Medicine@Yale

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Advancing Biomedical Science, Education, and Health Care

Yale alum builds a crucial bridge for psychiatry researchers

Over the course of an eventful life, Herb Allison, M.B.A., a 1965 alumnus of Yale College, has found himself in many situations that could make the calmest of us feel anxious. He spent four years as an officer in the U.S. Navy, including a year in Vietnam. After obtaining a business degree at Stanford, he climbed aboard the roller coaster of the financial industry, first at Merrill Lynch, where he rose to become president and chief operating officer. He was president and CEO of TIAA-CREF, stewarding hundreds of millions of dollars in retirement accounts. Near the peak of the financial crisis in 2008, when the U.S. government placed the much-in-the-news mortgage lender Fannie Mae into conservatorship, he was appointed its president and CEO. In 2009, after the company stabilized, he was tapped to serve as Assistant Secretary for Financial Stability at the U.S. Department of the Treasury, a.k.a. "the TARP Czar."

But for all that, the stressful periods that have perhaps made the deepest personal mark on Allison began during his high school years and continued while he was an undergraduate Yale, when he suffered from a persistent series of panic attacks that he now recognizes was a severe anxiety disorder.

Those experiences were the inspiration for a $3 million gift from Allison's family foundation to the School of Medicine to establish a Psychiatry Research Scholars Program under the aegis of the Yale Child Study Center (CSC) and the Department of Psychiatry.

Herb Allison

"I became interested in this field because I know people who have these illnesses, and I myself, when I was an undergraduate at Yale, suffered from anxiety attacks that were very difficult to deal with," Allison recalls. "These disorders weren't understood—people told me to just 'get over it'—and there were no effective drugs at the time either. It slowed me down, and a few times a year it even shut me down, undermining my self-confidence."

Under the direction of Matthew W. State, M.D., PH.D., the Donald J. Cohen Professor in the CSC and deputy chair for research in the Department of Psychiatry, the new initiative will provide grant support to talented junior faculty to bridge what State says is the most vulnerable period for young researchers—the first years after training, when risky independent research projects cannot yet garner the federal grant monies that provide scientists with more predictable funding. In times of uncertain government support for the National Institutes // Scholars *(page 7)*

Gift caps career fighting killer of children

Leading physician-scientist and wife create a new professorship to sustain a long legacy of basic research on gastroenterological disorders

In the developed world, diarrhea is thought of as an easily treated nuisance. But in the developing world it is a major scourge: according to the World Health Organization, diarrhea, often caused by cholera, is the second leading cause of death among children under 5 years of age, causing nearly 1 million deaths among that population each year.

Gastroenterologist and scientist Henry J. Binder, M.D., has devoted much of his career to systematically investigating the biology of gastrointestinal problems and diarrheal diseases, and exploring ways to curb their incidence. Now professor emeritus and senior research scientist in the Department of Medicine, Binder and his wife, Joan, have recently committed to endowing a professorship for a physician-scientist to pursue research in gastroenterology at the School of Medicine.

The Binders' commitment establishes the Henry J. and Joan W. Binder Professorship in Gastroenterology.

"Henry Binder has had a long and distinguished career, contributing greatly to our knowledge of intestinal function and disease, to the field of gastroenterology, and to Yale," says Robert J. Alpern, M.D., dean and Ensign Professor of Medicine. "He and Joan have now chosen to extend these contributions by contributing funds to create a professorship, and I am deeply grateful for their generosity."

Binder first developed an interest in gastroenterology while a student at New York // Gastroenterology *(page 7)*

TERRY DAGRADI

Henry and Joan Binder first arrived at Yale in 1963. Now, after almost 50 years, the Binders are giving back by establishing an endowed chair in gastroenterology, a field that Henry Binder has helped to transform.

Alumnus returns to Yale as new chair of Pediatrics

George Lister

George Lister, M.D., a 1973 graduate of the School of Medicine and a former member of its pediatrics faculty, has returned to campus as chair of the Department of Pediatrics. He will also serve as chief of pediatrics at Yale-New Haven Hospital (YNHH) and physician-in-chief at Yale-New Haven Children's Hospital.

At the core of Lister's decision to return to Yale was "the remarkable attraction of the students and the young people who come to campus with idealism, imagination, and bold ideas," says Lister, who was a member of the medical school's faculty from 1988–2003. "I treasured my time teaching in the medical school, and it was entirely because of the personal relationships."

Lister says he sees the opportunity in Yale's // Pediatrics *(page 7)*

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TERRY DAGRADI

Seeing many patients die of organ failure as a physician-in-training and in her work as an anesthesiologist inspired Laura Niklason to make a difference. Though she was initially skeptical that artificial organs would ever be clinically practical, she went on to become a leading figure in tissue engineering, and her "off-the-shelf" arteries, decades in the making, are soon to be tested in human clinical trials.

Going with the flow

Building replacements for arteries and lungs takes ingenuity—and patience

Having already earned a doctorate in biophysics at the University of Chicago, Laura E. Niklason, M.D., PH.D., knew when she started medical school at the University of Michigan that research would be a major part of her career. At Michigan, she did work for a local company on ventricular assist devices—implantable machines that help failing hearts pump blood—but after seeing many patients in intensive care die of organ failure, she was skeptical that artificial solutions would ever work for patients over the long term.

But Niklason, professor of anesthesiology and of biomedical engineering, "stumbled into tissue engineering" during her anesthesiology residency at Massachusetts General Hospital. A tutor working in the MIT lab of biomedical engineering maven Robert Langer, PH.D., showed her a picture of a rat skull in which he had drilled two holes and then permanently repaired one hole by filling it with engineered cartilage. "That made me sit up because it never had occurred to me that it might be possible to reconstitute a whole tissue just from cells," she says.

In 1995, while still a resident, Niklason found herself working in Langer's lab as well, now thinking that "this tissue engineering stuff might be the coolest thing ever." And though she had no previous experience as a bench biologist, she set out to engineer an artery from scratch, spending three years designing scaffolding on which to grow the tissue, creating a mechanical environment for the cells to grow in that mimicked the action of the heart, and concocting a nutrient medium matching the body's chemical environment.

She continued that work at Duke University, where she moved in 1998. At first, "there were lots of snafus, and lots of burst pipes and leaky fluids," she says. But in 1999, her team published a paper in *Science* on the first successful transplant of engineered arteries built from an animal's own cells. Next she focused on translating the method for human cells and making the process clinically feasible—it took three months to grow an artery, far too long to "ask a patient to hold his breath," she says.

The solution was to grow arteries from donor cells, and then, in the final step, wash the cells away, leaving only the "skeleton" called the extracellular matrix (ECM). Surprisingly, the tissue didn't look any different and was just as mechanically strong as cellularized tissue, says Niklason, who joined Yale's faculty in 2006. "The advantage is that since the cells are gone, there's no rejection. Because it's non-living we can store it for months, so we have a tissue that's off-the shelf." Later this year, Durham, N.C.-based Humacyte, a biotech company Niklason founded while at Duke, will begin its first clinical trials of these arteries, which will be implanted into the arms of individuals with kidney disease to provide a source of high blood flow to expedite dialysis.

Other researchers in her lab are working on lung regeneration as an alternative to lung transplantation, a difficult procedure with a low 10-year survival rate due to infection and organ rejection. The approach is similar to artery engineering: create decellularized lungs, keeping their complex branched vasculature intact, and then seed the ECM with a patient's own cells.

With a patience that comes from long experience in medical research, Niklason says it may be 20 years before people will be breathing through regenerated lungs. But she'll keep busy in the meantime. "I've piled a lot on my plate, she says, laughing, "but I've been doing it for decades."

School of Medicine welcomes the Class of 2016, a diverse group

A rabbi, a ballerina, and a Green Beret walk into Yale School of Medicine—all of them members of the Class of 2016. Chosen from 4,103 applicants, the 100 incoming students come from an amazing variety of backgrounds, with many impressive achievements already under their belts.

