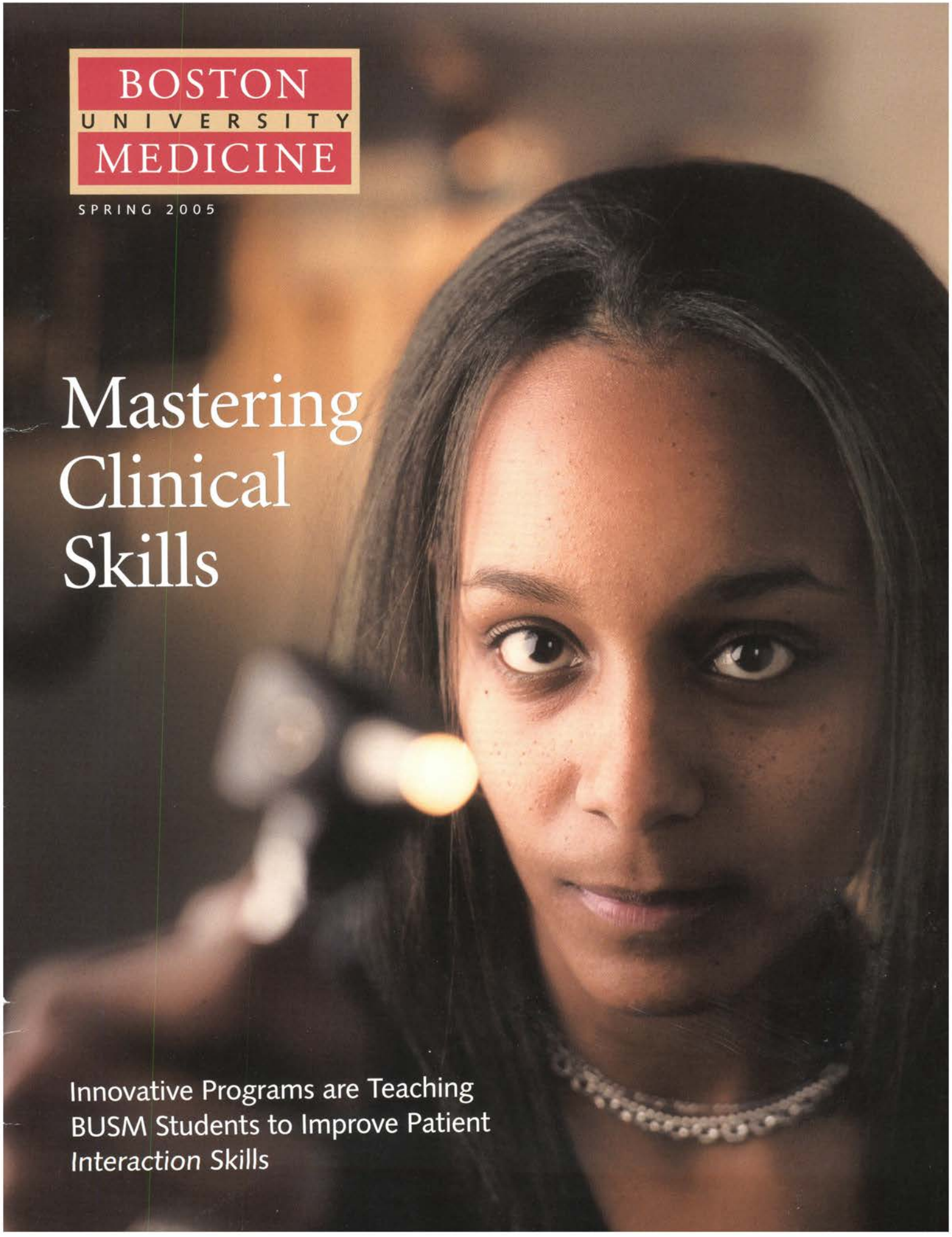
2005

Boston University medicine: v. 14, no. 1-3


BOSTON
UNIVERSITY
MEDICINE
SPRING 2005
Mastering Clinical Skills
Innovative Programs are Teaching BUSM Students to Improve Patient Interaction Skills

MESSAGE FROM THE DEAN

This issue of *Boston University Medicine* went to press halfway between Match Day and Graduation, and as you can imagine, the excitement on campus early in May was palpable. By the time you read this, the class of 2005 will be dispersed, taking with it the memory of a remarkable transition at the school. Presiding at her first Graduation as Dean, Karen H. Antman conferred diplomas on 155 new medical doctors, 16 PhDs, and 5 MD-PhDs.

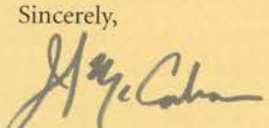
Dr. Antman started work on May 1, becoming the first woman dean here since Frances Sproat Cook held the position from 1863 to 1865 in the New England Female Medical College. More news about Dean Antman's arrival on campus appears on page 2.

Selecting carefully from the many interesting ideas that power the intellectual life at this campus, we've chosen in this issue to tell you about an important development in medical education: use of simulations to teach clinical skills. A well-trained standardized patient can provide realistic and manageable information to a medical student while at the same time assuring the teaching faculty of a predictable and consistent performance. As we move to more rigorous assessment of clinical skills, such simulations are becoming a valuable tool.

Other articles in this issue will take you from the molecular and genetic scale of age-related changes in brain function among zebrafish all the way to the largest genetic/phenotypic study of centenarians and their children in the world. The tiny, transparent zebrafish and its genome point the way to phenotype futures. The centenarian study reveals how genetic variations link to the ability to delay or escape age-related illnesses and to age relatively slowly.

This, then, concludes my final message to you as Acting Dean. Starting May 2, I return to my position as Associate Dean for Academic Affairs, and I plan to retire next year. Serving as the school's Acting Dean for the past 17 months was an unexpected honor. One high point of this office has been participating in the planning and preparation of this magazine, and I hope you enjoy the reading in this issue.

Sincerely,



John McCahan, MD

BOSTON UNIVERSITY MEDICINE

Vol. 14, No. 2, Spring 2005

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FEATURES

DEPARTMENTS

Boston University Medicine is published by Boston University Medical Center, Department of Corporate Communications, 715 Albany Street, Boston, MA 02118, on behalf of the Boston University School of Medicine.

Managing Editor: Stephen McGettrick. **Editor:** Donna Coco. **Design:** Boston University Office of Publications Production. **Cover:** Tom Kates. **Photography:** Tom Kates, Frank Curran, Boston University Photo Services and Cannon Design. **Contributing Writers**: David Craig, Peter Reich.

On the Cover: Miriam Shiferaw, a second-year student, performs an exam in the Clinical Skills Center.

BUMC Welcomes New Dean and Provost

Karen Antman, MD, a prominent oncologist who is recognized internationally as an expert on breast cancer and other malignancies, has been named dean of Boston University School of Medicine and provost of the Boston University Medical Campus.

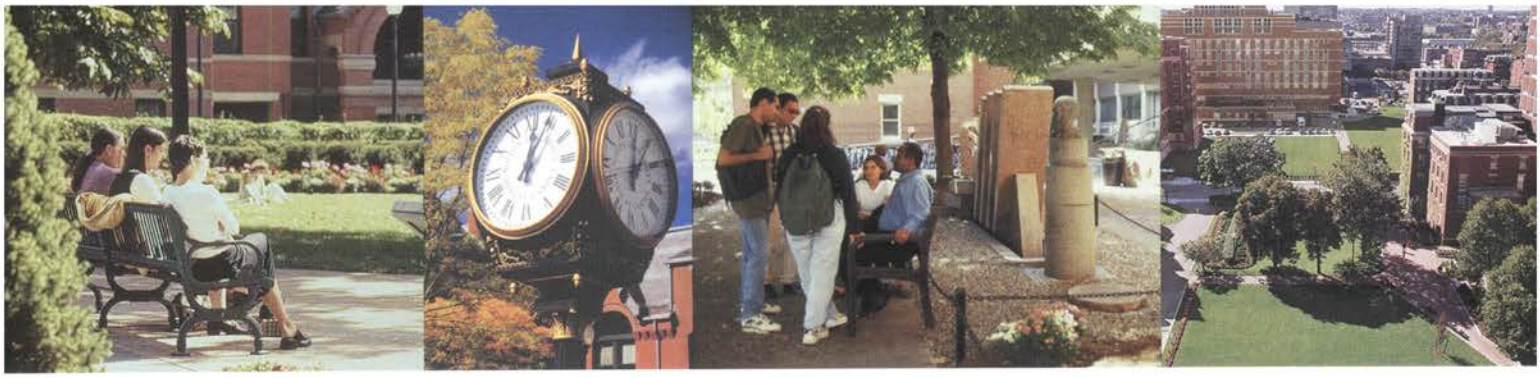
"Dr. Antman is an outstanding choice for these two posts," says Aram Chobanian, MD, Boston University president *ad interim*. "She is a proven administrator and educator, she is an excellent clinician and clinical scientist, and she is an established leader on health policy issues. We are indeed fortunate to find an individual who combines all of these strengths, and I am sure she will be an exemplary leader for both our School of Medicine and the entire medical campus."

Antman comes to Boston University from the National Cancer Institute, where she has served as deputy director for Translational and Clinical Sciences. She spent more than 10 years on the faculty of the Columbia University College of Physicians and Surgeons, where she was Wu Professor of Medicine and Pharmacology and director of the Herbert Irving Comprehensive Cancer Center, which is a National Cancer Institute-designated Cancer Center. She was voted Senior Faculty Teacher of the Year by medical residents at Columbia. She also served on the faculty of Harvard Medical School, and has had hospital appointments at Brigham and Women's Hospital and Dana-Farber Cancer Institute in Boston and Columbia Presbyterian Hospital in New York.

