## A futurist's view

**With smart dust, surgical robots, transgenic replacement organs and a 150-year life span now conceivable, Richard Satava says now is the time to face the ethical challenges that technology will bring to medicine.**

Every few months Richard M. Satava, M.D., visits colleagues at a lab at MIT where there's a coffee cup with his name on it. The cup also has embedded in it something called "smart dust," an electronic medium so small that it is barely noticeable as it receives and transmits information. When Satava places his cup in a coffee machine at the lab, the cup's smart dust tells the machine's smart dust how he likes his coffee, right down to the cream and sugar.

For Satava, a faculty member in the Department of Surgery from 1998 until last July, when he moved to the University of Washington, this smart dust has implications and applications far beyond the frivolity of getting his coffee right. [Satava came to Yale from DARPA, the Defense Advanced Research Projects Agency, which was established in 1958 in response to the Soviet Union's launching of Sputnik.] It is one of many technologies that offer the promise of longer, healthier lives. These technologies sit on the cusp of biology, engineering, nanotechnology and other sciences. They will revolutionize, he believes, not only medicine but also society. Some of these technologies are already in use; others soon will be. Society's task is not only to understand how to harness them but also to address how they will change what it means to be human.

Associate Editor John Curtis met with Satava before his departure last summer for Seattle to discuss the "biointelligence age" and its implications.



**You have described modern society as having entered “the biointelligence age.” What does this mean?**

The biointelligence age is marked by the intersection of technologies to do things you can't do with a

single technology. It has become obvious that one of the most important things about the future of science and research is that the major disruptive technologies that are going forward are going to be coming from interdisciplinary research.

#### **What are disruptive technologies?**

Mobile communication is an example. We've gone from a telephone to a cell phone, and we've gone from dumb stuff to smart stuff. It may be in the not-too-distant future that there won't be any phones in any homes. Why do you need a phone at home if you've got one on your watch everywhere you go?

And so what used to be only a scientific research tool, as you saw with the Internet, became something that intruded in virtually every person's life. That's a disruptive change. Those technologies that are disruptive are no longer coming out of information or engineering alone, but from the intersection of two technologies. And you have enormous potential: disruptive technologies will displace other previously successful technologies. So that's the origin of the biointelligence age.

We had the agricultural age, the industrial age and the information age. If we look at our technologies, what we're seeing is that they're getting smaller and smaller in scale. And they're becoming smarter and smarter. So things like microsensors are going to be virtually everywhere. They're like a smart bar code. They interact, you can program them and they can tell you about themselves without having to be scanned.

#### **Where would these microsensors be?**

Virtually everywhere. This was coming out of Xerox Park Research Lab and the University of California, Berkeley, under the program Smart Dust. These particles are so tiny—they're the size of the head of a pin or smaller—but they're entire intelligence systems that have sensors on them that can sense the environment and store information. You can't see them without a microscope; that's why they're called dust.

## **“The robot is not a machine. The robot is an information system.”**

They communicate with each other. So the environment is going to be smart instead of dumb. They're going to be in the food you eat, the clothes you wear, embedded in your body, absolutely everywhere. For example, when you came into this room, this desk would know it was you and rearrange itself for you.

Have you been able to buy anything lately that doesn't have a bar code on it? Probably not. But it's dumb. In the future, it will be smart. You plant the field and you spray it with the fertilizers and insecticides and smart dust—maybe a thousand different sensors per millimeter—and as the food comes up the smart dust gets incorporated into the plants. And the plants talk to the harvester: “Pick me. I'm ready. Don't pick me. I'm not ready.” It goes into the store. You've got a little handheld and you talk to the artichokes. “How ripe are you? How much do you weigh?” A world that used to be dumb and unconnected now gets connected, and that information gets shared.

#### **How is this going to be applied to medicine?**

We will have sensors throughout our bodies. So, as doctors, we'll be able to continuously monitor the health of individuals.

At DARPA we came up with something that got called the millennium toilet. The only place that we could monitor somebody and give a physical examination every single day would be in the bathroom. Everybody has to do their morning hygiene. What today is a dumb bathroom would become a smart one. When you brush your teeth, your toothbrush takes your blood pressure and looks for cavities. When you look in the mirror there is a little camera that looks at your eyes to check your diabetes or hardening of the arteries or any of the thousands of diseases that we can pick up by looking at your eyes. When you go to the toilet, it would check what's in there. If, for example, Grandma was supposed to be taking her digitalis and she's got Alzheimer's disease and can't remember, the toilet would know. Because there is supposed to be a certain level of the byproduct, and if it's not there that means she didn't take her medicine. So she can be reminded. So we would postulate that in the future we would be able to make the room a smart room and it would actually be kind of an aid for you.

#### **How do you envision technology affecting surgery?**

Eventually the majority of surgery will be done by computers, but we're talking a minimum of 50 to 100 years from now. You can do a total body scan of the patient; this is called the holographic medical electronic representation, or HOMER. You can

plan the operation on the HOMER. You'll have the opportunity to do it on the computer two or three different times and edit them together and get the perfect operation. And when you have got the perfect operation, the robot will do it faster, quicker, more efficiently and more precisely than you could. It's possible that you could just send the operation file somewhere, to India, and let the robot in India do it. You don't have to be there once you've programmed it exactly to the patient's specifications.

The robots, I think, have turned out to be the key, one of the major innovating components of the future of surgery. The important issue here is that the robot is not a machine. The robot is an information system. It sends bits and bytes back and forth and works in the information world. Most of the people I have talked to are thinking of them as nothing more than extensions of your arm. And that unfortunately is a very narrow vision of what they are.

You can give the surgeon X-ray vision because you can overlay where the blood vessels are inside of the organ. When you look at the liver, you can see all the bile ducts and all the arteries and the veins, which aren't visible to the naked eye. And then you can use that same data afterwards, when they finish the operation. And so we will know exactly what you have done with your surgery and how good your outcomes are. In addition to that, taking the analogy of the aviation industry, the robot is also a recorder. Every time I make a motion, it sends a signal to the arm to move in a specific way. All you do is tap into that and send it to the black box behind the surgeon. It's just like the black box behind the pilot when he flies the airplane. So we will have continuous recording and we'll be able to use that system to monitor how good the surgeon actually is. And this will help surgeons to improve the quality of their surgery.

**A few years ago you were testing "smart shirts" on climbers on Mt. Everest. These shirts could monitor vital signs and transmit them to base camp. Where does that technology stand now?** About 18 months ago a company was set up for this, and this spring they're supposed to come out with the first commercial version that anybody can buy. And by that I mean you or your doctor can go to the store and order one of these shirts and you put it on, and it will begin taking your vital signs.

#### **How much will they cost?**

The probable production cost is somewhere between \$50 and \$75, so you should be able to buy the shirt for \$100 or \$200.

Not very expensive. And it's washable, you can use it for a long period of time and then you connect it to a little transmitter that sends the information on for analysis.

#### **Who would want to wear one of these?**

Oh, there are many, many people, whether they be the people who have a chronic disease like asthma, congestive heart failure or heart arrhythmia. There is a whole host of people that you can monitor various vital signs on. I think it would be super to put them on every high school or college athlete and be able to see how well they're performing. Every year we lose half a dozen young strong kids playing sports because they had some kind of unknown abnormality. And these can pick them up. There is a whole slew of different diseases that we know about that if we would screen for them we could prevent these deaths.

#### **Any technology has potential for misuse as well. Can you protect the confidentiality of the massive amounts of medical information that would be gathered and stored electronically?**

I always tell this little story and it has to do with the security of the medical record. When I was in the military in California, we were able to arrange it so that the people would come to their family practitioners in the morning. If they had something wrong and needed a surgeon, we'd see them that same afternoon. And so what would happen is they would have seen the doctor in the morning and then gone shopping or gotten lunch





or something, and they'd come back and see us. And every Saturday from the grocery, from the commissary over at the PX, from the department store, they would come with shopping carts full of medical records that people had left sitting on the checkout counter. Now I ask you, is electronic security better than people bringing back shopping baskets full of these medical records? It's not an issue really of whether or not it's secure. It's clearly, in my view, much more secure than anything we have today. But it's not perfect, and yet 95 percent of security breaches are from people on the inside misusing legitimate access to the information. The hackers that you read about in the newspaper account for less than 5 percent of all the losses of security of information. It's not a technical issue. Security is absolutely a regulatory issue or a human behavioral issue.