There's the Fulbright scholar, the Mayo Clinic PH.D, and the Half-Ironman Triathlon National Championship competitor. One entering student founded a music therapy program in Oakland, Calif., and another began an after-school tutoring program for the children of New York City's juvenile prisons. One worked his way through college running a Subway franchise. Two were teachers in rural France and Honduras.

The students' research has led to numerous publications, and their clinical work has already affected patients around the world. The class could hold its own in any musical or sporting event, counting dozens of musicians and athletes in its number.

Sixteen of the students were born outside the U.S., and 23 are underrepresented ethnic or racial minority groups. They hold diplomas from 53 different colleges, though two of those, Harvard and Yale, account for 31 members of the class. "We get many applications from Yale and Harvard every year, and they tend to be strong candidates," says Richard Silverman, director of admissions. "But we're delighted to have over 50 colleges represented in a typical class, including a significant increase in applications from California colleges in recent years."

As part of another noteworthy recent trend, taking time off between college and medical school is no longer the exception: some 64 of this year's entering students graduated from college before 2012. "The breadth of their experience is really quite striking."

Two international graduate students receive fellowships

Sashka Dimitrievska

Alice Qinhua Zhou

Two Yale doctoral students have received fellowships through a new initiative of the Howard Hughes Medical Institute (HHMI). Sashka Dimitrievska, in the Department of Biomedical Engineering, and Alice Qinhua Zhou, in the Department of Molecular Biophysics and Biochemistry, will each receive a $43,000 award, which is given to 50 international graduate students named fellows each year.

Dimitrievska, a native of Canada, is working with Laura E. Niklason, M.D., PH.D., professor of anesthesiology and of biomedical engineering, in studying aspects of engineered blood vessels (see story at left). Zhou, a native of China, is working with Corey S. O'Hern, PH.D., associate professor of mechanical engineering and of physics, and Lynne J. Regan, PH.D., professor of molecular biophysics and biochemistry and of chemistry, in a study to predict and redesign protein-protein interactions.

Recognizing that international graduate students in the U.S. often have difficulty securing funding, HHMI launched the International Student Research Fellowships Program last year to support the dissertation work of these students. HHMI has awarded more than $2 million in fellowships to students from 19 countries.

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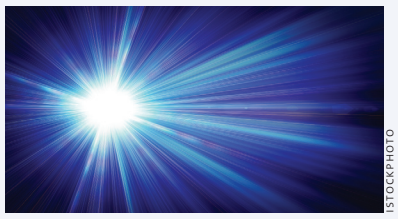
A flashy technique for cell biology



ISTOCKPHOTO

One of the most intriguing techniques in current biological research is optogenetics, in whch light-sensitive proteins derived from a variety of organisms, including plants, are introduced into cells, allowing scientists to rapidly and precisely control activity within these cells with flashes of light.

In the July 30 online edition of *Proceedings of the National Academy of Sciences*, Pietro De Camilli, M.D., the Eugene Higgins Professor of Cell Biology, and colleagues describe optogenetically engineered mammalian cells in which levels of phosphoinositides, lipid components of cell membranes that regulate crucial functions, can be instantly and reversibly controlled with bursts of blue light.

"This is a powerful tool to acutely manipulate the metabolism of membrane lipids and to study the resulting changes of cell behavior in real time," says De Camilli, also a Howard Hughes Medical Institute investigator. "Abnormal metabolism of lipids in cell membranes has been implicated in many diseases, such as cancer, diabetes, and neurodegeneration, including Alzheimer's Disease."

Does natural birth build better brains?

For several years, scientists in the lab of Tamas Horvath, D.V.M., PH.D., have studied UCP2, a protein that facilitates the metabolism of fatty acids. Breast milk is rich in fatty acids, and UCP2 helps neurons in the brains of newborn animals utilize these nutrients.

Horvath and colleagues in Spain and Brazil have now discovered that UCP2 levels are significantly lower in mice delivered by Caesarean section than those born vaginally, a difference that may persist into adulthood. As reported August 8 in *PLoS One,* mice with impaired UCP2 function have smaller nerve cells in the hippocampus, a brain region involved in memory, and these cells make far fewer connections with other neurons. Moreover, mice with low UCP2 levels perform differently on behavioral and memory tests.

Because UCP2 gene expression is induced by cellular stress, the authors suggest that reduced oxygen levels and restricted blood flow experienced by animals during vaginal birth may trigger production of the protein.

"The increasing prevalence of C-sections driven by convenience rather than medical necessity may have a previously unsuspected lasting effect on brain development and function in humans as well," says Horvath, the Jean and David W. Wallace Professor of Biomedical Research and chair of the Department of Comparative Medicine.

Science that's more than just skin-deep

Innovative microsopy technique brings Yale scientists a real-time glimpse of stem cells in action

The unique ability of embryonic stem cells to make copies of themselves and to differentiate into the myriad cell types that make up the body's tissues and organs has been described in almost magical terms in the popular press. But the action of some stem cells is quite familiar, and occurs right before our eyes. Clustered under every strand of our hair lie hair follicles, in which stem cells regulate the continuous growth of hair. Though the adult stem cells in hair follicles don't have the potential of embryonic stem cells to take on nearly any cell fate, their role in regeneration makes them an exciting research tool for understanding basic stem cell biology.

Embedded just beneath the surface of the skin and frequently regenerating, the hair follicle is an ideal "mini-organ" for observing tissue regeneration. The follicle is a highly specialized and dynamic stem cell niche in which cell signaling cues originating both inside and outside the follicle and cell-cell interactions within it regulate the timing and location of stem cell divisions. Researchers have gotten a glimpse of these processes by examining skin samples taken at sequential time points during the hair follicle regeneration cycle under the microscope. But since these samples are only static "snapshots," this technique may lead scientists to miss important steps of the regeneration process, creating the possibility that what is seen through the microscope does not reflect the dynamic biology of follicles in living animals.

TERRY DAGRADI

Yale scientists have developed a new non-invasive method for observing stem cell regeneration in the hair follicle of live mice in real time. (From left) Giovanni Zito, Panteleimon Rompolas, Elizabeth Deschene, David Gonzalez, Ann Haberman, Valentina Greco, and Ichiko Saotome.

School of Medicine researchers have now developed a non-invasive, high-resolution imaging approach that allows them to observe stem cell regeneration in the hair follicle in real time in live mice. Their findings, published in the journal *Nature* on July 26, have provided new insights that will allow researchers to tackle questions related to both tissue regeneration and the role of stem cells in cancer and other diseases. "Because we can follow the same cells over time, we can really learn the true behavior rather than inferring it by static analysis," says Valentina Greco, PH.D., assistant professor of genetics and dermatology and senior author of the study. With this new imaging approach, says Panteleimon Rompolas, PH.D., a postdoctoral fellow in Greco's lab and lead author of the *Nature* paper, gaps in our knowledge of the basic steps of regeneration can be filled, and cell-cell interactions and signals can be mapped in detail.

The team used a two-photon laser scanning microscope that makes it possible to produce high-resolution images of tissue in living animals at precise depths up to 100 microns (one-tenth of a millimeter). Such penetration is achieved by the use of low-energy near-infrared light, which scatters less in tissue than the light used in traditional light microscopy. Another advantage of this approach is that the low-energy light inflicts little damage on tissue, says co-author Ann M. Haberman, PH.D., assistant professor of laboratory medicine and director of the medical school's In Vivo Imaging Facility. These attributes of two-photon imaging mean that the microscopes can observe events as they would occur naturally.

In the new study, the researchers used mice engineered to express a fluorescent protein in the skin's epithelial cells, which allowed them to label and visualize epithelial cells within hair follicles. A series of optical sections of these glowing cells were collected with the two-photon microscope over several hours, generating three-dimensional views of living hair follicles in which dynamic cell behaviors could be followed over time.