"The opportunity to work with the outstanding group of educators, care providers, and laboratory, clinical, and public health investigators at Boston University Medical Center is an enormous privilege," says Antman. "Under Dr. Chobanian's leadership, each of the components of the Boston University Medical Campus has thrived, and we will build on the strong foundation already created."

Antman received her medical degree from Columbia University College of Physicians and Surgeons. She was a resident in internal medicine at Columbia Presbyterian Hospital and completed fellowship training in oncology at the Dana-Farber Cancer Institute. She has served as president of the American Society of Clinical Oncology, the American Association for Cancer Research, and the American Society for Blood and Marrow Transplantation. She served for seven years as an associate editor of *The New England Journal of Medicine* and on the editorial boards of *The Lancet* and several other major medical journals. Additionally, she has authored or co-authored more than 250 scientific articles and six books.

She was inspired to enter academia, she says, "when, as a young oncologist, I realized that I could be the best possible physician and my cancer patient still could die. It seemed essential for me to get involved in research and education. When problems



arose in obtaining care for patients, colleagues and I wrote editorials. I was invited to participate in committees and became involved in making medical policy."

Among Antman's goals will be to increase philanthropic support to the medical campus and encourage academia-industry partnerships. "It's the best of times in that the opportunities in science and medicine are enormous," she says, "and it's also a challenging time in that the National Institutes of Health's budget is now constrained and paylines for research are falling. So we will have to diversify our strategies and increase our productivity to remain competitive."

Antman, a professor of medicine, will step into the two positions vacated by Chobanian when he was appointed president *ad interim* of BU in November 2003. John McCahan, MD, has served as acting dean since Chobanian's departure, and Thomas Moore, MD, has served as acting provost.

"...as a young oncologist, I realized that I could be the best possible physician and my cancer patient still could die. It seemed essential for me to get involved in research and education."

—Karen Antman, MD

KAREN H. ANTMAN, MD
Academic and professional highlights

Education

MD, Columbia University, College of Physicians and Surgeons	1974
BS, Muhlenberg College	1970

Academic Appointments

Associate Professor of Medicine, Harvard Medical School	1988–1993
Professor of Medicine, Columbia University, College of Physicians and Surgeons	1993–1994
Wu Professor of Medicine and Pharmacology, Columbia University, College of Physicians and Surgeons	1996–2004

Hospital Appointments

Associate Physician, Brigham and Women's Hospital	1982–1993
Associate Physician, Dana-Farber Cancer Institute	1988–1993
Assistant in Medicine, Beth Israel Hospital	1985–1993
Attending in Medicine, Presbyterian Hospital in the City of New York	1993–2004
Attending at the Clinical Center, National Institutes of Health	2004–2005

Honors

Phi Beta Kappa	
National Cancer Institute Research Fellowship	1980–1981
American Cancer Society Junior Faculty Clinical Fellowship	1981–1984
Senior Faculty Teacher of the Year, Columbia-Presbyterian Medical Center	1994
Jeffrey Gottlieb Memorial Award for Outstanding Achievement in Cancer Therapeutic Research	1996

Professional Societies

Past President, American Society of Clinical Oncology	1995–1996
Past President, American Society for Blood and Marrow Transplantation	1997–1998
Past President, American Association for Cancer Research	2003–2004

Editorial Boards

Associate Editor, *Cancer Research*	1992–1993
Associate Editor, *New England Journal of Medicine*	1993–2000
Member, *The Lancet's* International Advisory Board	2002–
Member, *Cancer*	1991–1993
Member, *Annals of Internal Medicine*	1992–1995

Publications

Dr. Antman has authored or co-authored more than 250 scientific articles and six textbooks and monographs.

Advancing Medical Education Through Simulations

BUSM has increased its use of simulated patient encounters, giving medical students not only more experience with patients, but also enhanced feedback on their clinical skills.

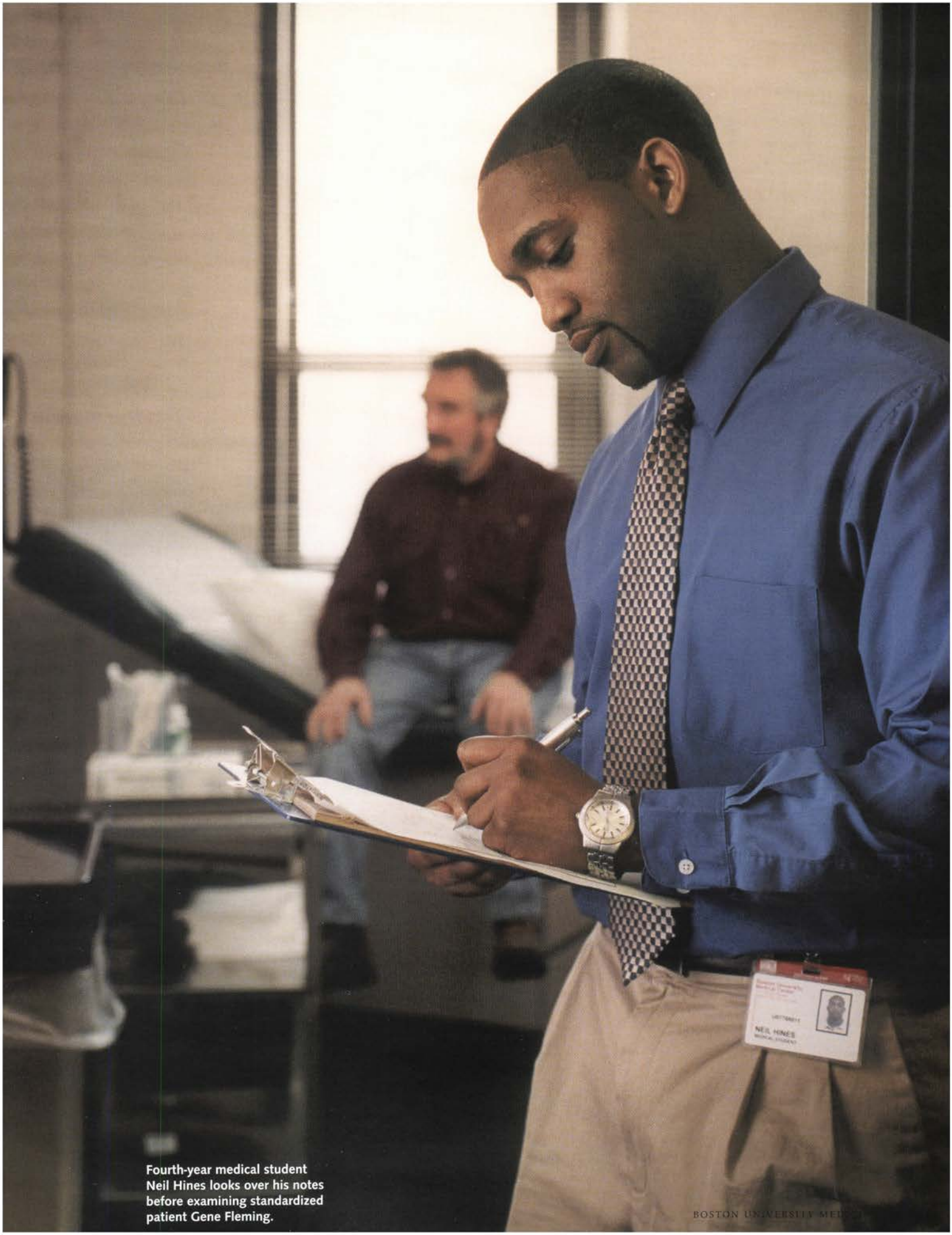
The fourth-year geriatrics clerk knocks on the door and then enters the exam room. She introduces herself, sits down, and starts asking the elderly patient questions about her health in a warm, soothing manner. With only 15 minutes for the exam, the clerk starts out well, asking pertinent questions. But rambling answers from the patient soon lead the clerk in circles, and she loses control of the interview. Before she knows it, the session is over, and the slightly flustered clerk hasn't finished her assessment nor given the patient any medical direction.

After the session ends, the patient turns to the clerk and asks, "So, how do you think you did?"

This elderly individual was actually a standardized patient, a lay person trained to act as a patient and provide students with feedback. The encounter was part of the mid-rotation formative evaluation recently instituted by the geriatrics clerkship, during which clerks are tested on their communication skills by participating in three different case studies, each of which employs a standardized patient.

The use of standardized patients is not new to Boston University School of Medicine (BUSM), but the increasing frequency with which they are used is. "Working with standardized patients can be an incredible teaching time for a student, because it's like having a real-live patient with real-live issues but no consequences," says Lorraine Stanfield, MD, assistant professor of medicine.

During the past two years, Stanfield has led a BUSM effort to institute two major exams that use standardized patients at the end of the second and third years to assess students' clinical skills. To house these exams and other simulated encounters, the school also created the Clinical Skills Center, an impressive facility, directed by Stanfield, that opened in the fall of 2003 and includes 12 outfitted exam rooms. Four of the rooms have video-monitoring equipment so that faculty can observe students in action from a control room and provide medical-oriented feedback in addition to the advice given by the standardized patients.



Fourth-year medical student Neil Hines looks over his notes before examining standardized patient Gene Fleming.

The end-of-third-year exam

Initially administered in the spring of 2004, the end-of-third-year exam was established to assist students preparing for the National Board of Medical Examiners Step 2 Clinical Skills (CS) exam, part of the United States Medical Licensing Examination (USMLE). The CS exam, which became mandatory in the fall of 2004, assesses students' abilities to execute fundamental clinical skills, like taking medical histories, performing physical exams, communicating, documenting findings and diagnoses, and ordering initial diagnostic tests.