#### What ethical issues do these new technologies pose?

The ethical issues that the new technologies are raising are far beyond anything that most people are addressing at this time. Security of medical records pales in comparison to the implications of the new technologies that are coming. Human cloning is one of them. There will be a human clone in 12 months. End of story. There is no question about that. And the reason is that there are two very reputable, very talented scientific groups offshore that have decided for reasons of their own that it is ethical to clone a human being. One of the groups has 200 families that have tried every single known method of creating their own child and have not been able to. Should we deny these families the opportunity to have children if we have the technology to give it to them? I don't know. On the other hand we don't want a version of *Brave New World*, where the gammas do all the physical work and the betas do all the clerical work and the alphas do all the management.

And that's brought to the forefront that there are many technologies that are accelerating so rapidly and we have not even looked at the potential behind them. When they come on the scene, we're going to be completely unprepared.

We need to look at a number of the issues in advanced technologies, no matter how hypothetical. There is research on apoptosis and telomerase, which we believe are the keys to longevity. There is no known human that has ever lived more than 120 years that's been documented scientifically.

Now you can control when a cell lives or dies, and you can make them live longer. They have allowed some rats to live the equivalent of three to five life spans. That is similar to

## “If I am all pieces of metal and artificial organs, am I still human?”

living 360 years instead of a maximum possible 120. What happens if we just double a human's average life span so everybody now lives 150 years? What is the implication of that? Am I going to have one career for 130 years or 150 years? When do I retire? Do I ever? How do we feed all the additional people? We are on the threshold right now. Who is looking at the implications of longevity?

A number of researchers are looking at salamanders and flat worms and beginning to find genes for regeneration. In these animals, if you cut off a leg they will grow a new one. Scientists at MIT and Massachusetts General Hospital have been growing synthetic organs made with stem cells and a vascular substrate. We now have a world with synthetic organs. What does that mean? It means a lot of things. Transplant is not going to be a problem. More important for me as a surgeon, right now I know about 20 different operations I do for different stomach problems. If you have an ulcer I do this procedure, if you have a cancer I do another procedure, if you're bleeding I do still a different procedure. In the future, if you have something wrong with your stomach, regardless of what the problem is, the stomach will be removed and replaced with one grown with your own stem cells. And, since I will do the same operation over and over, instead of many different ones, it will be possible for me to perfect the technique to provide you with a much better outcome.

Why should I repair an organ? The only reason for repairing now is that we cannot replace entire organs on everyone every time. What we will have in the not-too-distant future, approximately 10 to 20 years from now, is patients will have all these replaceable parts.

This prompts a very fundamental ethical question: what does it mean to be human? If I am all pieces of metal and artificial organs, am I still human?

This is just one of the many enormous ethical problems that technology is going to put on our plate. And the challenge is, are we courageous enough at this time to face them, or are we just going to scorn them out of ignorance? People say, “Well, that just cannot happen—that's just *Star Trek*.” And then Dolly appears on the scene and we're unprepared for the question of human cloning. So I think we have had a warning, and it's time to look at these technologies and say, “Yes, they sound futuristic, but since we can't predict the future, it is incumbent upon us to look at them and be more prepared than we have been in the past.” YM

**CLOCKWISE FROM TOP RIGHT**  
 1) Edmund Crelin, professor emeritus of surgery, and student Harsimran Singh listen to remarks by Deputy Dean Herbert Chase at a reception for the founding members of the Society of Disting-

uished Teachers in September.  
 2) Nancy Angoff, associate dean for student affairs, with student Michael Shapiro, who portrayed her in his class's second-year show last year. 3) Ralph Horwitz, chair of medicine, Marie Egan,

associate professor of pediatrics, and Michele Barry, professor of medicine and public health.  
 4) Society members Leo Cooney Jr., professor of geriatric medicine, and Lynn Tanoue, associate professor of medicine.

**Distinguished company**

Founding members of the new Society of Distinguished Teachers gathered for a reception on September 24 in the Beaumont Room. More than 60 members attended, all recipients of major teaching honors such as the Bohmfalk Prize, the Francis Gilman Blake Award, the Leah M. Lowenstein Prize, the Healthcare Foundation of New Jersey Humanism in Medicine Faculty Award and the Betsy Winters House Staff Award. Society members are expected to participate in curriculum discussions, advise junior faculty and mentor students. The society was formed to identify and reward outstanding teachers in an era of increasing demands on the time of both clinicians and basic scientists. The society will create term-limited chairs in medical education, with financial support. The society will also develop educational leaders to foster innovation in the curriculum. Members of the society will be asked to help raise funds for these initiatives.



ERIC KANE (4)

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## Neurobiologist named university provost

Susan Hockfield, a basic scientist and a dean, becomes first medical school faculty member to hold post.

In another era, the appointment of **Susan Hockfield**, PH.D., as provost might have been remarkable because of her gender. But since the 1970s, three other women—Hannah H. Gray, Judith Rodin and Alison F. Richard—have held Yale's top academic post.

"What is perhaps more unusual in my appointment as provost at Yale is that I'm a scientist," Hockfield, the William Edward Gilbert Professor of Neurobiology, said in December. Hockfield, who was appointed dean of the Graduate School of Arts and Sciences in 1998 and reappointed last fall to that post by President Richard C. Levin, is the first medical school faculty member to hold either position.

In her new job, she is the university's chief educational and administrative officer, overseeing academic policies and activities throughout the university. All deans report to her, and she has institutional responsibility for the allocation of resources, chairing the university's budget committee.

In an interview, Hockfield said she is excited by the opportunity to serve during "a terrific new era for Yale" in which the university is focusing on science and engineering, internationalism, the rebuilding of the campus and, most recently, review of the Yale College curriculum. "The university is more unified and the campuses really talk to one another," Hockfield said. And compared to a decade ago, a time when the physical plant had declined drastically, its buildings and grounds are in great shape. "Yale is now in a fabulous period of renewal. Who would have guessed that a 300-year-old university could turn as sharply and move as quickly?"

Hockfield, who joined the Yale faculty in 1985, has retained her laboratory on the third floor of Sterling Hall of Medicine while serving as graduate school dean. She directs a program of research focusing on the development of the mammalian brain, with a special interest in the progression of brain tumors, especially gliomas. She is the author of more than 90 scientific papers and is primary author of the text *Molecular Probes of the Nervous System: Selected Methods for Antibody and Nucleic Acid Probes*. She hopes to continue her scientific work while serving as provost but doesn't yet know to what extent that will be possible. Her focus is on the work ahead.

"I have said that being graduate school dean is the best job in the university, because of the breadth and diversity of the academic activities of the graduate school," she said. "But the provost engages an even larger array."

Hockfield succeeds Alison Richard, an anthropologist who has been named vice-chancellor of Cambridge University in the United Kingdom. President Levin announced in January that Hockfield will be succeeded as graduate school dean by **Peter Salovey**, PH.D., chair of the Department of Psychology and deputy director of the Center for Interdisciplinary Research on AIDS, based at the School of Public Health.



Yale President Richard C. Levin applauds after announcing the appointment of Susan Hockfield, right, as provost in mid-December.

## Three professors, authorities in genetics and immunology, receive Sterling honor

Three faculty members at the School of Medicine have been named to Sterling chairs, one of the university's highest tributes.

**Richard A. Flavell**, PH.D., known for his pioneering research on gene structure and critical genes of the immune system, has been appointed Sterling Professor of Immunology. **Richard P. Lifton**, M.D., PH.D., the newly designated Sterling Professor of Genetics, has identified genes that can make people susceptible to cardiovascular disease, renal disease and osteoporosis. **Ira Mellman**, PH.D., the new Sterling Professor of Cell Biology, is studying how individual cells organize their internal components to accomplish higher-order functions relevant to cancer and the body's natural immunity to cancer.