With the new technique, the researchers made two major observations that would have been impossible using static methods. First, they found that during the period of growth, when hair follicles rapidly extend underneath the skin, epithelial cells not only proliferate, but also migrate downwards. Second, they confirmed long-standing suspicion that the mesenchyme, a cluster of cells at the base of the hair follicle, is a crucial signaling center that dictates follicle growth; in follicles in which the team removed the mesenchyme with a laser, regeneration halted. "Not only does the study answer pre-existing questions, but the observations also raise new ones about how organizations of cells and their migrations and divisions are controlled," says Terry Lechler, PH.D., assistant professor of cell biology at Duke University, who was not involved in the study. "This work opens a whole new tool for analysis of hair follicle morphogenesis."

The study also has implications for other stem cell niches. "The hair follicle is just a paradigm representing what happens in other tissues," says Greco, a member of the Yale Stem Cell Center. Using this study as a stepping stone, Greco's team next plans to manipulate genes in the hair follicle, including over-expressing signaling molecules or knocking them out, to see how the regeneration process is affected. The idea is to eventually determine the function of each gene in regulating hair follicle stem cell biology. "While there are studies that have identified tissue regeneration signals, we still need to figure out how these signals interact with each other in the regeneration process, and in which behaviors they play roles." Such knowledge, Greco says, would better enable scientists to harness stem cells for therapeutic purposes.

"We're just now identifying the basis for future work," Greco says. "It was a risky project, but one with high reward. We now have a new way of looking at things that could not have been explored before. I think the best is yet to come."

Visit medicineatyale.org for a related video.

Giving creative researchers freedom to pursue ideas

Solving the mysteries of disease requires creative, innovative ideas from the best minds in medical research. Creativity can't be programmed to occur on a tight schedule or within a specific budget, yet that is precisely how most research grants are administered. Today's tight budgets and risk-averse grant committees favor research awards that provide funds to build on what is already known—not what is novel or unexpected.

Private support for endowed professorships, like the Henry J. and Joan W. Binder Professorship described in this issue, can provide established researchers with secure, flexible funding to pursue new ideas . . . to think creatively . . . to discover new treatments. Additionally, endowed professorships ensure that a donor's name and particular interests are advanced in perpetuity.

Gifts from donors can also spark new investigations by junior faculty like those who will be supported through the new Psychiatry Research Scholars Program covered in this issue.

Yale School of Medicine seeks donors who are not satisfied with a conservative approach to research, and who wish to participate in pushing the boundaries of knowledge. For more information on endowing a professorship or establishing a new research program, please contact Jancy Houck, associate vice president for development and director of medical development at (203) 436-8560 or jancy.houck@yale.edu.

OUT & ABOUT

June 1, 2012 Alumni of the School of Medicine returned to campus in droves for an event-filled **Reunion Weekend**. 1. (From left) **Samir Bhatt**, M.D. '86, **Ami Bhatt**, M.D. '87, and **Robert H. Gifford**, M.D., professor emeritus of medicine and former deputy dean for education. 2. Alumni and members of the campus community paid tribute to the late Howard M. Spiro, M.D., founding chief of the Department of Internal Medicine's Section of Gastroenterology from 1955 until 1982, and founder of the Yale Program for Humanities in Medicine in 1983. 3. **Melissa Grafe**, PH.D., the John R. Bumstead Librarian for Medical History, shares information from the library's exhibit "Medicine in Shakespeare's London." 4. (From left) **Gary B. Leydon**, associate director of technology at the medical school, with **Robert Adams**, M.D. '51, and **Dawn Adams**.

TERRY DAGRADI (4)

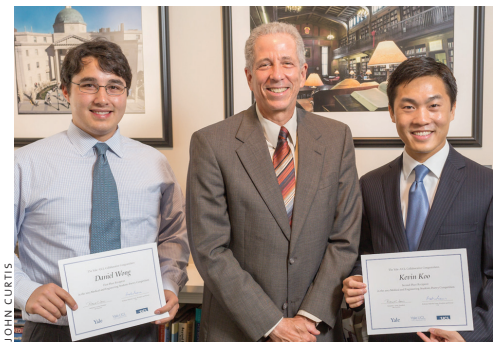
August 16, 2012 The School of Medicine formally welcomed the 100 members of the Class of 2016 (see related story, page 2) at the **White Coat Ceremony**, an annual event at which incoming medical students receive physician's jackets. 1. **Nancy R. Angoff**, M.P.H., M.D., associate dean for student affairs, with **David Asuzu**. 2. (From left) **Melissa Taylor**, **Durga Thakral**, **Sasha Deutsch-Link**, **Rebecca Treger**, **Linh Vu**, **Adesuwa Ighodaro**, **Deborah Ahove**, **Hiam Naiditch**, and **Emmanuel Ohuabunwa**. 3. (From left) **Jason Weed**, **Linh Vu**, **Jay Patel**, **Joyce Cheng**, and **Jake Wang**. 4. **Marcella Nunez-Smith**, M.D., M.H.S., assistant professor of medicine, gave this year's keynote speech.

Visit medicineatyale.org for a podcast of the keynote speech and video of the day's events.

TERRY DAGRADI (4)

July 25, 2012 A concert by the **Connecticut 102nd Army Band**, featuring members of the U.S. National Guard, was held on Harkness Lawn. 1. Spc. **Donald Hensley** of the Connecticut 102nd Army Rock Band. 2. Children and teachers from the Phyllis Bodel Childcare Program at the School of Medicine took in the music. 3. The Connecticut 102nd Army Brass Quintet, featuring (from left) Staff Sgt. **Chris Schrock**, Staff Sgt. **Chris Desjardins**, Spc. **Jeff Motola**, Sgt. 1st Class **Chris Geist** and Warrant Officer **Chris Baillargeon**.

TERRY DAGRADI (3)



JOHN CURTIS

August 13 Last year, the Yale-University College London (UCL) Collaborative launched the **Yale–UCL Poetry Contest**, open to medical and engineering students at both universities. (From left) **Daniel Wong** '14, who placed first in this year's contest; Dean and Ensign Professor of Medicine **Robert J. Alpern**, M.D.; and **Kevin Koo** '13, who placed second.

TERRY DAGRADI (3)

August 17 All members of the School of Medicine's incoming Class of 2012 received Apple **iPads**. The tablet computers have become a staple tool in the medical school's curriculum (see related story, facing page). 1. **Daniel Yang**. 2. (From left) **Laura Yockey** and **Sasha Deutsch-Link**. 3. (From left) **Anirudh Sreekrishnan** and **Nathan Lifton**.

JOHN CURTIS

August 24, 2012 High school students in the medical school's **Discovery to Cure Summer Internship Program** presented original research they conducted over the summer in Harkness Auditorium, an event marking the program's 10th anniversary. (From left) **Gil G. Mor**, M.D., professor of obstetrics, gynecology, and reproductive sciences and Discovery to Cure director, with **Amanda Kelly**, a 2011 graduate of Sacred Heart Academy in Hamden, Conn.

A strategy to target the "undruggables"

ISTOCKPHOTO

Drug designers have successfully created many protein drugs to battle human disese. But most proteins cannot cross cell membranes, so in general these drugs lock on to molecular targets studding the cell surface that indirectly affect processes inside the cell. But many important targets, including protein complexes, RNA, and DNA, reside inside the cell and have largely been deemed "undruggable" by protein drugs.

In the July 27 issue of *Chemistry & Biology,* a team of scientists led by Alanna Schepartz, PH.D., the Milton Harris '29 PH.D. Professor of Chemistry, describe a previously unknown molecular signal that helps proteins enter cells and reach the cell interior. The proteins enter via endosomes, small sacs pinched off from the cell membrane, and the newly found signal triggers their release from the endosomal sac.

"We are very keen to understand how this release signal works, as it may allow researchers to engineer molecules to follow a prescribed pathway into cells," says Schepartz, also director of the Yale Chemical Biology Institute and senior author of the paper.

Hoarding disorder: a unique obsession

Many of us know a "pack rat" who has trouble throwing things away, but people with hoarding disorder take that tendency to extremes, sometimes filling their homes to the ceiling with possessions.

Long considered a subtype of obsessive-compulsive disorder (OCD), compulsive hoarding is being reconsidered as a possible standalone diagnosis in light of evidence that its brain abnormalities are distinct from those of OCD patients. A recent study led by David F. Tolin, PH.D., adjunct associate professor of psychiatry, lends weight to that idea.