Although the Step 2 exam is longer, BUSM's end-of-third-year exam was modeled on the same format, says Peter Shaw, PhD, associate professor of family medicine, associate professor of socio-medical sciences and community medicine, and associate director in the Office of Medical Education. It presents students with six cases, one from each of their clerkships, developed by Shaw in conjunction with the clerkship directors. "The idea was to come up with a single case for each one of these clerkships that exemplified a central skill that the directors felt the students should get out of their clerkship," says Shaw. "That's pretty difficult to do, because students learn a lot of different skills, but we did it."

The exam takes a full day to complete, with each case lasting about 35 minutes. Students read the cases, which specify exactly what is expected of them, and then have 15 minutes to examine and interview the standardized patient. After completing the exam, students leave the room and have 10 minutes to fill out their post-encounter paperwork; at the same time, the standardized patient completes an evaluation form. "There's a whole series of questions—a check list—that the standardized patients go over," says Stanfield. "For example, if the patient came in with a cough, the form will contain questions such as did the student ask whether they smoked, what medicines they're on, if the patient is coughing up blood. There are all these possible things the student might have discovered—how many did the student find?"

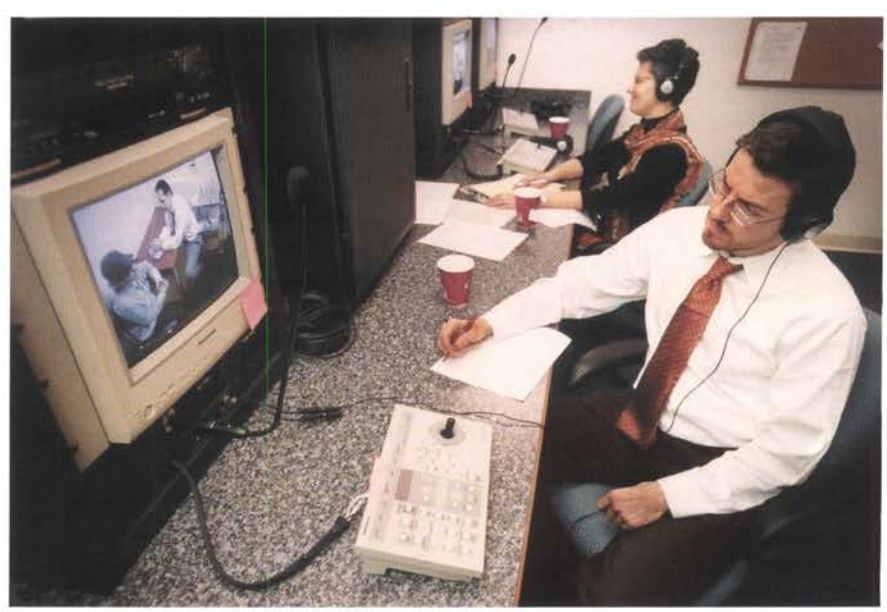
Students then go back into the exam room and receive detailed feedback from the standardized patient who, as Stanfield describes it, now becomes an educator. If a faculty member was watching via the video feed, he or she will also go into the exam room at this point and give feedback as well. Overall, students are tested on their interviewing and physical exam skills, as well as abilities to synthesize data, assess a patient's needs, and devise a plan.

"We've received a lot of positive responses about the exam from students," says Stanfield. "They really like the feedback, and some of them say they've learned things that they had no idea of before, because you really don't know how you're coming across to people."

BUSM student Lisa Stutius '05 took the exam last April. She was nervous, she says, wondering if she'd ask the right questions and come up with the correct diagnoses. It was also the first time she had to deal with strict time limits. Additionally, she wondered how genuine the encounters would seem, thinking the standardized patients might come across more as actors than patients. "I was surprised by how realistic the situations were," says Stutius. "The standardized patients had believable answers for any question you could ask and were amazingly realistic for the physical exams."

Each of the third-year clerkships were well represented by the cases, believes Stutius, who also thought the best part of the exam was the feedback. "Normally, a clinic visit is like a black box where it's just you and the patient and nobody is there to watch what you are doing," she says. "Here we got immediate,

Lorraine Stanfield, MD, has led the effort to ensure students learn proper clinical skills.



From the control room in the Clinical Skills Center, Matt Russell, MD, MSc, and Sharon Levine, MD, monitor student interactions with the standardized patients.

detailed, and extremely honest feedback. It was useful to hear what we could have done better and what we did well."

In general, Stutius found the exam to be an exceptionally valuable learning experience. The time limits helped her become more aware of the need to organize and prioritize information gathering, she says. "This was also one of the first times that I got to deliver my own assessments and plans to patients," says Stutius. "During my clerkships, it was usually the attending delivering the information, or me delivering information that I had verified with the attending. This gave me a chance to draw my own conclusions, make my own plans, and then attempt to deliver them clearly and confidently to patients. It was a great opportunity to see how much medical school has taught me."

Since then, Stutius has taken the Step 2 CS exam, and although she hadn't received her score as of press time, she thinks the end-of-third-year exam served as excellent preparation. "The formats of the two exams were similar enough that the end-of-third-year exam was like a practice exam," she says.

The end-of-second-year exam

The inaugural end-of-second-year exam took place at the Clinical Skills Center this past March, after the Introduction to Clinical Medicine (ICM) II course concluded. It's similar to the end-of-third-year exam, says Stanfield, but there are only three cases and they are easier. Students also have 17 minutes to meet with the standardized patients (vs. 15 minutes). The exam assesses students' communication and interviewing skills, as well as their abilities to synthesize data. "In the third year, you can ask students to really talk and write about what they think is going on and what they want to do about it," says Stanfield. "In the second year, they're essentially learning how to gather data, but they don't know what to do with it yet."

The cases were developed by the course managers from ICM I fall, ICM I spring, and ICM II, those faculty members being respectively: Douglas Hughes, MD, associate professor and vice chairman, Department of Psychiatry; Nanette Harvey, MD, clinical instructor, family medicine; and Stanfield. "Students see one case from each of us, but it was very much a collaborative effort," says Stanfield. "We sat together and talked about what we wanted the different cases to look at and to test."

> "Do they know what to ask and how to ask it? Do they know how to use their diagnostic equipment? If not, then we really have to look at what we are teaching and why it's not working."
>
> —Lorraine Stanfield, MD

The exam was instituted for a variety of reasons, notes Stanfield, one being that it gives faculty a standard way of evaluating students. "It's after they've had a series of courses on introductory clinical exam skills, but before we're letting them loose on the third year," she explains. "It's nice to be able to evaluate their skills and say, 'This student has a problem in this area. How can we help him address it over the next few months before he enters the third-year curriculum?' "

At the same time, it helps the faculty evaluate their curriculum. "We want to know if students have achieved a certain level of competence with regard to their interview and physical examination skills," says Stanfield. "Do they know what to ask, and how to ask it? Do they know how to use their diagnostic equipment? If not, then we really have to look at what we are teaching and why it's not working."

Furthermore, it should help students prepare for their end-of-third-year exam, as well as give them even more experience before taking the Step 2 CS exam. "We hope that after taking our two end-of-year exams, by the time students get to the USMLE board exam, it won't seem that intimidating," says Stanfield.

Standardized patients and clerkships

In addition to the end-of-year exams, medical students also encounter standardized patients during many of their clerkships. While participating in the obstetrics/gynecology clerkship, students learn how to perform pelvic and breast exams using standardized patients, and they are also used for part of the final exam. "It's a particularly good way to observe the competency of students who are completing our clerkship," says Dick A. J. Brown, MD, clinical associate professor of obstetrics and gynecology and director of the clerkship.

Pediatrics also uses standardized patients for a pass/fail exam that tests students' abilities to take a comprehensive well-child history. During the exam, the standardized patient plays a parent of a 14-year-old and a 3-year-old child and then takes on the role of the 14-year-old. Benjamin Siegel, MD, professor of pediatrics and psychiatry and director of the clerkship, says he wants to make sure students can carry out the history in a psychologically, socially, and culturally competent manner while displaying empathy and using good communication skills.

Students receive the family's history in advance so they can adequately prepare, says Siegel. He expects students to ask challenging questions on topics such as substance abuse, domestic and family violence, and teenage sexuality. "The exam lets them practice asking challenging questions, and then they receive feedback on how to enhance these critical interviewing skills," says Siegel. "It

Training Under Pressure

STANDARDIZED PATIENTS work well for teaching communication and certain diagnostic skills. But what about situations that demand immediate action, like anaphylaxis, when a patient experiences an allergic reaction and his airways constrict? Or when a patient needs to be intubated?

Enter SimMan, a realistic mannequin that can be programmed to simulate various patient-care scenarios. Just a small sampling of its features include an EKG library of more than 2,500 cardiac rhythm variants (heart sounds are synchronized with the EKG), a pulse strength that varies with the selected blood pressure, and the ability to recreate such airway complications as pharyngeal obstruction and tongue oedema. The person monitoring the simulation can also change SimMan's vital signs on-the-fly. "It can actually talk," says Keith Lewis, MD, associate professor of anesthesiology and chairman of the Department of Anesthesia. "You can program it to say things like 'I'm feeling light headed' or 'I don't feel right. I can't breathe.' "

Lewis spearheaded the development of a simulation center at Boston Medical Center that features two SimMans plus a pediatric version of SimMan to be used for several purposes. One is to create infrequent, but potentially life-threatening scenarios to test and sharpen hospital staffs' skills. "Malignant hyperthermia, for example, is when a patient undergoing general anesthesia has an increase in body temperature—it goes up to 106 or 108," explains Lewis. "If the diagnosis is not made quickly and treated very aggressively, the patient can die. It's incredibly infrequent, but when it happens, that's not the time you want to go through the moves that need to occur. So we can simulate events like this that are uncommon, but life threatening."