Flavell's laboratory is trying to understand how the immune system recognizes and responds to infectious agents and why it sometimes attacks the body's own cells. Since 1988, Flavell has served as chair of the Section of Immunobiology at the School

of Medicine and as a Howard Hughes Medical Institute (HHMI) investigator.

Lifton received the 2002 Basic Research Prize from the American Heart Association for his discovery of mutations that cause hypertension and low blood pressure, findings that have established the central role of the kidney in blood pressure regulation and allowed Lifton and colleagues to identify new therapeutic targets. He is chair of the Department of Genetics and has been an HHMI investigator since 1994.

Mellman is exploring fundamental questions of membrane traffic—how molecules find each other and their intended sites of residence inside cells. His research team has focused on two areas: identifying the molecular mechanisms responsible for directing membrane components to their correct locations in epithelial cells, neurons and lymphocytes; and determining how the immune system processes antigens, agents that induce the formation of protective responses to foreign invaders as well as to cancer cells. A member of the Ludwig Institute for Cancer Research since 1999, Mellman chairs the Department of Cell Biology at Yale.



Richard Flavell



Richard Lifton



Ira Mellman



**Elizabeth H. Bradley, M.B.A.,**

PH.D. '97, associate professor of epidemiology and public health, left, and

**Barbara I.**

**Kazmierczak, M.S., M.D., PH.D.,** assistant professor of medicine and microbial pathogenesis, were recipients of the 2002 Donaghue Investigator Program Awards for Health-Related Research. The awards, announced in October by the Patrick and Catherine Weldon Donaghue Medical Research Foundation, provide grants of \$100,000 a year for five years to prepare medical researchers for an independent research career and for leadership in research to benefit human life. Bradley's research objective over the five-year period is to examine why clinical care often deviates from clinical guidelines that are widely supported by scientific evidence. She is the first recipient from Yale's School of Public Health. Kazmierczak is interested in determining how the lung defends itself against microbial pathogens and hopes to develop a better understanding of how epithelial cells contribute to innate and acquired immunity to reduce the risk of opportunistic infections.

**John A. Elefteriades, M.D. '76, HS**

'83, professor and chief of cardiothoracic surgery, has received several honors this year, including

appointment to the editorial board of the *American Journal of Cardiology*, election to a three-year term on the American College of Cardiology Board of Governor's Steering Committee and appointment as secretary

of the International College of Angiology for a two-year term. Elefteriades also delivered the annual Stanley K. Brockman Visiting Lecture at MCP Hahnemann University School of Medicine in June.

**Robert H. Gifford, M.D., HS '67,**

professor emeritus of medicine, was honored in May upon his "second" retirement, after two

years of teaching science to the students of Sacred Heart/St. Peter's School. A benefit to honor Gifford raised \$25,000 for scholarships. Faculty at the school also created the Robert H. Gifford Science Award, which will be given annually to an outstanding science student.

Gifford brought the first science curriculum to the parochial school after he retired from Yale in 2000 as the medical school's deputy dean for education. The addition of the science program has allowed the students to gain an appreciation for how scientists collect information and the importance of paying attention to detail.

**R. Lawrence Moss, M.D.,** associate

professor of surgery and a recent addition to the School of Medicine faculty, has joined the

staff at the Yale-New Haven Children's Hospital as surgeon-in-chief. He is known for his leadership in clinical research in children's surgery and the development of evidence-based surgery. Moss is spearheading a clinical trial in 12 centers across the country to investigate different ways of treating premature newborns who suffer from necrotizing enterocolitis, a severe inflammatory disorder of the intestines.

**Frederick Naftolin, M.D., D.PHIL.,**

professor of obstetrics and gynecology and professor of molecular, cellular and develop-

mental biology, received the Arnaldo Bruno International Prize for Gynecology from the National Academy of Italy. The prize was presented in June by the president of the academy. Also present at the award ceremony was the president of the Republic of Italy. Naftolin, honored for his "superior scientific activity," has spent more than three decades studying the metabolism and action of ovarian steroid hormones, particularly estrogen and its congeners.

**Pasko Rakic, M.D., PH.D.,** chair

and professor of neurobiology and the Dorys McConnell Duberg Professor of Neuroscience

received the 15th annual Bristol-Myers Award for Distinguished Achievement in Neuroscience Research for his discovery of the principles and molecular mechanisms of neuronal migration. He was awarded \$50,000 and a commemorative medallion. The latest research from Rakic's laboratory indicates that genes associated with neuronal stem cell differentiation in early development also have a role in maintaining neuronal structure and their connections in the adult brain, thereby participating in the origin of neurodegenerative diseases.



**Alan C. Sartorelli, PH.D.,** the Alfred Gilman Professor of Pharmacology, and **Elias Lolis, PH.D.,** associate professor of pharmacology, were among the recipients of the 2002 Glaxo-SmithKline Drug Discovery and Development Award announced in October. Six researchers will split a \$500,000 unrestricted research award to support development of HIV/AIDS therapeutics. Sartorelli will receive \$100,000 for his research, which focuses on making certain enzyme inhibitors work more effectively. Lolis is attempting to counter the likely side effects of some of the experimental entry inhibitor drugs.

**Douglas W. Vaughn, M.D., D.D.S.,**

assistant professor of anesthesiology, has been appointed medical director of

perioperative services at Yale-New Haven Hospital, where he served as clinical director for the Department of Anesthesiology. In his new position, Vaughn will work to streamline operations, improve operating room efficiency and continue excellence in patient care and safety.

**SEND FACULTY NEWS TO**

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## With diverse roots and much in common, Class of 2006 is welcomed to Yale

As with many of the classes that have come before, the Class of 2006 is a group of individuals with strong similarities and equally striking differences. About half the students attended Ivy League colleges, yet not all came to Yale straight from their undergraduate studies. Among the new students are a jet fighter pilot and a 40-year-old grandmother (See *Long Road to Cedar Street*, p. 16). Also in the group are a record-breaking equestrian, a juggler who demonstrated his skills at a lunch for the new class, and students who organized programs or businesses that developed patient information software, published books and taught self-defense to women and teenage girls. The class includes students born in Saudi Arabia, Nigeria, Vietnam, Cuba, Austria, China, Norway, the United Kingdom and Canada and students fluent in a variety of languages including French, German, Yiddish, Hebrew, Chinese and Japanese.

On the afternoon of August 27, these 55 women and 45 men gathered under a tent on Harkness Lawn for a ceremony that both unites them in a calling and symbolizes their profession. “Donning a white coat marks a rite of passage,” said Charles J. Lockwood, M.D., FW ’89, the new chair of obstetrics and gynecology, and keynote speaker at the White Jacket

Ceremony. “A white coat is a potent and durable symbol of medicine’s rich past and exciting future.”

Tracing the history of medicine in the United States, Lockwood noted that many teaching techniques of the 19th century are still in vogue, as are humanism and a reverence for life. “What has changed is the quality and quantity of material that must be taught,” he said, recalling his first day as a medical student 25 years ago. “My dean told us that over the next four years we would double our vocabulary.” He became a physician before personal computers, before AIDS, before PET scans and before FedEx could deliver specimens overnight. “Indeed, the structure of DNA had only been discovered 25 years before. What occurred over the next 25 years is too amazing to contemplate.”

Dean David A. Kessler, M.D., closed the ceremony by asking for a promise from the new students. “Becoming a doctor is a privilege,” he said. “In exchange for that privilege I want you to change the world. I want you to do some good. The request I have of you is for the rest of your life.”

—John Curtis



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**FROM TOP 1)** Nana Akua Asafu-Agyei and Calvin Barnes wait to don their white jackets during the ceremony on Harkness Lawn in late August. **2)** Michael Reel was joined at the ceremony by his wife Susan and their one-year-old daughter, Julia. **3)** Kendra Klang received her white jacket from Dean David Kessler. **4)** Among the more than 40 alumni who attended the ceremony was Lycurgus Davey, who received his medical degree in 1943.