In the new research, healthy people, people with OCD, and people with hoarding disorder were asked to bring junk mail to the lab. In a functional magnetic resonance imaging scanner, subjects were presented with pictures of their own mail as well as mail not belonging to them, and were asked to decide to keep or shred each piece.

As reported in the August issue of *Archives of General Psychiatry,* compared with the control and OCD groups, the hoarders' brains showed less activity in regions involved in emotional regulation, risk assessment, and decision-making when they considered others' mail but were hyperactive while deciding about their own. The under- and overactivation patterns resembled those seen in autism and anxiety disorders, respectively, say the researchers.

Center treats cystic fibrosis in adulthood

Medical advances are bringing longer, fuller lives to patients of a dedicated Yale clinic for adults

In the mid-1950s, children with cystic fibrosis (CF), a genetic disease that causes thick mucus to clog the lungs and pancreatic ducts, were not expected to survive long enough to attend grade school. Even 10 to 15 years ago, children with this disease routinely died before their 18th birthday. But today, thanks to advances in both research and treatment strategies, doctors at the Yale Adult Cystic Fibrosis Center are seeing patients graduate from college, get married, have children, and work in every profession from teacher to executive. One recently ran in the New York City marathon.

Having CF is still a major challenge for patients, who often must take several medications to manage the disease, as well as various therapies to clear their lungs. In severe cases, they become candidates for lung transplantation. Still, these days, most patients' stories represent a vast improvement over the recent past. "Most of my patients are working members of the community, and nobody passing them on the street, or working with them, would know that they're sick," says Jaideep Talwalkar, M.D., assistant professor of medicine and pediatrics, and associate director of the center.

Yale's adult program, accredited by the Cystic Fibrosis Foundation, has continually kept up with advances in the field. Because long-standing data links comprehensive care with longer life spans, all patients now have easy access to a nurse, respiratory therapist, nutritionist, social worker, physical therapist, and research coordinator.

"All of our caregivers are very important," says Cheryl Robaczynski, registered dietician for the clinic, explaining that CF is a complex disease that affects not only the lungs, but other factors as well, such as digestion and blood sugar. "One symptom may be an issue for a patient during a visit and it may take center stage, but everything is important. As a member of the team, I need to have basic knowledge in all of the areas," she says.

The center's expertise has recently been bolstered by the 2010 recruitment of Amy M. Ahasic, M.D., M.P.H., assistant professor of medicine and an expert in critical care and occupational medicine.

Most of the center's patients were diagnosed as newborns or children, and treated at the Yale Pediatric Cystic Fibrosis Center by the center's director, Marie E. Egan, M.D., and her colleagues. Very early screening has given these patients an advantage in that they began respiratory therapy before they were weakened by built-up mucus and debilitating lung infections. "We're very aggressive in making sure kids are gaining weight and getting adequate pancreatic enzymes if they have pancreatic insufficiency, which most patients do," says Egan, associate professor of pediatrics and of cellular and molecular physiology.

When patients turn 18, they participate in a formal transition to the adult clinic, quickly or gradually, depending on their comfort level.


ROBERT LISAK

Jonathan Koff, director of the Yale Adult Cystic Fibrosis Center, examines a patient. Koff attributes the center's success in treating patients to a number of factors, including better diagnostic methods.

Meanwhile, a minority of patients make their first visits as adults, as a woman in her 60s, who had been misdiagnosed as having asthma, did recently.

"Cystic fibrosis is a multi-system disease and we're interested in helping to diagnose patients where it was not previously considered," says Jonathan Koff, M.D., assistant professor of medicine and the adult center's director, who especially wants to test those who have pancreatitis, fertility issues, chronic sinusitis, nasal polyps, and chronic lung infections. Those diagnosed at a later age typically have a milder version of the disease and are often relieved to hear their diagnosis. "If they come to us with a cough, and we tell them that they have CF and we can provide relatively simple therapies to improve things, I think they're better off," he says.

Adult patients are different in that they are expected to "take ownership" of their disease and to depend less on family members to make sure they take their antibiotics, enzymes, vitamins, use airway clearance devices to break up mucus, or take a nebulizer treatment multiple times a day. They learn to juggle what can be hours per day of therapy with their jobs, relationships, and families. "We value the input and involvement of family members regardless of the age of the patient, but we really try to put our emphasis on the patient. When I have a 25-year-old whose mother is still making calls to say her child isn't feeling well, that's a sort of a red flag that the patient needs to take ownership," says Talwalkar.

Patients visit the adult center at least four times a year, and more frequently if there are symptoms or issues that require special attention. They may see specialists in areas that become important as they grow, including diabetes and its complications, osteoporosis and risk of fractures, and fertility and family planning, and insurance or employment issues.

"Overall, our patients are optimistic, because they've seen other patients do well," says Koff. "We have patients who do all sorts of things, so that ultimately the challenge becomes balancing their therapies in their daily life."

Apple names Yale a 'standout school' for curricular innovations

The School of Medicine's iPad initiative, through which all Yale medical students have been provided with an Apple tablet computer containing the school's curriculum, has won praise on campus and off, most recently by Apple Computer itself, which chose to include the School of Medicine in its "Standout Schools" webcast series.

The series showcases educators from across the country who are using technology to engage students in new ways.

On July 31, the live event featured an interview with Michael L. Schwartz, PH.D., associate dean for curriculum and associate professor of neurobiology, who described the transition from the mountainous stacks of paper students once received to a curriculum that is essentially paperless. The idea, which began as a five-month pilot program in 2011, has had manifold benefits. "We felt this would allow us to be a little 'greener' in our curriculum, by reducing the nearly $100,000 a year we spent on copying costs," Schwartz said.

But the initiative has also vastly changed the way Yale medical students learn, and may ultimately change the way they practice medicine. "Our goal was to provide a full curricular material set to our students, electronically, taking advantage of what the platform allows," Schwartz says. "We also wanted to provide our students with a secure mechanism for generating, storing, and reading electronic protected health information, and the iPad met the standard very well for us. And finally, we wanted to create a platform that will provide our faculty with new ways to continue developing our curriculum."


Michael Schwartz

The webcast can be found online at http://edseminars.apple.com/standout-schools.