Lewis also plans to use the center for training residents during their first few weeks, teaching them how to intubate and deal with life-threatening situations. Eventually, he wants to include a few sessions with medical students as well during their two-week anesthesia rotation. "Working with SimMan is very lifelike and anxiety producing," says Lewis, "because I can create the next scenario and change how the mannequin reacts based on what the resident does. I can see how they perform under peer pressure and performance pressure."

With SimMan, residents also have to physically execute the various procedures, notes Lewis. "It feels like you're really intubating someone when you put the breathing tube in," he says, "and unlike other simulations, this brings in the kind of sixth sense about anesthesia. It's not just one thing that's going on at one time. At the same time that you're intubating, you see the EKG, you see the pulse oximeter, you see x, y, and z going on and all the consequences of the event."

Although Lewis's focus is understandably on anesthesia, his goal is to open the simulation center to whatever specialty would like to use it. Jonathan Olshaker, MD, professor and chairman of the Department of Emergency Medicine, is interested in potentially using the simulation center, although he's also interested in creating a more extensive center that would be both a hospital and medical school resource. "We're still in the early stages of planning this," he says, "but it would be a real nuts-to-bolts simulation center. It would provide training in airway, chest tubes, clinical scenarios—a place that gives practice to both your thought processes and your procedural skills."

Ruben Azocar, MD, assistant professor of anesthesiology and director of the Simulation Center, demonstrates an intubation on SimMan.

Like Lewis, Olshaker thinks mannequins such as SimMan are an excellent way to offer this kind of training. "It's an opportunity for junior trainees to practice procedures and become more facile with them before actually performing them on patients," he says. "It's also an opportunity for attending physicians to get continuing medical education. So it's good for everybody."

Creating such a center is an expensive proposition due to all of the necessary equipment; Olshaker also envisions hiring a full-time manager. But he's optimistic and hopes to see progress in the next few years. "It's an exciting concept," he says. "I think in the next 10 years it will become mandatory for emergency medicine residencies to have such a center. It's also a great recruiting tool for students, residents, and staff."

also allows for exploration of the way in which students ask challenging and sensitive questions without causing shame or humiliation to either the student or the patient."

Family medicine has been using standardized patients to test students' interviewing skills since its clerkship began in 1998, says Shaw, who is director of the clerkship. Recently, family medicine started employing the Clinical Skills Center to extend its use of these encounters, conducting two cases on one day around the middle of its clerkship. For one case, students discuss the patient presented in written form in the morning, and then, in small groups, perform a history and physical exam on a standardized patient at the center in the afternoon. One student performs the exam, which takes about 15 minutes, while two or three fellow clerks and a faculty member observe. "When the session ends, the student who performed the examination is asked to reflect on it," says Shaw, "and then the observing students give feedback. The faculty member also gives feedback, as does the standardized patient."

The other case is a patient interview using an interpreter. Again, the students discuss the written case in the morning and then perform the interview at the center in the afternoon, with one student asking the questions and others observing in small groups. After the interview is completed, both the patient and interpreter talk about how the student came across. "Students need to know how to work with an interpreter," says Shaw. "They run into such instances all the time, and not only in large cities. Lewiston, Maine, for example, has a big Somali population—who would've thought?"

There are plans to add yet another case to this mid-clerkship evaluation, according to Shaw. "We were a little concerned in family medicine because the physical exams aren't being as systematically observed as we want, so we're going to add another case," he says.

Additionally, students interview standardized patients as part of the clerkship's final exam. "They don't do a physical exam," explains Shaw. "That information is provided on a card along with a chief complaint. There's a checklist of questions that students have been trained to ask, so it's the student's job to interview the standardized patient and do a focused history of the problem.

"Students need to know how to work with an interpreter. They run into such instances all the time, and not only in large cities."

— Peter Shaw, PhD

"It's great having the Clinical Skills Center to hold these in," he adds, "because you have the exam rooms and the equipment—it just makes it that much more realistic."

With funding from the Donald W. Reynolds Foundation, geriatrics added standardized patient encounters to its clerkship this past fall. As described earlier, the ungraded exam, which takes place at the Clinical Skills Center, assesses clerks' communication skills with three case studies. "We instituted it as a formative evaluation in the middle of their rotation so if there were skills that we thought students could work on, there would be time to remediate," says Sharon Levine, MD, associate professor of medicine and director of education for the Geriatrics Section. "Our goal is that they should be able to have a meaningful conversation with a patient that shows good communication skills. The way we talk to geriatric patients is important—a large segment are demented, or deaf, or blind. They usually have comorbidities that have to be dealt with. So communication skills become really important."

Before each encounter, students receive a sheet that provides an opening scenario and a basic overview of the case. Students then have 15 minutes to perform the exam, followed by seven minutes to complete their post-encounter paperwork. During this time, the standardized patients fill out evaluation forms. "It's a very specific form with a checklist," says Levine, "so students get objective feedback."

Next, students discuss how they did with the standardized patients. Using the video equipment, faculty members try to observe every student during a case as well, and will join the session that they have been observing to add a medical perspective to the feedback.

Geriatrics instituted the exam because the faculty wanted a standardized method for measuring students' capabilities, says Levine. "We observe students often while on house calls or in the nursing home, but in the field every doctor has his or her own style in terms of what responsibilities they let students take on," she explains. "Does the student mostly observe? Does the student interact with the patient but then isn't responsible for generating the treatment plan? How much autonomy does the student really have? We have no way of seeing that, because everybody has their own way of teaching and grading. This gives us a standardized way to observe and takes out the potential bias of observations by individual preceptors."

Students have responded positively to the exam, adds Levine, saying they find it very useful. "Most students want to be effective doctors," she says. "This is the kind of feedback that can really help them be more effective. It's a win-win for us in geriatrics, and it's a win-win for the institution." □

Celebrating

Centenarians

To learn how to achieve a healthy, long life, the New England Centenarian Study looks to those who have accomplished this feat.

ASK PEOPLE IF THEY WOULD LIKE TO LIVE TO 100 or older, and many will reply with an emphatic "no!" To them, old age means decaying health, both physically and mentally, and poor quality of life.

Ask one of the participants in the New England Centenarian Study (NECS), however, and you'll likely get a different reply. The NECS, directed by Thomas Perls, MD, MPH, associate professor of medicine in the Department of Medicine's Section of Geriatrics, began in 1994 and is the world's largest comprehensive study of centenarians and their families, with more than 1,300 participants. Many of these age-defying individuals are quite engaging and still enjoy life. They visit with family and friends, attend to their gardens—a couple of exceptional centenarians even work or golf. "The notion that there's a turning point and that the older you get, the sicker you get, doesn't have to be true," says Perls.

Eunice Holmes, at 104, with her nephew, Doug Schroder

Grace Fair, at 103

Raymond and Lydia Schwartz, at 100 and 98

"People have such a negative stereotype of older people," says Dellara Terry, MD, MPH, who works with Perls on the NECS and is an assistant professor of medicine. "We're bombarded with this negative image of people in their older years. I think there's a lot to be appreciated and enjoyed about older people."

Centenarians provide us with a model of successful aging, notes Perls. By studying them and their families, he hopes to determine how certain people attain exceptional old age while markedly delaying or completely escaping diseases normally associated with aging, like Alzheimer's disease, cancer, heart disease, and stroke. The goal is to discover not only how to live longer, adds Terry, but how to live in good health. "It's the quality of life for whatever life span you have," she says.

Achieving a healthy old age is not dependent on any one factor, says Perls. "In the past, people thought there was some kind of holy grail or fountain of aging well, like it was a single gene," he says. "Very rarely is something purely genetic. It's usually an interaction of genetic, environmental/behavioral, and what we call stochastic—just plain luck—factors."

Perls and Terry look at genetics as well as a variety of other components for clues to longevity, analyzing blood samples and taking histories of participants. "We get a better understanding of what their health is like, including health-related behaviors, such as exercise and smoking, and then we take that phenotype—which is a sum of these various factors—and we ask the question, 'What is different about these folks vs. our controls?' " explains Terry.

During the NECS's past 10 years, numerous reports and publications have emerged from its data. "One major finding was that the older you get, the healthier you've been," says Perls, referring to an NECS retrospective analysis that found about 90 percent of centenarians were functionally independent at least until the average age of 92, and 75 percent were equally functional at the average age of 95.

Centenarians appear to spend most of their lives in excellent health, according to the report, with a relatively rapid terminal decline, challenging the notion that old age equals poor health. "You can't be doing poorly in your 60s and 70s and expect to have a healthy older age," says Perls, "but if you avoid or delay disease, you can have an old age that's mostly in good health and function. These observations constitute a positive, enabling view of aging."

Most centenarians—about 85 percent—are women, according to NECS statistics. Men, though far fewer, tend to fare better than women in terms of physical and cognitive function. The NECS also discovered that neither dementia nor Alzheimer's disease are inevitable in old age, which contradicts what many people believe. Its findings suggest that around 25 percent of centenarians are cognitively intact; among those who are not, almost 90 percent didn't display any clinically evident impairment until well into their 90s.

Other factors often assumed to contribute to longevity—diet, education, ethnicity, religion, and socioeconomic status—actually vary widely among centenarians, according to NECS data. However, centenarians do share some characteristics: Few are obese,

Thomas Perls, MD, MPH, and Dellara Terry, MD, MPH, discuss the study.

Maybelle Montgomery, at 109, with her son, William, and his wife, Faye

Amos and Lucy Marston, at 95 and 87

Melvin Snook, at 100

heavy smoking is rare, and most handle stress well.