TERRY DAGRADI (4)



JOHN CURTIS

Physician Associate Program graduates Kristen Cushing and Christine Ho wait for the procession in Harkness Auditorium to begin.

### Be true to yourself, your education and your profession, PA grads urged

In her Commencement address, Ina Cushman, PA-C '86, president of the American Academy of Physician Assistants, urged the graduates in the Physician Associate Class of 2002 to hold three values dear: "Be true to yourself. Be true to your profession. Be true to your education," she said. "These three pieces add up to a whole and complete life.

"Do not lose sight of who you are and where you came from," she continued. "Do not lose sight of what is important in your life. Take time to think about your family, friends and colleagues. Actively seek balance in

your life. There is a time for work and a time for play."

William R. Miller, PA '02, president of the Class of 2002, noted that because of the small class size—about 35 students—and the intensity of the concentrated 25-month curriculum, physician associates tend to form close friendships. "Everyone is an integral part of the group," he said in remarks at graduation in September. "You don't get to pick and choose who you talk to. You have to deal with everyone." The group included, according to Miller, "a devout Muslim from Virginia ... a former engineer ... a frat boy from Connecticut ... a French Canadian with a black belt in aikido ... a hyper, 30-something surfer dude ... and a nomadic 40-something from everywhere with a zest for life."

—John Curtis

### Surgery program sails forward

Last February, the Accreditation Council for Graduate Medical Education (ACGME) threatened to withdraw approval of Yale's general surgery residency program because of its 100-hour work weeks and every-other-night call schedule. After steps were taken to reduce hours [Summer 2002, "Surgical Residency Revamped" p. 7], the ACGME announced in October that the program would continue without interruption. "We are very pleased, and we are moving along," said Director John H. Seashore, M.D. '65, HS '70, professor of pediatric surgery. The program now limits residents' work weeks to 80 hours, cuts back the number of days they are on call and has added 12 physician associates and other staff to extend coverage.

Seashore said residents have traditionally worked long hours, often doing administrative work or patient transport, tasks that can be performed by others. The ACGME's action, he said, prodded the medical school and Yale-New Haven Hospital to address a longstanding imbalance between education and service. "In some ways they are the ammunition that forces the institution to say 'We've got to expend the resources to fix this,'" Seashore said. "In two years they will revisit us and there is no question in my mind that we will get full accreditation at that time." The surgery program had held provisional status since merging with several other residency programs in 1995 and, under ACGME rules, had to be considered a new entity.

—John Curtis



## Gut feeling

Gastroenterologist Juanita Merchant followed her intuition to a new view of how the stomach deals with acid.

By Nancy Ross-Flanigan  
Photographs by George Waldman

Temperatures hit the 100-degree mark and just kept climbing on the summer day when Juanita Merchant tackled Lava, the most challenging rapid on her 8-day rafting trip through the Grand Canyon in 1993. Only the occasional splash of chilly river water offered relief as her oar dipped in and out of the churning froth. But the heat was hardly her main concern. Stroking in synchrony with her raftmates, Merchant could only hope that they would slide into Lava at precisely the proper point and paddle at just the right moment to avoid crashing into boulders or flipping over. There was no turning back, no second-guessing. It was a matter of trusting their instincts, believing that the river would eventually smooth out and take them where they wanted to go.

Trusting one's instincts is as important in research as in roiling rapids, says Merchant, a 1984 graduate of Yale's M.D./PH.D. program who is now an associate professor at the University of Michigan. Her recent work on stomach ulcers is a case in point. Ultimately, she and her co-workers showed last year that suppressing stomach acid with prescription drugs called proton pump inhibitors can allow bacteria to flourish, triggering inflammation and ulcers that may lead to cancer. But before they could reach that conclusion, the scientists had to rethink

almost everything they had been taught about stomach acid secretion, and to trust clinical observations and experimental results that seemed to fly in the face of conventional wisdom.

The standard textbook explanation of how acid secretion is regulated revolves around the hormone gastrin, which is produced by specialized cells in the stomach when acid levels are low. Gastrin acts on acid-secreting cells to induce and maintain the proper level of acidity; then a feedback mechanism turns off further gastrin production and acid secretion. But this time-honored view doesn't square with what Merchant and other gastroenterologists see in patients infected with *Helicobacter pylori*, the bacterium implicated in ulcers. Somehow, *Helicobacter* thwarts the feedback response, and the stomach just keeps pumping out acid, which eventually leads to ulcers. To better understand the process, Merchant's research team developed a strain of mice that couldn't produce gastrin. The plan was to infect these mice with *Helicobacter* and see if they would still develop inflammation and ulcers. The researchers ran into a snag that again challenged their assumptions: mysteriously, infecting the mice with *Helicobacter* was virtually impossible, and yet the uninfected animals were showing signs of inflammation, just as if they had bacteria in their guts.

"We could have just said, 'Well, this isn't working, so let's chuck this model and move on to something else,'" says Merchant. "But I knew we had technically executed this experiment correctly, so I reasoned that the data must be telling us something. I always tell my postdocs that it's almost like there's a secret door waiting to be uncov-



Juanita Merchant says the mentoring she received as a student in Yale's M.D./PH.D. program exerted an important influence on her career. She now fills the same role for students at the University of Michigan, where she is an asso-

ciate professor. "We have little training sessions: How do you write an abstract? How do you present a 10-minute talk? ... I could just hand them a stack of examples, but it's not the same as having me sit next to them explaining how to do it."

ered. If you sit down and really organize your data and look at it without tunnel vision, without being bound by assumptions, you'll find a way to move through that door."

By scrutinizing their data and carefully performing a series of experiments, the researchers figured out that low acid levels in the gastrin-deficient mice had allowed a variety of other bacteria to flourish in their stomachs, preventing *Helicobacter* from gaining a foothold. But far from protecting against the effects of *Helicobacter*, these other bacteria, such as *Staphylococcus* and *Pseudomonas*, were themselves triggering inflammation.

"It seems that the stomach is almost like a rheostat, with acid levels controlling which organisms end up growing there," says Merchant. *Helicobacter* thrives when acid levels are high; when levels drop, other bacteria take over. The finding that these other bacteria can stir up their share of trouble overthrows the notion that *Helicobacter* is the only bug behind the kind of chronic stomach inflammation that can lead to cancer.

But the implications of Merchant's research don't end there. If low acid levels allow bacteria to run rampant, what does that mean for the millions of Americans who seek relief from heartburn and ulcers by gulping down acid-controlling pills every day? Merchant can't say for sure, but another set of experiments in mice suggests that long-term use of such drugs may do more harm than good. In these experiments, Merchant and colleagues at the University of Michigan treated normal mice for two months with a proton pump inhibitor, a type of drug that blocks acid secretion (Prilosec and Prevacid are examples). Sure enough, the mice developed inflammation that subsided only when the bur-

geoning bacteria were controlled with antibiotics. Merchant isn't telling patients to dump their pills, but she cautions against taking high doses over years or decades.

She plans to follow up the findings with studies of patients. "Mice obviously can't tell you when something hurts or feels better," says Merchant, a former Howard Hughes Medical Institute investigator who sees patients on rotation as an attending physician in the U-M Health System. "So we really need to correlate the inflammatory changes due to these other bacteria to symptoms that patients have."

Though she never set out to overturn the view that *Helicobacter* is the sole culprit in ulcers or to question the use of popular acid-reducing drugs, once the results were published—in the January 2002 issues of *Gastroenterology* and the *American Journal of Physiology/Gastrointestinal and Liver Physiology*—Merchant felt prepared to stand behind her conclusions. She had braced herself for criticism, but says that so far it hasn't come. In fact, in an article in the April *American Society for Microbiology News*, Martin J. Blaser, M.D., whose earlier work uncovered the *Helicobacter*-ulcer connection, agreed that getting rid of *Helicobacter* can allow other bacteria to colonize, with potentially harmful results. And in a commentary in the November 2002 issue of *Gastroenterology*, the journal of the American Gastroenterological Association, Richard M. Peek Jr., M.D., concurred with Merchant's hypothesis that other bacteria can induce and perpetuate the inflammation.