Grants and contracts awarded to Yale School of Medicine

September/October, 2011

Federal

Philip Askenase, NIH, *Allergy and Immunology Training Grant*, 5 years, $1,031,249 • **Lydia Barakat**, Health Resources and Services Administration, *Natl. AIDS Education and Training Centers/Expanding HIV Training Into Graduate Medical Education*, 3 years, $450,000 • **Rachel Barnes**, NIH, *Examining Innovative Obesity Treatment and Related Novel Constructs*, 5 years, $800,410 **Jonathan Belman**, NIH, *TUG-Mediated GLUT4 Glucose Transporter Trafficking and Regulation by Post-Translational Modifications*, 2 years, $70,630 • **Robert Bjornson**, NIH, *High-Performance Computing Instrumentation for Yale University Biomedical HPC Center*, 1 year, $587,958 • **Christopher Burd**, NIH, *PtdIns 4-Kinase Regulation of Protein Sorting in the Golgi Apparatus*, 3.9 years, $1,322,977; NIH, *Sorting and Trafficking in the Endosomal System*, 2 years, $781,531 • **Lieping Chen**, NIH, *Memory T Lymphocyte-Mediated Innate Immunity*, 1 year, $358,211 • **Yung-Chi Cheng**, NIH, *Chinese Herbal Medicine as a Novel Paradigm for Cancer Chemotherapy*, 5 years, $996,835 • **Keith Choate**, NIH, *Mechanisms of Genetic Reversion in Ichthyosis with Confetti*, 5 years, $1,870,126 • **Gary Cline**, NIH, *Mouse Metabolic Phenotyping Center*, 4.8 years, $61,258 • **Joseph Craft**, NIH, *Training Program in Investigative Rheumatology*, 5 years, $1,633,985 • **Enrique De La Cruz**, NIH, *Actin Filament Elasticity and Actin-Binding Protein Function*, 3.7 years, $1,416,657 • **Francesco D'Errico**, Dept. of Homeland Security, *ARI-MA Superheated Emulsions for Nuclear Material Detection*, 4 years, $394,729 • **John Eicher**, NIH, *Pleiotropic Roles of Dyslexia Genes in Neurodevelopmental Language Impairments*, 3 years, $125,400 • **David Fiellin**, NIH, *Integrated Stepped Care for Unhealthy Alcohol Use in HIV*, 5 years, $2,941,601 • **Richard Flavell**, U.S. Army Medical Research Acquisition Activity, *Deciphering the Role of the Inflammasome in Regulation of the Intestinal Mucosal Immune Response in Health and Auto-Inflammatory Colitis*, 3 years, $1,199,133 **Jason Fletcher**, NIH, *Estimating the Causal Effects of Social Networks on Health Behaviors*, 1.9 years, $522,263 • **Terri Fried**, NIH, *Promoting Behavior Change to Increase Engagement in Advance Care Planning*, 1.8 years, $372,302 • **Xiao-Bing Gao**, NIH, *The Role of Hypocretin in Cocaine Reinforcement*, 1 year, $93,242 • **Alan Garen**, NIH, *Hepatitis D Virus Genomic RNA in the Etiology of Liver Cancer*, 2 years, $176,979 • **Mark Gerstein**, Brookhaven Natl. Laboratory, *KBASE: An Integrated Knowledgebase for Predictive Biology and Environmental Research*, 9 months, $122,000 • **Jaime Grutzendler**, NIH, *Role of Endothelial Cancer Cell Engulfment During Metastatic Brain Invasion*, 2 years, $396,702; NIH, *Vascular Mechanisms of Neuronal Circuit Disruption in Dementia*, 1.4 years, $117,396 **Jennifer Guo**, NIH, *The Neural Correlates of Impaired Consciousness in Childhood Absence Epilepsy*, 1 year, $145,470 • **Robert Heimer**, NIH, *Parenteral HCV Transmission: Assessing Risks and Prevention Strategies* In Vitro, 4.8 years, $2,963,889 • **Roy Herbst**, NIH, *Personalizing NSCLS Therapy: Exploiting KRAS-Activated Pathways*, 4.9 years, $1,311,323 **Tamas Horvath**, NIH, *AgRP Neurons Regulate Bone Remodeling in Aging*, 4.9 years, $1,021,717 • **Karl Insogna**, NIH, *AgRP Neurons Regulate Bone Remodeling in Aging*, 4.9 years, $855,514 • **Amy Justice**, NIH, *Alcohol and Multisubstance Use in the Veterans Aging Cohort Study*, 5 years, $3,145,347 • **Leonard Kaczmarek**, NIH, *Cellular Regulation of Sodium-Activated Ion Channels*, 4.8 years, $1,758,440 • **Richard Kibbey**, NIH, *The Role of the Mitochondrial GTP Cycle in Insulin Secretion*, 5 years, $1,861,603 • **Megan King**, NIH, *The Role of Nuclear Architecture in Adaptation*, 4.9 years, $2,493,523 • **Jonathan Koff**, NIH, *Effect of Rhinovirus on Airway Epithelial Reciprocal Pathways Influence NK Cells*, 7 months, $328,887 • **Peter Krause**, NIH, *The Health Burden of a Recently Discovered* Borrelia *Spirochete*, 2 years, $433,873 • **Harlan Krumholz**, NIH, *Administrative Supplement to Yale Clinical and Translational Science Award* (Robert Sherwin, PI), 4.8 years, $299,739 **Nicole Landi**, NIH, *Neurobiology of Language Function in Adolescents Exposed to Cocaine In Utero*, 1.8 years, $430,981 • **James Leckman**, NIH, *Integrated Brain, Body, and Social Intervention for ADHD*, 3.9 years, $1,005,819 **James Macy**, NIH, *Mouse Metabolic Phenotyping Center*, 4.8 years, $305,116 • **Nicole McNeer**, NIH, *Nanoparticle Delivery of Triplex-Forming PNAs for* β*-thalassemia Gene Therapy*, 1 year, $140,190 • **Laura Niklason**, NIH, *Biological Vascular Grafts*, 4.1 years, $2,048,805 • **Marcella Nunez-Smith**, NIH, *Eastern Caribbean Health Outcomes Research Network (ECHORN)*, 4.7 years, $2,847,233 **Jordan Pober**, NIH, *Regulating Anti-Endothelial T Cell Responses in Graft Arteriosclerosis*, 3.7 years, $2,593,950 • **Peter Rabinowitz**, Natl. Inst. for Occupational Safety and Health, *Assessing Hearing Conservation Effectiveness*, 4 years, $2,446,460 • **Mohini Ranganathan**, NIH, *Characterization of the Response to Kappa Opiate Agonist Salvinorin A in Healthy Humans*, 2 years, $359,975 • **Martin Schwartz**, NIH, *Regulation of a Lipid Raft Trafficking Pathway by Integrins*, 3.8 years, $1,546,242 **Gerald Shadel**, U.S. Army Medical Research Acquisition Activity, *Regulation of Yeast Mitochondrial Function and Life Span by TORC1 Signaling*, 3 years, $324,914 • **Erik Shapiro**, NIH, *MRI-Based Immune Cell Tracking in Alzheimer's Disease*, 2 years, $444,638 • **Gerald Shulman**, NIH, *Mouse Metabolic Phenotyping Center*, 4.8 years, $3,835,836 • **Jody Sindelar**, NIH, *Financial Motivations to Quit Smoking and Prevent Related Economic Costs*, 2 years, $413,750 • **Megan Smith**, Dept. of Health and Human Services, *New Haven MOMS Project Phase II*, 5 years, $299,995 • **Christal Sohl**, NIH, *Kinetics of DNA Polymerase Gamma Upon Mutation and Nucleoside Analog Exposure*, 3 years, $152,766 • **Stefan Somlo**, NIH, *Mouse Models of Polycystic Kidney Disease*, 5 years, $1,861,603 • **Matthew State**, NIH, *Collaborative Genomic Studies of Tourette Disorder*, 2.8 years, $302,001 • **Richard Sutton**, Dept. of Defense, *XMRV and GWI: Is There an Association?* 3 years, $565,419 • **William Tamborlane**, NIH, *Career Development Programs in Diabetes Research for Pediatric Endocrinologists*, 2.8 years, $1,275,826 • **Mary Tinetti**, NIH, *Therapeutic Competition Among Disease in Elders: Frequency and Outcomes*, 1.9 years, $135,983; NIH, *Effect of Treating One Disease on Other Diseases and Health Outcomes in Elders*, 1.5 years, $475,575 • **Tobias Walther**, NIH, *Mechanisms of Lipid Droplet Protein Targeting*, 4.9 years, $2,059,899 • **Nadia Ward**, Dept. of Education, *Gaining Early Awareness and Readiness for Undergraduate Programs*, 7 years, $7,139,998 • **Tian Xu**, Dept. of Defense, *A Forward Genetic Screening for Prostate Cancer for Progression Genes*, 3 years, $620,625 • **Hongyu Zhao**, NIH, *Chinese Herbal Medicine as a Novel Paradigm for Cancer Chemotherapy*, 5 years, $343,736