Another major finding, according to Perls, is that women who conceive and bear children naturally after the age of 40 have a four-times greater chance of living to 100 than other women. "It indicates that the rest of the body is aging well," says Perls. "One driving force from an evolutionary point of view is maybe the genes that enable you to have a child later in life enable you to live longer."

Centenarians typically aren't the only ones in their families to live healthy, long lives. Strong family ties to longevity often exist. For example, at least 50 percent of centenarians have first-degree relatives or grandparents who also reach very old age; brothers of centenarians have a 17-times greater chance of living to 100 and sisters have an eight-times greater chance.

With the help of a recently awarded five-year, $3.7 million grant from the National Institutes of Health (NIH), the NECS, along with three other research institutions, will extend its investigations to families with exceptional longevity. "Families have certain characteristics in common," explains Perls. "Diet, education, access to health care, tobacco use, and socioeconomic status are some of the many characteristics that family members have in common that can also affect life expectancy. With the NIH grant, we're going to look at familial traits and their possible ties to longevity. These families also may lack variations of genes that predispose them to premature illnesses and/or they may have variations that slow down aging and decrease one's susceptibility to age-related diseases, thus setting the stage for them to live longer."

For more than seven years, the NECS also has been following the children of centenarians in a nationwide study directed by Terry. "The advantage to studying the children is we can catch them at a point in their lives when they're still young—even though they're in their 70s, they're young for us. So we can track them and monitor them as they grow older," she says. "Many of the centenarians we recruit for our study die within a year of us recruiting and enrolling them. So when you try to collect information from them about their current health, or you get blood work to test for things like cholesterol, for example, that data may reflect frailty as opposed to what they were like for the past 80 or 90 years."

More than 400 centenarian offspring and about 300 offspring from non-centenarians participate in the study, according to Terry, who says data come from participants' responses to annual questionnaires. More detailed information is collected from the offspring than from the centenarians, she says, explaining that such a thorough questionnaire would be too taxing for most centenarians. The researchers collect data on the children's health and medical conditions, as well as when they developed those conditions. Researchers also look at functional abilities, nutritional data, alcohol consumption, smoking and exercise habits, body mass and weight, and the ability to handle stress. "We even ask things like if they need eyeglasses, dentures, or hearing aids," says Terry, "and we collect serum to do blood measurements for various biomarkers of health and possibly aging."

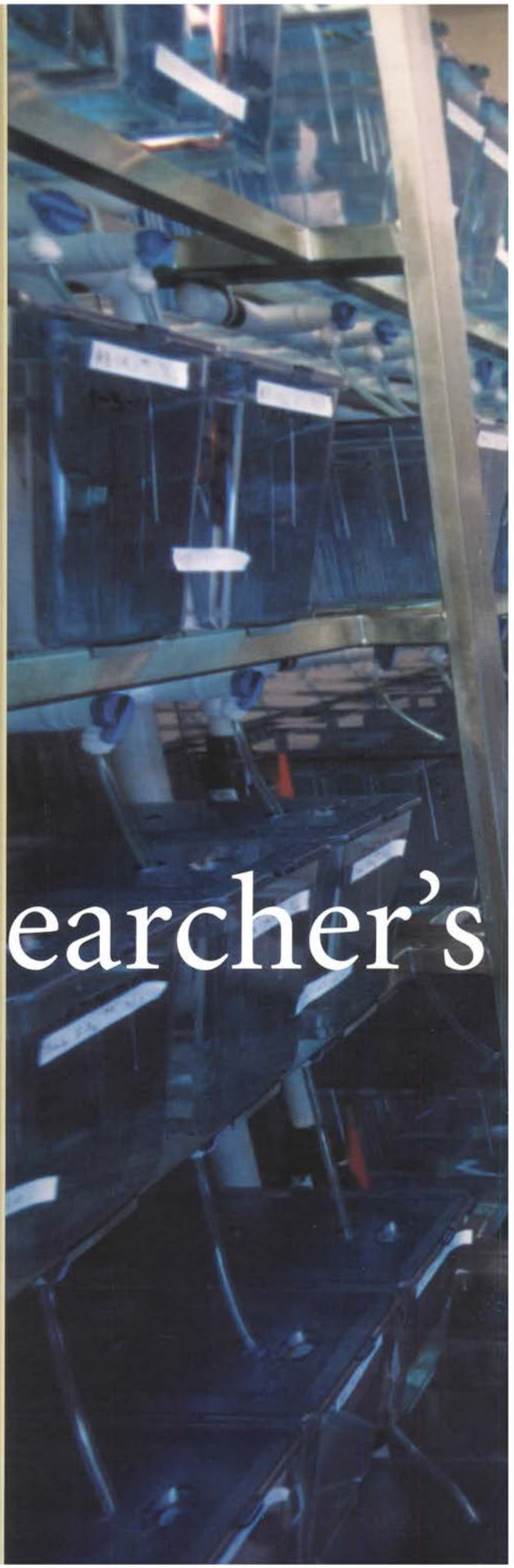
Although it will be some time before Terry can report any prospective findings, she has discovered from the current data that centenarian offspring have a much lower prevalence of heart disease and its associated risk factors of hypertension and diabetes. When the offspring do develop these diseases, it is typically at a later age.

Terry also is starting genetic analysis of the offspring in collaboration with Lindsey Farrer, PhD, professor of medicine, neurology, and genetics and genomics, and chief of the Genetics Program, and Clinton Baldwin, PhD, professor of pediatrics, research associate professor of medicine, and research assistant professor of biochemistry. "As we figure out more and more differences between the offspring and controls, we can choose which genes to investigate," says Terry.

The NECS's overall goal, says Perls, is to learn from the centenarians and hopefully help the general population to live well longer. "We have the genes to make it up into our mid- to late-80s and be healthy," he says. "If you smoke, don't exercise, are fat—these factors make us die at 79. So we're doing a poor job of taking advantage of our genes. We should be able to live another 10 years longer, and do so healthfully."

"Ultimately, we hope that people will learn from our study—whether it be lifestyle changes or eventual medications that help with age-related diseases—how to live well longer," adds Terry, "so they can stay active and vibrant and participate in society longer." □

For one BUSM researcher, zebrafish may prove to be the key to determining how certain brain secretions are involved in the regulation of behavior and physiological functions.



A Researcher's

Viewed under the microscope, the tiny, transparent zebrafish embryos zoom back and forth across the slide. Amazingly, these aquatic creatures share the majority of the same genes with humans, which is one of the reasons why Irina Zhdanova, MD, PhD, associate professor in the Department of Anatomy and Neurobiology at Boston University School of Medicine (BUSM), is so excited about zebrafish as research models. Zhdanova studies how certain brain secretions regulate behavior, as well as physiological functions. A large part of her research focuses on melatonin, produced by the pineal gland, and this hormone's involvement in the daily sleep regulation of diurnal (active chiefly in the daytime) species like humans. Zhdanova wants to understand the process by which melatonin affects sleep and cognitive performance.

She initially became interested in the relationship between melatonin and its effect on sleep while working as a post-doctoral fellow in the Department of Brain and Cognitive Sciences at the Massachusetts Institute of Technology (MIT) in Cambridge. "We had suggested that melatonin is a sleep-promoting signal for diurnal, but not nocturnal, animals," says Zhdanova. "I was doing clinical studies at MIT and became more and more interested in determining what are the mechanisms involved in this, so I started studying primates. We were the first group to show that melatonin actually promotes sleep in diurnal monkeys."

Fish Tale

However, Zhdanova found the use of monkeys for her experiments to be limiting. They are a large, expensive, and difficult-to-maintain species, she notes. They're also tough to breed. "There are very few progenies from the monkeys, so the genetics is a very difficult thing to do when you compare it, for example, to mice, which can have a litter of 10 or 12 pups in a couple of months," she explains. "But for our studies, the problem was mice are nocturnal. So if we want to ask how melatonin affects sleep, we cannot do it in nocturnal animals."

Although primates still play a major role in Zhdanova's research, she needed to find another genetically well-characterized diurnal species to facilitate her work. Through the scientific community, she heard about fellow researchers in laboratories around the world working with zebrafish. The species had become a favorite model for developmental biologists studying vertebrates, says Zhdanova. The reasons are multifold: Zebrafish are extremely prolific, laying 100 to 200 or more eggs weekly; the eggs develop rapidly, from a single cell to a recognizable tiny fish in 48 hours; the eggs grow outside of the mother's body and are transparent, so researchers can easily watch their development; the fish are relatively easy to maintain; and they also are genetically similar to humans, with zebrafish possessing counterparts to many human developmental and disease genes.

"Zebrafish were like a present to me," says Zhdanova. "We're amazingly close to those fish. The difference in terms of the number of genes that we are off from this fish is minute compared to the entire number of genes. Of course, each species adapted to different environments, but the DNA—the code—is the same. It's the same language that nature is talking to us in."

Zhdanova began her research with zebrafish while still at MIT. Her first quest was to demonstrate that melatonin actually affects the zebrafish's behavior, which she and her colleagues did, showing it promotes a sleep-like state. "We don't want to talk about sleep like how people sleep," she explains, "because some of the manifestations of sleep in mammals seem to be quite different from the zebrafish. That's why we characterized it behaviorally."

Enough similarities do exist, however, to make zebrafish a good model for Zhdanova's experiments. For example, much like mammals, zebrafish have a circadian rhythm of sleep and wakefulness. Additionally, when zebrafish are in their rest state, their arousal threshold is increased—they need more of a signal to activate them. "That's exactly the same thing that happens in all animals that are sleeping," she says. "And if you start depriving zebrafish of rest, they don't recover right away. They need some time. That's very similar to how humans respond."