Even if peers had been critical, Merchant probably wouldn't have wavered. Wavering just isn't in her makeup. That confidence comes in part from her scientific and medical training, she says, but also from earlier influences.



"My mother was a teacher, and she raised my brother and me by herself," she explains. "My father left when I was in fourth grade, and seeing my mother struggle at such a young age made a lasting impression. She also instilled in us the importance of getting an education and not letting anything deter us." That resolve, in turn, traces back to Merchant's mother's childhood on a small farm in Oklahoma, where *her* mother was determined to help the family get ahead. "It was a family of 13, and everyone was expected to work on the farm," says Merchant, 46, who now has a daughter of her own, 3-year-old Olivia. "I remember my mother telling me that her mother used to take her place in the field so that she could go to school."

Determination does run deep in Merchant's lineage, but she would be the first to acknowledge that sheer will and ability aren't always enough. Sometimes you need an expert guide to show you the way, she says, again drawing parallels between whitewater rafting and negotiating the career challenges of a physician-scientist.

"As a novice rafter, there were times when my well-being was completely dependent on the skill of the guide calling out orders from the rear of the raft," she recalls. Similarly, she would have been adrift without mentors who guided her, from her undergraduate days at Stanford through her time at Yale, where she studied with Russell Barnett, to her faculty position at Michigan. It was in Barnett's lab that she learned "how to think about science" while working on membrane biogenesis in the duck salt gland. Her very first mentor as a sophomore Stanford pre-med student was Renu A. Heller, PH.D. '69, who suggested she obtain both a doctorate and a medical degree at Yale. She's also grateful to her first clinical mentor, Rosemarie L. Fisher, M.D., FW '75, professor of medicine at Yale, who helped her stay focused on her goals and showed by example that a woman could succeed in a male-dominated subspecialty. Now in the mentor's role, Merchant is the one at the rear of the raft, offering guidance to her students and postdocs. It's not enough simply to expect them to follow her lead, she believes. To make sure they're adequately equipped for their future careers, she meets with each person in her lab individually. "We have little training sessions: How do you write an abstract? How do you present a 10-minute talk? How do you present an hour-long talk? How do you write a five-page grant? How do you write a 10-page grant? I could just hand them a stack of examples, but it's not the same as having me sit next to them explaining how to do it." But unlike the whitewater guide, you won't hear Merchant barking orders.

"I believe," she says, "in a gentler approach to bringing people along."

Nancy Ross-Flanigan is a freelance writer in Belleville, Mich., and a former science writer for the *Detroit Free Press*. George Waldman is a photographer based in Detroit.

## For Nobelist educated at Yale, "It's like winning the lottery"

Almost a century after mass spectrometry was first used to analyze small molecules, a Yale doctoral alumnus and former professor has shared in the 2002 Nobel Prize in Chemistry for his pioneering efforts to apply the technique to large molecules, such as proteins.



His discovery, electrospray ionization (ESI), allows scientists to gauge the weight of large molecules and determine quickly and accurately what proteins are in a sample. **John B. Fenn**, PH.D. '40, professor emeritus of chemical engineering at Yale, described his technique in a paper in *Science* in 1989. Evidence of his method's significance is clear: last year alone more than 1,700 scientific papers that relied on ESI were published.

"What really gave it a kick in the pants was the advent of proteomics," Fenn said when reached by phone three weeks after he heard the news. "It turns out that ESI is one of the most sensitive ways of getting accurate values of the mass of protein molecules. With the right instruments it has got such tremendous resolution that you can distinguish individual protein molecules even though they are in with a whole bunch of others in the sample."

In its citation, the Royal Swedish Academy of Sciences said Fenn's work has led to "increased understanding of the processes of life," quickened the pace of drug development and led to faster diagnoses of cancer.

Fenn received the news of the award at his home in Virginia, where he is a professor of analytical chemistry at Virginia Commonwealth University in Richmond. He shared the award with two other researchers, Koichi Tanaka, an engineer from

Japan, and Kurt Wüthrich, PH.D., of Switzerland. Tanaka worked on other applications of mass spectrometry and Wüthrich used nuclear magnetic resonance to determine protein structures.

"It's like winning the lottery," Fenn says. "I'm still in shock."

The technique he described in his 1989 paper solved a problem that had bedeviled scientists since 1912, when mass spectrometry was first used to analyze small molecules. Mass spectrometry worked only for molecules that weighed up to 1,000 times as much as a hydrogen atom. Using ESI, Fenn turned large molecules into smaller ions, without causing them to decompose. He created charged droplets by spraying molecules with water in an electrical field. As water evaporated from the droplets, only protein ions remained. Their mass could be determined by setting them in motion and measuring how long they took to travel a set distance.

Fenn, who received his doctorate in chemistry from Yale in 1940, returned to his alma mater in 1967 as a professor of chemical engineering, after stints in the chemical industry and on a U.S. Navy jet propulsion project. In 1978, with colleagues in chemistry and medicine, he began the work that led to the development of ESI.

Fenn left for Virginia in 1994, after his wife's death and disagreements with the university over lab space. (His daughter, Barbara Fenn Reif, retired in December as director of student and alumnae affairs at the School of Nursing.) He's still teaching and doing research, concentrating on the "conformation problem" of proteins. "How they fold and why they fold and what they fold to are extremely important problems because they determine what chemical reactions they do," he says. "We are trying to pursue that."

And, of course, his main tool is ESI.

—John Curtis



## A long life, steeped in science and medicine

**Elizabeth R. Harrison, M.D.** '26, one of the first women to graduate from the School of Medicine and pediatrician to three generations of New Haven children, celebrated her 103rd birthday on November 2.

A medical career seemed a natural choice for a young woman growing up with a father who did research in embryology. "I was just immersed in all this," Harrison says of medicine, during an interview at the Whitney Center in Hamden, Conn., where she lives. She was the daughter of Yale zoologist Ross Granville Harrison, M.D., PH.D., known for developing an early method for growing animal cells *in vitro* in the early 1900s. Having been exposed to her father's work, Harrison had no qualms about performing her first human dissection in medical school. "All you did was take a scalpel and move the muscle and isolate it and report it on the chart. There wasn't anything to be squeamish about," she recalls. "My father had taken us tadpole hunting and we'd worked with live animals, so I didn't think anything of it."

Harrison was born in Baltimore in 1899. Her German-born mother spoke five languages, and Elizabeth Harrison grew up speaking German and English. According to her nephew, Ross Granville Harrison III, Harrison was visiting Germany on the eve of World War I and found herself trapped there by war for three years. She returned to New Haven to graduate from Hillhouse High School, began college at Smith, then transferred to the University of Chicago.

When asked if she faced prejudice as a woman in medicine, Harrison says that whatever problems she encountered, she kept to herself. "If I had shot my

mouth off, I never would have gotten anywhere. I was very reticent about my experiences." Her nephew says Harrison has spoken obliquely of feeling ostracized or passed over during medical school and in her early years in practice, but "as she would say, she doesn't like to be a crab."

Harrison lived above her Bradley Street office. Never married, she maintained a very busy practice. "She was a spectacular diagnostician," her nephew says. "She would take one look at a kid and tell you what was wrong with him. She had instincts that were bigger than life."

He says Harrison still saw patients into her 90s. When he took her to celebrate her 102nd birthday with a dinner at Mory's, she was not just visiting a Yale landmark but also returning to her childhood home; what is now Mory's was faculty housing when her father was named chair of Yale's zoology department, her nephew said, and the family lived there from 1907 to 1911. Harrison still very much enjoys music (although she claims she "flunked" piano). She hummed along when a group of Whiffenpoof alumni sang at the Whitney Center last fall.