Non-federal

Anton Bennett, University of Rochester (NIH), *Targeting Phosphatase Regulated Cleavage of HIF-1-Alpha in Ischemic Brain Injury*, 5 years, $88,436 • **Hilary Blumberg**, American Foundation for Suicide Prevention, *The Neural Circuitry of Suicidality in Adolescent Depression*, 2 years, $75,000 • **Elizabeth Bradley**, Harvard School of Public Health, *Developing the Long-Term Capability of Ethiopia's Health Extension Program Platform*, 1 year, $174,995 • **Bo Chen**, Karl Kirchgessner Foundation, *HDAC4-Mediated Cone Photoreceptor Protection in Retinal Degeneration*, 1 year, $50,000 • **Won-Kyung Cho**, American Thoracic Society, *The Role of IL-13 Signaling and Arginase in the Pathogenesis of Pulmonary Arterial Hypertension*, 2 years, $100,000 • **Judy Cho**, University of Colorado at Denver (NIH), *Pilot Integrative Studies in Human Intestinal Inflammation/Cooperative Study Group for Autoimmune Disease Prevention Pilot Project*, 1 year, $123,750 • **Hyung Chun**, Pfizer Inc., *Targeting of P53 by MicroRNA-P53 in PH*, 1 year, $100,000 **Eve Colson**, Josiah Macy Jr. Foundation, *Using Continuity of Teaching, Patient Care and Inter-Professional Learning: An Innovative Clinical Curriculum at Yale*, 2 years, $280,000 • **Pietro De Camilli**, Simons Foundation, *Functional Analysis of Patient Mutations in EFR3A, an ASD Candidate Gene*, 2 years, $250,000; Ellison Medical Foundation, *PI(4,5)P2 Metabolism in the Aging Brain*, 4 years, $997,250 • **Enrique De La Cruz**, Human Frontier Science Program Organization, *Mechanical Properties of Reconstituted Actin Stress Fibers*, 3 years, $88,000 **Marcel De Zoete**, Netherlands Organisation for Scientific Research, *The Role of NOD-Like Receptors in Controlling a Healthy Intestinal Microbiota*, 2 years, $295,408 • **Daniel Dries**, Brigham and Women's Hospital (NIH), *Prevention of Cardiac Allograft Vasculopathy Using Rituximab Therapy in Cardiac Transplantation*, 1 year, $8,920 • **Richard Ehrenkranz**, Boston Medical Center (NIH), *Neonatal Biomarkers in Extremely Preterm Babies Predict Childhood Brain Disorders*, 1 year, $86,490 • **Durland Fish**, G. Harold and Leila Y. Mathers Charitable Foundation, *Research on the Epidemiology of Tick-Borne Diseases at Yale*, 1 year, $165,000 **Mark Gerstein**, Massachusetts Inst. of Technology (NIH), *A Data Analysis Center for Integration of Fly and Worm modENCODE Datasets*, 1 year, $140,001 • **Thomas Gill**, University of Pennsylvania (NIH), *The Testosterone Trial: Bone Study*, 11 months, $41,835; University of Florida (NIH), *The LIFE Study*, 1.2 years, $1,810,397 • **Julie Goodwin**, Charles H. Hood Foundation, *The Role of the Endothelial Glucocorticoid Receptor in the Development of Atherosclerosis*, 2 years, $150,000 • **Michael Higley**, Alfred P. Sloan Foundation, *Alfred P. Sloan Research Fellows*, 2 years, $50,000 **Ralph Hoffman**, Brain and Behavior Research Foundation, *Aberrant Memory Consolidation and the Emergence of Schizophrenia*, 1 year, $98,920 • **Mark Horowitz**, Maine Medical Center Research Inst. (NIH), *Interdisciplinary Study of Marrow Adiposity, Mineral Metabolism and Energy Balance*, 9 months, $260,533 **James Howe**, University of Texas (NIH), *Structure and Function of NMDA*, 1.7 years, $21,459 **Peter Jatlow**, University of Connecticut Health Center, *Nicotine Replacement for Smoking Cessation During Pregnancy*, 4 months, $6,310 • **Amy Justice**, University of Pittsburgh (NIH), *Cardiovascular Disease Mechanisms in HIV Infected and Uninfected Veterans—Supplement*, 9 months, $130,055 **Leonard Kaczmarek**, Autifony Therapeutic Ltd., *Development of Kv3 Channel Modulators for Treatment of Tinnitus*, 1 year, $115,735 **Robert King**, Rutgers, the State University of New Jersey (NIH), *Collaborative Genomic Studies of Tourette Disorder*, 10 months, $43,000 • **Gary Kupfer**, Milbank Foundation for Rehabilitation, *Psychosocial Support for Pediatric Cancer Patients and their Families*, 1 year, $50,000 • **Linda Mayes**, Northern Illinois University (NIH), *Maternal Self-Regulation and Parenting: Contributions to the Emergence of Infant Self-Regulation*, 1.8 years, $222,194 • **Diane McMahon-Pratt**, Intelligent Optical Systems, Inc. (Dept. of Defense), *Multiplex Rapid Test Kit for Leishmanaiasis Detection in Sand Flies*, 2 years, $201,944 • **Eric Meffre**, Mt. Sinai School of Medicine (NIH), *Loss of B Cell Tolerance in Primary Immunodeficiencies*, 1 year, $412,985 • **Kevin O'Connor**, University of Colorado at Denver (NIH), *Cooperative Study Group For Autoimmune Disease Prevention*, 1 year, $123,375 • **A. David Paltiel**, Massachusetts General Hospital (NIH), *Novel Methods to Inform HIV/TB Clinical Trial Development*, 1 year, $40,838 • **Vinita Parkash**, Johns Hopkins University (Dept. of Defense), *Elucidation of Molecular Alterations in Precursor Lesions of Ovarian Serous Carcinoma*, 1 year, $50,841 • **Katerina Politi**, Canary Foundation, *Mouse Models in Support of Lung Cancer Biomaker Discovery*, 1.5 years, $65,112 **Anna Rhoades**, University of Pennsylvania (NIH), *Mechanisms of Curvature Sensing and Generation by Peripheral Membrane Proteins*, 1 year, $19,275 • **David Rimm**, University of Wisconsin-Madison (NIH), *Era Proteostasis in Breast Cancer*, 11 months, $68,683 • **Harvey Risch**, Johns Hopkins University (Dept. of Defense), *Prevention of Ovarian High Grade Serous Carcinoma by Elucidating its Early Changes*, 1 year, $12,288 • **Michael Robek**, Columbia University (NIH), *Interleukin 21 as a Vaccine Adjuvant for High Priority Pathogens*, 1.5 years, $290,734 • **Robert Rosenheck**, Feinstein Inst. for Medical Research (NIH), *Recovery After an Initial Schizophrenic Episode (RAISE) Project*, 3 years, $169,214 • **James Rothman**, Wellcome Trust, *Nanoscopy in the Living Cell*, 2.5 years, $3,439,224 • **Elizabeth Scheideman**, American Cancer Society, Inc., *Retroviral Library Screening to Identify GPCR Transmembrane Inhibitors*, 3 years, $150,000 **Martin Schwartz**, Sanford-Burham Medical Research Inst. (NIH), *Ultrastructual Basis of Mechanotransduction in Matrix Adhesions*, 11 months, $262,902 • **Nenad Sestan**, University of Texas Southwestern Medical Center at Dallas (NIH), *Structural Development of Human Fetal Brain*, 1.7 years, $71,272 • **Lawrence Siew**, American Academy of Pediatrics, *Reliability of Telemedicine in the Assessment of Seriously Ill Children*, 1 year, $10,000 • **Jody Sindelar**, State of Connecticut (NIH), *Incentives to Quit Smoking in CT Medicaid: Role of Medical Homes*, 5 years, $101,876 • **Brian Smith**, Association of Pathology Chairs, *Proposal to Survey U.S. Medical Schools Regarding Formal Instructions and Curricula in Laboratory Medicine*, 1 year, $5,000 • **Steven Southwick**, Mount Sinai School of Medicine (DHHS), *Trajectories of Psychological Risk and Resilience in World Trade Center Responders*, 3 years, $246,296 • **Stephen Strittmatter**, Axerion Therapeutics, Inc., *Axonal Growth Therapy for Neurological Recovery from Spinal Cord Injury and Stroke*, 1 year, $109,375 **Patrick Sung**, Lawrence Berkeley Natl. Laboratory (NIH), *Structural Cell Biology of DNA Repair Machines*, 1 year, $106,614 • **Oyebode Taiwo**, Stanford University (DHHS), *Occupational Exposure to PM2.5 and Cardiovascular Disease*, 1 year, $80,904 • **William Tamborlane**, Case Western Reserve University (NIH), *Epidemiology of Diabetes Interventions and Complications*, 9 months, $198,941 • **Flora Vaccarino**, Brain and Behavior Research Foundation, *GABA Neuron Differentiation in Tourette Syndrome*, 1 year, $100,000 • **Min Wang**, Alzheimer's Association, *Nicotinic Alpha7-NMDA Receptor Interactions in the Aged Nonhuman Primate*, 2 years, $99,105 **Stuart Weinzimer**, Stanford University, *Treat-To-Range Closed-Loop Therapy for Type 1 Diabetes: Smart Rx*, 1 year, $134,727 • **Sherman Weissman**, Stanford University (NIH), *Longitudinal Epigenomic Tracking of the Reprogramming Process*, 5 years, $2,888,886 • **Xiao Xu**, Wayne State University (DHHS), *Drug Insurance, Medication Adherence, and Subsequent Outcomes Among Seniors*, 7 months, $11,203 • **Xiaoyong Yang**, Ellison Medical Foundation, *O-GlcNAc Signaling in Caloric Restriction and Aging*, 4 years, $400,000 **Dejan Zecevic**, Research Foundation of CUNY (NIH), *VGSC Modulatin by FHFS: Neural Functions and Mechanisms*, 1.7 years, $18,867 **Jiangbing Zhou**, B*CURED, *Targeted Delivery of Combination Therapy for GBM Using Multi-Functional Ultrasmall Nanoparticles Loaded with SIRNAS*, 1 year, $50,000