> "Zebrafish were like a present to me. We're amazingly close to those fish... the DNA – the code – is the same. It's the same language that nature is talking to us in."
> —Irina Zhdanova, MD, PhD

While moving forward with her zebrafish research, Zhdanova also continued her work with primates. She started a collaboration with Mark Moss, PhD, BUSM professor and chairman of the Department of Anatomy and Neurobiology, in which they examined the effects of melatonin treatment on the sleep parameters of three primate species. During their investigations, Zhdanova let Moss know she was interested in starting her own lab. In 2002, he brought her over to BUSM.

Zhdanova planned to carry on her primate research at BUSM, but she also wanted to continue working with zebrafish. At the time, however, BUSM did not have a place for her to establish a zebrafish lab. "I knew that zebrafish were a goldmine," she says, "so I decided to build whatever I could, apply for a grant, and see what happens."

Using supplies from fish and hardware stores, Zhdanova constructed her own aquarium, a five-row shelving unit with each row holding seven fish tanks. In nooks and crannies around her lab, she placed microscopes, a brine shrimp tank (to feed the zebrafish), and other equipment needed to conduct her experiments. "It was difficult to work this way, but I really wanted to continue my research," says Zhdanova.

Then she won her first grant for zebrafish research from the Chaikin-Wile Foundation to study the subcommissural organ Reissner's fiber complex. The subcommissural organ (SCO) is positioned next to the pineal gland in the center of the brain, explains Zhdanova. In most vertebrates, it is active, secreting proteins that aggregate and make a tiny rope-like structure that originates in the third brain ventricle and travels through the fourth ventricle, and then through the entire central canal of the spinal cord, dissipating at the end. That rope is the Reissner's fiber, says Zhdanova. However, in humans, the SCO loses activity gradually during early childhood and appears to have little activity in adults.

"This gland is an enigma," says Zhdanova. "What it does, we don't know." To find out, she is exploring the potential role the SCO might play in development, circadian rhythmicity, and behavior, and she's using zebrafish as her models.

For this research, Zhdanova and her colleagues in the lab are endeavoring to breed transgenic zebrafish: These fish

would have an encoded green fluorescent protein (GFP) in their DNA that is tied to a specific protein. When the protein of interest is generated, so would the GFP, except the GFP glows when viewed under a microscope with fluorescent light, allowing Zhdanova to see where the protein of interest is initially produced. She also wants to tag the two proteins together, which would allow her to see where the protein of interest travels during development, again by viewing the GFP.

Zhdanova is halfway to her goal. She's been able to create a fish that expresses the GFP, and now she's working on tagging the protein. Her aim is to see the Reissner's fiber in a living zebrafish so she can follow the fiber's development and changes. "Right now, to see the Reissner's fiber, you have to kill the fish. But we could see it in our transgenic fish, under the microscope, in a living fish," she says. "We'll see what changes occur, and those could be long-term or short-term changes. But they'll be dynamic—we can see everything as it happens."

Since then, Zhdanova has won two other grants from the National Institutes of Health for zebrafish research. With one from the National Institute of Mental Health, she's examining which structures in the zebrafish are responsible for the effect of melatonin on sleep and which melatonin receptors are responsible. Zhdanova is working on transgenic fish for this study as well to see if she can tag the melatonin receptor protein with a GFP. "We want to see where those melatonin receptors are," she says.

She's also approaching the question from another angle, trying to inhibit a specific DNA construct so that particular genes related to the melatonin receptors aren't expressed. "We could then administer melatonin, and if there is no effect, we would know that it is most likely related to this receptor," says Zhdanova.

Although both zebrafish and humans have melatonin receptors, the two don't correlate exactly. But again, they have enough in common that zebrafish can serve as a model, says Zhdanova. "There are difficulties, but at the same time there are advantages, like the zebrafish are easy to produce, they are prolific, fast developing and transparent during development," she says. "Zebrafish are also a good model because melatonin can affect circadian rhythms in zebrafish, and because, obviously, there is just no possible way to do those studies in humans. It's even quite difficult to do those studies in primates. So we hope that the zebrafish will be a kind of first step where we can test these hypotheses, and then address them in primates. Then we can say, 'OK, maybe it's the same way in humans.' "

Her final grant, from the National Institute on Drug Abuse, studies the molecular mechanisms involved in drug abuse using zebrafish as the model. "It's not only the craving of the drug, but also how the animal becomes supersensitized to it. So, for example, we could figure out what are the genes and the proteins involved in those processes, and why addiction develops in some individuals, but not in others," says Zhdanova. "For that we need to characterize the responses to different drug doses and the particular symptoms associated with these effects."

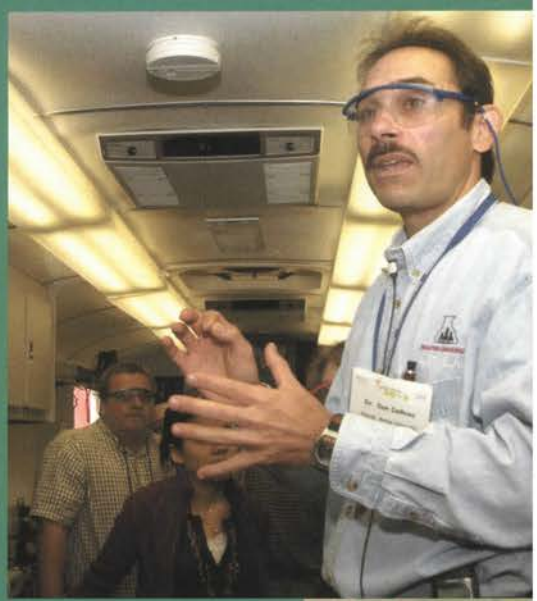
With three grants under way, Zhdanova was able to secure a larger space to build a dedicated zebrafish lab. Last summer, construction was completed, and Zhdanova already has thousands of zebrafish growing at various stages for her projects.

"More and more people are doing research with zebrafish. The community has grown by geometrical proportions in the last five years. There used to be about 100 people at meetings, and now it's more than 1,000, because there are so many people around the world who are interested in this," says Zhdanova. "These fish really are amazing and beautiful." □

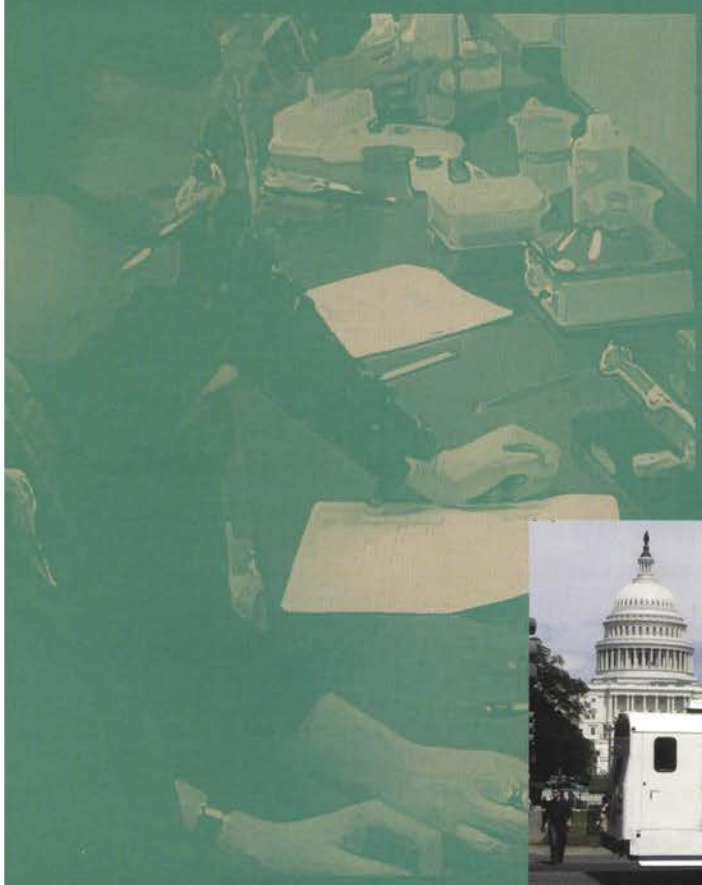
In the zebrafish laboratory are, from left, John Davenport; Lili Yu; Christina Quasarano; Emmanuel Guelin, PhD; Irina Zhdanova, MD, PhD; and Ken Masuda, PhD.

CityLab Persists on its Successful Path

As BUSM's CityLab program continues to grow, it brings biotechnology education to more students and residents with each passing year.



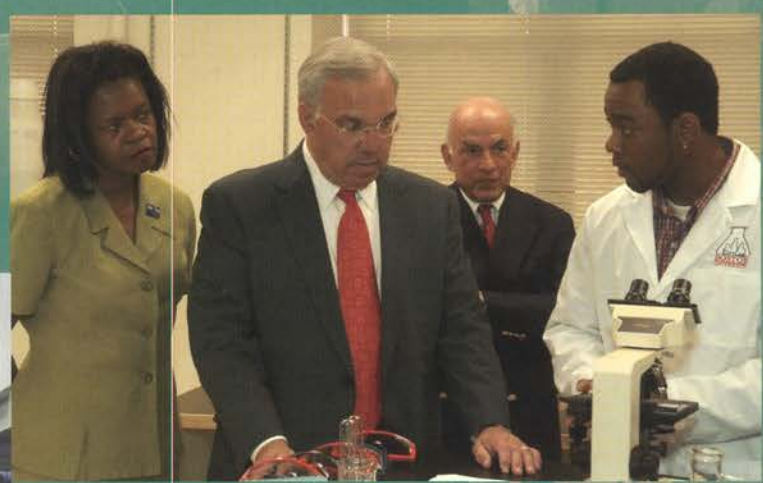
Don DeRosa, MAT, EdD, director of CityLab, gives instruction to a group of students.