—Cathy Shufro

*We are sorry to report that Dr. Harrison died on January 5, as this issue of Yale Medicine was going to press. A memorial service at Battell Chapel is planned for February 15.*



**Harrison's father, Ross Granville Harrison, chaired Yale's zoology department in the early 1900s.**

## A Yale connection to Thailand—and the King of Siam

**When Kanya Suphapeetiporn, M.D., PH.D.** '02, finishes her pediatrics residency in Brooklyn and heads home to her faculty posi-

tion in Thailand, she hopes to send some of her best students back to Yale for educational exchanges. If they do come, it will be nothing new: the link between Yale and Chulalongkorn University, where Suphapeetiporn is both alumna and junior professor, has a long history.

It began 20 miles from New Haven, more than 30 years ago. In the late 1960s, Nicholas P.R. Spinelli, M.D. '44, served as a mentor to a young doctor from Thailand doing an internship at Bridgeport Hospital, a Yale-affiliated hospital where Spinelli was director of medical education. That man, obstetrician Supawat Chutivongse, M.D., went on to become dean of Chulalongkorn's medical school in Bangkok. Since then, he and Spinelli have worked together to bring a dozen of the school's strongest graduates to Yale to hone their skills.

Spinelli helped Suphapeetiporn apply to Yale's doctoral program in the Department of Genetics, where she did research in cancer genetics. Suphapeetiporn plans to set up a basic research lab when she gets back to "Chula," the university named in 1917 after the beloved Thai King Chulalongkorn, King Rama V. (His father, King Rama IV, was portrayed by Yul Brynner in *The King and I*.) Spinelli met Suphapeetiporn at the airport when she arrived in 1996, invited her to his home, attended her thesis presentation and watched her graduate last May. Suphapeetiporn enjoyed listening to Spinelli's stories from a career in medicine that included private practice as an internist, overseeing the Bridgeport residency program

and directing alumni affairs for the School of Medicine.

Reached by telephone after a long night on call at the State University of New York Medical Center in Brooklyn, Suphapeetiporn says that Spinelli's dedication to former students is exemplified by the fact that he's kept in touch with her dean at Chula for more than 30 years. "I am so impressed that they still keep in touch," she says.

While at Yale, Suphapeetiporn spent most of her time in the lab and the library, but she also enjoyed New Haven's first-rate pizza and New England's hiking trails. Two years ago, Yale's community of Thai students, numbering about a dozen, gained a new member: a colleague of Suphapeetiporn's from Chula, Atapol Sughondhabirom, M.D. He is doing a postdoctoral fellowship in psychiatry, studying the genetics of drug addiction. Sughondhabirom and his advisors have a grant to train Thai students in the genetics of psychiatric disorders, further strengthening the connection between Yale and Chula.

Spinelli says he is impressed that every Thai student he has known has returned to Thailand. Planning to follow suit, Suphapeetiporn is eager to get home. "I think," she says, "that I can do something useful."

—Cathy Shufro

### Familiar Faces

**Do you have a colleague who is making a difference in medicine or public health or has followed an unusual path since leaving Yale? We'd like to hear about alumni of the School of Medicine, School of Public Health, Physician Associate Program and the medical school's doctoral, fellowship and residency programs. Drop us a line at [ymm@yale.edu](mailto:ymm@yale.edu) or write to Faces, Yale Medicine, P.O. Box 7612, New Haven, CT 06519-0612.**

## Cell biologist wins Lasker prize

**James E. Rothman**, PH.D. '71, the Paul A. Marks Chair of the Cellular Biochemistry and Biophysics Program and vice chair of the Sloan-Kettering Institute, was one of two scientists honored with the 2002 Albert Lasker Award for Basic Medical Research. Rothman and colleague Randy W. Schekman discovered the universal molecular machinery that orchestrates the budding and fusion of membrane vesicles, a process essential to organelle formation, nutrient uptake and secretion of hormones and neurotransmitters. The mission of the Albert and Mary Lasker Foundation is to increase public awareness, appreciation and understanding of promising achievements in medical science in order to promote public support for research.



## 1940s

**William G. Anlyan**, M.D. '49, chancellor emeritus of Duke University Medical Center, was awarded the Distinguished



Meritorious Service Medal by Duke University at its Founder's Day celebration in October. The award, the university's highest honor, was presented for his 24 years of service and leadership as chancellor. Anlyan, an innovator in medical education and an exemplar in nurturing the careers of colleagues, is also a trustee of The Duke Endowment and a board member for Research!America, an alliance for discoveries in health.

The Yale Eye Center honored **Rocko M. Fasanella**, M.D. '43, HS '50, in June with a scientific program at the New Haven Lawn Club that highlighted new advances in his subspecialty, oculoplastic surgery. From 1951 to 1961 Fasanella was the chief of ophthalmology in the Department of Surgery.

His contributions to ocular surgery were the focus of a talk on Fasanella's career offered by his son-in-law, Richard Petrelli, M.D., assistant clinical professor of ophthalmology. Fasanella was again feted at the evening Reunion and Commencement Banquet of the Yale Alumni in Ophthalmology, which was attended by his five children and three of his grandchildren, as well as many colleagues. The Fasanella family presented a portrait of Fasanella to hang in the Department of Ophthalmology and Visual Science.

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### VISIT US ON THE WEB

[info.med.yale.edu/yymm](http://info.med.yale.edu/yymm)

## 1960s

**Augustus A. White III, M.D.,** PH.D., HS '66, orthopaedic surgeon-in-chief emeritus at Beth Israel Deaconess



Medical Center, the Ellen and Melvin Gordon Professor of Medical Education at Harvard Medical School and master in the Oliver Wendell Holmes Society, was awarded the 2002 Elmer and Rosemary Nix Ethics Award at the October annual meeting of the Clinical Orthopaedic Society (COS) in Indianapolis. The COS is an invitational society established in 1912 that focuses on clinical practice. White was recognized for his life's work in teaching the ethical practice of orthopaedics. In June, he was also named to the National Advisory Council on Minority Health and Health Disparities of the National Institutes of Health.

## 1970s

After working on mixed radiological/chemical contamination issues for eight years at a Department of Energy facility, **Peter J. Gorton, M.P.H.** '79, writes that he has spent the last six years as president of Panamerican Environmental Inc., a consulting firm in Buffalo, N.Y. The firm specializes in real estate due diligence, petroleum contamination remediation and forensic investigation, and brownfields assessment and remedial alternatives.

**Michael S. Siclari, M.D., M.P.H.** '78, left us a note on the alumni website to tell us that he is an assistant professor of clinical medicine at Brown and a staff physician in the emergency department at Roger Williams Medical Center in Providence, R.I. He is a member of the American Board of Internal Medicine and the Board of Certification in Emergency Medicine. Siclari is also an associate medical director of Care Advantage Inc. for Blue CHIP of Rhode Island. He and his wife, Lynn, and three children, Stephen, Peter and Katherine, live in Providence.

## 1980s

**Susan R. Carter, M.D.** '89, has married fellow ophthalmologist Marco A.E. Zarbin, M.D., PH.D. Carter was an associate professor and vice chair of ophthalmology at the University of California, San Francisco, Medical Center, and is relocating her practice to the New York metropolitan area. Zarbin is professor and chair of the Institute of Ophthalmology and Visual Science at the New Jersey Medical School at Newark. Carter and Zarbin were married on August 31 by a Presbyterian minister at the Yale Club of New York.

**Lynne Perry-Bottinger, M.D.** '86, an interventional cardiologist in private practice in New Rochelle, N.Y., and clinical assistant professor of medicine at Weill Medical College of Cornell University and at Columbia University, reports that she is "apparently one of only three African-American women who are interventional cardiologists in the United States, out of a pool of about 20,000 cardiologists overall."



**Valerie E. Stone, M.D.** '84, recently joined the faculty at Harvard Medical School as an associate professor of medicine.



She is also on the staff of the Massachusetts General Hospital, where her new roles include serving as associate chief of the General Medicine Unit, co-director of the Primary Care Internal Medicine Residency Program and senior scientist at the hospital's John D. Stoekle Center for Primary Care.