// Gastroenterology *(from page 1)* University School of Medicine, where he stayed on as an internal medicine resident at Bellevue Hospital.

He first came to Yale as a fellow in gastroenterology in 1963. "I have been at Yale for just short of 50 years," he says. "Having spent my professional career as well as a good deal of my life here, I felt that I wanted to support basic research in gastroenterology at the institution."

At the School of Medicine, Binder has served in numerous teaching, administrative, research, and clinical roles. He was director of the General Clinical Research Center from 1980 to 2001. He established and for many years directed two National Institutes of Health (NIH)-supported training programs, and had more than 35 years of continuous support from the NIH. His work in the lab focused on understanding the mechanisms by which ions such as sodium and potassium are absorbed and secreted by the large intestine, and how changes in this physiology cause diarrhea.

Though he is a professor emeritus and retired, "you would never know it," Joan Binder observes. He maintains an active clinical practice with Yale Medical Group, providing care to patients with a variety of gastrointestinal illnesses including unexplained chronic diarrhea.

Binder's decades of research are now serving as the basis for improving diarrhea treatment in parts of the world where treatment is critically needed. In recent years, with support from the Bill and Melinda Gates Foundation, Binder has worked to reformulate oral rehydration solution (ORS)—a recipe of salt, sugar, and water—in the optimal ratio for the treatment of diarrhea in children. This new formulation evolved from research in his laboratory.

Diarrhea is most prevalent in places where people lack access to clean food and water, and Binder has traveled to India—where diarrhea causes more than 350,000 child deaths per year—over a dozen times, collaborating with investigators at Christian Medical College in South India for the last 20 years to study diarrhea together with the development of this reformulated ORS.

For a lifetime of contributions to the field, Binder was awarded the Distinguished Achievement Award in 2005, and the distinguished Mentor Award in 2007, both from the American Gastroentological Association. This past year, New York University honored him with the Solomon A. Berson Alumni Achievement Award in Clinical Science.

After nearly 50 years in New Haven, Yale is also "home" for Joan Binder, who has served as a docent at the Center for British Art for three decades. The Binders' daughter, Sarah, graduated from Yale College in 1986 with a degree in history.

"Yale has given me a collegial environment that has been very beneficial to establish collaborations and interactions with a range of colleagues," Henry Binder says. "I found it a very nurturing, friendly, collaborative environment."

// Pediatrics *(from page 1)* Department of Pediatrics to build novel programs to meet new challenges in medicine. "There is a need to replenish, to rejuvenate the department with a stream of young physicians and investigators and educators," he says. "The most important thing I can do is establish an environment where people want to come and launch their careers—an environment that is challenging, but offers opportunity. I want to seed the department, rather than sod it."

Lister returns to Yale from the University of Texas Southwestern Medical School, where he served as chair and professor of pediatrics and associate dean of education since leaving Yale in 2003. At UT Southwestern, Lister established a multispecialty consultation network that allowed health care providers to discuss their patients' cases with subspecialists at any time for free. The network was created in response to the multitude of underserved patients Lister observed, many of whom lacked health insurance or lived long distances from medical centers. He hopes to develop a similar network in the New England area, which will not only provide access to medical expertise to physicians in the communities that Yale serves, but will keep those physicians informed about "the real and present problems in the direct care of patients."

Lister was a pediatric resident at YNHH and then a fellow at the University of California, San Francisco. Five years after returning to Yale in 1988, he became director of the pediatric intensive care unit. He soon established the Section of Critical Care and Applied Physiology in the Department of Pediatrics, and under his leadership the section continued to expand its clinical and academic activities.

"Dr. Lister spent many highly productive years at Yale and helped shape the department to which he is now returning as chair," says David J. Leffell, M.D., the David Paige Smith Professor of Dermatology and Surgery and deputy dean for clinical affairs. "His knowledge of our institution and experience as chair of the pediatrics department at Southwestern will allow him to proceed rapidly to help the department realize its great potential."

At Yale, Lister will continue his research on monitoring children at risk for sudden infant death, work on which he has collaborated with Yale's Eve R. Colson, M.D., associate professor of pediatrics, for many years. He also hopes to develop a program to help students interested in pediatrics to develop careers as physician-scientists, and to build bridges between pediatrics and other departments. In particular, he is interested in building collaborative efforts to diagnose and treat chronic illnesses that emerge in childhood, such as diabetes, congenital heart disease, and depression.

Lister succeeds Clifford W. Bogue, M.D., who has served as interim chair of the Department of Pediatrics since September 2010.

// Scholars *(from page 1)* of Health (NIH), this period in a young researcher's career has become especially fraught.

"This program is particularly important for psychiatry and for child psychiatry," says State, also professor of genetics and co-director of the Yale Program on Neurogenetics, "because we're at a point where we're beginning to understand the basic mechanisms of these diseases, and we need the next generation desperately to be able to leverage that knowledge with the latest technology. These next several years will be the time when we will finally start to crack this, and we can't afford to lose these people." The new program, says State, "gives free rein to young faculty to do high-risk, interesting things early in their career, which is exactly what we need to do."

For Allison, it was a happy discovery that his alma mater was a center of world-class research on precisely the sorts of psychiatric illnesses he would like to target: in addition to anxiety disorders, Allison hopes to see the gift provide support for research on depression, obsessive-compulsive disorder (OCD), and Tourette syndrome, which receive far less research funding than better-known disorders such as schizophrenia and autism.

"I was a liberal arts major, and I never encountered anybody at the medical school," says Allison. "But over the last year and a half I've gotten to how important the research at Yale has been, and how promising it is. If this is thought of as seed money that can attract additional funding, so much the better."

In addition to nurturing scientific talent, Allison has focused his donation on increasing collaborations between researchers who approach psychiatric disorders from diverse perspectives. "This type of illness is about the most complex there is, because there are genetic causes, developmental causes, and the environment, and there has to be a coordinated approach—genomics, pharmacology, neuroscience, and psychiatry—to understand them."

The initiative took root in Allison's conversations with Yale CSC Director Fred R. Volkmar, M.D., the Irving B. Harris Professor of Child Psychiatry, Pediatrics, and Psychology; John H. Krystal, M.D., the Robert L. McNeil Jr. Professor of Translational Research and chair of the Department of Psychiatry; and State, who says that Allison was thinking big: "'I want you to do something transformative,' he said, 'What are the big ideas?' And we concluded that the impact of this program would be both immediate and lasting, not just understanding these disorders, but moving toward treatment. This is a huge win-win."