MobileLab makes a trip to a trade show in Washington, D.C.

"CityLab is about giving back to the community, and introducing to school-age boys and girls the joys of science," says Carl Franzblau, PhD, chairman and professor of biochemistry and associate dean for Graduate Medical Sciences (GMS) at Boston University School of Medicine (BUSM) and founder of CityLab. The multifaceted program, which is run by GMS, accomplishes this mission by offering free biotechnology education to Massachusetts students and residents. The program officially began in 1992, when Franzblau received a grant from the National Institutes of Health's National Center for Research Resources (NCRR) to create a laboratory where teachers could bring middle and high school students to learn about the growing biotechnology industry. Since then, the program has touched more than 300,000 students and 2,000 teachers. Over the years, however, CityLab has also greatly expanded its offerings, notes Franzblau.

Carl Franzblau, PhD, founded CityLab.



State Senator Dianne Wilkerson, Boston Mayor Thomas Menino, and BU President *ad interim* Aram Chobanian, MD, speak with CityLab Academy graduate James Leonard.

Local high school students conduct an experiment at CityLab.

The biotechnology lab, where students come to participate in hands-on experiments, still exists as the core of the program and is located on the medical campus at 801 Albany St. It's led by Don DeRosa, MAT, EdD, director of CityLab and research assistant professor of biochemistry. During the school year, every Tuesday through Friday, about 50 students—two classes a day—come to the labs to participate in a discovery-oriented biotechnology lesson set up as a mystery. For example, in "The Case of the Crown Jewels," students learn how to use DNA fingerprinting to solve a crime. "They learn what forensic medicine is about, as well as what DNA can actually show and how accurate and compelling it can be," says Franzblau. "The students use much of the equipment and technology that's used in the modern biology life sciences."

The experiments are set up as mysteries because people learn better when a task means something to them. "Research shows that we tend to remember things that are meaningful to us," DeRosa says. "People love a mystery, so we thought why not leverage that natural curiosity and put it in the context of biotechnology. The students respond well to it."

An important aim of the program is for students to understand the fundamental concepts behind scientific experimentation and methodology. "The students identify a problem. They explore the concepts, and they construct an approach to gain knowledge," says DeRosa.

Additionally, he hopes to demystify biotechnology for the students. "We want them to leave here saying, 'This biotechnology is not that difficult, nor is it boring. Not only can I do that, but I understood it and it was pretty exciting and rewarding.' "

In fact, the program has become so popular that there's a year-long waiting list, and its popularity has spurred the development of several offshoots.

CityLab Academy graduate Khadija Rhourida is now a research technician at BU School of Dental Medicine. Inset, CityLab Academy Director Connie Phillips, MA, MPH.

Perhaps the most ambitious is MobileLab, a 40-foot vehicle that brings a science laboratory to schools all around eastern Massachusetts. "The mastermind behind MobileLab is Carl Franzblau," says DeRosa, who directs MobileLab as well.

"I felt that if the students could not come to us as often as they would have liked, then why not make a house call to their schools?" says Franzblau. "The University and the NCRR Science Education Partnership Award program generously helped to fund the MobileLab."

The MobileLab offers the same curriculum as CityLab, but gives teachers more flexibility because it's onsite. Teachers can bring three or four classes a day to the MobileLab without interfering with other classes. The MobileLab usually stays for a couple of days, so teachers can use it as an adjunct classroom or however they choose."

Like CityLab, the MobileLab is also incredibly popular and typically booked a year in advance. "We open up booking the first week in May, and usually after three days we're booked for the year," says DeRosa.

The CityLab team is disappointed that it cannot fulfill the demand for its use, notes Franzblau, especially to those school systems in the western part of Massachusetts. As a solution, Franzblau has proposed the creation of a statewide Sciences Corps, under which the state, along with CityLab's help, would provide MobileLabs to all of Massachusetts, but no decision has been made concerning this proposal as of press time. In the meanwhile, the CityLab staff has helped other programs develop their own MobileLabs, including sites in North Carolina, Connecticut, and Maryland, and has consulted with others from Texas and Canada.

Several other CityLab programs exist for students interested in furthering their biotechnology explorations. High school students can come to a week-long Biotechnology SummerLab, developed to provide a deeper understanding of basic techniques and concepts related to DNA science.

During that week, students become part of a mock company that purifies proteins. After several days of initiation and training, students are split into teams and asked to create the purest protein possible. "They insert a DNA component into a bacterium, and what they do in one week—it's actually amazing—they grow the bacterium, clone it, grow it, isolate a protein, and then purify the protein," says Franzblau. "On Friday, they give a report to their friends, family, and faculty."

Last summer, CityLab faculty member Carla Romney, DSc, MBA, research assistant professor of biochemistry, led an effort to expand the summer lab to include students with disabilities through a grant from the National Science

Foundation. "It was a wonderful experience," says Franzblau. "There was a tremendous amount of camaraderie. We're going to do it again next year."

For those students who still want more, DeRosa runs what he calls a scholars program. Once a month, these students come to CityLab in the evening and perform technique-oriented biotechnology investigations. Most of the students are previous participants in the summer camp, although it's open to others as well. "I'm constantly surprised by the number of students who come into Boston," says DeRosa. "But they seem to appreciate coming in, and it works out well."

If students are 16 or older, they can also request a summer internship. "We can't promise them, but we'll try to place them in one of the research labs here," says DeRosa. "We know it's difficult to take someone for the summer, but some of the researchers here have been very generous. What we offer are students who have the basic skills and know how to work in a lab. They're pretty motivated and reliable."

For several years now, CityLab also has partnered with the Massachusetts Biotechnology Council (MBC), a not-for-profit organization that provides services and support for the Massachusetts biotechnology industry. With funds from the MBC, CityLab has helped train teachers to set up laboratories and develop educational programs in their schools. Last year, the MBC's Education Foundation won a $1.3 million grant from the U.S. Department of Labor to expand this program and reach even more schools across Massachusetts. "The MBC asked us to expand our role as trainers," says DeRosa, "and as a result, we'll be getting a lot more financial support."

CityLab's reach doesn't stop with students. In 1996, CityLab Academy, a nine-month academic and job-skills training program for high school graduates interested in pursuing a career in the biotechnology industry, was founded. The program is free, and upon its completion, participants receive a certificate in Biomedical Laboratory Science and 12 credits from Boston University.

Connie Phillips, MA, MPH, director of CityLab Academy, played a major role in developing the program, which accepts 20 to 25 students each year. During the course of two semesters, students take four undergraduate courses that provide them with the technical knowledge needed to work in a lab—courses like Medical Terminology and Cell Culture Techniques. They also take courses that teach life skills such as how to write a résumé and interview for a job. Phillips recently instituted a mentoring program as well. "We pair each student with a graduate student in the GMS program," she explains. "Some of our Academy students need help with academic issues, for example. Some of them don't know, or have forgotten, how to study, or they have to give a PowerPoint presentation but don't understand the program. The mentors are there to help."

> "CityLab Academy was the magic key that opened the doors of success for me."
>
> —Khadija Rhourida, CityLab Academy graduate

During the second semester, students also perform an internship in one of Boston University Medical Center's research labs, so they can see firsthand how to apply their newly acquired skills. "I found the internship inspiring," says Batool Saleem, who graduated from CityLab Academy in 2004 and now works for a lab in Boston. "It was a chance to get a feel for real-life lab work and to learn something new and different in addition to the regular classes and lab experiments. I also got a chance to meet a lot of great scientists who are doing wonderful work in their fields."

Khadija Rhourida graduated from CityLab Academy in 2003. She is now a research technician at the Boston University (BU) School of Dental Medicine and a degree candidate in biomedical laboratory and clinical sciences at BU. "The courses that I took in CityLab and the ones I'm taking now apply directly to my technical work in the lab," says Rhourida. "CityLab Academy was the magic key that opened the doors of success for me."

Last summer Aram Chobanian, MD, president *ad interim* of BU, announced it will fund a $1 million initiative to provide biomedical and biotechnology job training specifically to Boston residents. The program will be a major expansion of CityLab Academy, with the aim of helping Boston residents to take advantage of the job opportunities created by the laboratories being built on the medical campus, as well as in the state's growing biotechnology industry. Like CityLab Academy's existing program, this, too, will be free, and participants will earn 12 BU credits. In a press conference announcing the program, Boston Mayor Thomas Menino thanked BU for its efforts and remarked how the training program will help residents secure jobs in the promising biotechnology industry. Massachusetts Sen. Dianne Wilkerson commended BU's commitment to the community.

Franzblau and his colleagues see both CityLab and CityLab Academy as altruistic endeavors. "I think it's truly a community service," he says. "It's all about how we can create opportunities, and what we can do to make it better for everyone." □

Alumni Awards

The Boston University School of Medicine (BUSM) Alumni Association annually confers two types of awards on alumni. Its Distinguished Alumnus/Alumna Award recognizes outstanding clinical, teaching, and research careers, and its Humanitarian Award acknowledges graduates who have made a significant contribution to the betterment of society.

Distinguished Alumnus Awards 2005

David Edelstein, MD '80

David Edelstein, MD '80, is an internationally recognized expert in hearing loss and diseases of the ear, nose, and throat. He is chairman of the Department of Otolaryngology and president of the board of surgeon directors of the Manhattan Eye, Ear, and Throat Hospital in New York. Additionally, he serves as the hospital's chief of the Nasal and Sinus Service, director of the Nasal and Sinus Lab, and co-chief of the Allergy Service. He is clinical professor of otorhinolaryngology at the Weill Medical College of Cornell University, clinical associate professor of otolaryngology at New York University School of Medicine, and chief of Rhinology Service at the Lenox Hill Hospital. He also serves on the faculty of Mount Sinai School of Medicine, supervising resident surgery. Edelstein performed his general surgery and otolaryngology residencies at Mount Sinai Medical Center in New York.