## 1990s

Neuroscientist **Mark G. Barad, M.D.** '91, PH.D. '91, has been named the first Faculty Scholar by the Tennenbaum Family Interdisciplinary Center for Initiatives in Brain Research at the University of California, Los Angeles (UCLA). The center, established earlier this year with a four-year, \$1 million gift from Michael E. and Suzanne Tennenbaum, created the scholar position to help spur unique, collaborative research into the brain's plasticity, or adaptability, and to accelerate development of new treatments for brain damage and disease. Barad's focus for the first two years of the program will include developmental delay in children, age-related memory loss, brain repair and regeneration after trauma or stroke, and psychotherapy, especially for anxiety disorders. Barad is an assistant professor of psychiatry and biobehavioral sciences at UCLA's Neuropsychiatric Institute.



**Arani Bose, M.D., HS '95,** left, and **Steven V. Pacia, M.D., HS '91,** FW '93, are combining medical careers with the running of a fine arts gallery in Manhattan. Bose is assistant professor of radiology and neurology at New York University (NYU) and founder of Smart Therapeutics, a biotech company that produced the first intracranial stent. Pacia is director of the NYU Clinical Neurophysiology Fellowship, as well as director of research for the Comprehensive Epilepsy Center at NYU and principal investigator for a site of a National Institutes of Health multicenter study of epilepsy surgery. Together, Bose and Pacia run Bose Pacia Modern, a gallery of contemporary Indian art that they launched with their wives in 1994, while still in medical training. The gallery, the first in North America to focus on the modern art of India, is located in the Chelsea art district and has mounted shows reviewed in *The New York Times* and fine arts magazines. (For a look at the current exhibition and past shows, see [www.bosepacia-modern.com](http://www.bosepacia-modern.com).)



**Claude T. Anderson, M.D.** '53, HS '57, a scholar, writer, painter and self-taught musician, died June 26 of a heart attack at his home in Ramona, Calif. He was 80.

Born on a farm in Chapin, Ill., Anderson developed a lifelong love for learning as a pupil in a one-room schoolhouse. In 1941, while at Knox College in Galesburg, Ill., he was called to active duty in the Army Air Force as a navigator on B-17s. After the war he returned to Knox, graduating cum laude and Phi Beta Kappa in 1947, then continued on to medical school at Yale, where he won the Ferris Prize in Anatomy. After his second year, he traveled to Oxford as a Rhodes scholar and in two years earned bachelor's degrees in physiology and pharmacology. Oxford awarded him an honorary master's degree three years later. While in England, he proposed, via telegram, to his future wife, Evelyn Hamburger, R.N., PH.D., M.N. '50.

Anderson returned to Yale, earning his medical degree in 1953 and serving on the house staff until 1957. He continued his Air Force career and earned a master's degree in radiation biology while in the military. In 1972, he retired from the service at the rank of colonel and went on to an immunology fellowship at the University of Texas Health Science Center. While there, he earned a degree in philosophy. In 1979, he opened the South Texas Immunology Lab and served as its director. He retired to Ramona in the mid-1990s.

Anderson wrote short stories, limericks and political satire for

enjoyment; he was a voracious reader with a personal library exceeding 30,000 volumes. He dabbled in painting and taught himself to play more than a half-dozen musical instruments.

**Joseph V. Baldwin, M.D.** '40, HS '47, of Manchester, Conn., died June 27 at Manchester Memorial Hospital. He was 88.

Baldwin attended Clark University and earned his medical degree from Yale. He started his residency training in pediatrics at Grace Hospital in New Haven in 1940 and was an assistant in the Clinic of Child Development until 1942.

Baldwin then served in the Navy as lieutenant commander and flight surgeon during World War II. He returned to the hospital in 1946 as an assistant resident in pediatrics until 1947.

While at Yale, Baldwin was a research assistant at the Clinic of Child Development from 1947 until 1948, working under Drs. Arnold L. Gesell and Catherine S. Armatruda, both pioneers in child development. In 1948 he became an instructor in pediatrics and at the Child Study Center. From 1949 until 1953, when he retired, Baldwin was a clinical instructor in pediatrics with an appointment in the Child Study Center.

**Frank D. Carroll, M.D.** '32, of Rye, N.Y., died July 24. He was 95.

Carroll received his undergraduate degree from Harvard in 1929 after three years of study; he then went on to Yale for his medical education. He interned at the Charles V. Chaplin and Rhode Island hospitals in Providence and completed his ophthalmology residency at the Massachusetts

Eye and Ear Infirmary in Boston. He served as a research fellow in the department of ophthalmology at the College of Physicians and Surgeons of Columbia University in New York. After his fellowship, Carroll was appointed to the faculty at Columbia. Upon his retirement, he held the title of clinical professor emeritus of ophthalmology.

Carroll had a private practice in Rye, N.Y., from which he retired in 1990. He was also in charge of the eye department of the United Hospital in Port Chester, N.Y., for 28 years and ran a free eye clinic there.

**Anne B. Collart, M.P.H.** '66, a social worker and businesswoman, died April 18 at her home in Harwich Port, Mass. She was 61.

Collart was raised in Plainfield, N.J., and graduated from Wheaton College in Illinois. She earned her master of public health degree from Yale and a master's degree in social work from Fordham University in 2000. She worked as an epidemiologist for the Metropolitan Life Insurance Co. and later as a computer trainer and consultant for various firms before founding her own company, ABC Computers.

Fulfilling a lifelong dream in 2000, she returned to her family home in Harwich Port on Cape Cod. Collart was a clinical social worker with Child and Family Service of Cape Cod and a member of the National Association of Social Workers and the Massachusetts Society for Clinical Social Work. She was an accomplished sailor and avid golfer.

**Richard B. Helgerson, M.D.** '71, died at his home in Madison, Wis., on April 19. He was 58.

Raised on a dairy farm near Elk Point, S.D., Helgerson completed grade school in a one-room schoolhouse, the only member of his class. He earned his bachelor's degree from the University of Cincinnati in 1967 and his medical degree from Yale. In 1979, after completing his internship and residency training in general surgery and a fellowship in surgical infectious diseases at the University of Minnesota Hospitals, he joined the faculty at the University of Wisconsin Medical School (UW) in the department of surgery.

Helgerson had a 22-year career at UW, where he was director of the burn unit at University Hospitals and director of the General Surgery Residency Program. He was best known for his treatment of severely burned children because of his skills in burn wound management and skin grafting. Helgerson was a member of the Madison and Wisconsin surgical societies, the American Association of Burn Surgeons and the International Burn Society. Progressive illness cut short his career and forced his retirement in 2001.

**Wilbur D. Johnston, D.D.S., M.D.** '37, of North Haven, Conn., died at his home on August 27. He was 92.

Johnston, a specialist in orthodontics, received his dental degree from the University of Pennsylvania and his medical degree from Yale. He served in the Army Medical Corps during World War II as a major and was awarded the Bronze Star. Johnston was appointed an assistant clinical professor of surgery at

Yale in 1946 and was clinical professor of surgery (dental) at the time of his death. During his career, he received a certificate of honor from the New Haven Dental Association and numerous awards of merit.

**Dunham Kirkham, M.D.** '37, of Union, Maine, died at his home on July 1 after a long illness. He was 92.

Kirkham graduated from Dartmouth College in 1933 and received his medical degree from Yale. He was a member of the active Army reserve and served in the Pacific theater during World War II as a specialist in tropical medicine. He was recalled to active duty during the Korean War and retired in 1969 after 27 years of service.

His 53-year medical career as a civilian spanned much of the globe and included private practice, public health service and years with both the U.S. Veterans Administration and New York State. Kirkham retired in 1972 as head of the medical-surgical clinic at Sunmount State School in Tupper Lake, N.Y. He and his wife moved in 1988 to Union, where he enjoyed gardening and fishing.