John Krystal


Matthew State


Fred Volkmar

(From left) Thomas Fernandez, Christopher Pittenger, and Tamara Vanderwal, the inaugural group of Psychiatry Research Scholars, will receive funding to support their research on psychiatric illnesses.

The inaugural Psychiatry Research Scholars will receive their first funding in September, and State says the three individuals chosen exemplify the range of research interests, and the range of career stages, the program is designed to support.

Tamara Vanderwal, M.D., M.DIV., just completed her clinical training at Yale this past July, and she will make use of the new funding to support her neuroimaging research on the development of the "social brain" in toddlers and young children.

Thomas Fernandez M.D., an instructor at the CSC, will dramatically expand his research, which receives partial funding from the National Institute of Mental Health, in psychiatric genetics, focusing on Tourette syndrome, motor stereotypies, and anxiety.

An expert on OCD, Christopher Pittenger M.D., PH.D., assistant professor of psychiatry, in the CSC, and of psychology, has received some external funding for his work, but he is pursuing a line of research that State says "has the potential to make major contributions to the understanding and treatment of Tourette disorder." This work "has great promise to garner NIH funding with a relatively modest amount of additional investment" from the new gift, State says.

"If this new effort can hasten the day when these illnesses are better understood," Allison says, "then the gift of our family's foundation will have provided a little bit to help in that direction."

RNA biologist is honored as scientist, advocate, and mentor

The School of Medicine's Joan A. Steitz, PH.D., has been awarded two major prizes that recognize outstanding achievements of women scientists.

Steitz, Sterling Professor of Molecular Biophysics and Biochemistry and a Howard Hughes Medical Institute investigator, was awarded the Pearl Meister Greengard Prize of Rockefeller University for more than four decades of research on how messenger RNA (mRNA) is fashioned in order to make proteins from the instructions in DNA, a process crucial to all life.

Steitz was also named winner of the 2012 Vanderbilt Prize in Biomedical Science, created "to honor and recognize a woman scientist of national reputation who has a stellar record of research accomplishments and is known for her mentorship of women in science" by Vanderbilt University School of Medicine.

"Professor Steitz is both a tireless advocate and a visible and successful role model for women in science," said Steven Girvin, deputy provost for science and technology at Yale. "Her work was critical to our understanding of the complex and crucial role RNA molecules play in biology."

As a student at Harvard University in the 1960s, Steitz almost decided not to pursue a career in science because of a lack of opportunities. However, with the encouragement of established scientists such as James D. Watson, PH.D., winner of the Nobel Prize for discovery of the structure of DNA, Steitz began to study how RNA operates in bacteria.

After coming to Yale in 1970, Steitz soon discovered "initiator regions," sites in mRNA strands that mark where the cell's protein-making machinery begins translating mRNA into proteins. In a classic paper published 10 years later, Steitz showed that RNA-protein complexes in the cell nucleus called snRNPs are critical to splicing, by which non-coding sequences are excised from pre-mRNA to form mRNA. Steitz has been an international leader in describing the molecular events involved in creation of mRNA. In the decades since, RNA biology has exploded, and Steitz continues to explore RNA's diverse and powerful roles in the cell.

The Pearl Meister Greengard Prize was created by Nobel laureate and Rockefeller professor Paul Greengard, PH.D., who donated his entire monetary share of the 2000 Nobel Prize in Physiology or Medicine to Rockefeller University to establish the annual prize, which honors the accomplishments of women scientists. The prize is named in memory of Greengard's mother, who died giving birth to him. The award includes a $100,000 honorarium.

Winners of the Vanderbilt Prize receive a $25,000 honorarium, visit Vanderbilt to meet with faculty and to deliver a Discovery Lecture, and also serve as a mentor, "nurturing the career, research, and studies" of a Vanderbilt Prize Scholar, "a promising woman beginning her PH.D. studies" at Vanderbilt University School of Medicine. Steitz will receive the award in May, 2013.

TERRY DAGRADI

Joan Steitz, who has made seminal contributions to RNA biology, received two top honors in September.

Epidemiologist honored for work developing mathematical models of disease outbreaks

Alison P. Galvani, PH.D., has received the Blavatnik Award for Young Scientists from the New York Academy of Sciences. Galvani, associate professor of epidemiology and of ecology and evolutionary biology, is one of four faculty recipients of the award in 2012.

Galvani's work focuses on integrating epidemiology, evolution, and ecology in order to generate predictions that could not be made by these disciplines alone.

Galvani's interdisciplinary approach has widespread potential for answering evolutionary questions, explaining empirical observations, and informing public health policy.

Alison Galvani

She has applied this approach to the study of HIV, influenza, tuberculosis, and the human papillomavirus (HPV), among other diseases.

The Blavatnik Awards celebrate the excellence of young scientists and engineers in New York, New Jersey, and Connecticut. They recognize highly innovative, impactful, and interdisplinary accomplishments in the life sciences, physical sciences, mathematics, and engineering, with unrestricted financial prizes.

Leading researcher on disability in the aged is lauded by national gerontology society

Thomas M. Gill, M.D., an expert in research and clinical care aimed at preventing disability among older persons, has received the 2012 Joseph T. Freeman Award from the Gerontological Society of America.

Gill, the Humana Professor of Medicine and professor of epidemiology and of investigative medicine, is a leading authority on the epidemiology and prevention of disability among older persons. His research has offered compelling evidence to support an emerging paradigm of disability as a reversible, and often recurrent, event. With results from his epidemiologic studies, Gill

Thomas Gill

successfully implemented a landmark clinical trial that demonstrated that functional decline among frail elderly persons can be prevented.

Gill serves as director of the Yale Program on Aging, the Claude D. Pepper Older Americans Independence Center, the Center on Disability and Disabling Disorders, and a National Institute on Aging-funded postdoctoral training program in geriatric clinical epidemiology and aging-related research.

Stem cell scientist is the recipient of awards from the White House, genetics societies

In July, President Obama named Valerie Horsley, PH.D., the Maxine F. Singer '57 Assistant Professor of Molecular, Cellular, and Developmental Biology one of 96 recipients of the Presidential Early Career Awards for Scientists and Engineers (PECASE). In August, she was given a 2013 Rosalind Franklin Young Investigator Award, which is funded by the Gruber Foundation and administered by the Genetics Society of America and the American Society of Human Genetics.

Horsley studies the cellular and molecular mechanisms that control stem cell activity and function within epithelia—the tissues that line our internal organs and outer surfaces. Her lab uses the mouse as a genetic model

Valerie Horsley

system to study how adult stem cells within epithelial tissues maintain tissue homeostasis and contribute to wound healing, and their role in cancers.

The PECASE is the highest award bestowed by the United States Government on science and engineering professionals in the early stages of their independent research careers. The Franklin Award, named in honor of one of the founders of modern genetics, is given every three years to two young women geneticists. Designed to support career development, the awards include a grant of $75,000 over three years.

Charity renews support for research on outcomes in survivors of childhood cancer

Nina S. Kadan-Lottick, M.D., M.S.P.H., associate professor of pediatrics, has received a St. Baldrick's Foundation Extended Scholar Award.
The award extends Kadan-Lottick's previous St. Baldrick's Scholar Award, given in 2008, for an additional two years.

Kadan-Lottick researches outcomes among survivors of childhood cancer, 25 to 30 percent of whom experience long-term impairment in cognitive abilities and emotional regulation.

Her research seeks to explain the considerable variation in outcomes seen among children who received identical therapy, with a focus on possibly inherited factors that affect how chemotherapy is metabolized, or that result in vulnerability to these outcomes.

Nina Kadan-Lottick

The St. Baldrick's Foundation, founded in 2000, is a volunteer-driven charity committed to funding research to find cures for childhood cancers and to give survivors long and healthy lives.

Kadan-Lottick, medical director of the heros Program at Yale, received her M.D. from Johns Hopkins University School of Medicine. She completed a residency in pediatrics at Johns Hopkins Hospital, and fellowships in pediatric hematology/oncology, at The Children's Hospital at the University of Colorado Health Sciences, and in epidemiology, at the University of Minnesota.