**Ruth Eiko Oda, M.D., HS** '54, of Hilo, Hawaii, died November 2, 2001, at the age of 73.

Oda was a retired pediatrician who had practiced in Hilo for 43 years. She was a member of Piihonua Kumiai, a neighborhood assistance association, and the American Medical Association and was a fellow of the American Academy of Pediatrics.

**Samuel D. Rowley, M.D., M.P.H.** '69, of Orange Park, Fla., died at the Baptist Medical Center in Jacksonville, Fla., on February 12, 2002, at the age of 82.

Born in Hartford, Conn., Rowley received a medical degree from Jefferson Medical College in Philadelphia and a master's in public health from Yale. He practiced pediatrics in Hartford from 1951 until 1967. Rowley served as director of the Rentschler Pediatric Clinic from 1968 until 1972, when he moved to Florida. He was director of the Duval County Health Department from 1973 until 1985 and was on the board of directors of the Mental Health Clinic in Jacksonville. Rowley co-founded the Bridge of Northeast Florida, an agency that provides services for inner-city youth, and served as president and a member of its board for almost 30 years.

**Morton A. Schiffer, M.D.,** of Norwalk, Conn., died July 26 at his home. He was 88.

A native of New York City, Schiffer graduated from Alfred University and earned his medical degree in 1938 from Long Island College of Medicine. He served as a physician in the Navy during World War II. During his early career, he was director of the obstetrics and gynecology department at the Jewish Hospital and Medical Center in Brooklyn. He was there for 41 years. He also was an obstetrician and gynecologist-in-chief at Stamford Hospital in Connecticut. For 10 years starting in 1972, Schiffer was chair of the obstetric advisory committee to the New York City health commissioner.

Schiffer joined the faculty at Yale in January 1994 and retired

in 2001 as a clinical professor of obstetrics and gynecology.

**Horace E. Thomas, M.D., HS** '36, a retired surgeon and active volunteer, died March 5, 2002, at his home in Columbia, Mo. He was 90.

Thomas received his medical degree from Harvard and completed his internship at Yale. He served in the Army from 1940 to 1946 as a surgeon in military hospitals in Georgia, California and Australia. In 1947, he moved to Columbia, where he married Helen E. Yeager in 1949.

During his career as a surgeon from 1947 until 1985, he practiced at Boone Hospital Center, Columbia Regional Hospital, Ellis Fischel Cancer Center and the Keller Memorial Hospital in Fayette, Mo. "I think he is the one surgeon in this community who really deserved the title of complete general surgeon," said Frank Dexheimer, M.D., a colleague who knew him since 1960. He was the recipient of the Missouri University Alumni Service Award and the Boone County Medical Society's Physician of the Year Award. Upon retiring, Thomas traded in his surgeon's mask for a hard hat as a volunteer for Habitat for Humanity. He gave both his time and his money to the organization.

**Thomas J. Trudell, M.P.H.** '75, CEO and president of Marymount Hospital in Garfield Heights, Ohio, died July 3 of a stroke. He was 61.

Born in New Britain, Conn., Trudell earned his bachelor's

degree from Providence College in Rhode Island. He served during the Vietnam War as an Army captain stationed in Thailand from 1966 until 1968. He continued with his education and received a master's degree in business administration from Northeastern University and a master of public health degree from Yale. Trudell joined Marymount in 1979 as vice president for planning and development. In 1981, he became its chief executive officer and later became president. In his more than two decades at Marymount, he was credited with the development of new services and expansion of the hospital complex, which included the diagnostic and treatment building and outpatient care center. He led the hospital's 1995 merger with the Cleveland Clinic Foundation. In December 2000, in recognition of his contributions, the hospital renamed its Behavioral Health Center the Trudell Center.

Trudell also served as chair of the Ohio Quality Cardiac Care Foundation and as a member of several committees and boards of the Cleveland Clinic system, including the Center for Health Affairs board.

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**SEND OBITUARY NOTICES TO**  
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P.O. Box 7612, New Haven, CT  
06519-0612, or via e-mail  
to [claire.bessinger@yale.edu](mailto:claire.bessinger@yale.edu)

A *Culex quinquefasciatus* mosquito, one of the species associated with the transmission of West Nile virus.



JAMES GATHANY/CDC

### Insect propellant

Within hours of reading in *The New York Times* that the West Nile virus had been isolated from a flamingo at The Bronx Zoo in the summer of 1999, Yale professor Durland Fish, PH.D., was at the zoo, preparing to collect mosquitoes [Spring 2000, “To the Vector Go the Spoils”].

Since then, the disease has spread to 45 states, been diagnosed in 3,500 people and claimed 200 lives. As the virus has moved from anomaly to epidemic, Fish and his colleagues in the vector biology program have remained on the case.

Now a grant to Fish will allow Yale to strengthen the nation’s response to vector-borne diseases like West Nile. With \$1.3 million from the Centers for Disease Control and Prevention, the School of Public Health will join two other Yale schools in training six doctoral candidates in a “whole-organism” approach to vector-borne diseases—which includes the field study of insects and other arthropods that carry disease. The grant will also fund summer fieldwork for 20 students in epidemiology and public health.

Fish said the grant would help redress an imbalance in research into vector-borne diseases. “In recent decades, it has been very much lopsided toward the laboratory,” he said. Research has focused on developing vaccines, which have proven either unattainable (in the case of malaria, for example) or impractical (“Who are they going to vaccinate against West Nile?” Fish asks. “The whole country?”). The whole-organism approach complements lab research, allowing scientists to understand “the entire living organism in its environment. These things happen outdoors, in the fields, in the woods.” Fish said vector-borne diseases are proliferating because of environmental change, such as the reforestation that has benefited the ticks that carry Lyme disease; and because of increased international trade and travel, which introduces exotic organisms like the mosquitoes carrying West Nile. Those mosquitoes, or that mosquito, Fish theorizes, arrived in New York City on a jet. The possibility of bioterrorism poses a new threat. “West Nile is a scary example of what would happen if somebody wanted to introduce something,” Fish said.

—Cathy Shufro

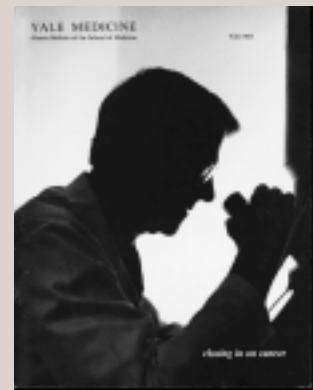


### FALL/WINTER 1971

“The present first year medical class is the largest in the school’s history—102 students. This is a ten percent increase in class size as compared with the previous year and is the second increase in the past five years.

“In 1951 the number of first year students was increased from 65 to 80. The size of entering classes then remained relatively constant until 1967 when in response to the nation’s need for more physicians a further increase was authorized, and 92 students were admitted.

“In commenting on the recent increase to 102 students, Dean [Frederick C.] Redlich noted that changes in Yale’s class size and curriculum are in concert with the national goals of increasing the enrollment of existing medical schools and fostering curriculum innovations. The additional teaching and administrative resources necessary to support the larger medical class will be provided through a Physician Augmentation Program grant from the Department of Health, Education and Welfare.”



### FALL 1985

“In just the last decade, the field of medical diagnostic imaging has entered into a new era with a dazzling spectrum of computer-based technology that has vastly improved diagnostic capability, and at the same time, created new roles for diagnostic radiologists.

“Computed tomography (CT) scans, first used in the 1970s to detect brain tumors, now scan the entire body, using computers to organize thousands of X-rays taken by a machine which rotates around the patient’s body. ...

“The newest diagnostic tool—and the one causing the most excitement—is magnetic resonance imaging (MRI). Without the use of ionizing radiation or intravenous contrast material, the new technology has opened a whole new area of diagnostic imaging. Its unsurpassed contrast resolution enables discrimination of the individual tissues comprising an organ. For example, gray and white matter can be distinguished in both the brain and the spinal cord. ... Within the uterus, the glandular and muscular layers can be delineated. ...

“For patients who are unstable, portable X-ray units, ultrasound scanners and nuclear medicine cameras can be brought to the bedside.”



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