The author of more than 60 publications, Edelstein's current research interests include geriatric otolaryngology, rhinologic effects of medication, hearing loss in children, and auricular repair and reconstruction. He has been listed in the *Best Doctors in America* for the past six years. Among his numerous awards are the Honor Award from the American Academy of Otolaryngology—Head and Neck Surgery and the Distinguished Service Award of the Helen Keller Manhattan League. In 1992, he opened the first rhinology lab and nasal-sinus center in New York.

Edelstein is on the board of governors of the American Academy of Otolaryngology—Head and Neck Surgery and is a fellow of the American Laryngological, Rhinological, and Otological Society. He has been chairman of the Otolaryngology Section of the New York Academy of Medicine and president of the New York Laryngological Society. He also has served on a number of international task forces and national committees sponsored by the National Institutes of Health and the American Academy of Otolaryngology—Head and Neck Surgery on hearing loss and ear, nose, and throat infections.

Vernon Sondak, MD '80

Vernon Sondak, MD '80, is a recognized leader in melanoma research. He is professor of oncology and surgery and director of Surgical Education at the University of South Florida College of Medicine, as well as program leader of the Cutaneous Oncology Program at the university's H. Lee Moffitt Cancer Center and Research Institute. A *summa cum laude* graduate of BUSM's six-year program, Sondak performed his internship and residency in general surgery at UCLA School of Medicine and completed a fellowship in surgical oncology at UCLA.

With more than 300 publications to his credit, Sondak's research interests include melanoma, soft tissue sarcoma, diseases of the breast, and intra-abdominal tumors. He is on the editorial board of *Cancer Investigation, Current Cancer Therapy Reviews,* and *Cancer,* for which he is also section editor for melanoma/skin cancer. A member of numerous advisory boards, he serves on the Melanoma Research Foundation

Scientific Advisory Board and the Medical Advisory of the Sarcoma Foundation of America.

Sondak is a diplomate of The American Board of Surgery and a fellow of the American College of Surgeons. He is a member of The Society of Surgical Oncology, the American Society of Clinical Oncology, the American Association for Cancer Research, and the National Surgical Adjuvant Breast and Bowel Project. He is also a founding member of the Society for Melanoma Research and the International Sentinel Node Society.

Michael Walker, MD '60

Michael Walker, MD '60, is renowned for his leadership in the investigation of brain tumors and stroke. He is the retired director of the Division of Stroke, Trauma, and Neurodegenerative Disorders at the National Institute of Neurological Disorders and Stroke (NINDS) at the National Institutes of Health (NIH), where he spent more

than 30 years and was recognized as an outstanding authority on clinical investigations. He completed his residency in neurosurgery at Boston City Hospital (now Boston Medical Center) and a fellowship in neurosurgery at the Lahey Clinic.

Walker's work directly influenced the practice of neurosurgery both nationally and internationally. In 1966, he founded the Brain Tumor Study Group, which established the protocols for the clinical study of therapy for human brain tumors. During his tenure at the NINDS, Walker oversaw many of the institute's most important investigations of pain, stroke, trauma, tumors, and the overall understanding of the brain, including the redesign of the strategy for treating stroke victims, the use of aspirin as a preventative measure against stroke, the benefits of carotid endarterectomy for at-risk populations, and the immediate use of methylprednisolone for treating acute spinal cord injury.

He is the recipient of numerous awards, including the Public Health Service Special Recognition Award for Creativity and Leadership in Clinical Research, the Presidential Rank Award, and the NIH Directors Award. He is the author of more than 100 publications, the founder and former editor-in-chief of the *Journal of Neuro-Oncology,* and was deputy editor of *The Annals of Neurology.* His many professional affiliations include membership in the American Academy of Neurology, the American Association of Neurological Surgeons, and the Congress of Neurological Surgeons.

Humanitarian Award 2005

Nlogha Okeke, MD '55

Nlogha Okeke, MD '55, is the founder, medical director, and surgeon-in-chief of the Eastern Nigeria Medical Center and has dedicated his life to serving the people of his region by bringing medical care and economic assistance to a country torn by civil war, military dictatorship, and economic instability. Okeke completed his residency and a fellowship in surgery at Boston City Hospital (now Boston Medical Center).

Okeke grew up in the Enugu State of Nigeria, where, at the time, 50 percent of children did not live to adulthood. He has since established a full-service hospital there and the first teaching hospital in Nigeria. He has sought contributions from foreign countries, foundations, and

private citizens, and has recruited doctors and nurses from the United States.

Due to the civil war in Nigeria in the late 1960s, Okeke was forced to leave the country, coming to the United States and establishing a surgical practice in New Bedford, Mass. However, in 1976, he closed his practice and returned to Nigeria, rebuilding the hospital in the face of the economic and social devastation left by the conflict. Today, Nigeria is a country where 70 percent of the population lives on less than a dollar a day, and an estimated 4 million Nigerians have HIV/AIDS. Resources are extremely limited and Okeke regularly seeks contributions of equipment and supplies that are standard items in U.S. hospitals. Presently, he is working to establish a diagnostic center at the hospital.

During the past 40 years of political instability, economic constraints, and other overwhelming obstacles, Okeke and his dedicated wife have continued the struggle to keep the hospital open, equipped, professionally staffed, and capable of training health care providers.

IN BRIEF

Elaine Alpert, MD, associate professor of medicine at Boston University School of Medicine (BUSM) and associate professor of social and behavioral sciences at the School of Public Health (SPH), received the Family Violence Prevention Fund's Educator Award. The award recognizes an individual's efforts in providing educational leadership and advocacy for health care providers, systems, and communities to improve the lives and safety of those affected by violence and abuse.

Dick A. J. Brown, MD

Dick A. J. Brown, MD, associate clinical professor of obstetrics and gynecology and director of Medical Student Education, received the Massachusetts Medical Society's 2004 Grant V. Rodkey Award. Established by the society's Medical Student Section, the award was named for its first recipient and recognizes physicians who make outstanding contributions to medical education in Massachusetts.

Karen Bryant, MD, assistant professor of medicine, received a five-year Geriatric Academic Career Award from the Bureau of Health Professions, which is part of the Health Resources and Services Administration of the U.S. Department of Health and Human Services. This faculty development award for clinician

Karen Bryant, MD

educators in geriatrics will enable Bryant to work toward improving health care delivery and outcomes for diverse, vulnerable older adults by developing innovative curricular materials for cultural competency education related to the care of this population.

Benedict Daly, MD

Three BUMC faculty were recently inducted into the Gold Humanism Honor Society, an international organization that recognizes senior medical students, residents, and role-model physician teachers for demonstrated excellence in clinical care, leadership, compassion, and dedication to service. The inductees are **Benedict Daly, MD**, professor of cardiothoracic surgery; **Michael Grodin, MD**, professor of health law and director of the Law, Medicine, and Ethics Program at SPH, and professor of psychiatry, pediatrics, and socio-medical sciences at BUSM, and **Nicole Prudent, MD, MPH**, clinical assistant professor of pediatrics.

Francis Farraye, MD, associate professor of medicine, was elected vice chair of the Board of Governors and member of the Board of Trustees of the American College of Gastroenterology. Farraye also serves as the chair of the Patient Care Committee and governor in Massachusetts for the organization.

Joseph Loscalzo, MD, PhD, Wade Professor and chairman of the Division of Medicine, research professor of biochemistry, as well as director of the Whitaker Cardiovascular Institute, was one of 10 heart specialists to receive the American Heart Association (AHA) 2004 Distinguished Scientist Award. The prestigious award honors members who have made extraordinary contributions to cardiovascular and stroke research.

Richard Shemin, MD

Richard Shemin, MD, professor and chairman of Cardiothoracic Surgery, was elected vice president of the Massachusetts Chapter of the Society of Thoracic Surgeons for 2004 to 2005; he will serve as chapter president for the next academic year beginning October 1, 2005.

GRANTS & MAJOR CONTRIBUTIONS

Martha Skinner, MD

Alan Gerry, president of the Gerry Foundation, Inc., has forwarded $500,000 to support the work of **Martha Skinner, MD**, professor of medicine and director of the Amyloid Treatment and Research Center at Boston University School of Medicine (BUSM). The center is recognized worldwide as a resource for people suffering from amyloidosis, a very rare and life-threatening disease. This challenge grant is the final payment on Gerry's multi-year pledge of $3 million to assist Skinner in both treating patients and working toward finding a cause and cure for amyloidosis. His generosity has prompted many others to join him in support of this essential work.

The Evans Medical Foundation, Inc. has contributed $154,000 to underwrite the recently established "Norman Levinsky Fellowship Program in Molecular Medicine." During a career that spanned four decades until his death in 2004, Levinsky, MD, had served as chairman of the Department of Medicine at BUSM and more recently as associate provost for the Boston University Medical Campus. He was a respected researcher, administrator, and clinician, and the Levinsky Fellowship will help carry on his excellent work.

Carolann Najarian, MD, through the family foundation she shares with her husband, **K. George Najarian**, has provided a $50,000 grant to establish the endowed "Carolann S. Najarian, MD Scholarship at BUSM." These scholarships will be awarded to second-year students in the MD/PhD program. Najarian has been generous for the past several years, making annual contributions to support scholarships that are awarded to two exemplary students each year. Her newly endowed fund will eventually continue this practice in perpetuity.

A number of pharmaceutical companies continue to support research at BUSM. **Ranbaxy Pharmaceuticals Inc.** invested an additional $514,837 in the project of **Allen Mitchell, MD**, professor of pediatrics and director of the Sloan Epidemiology Center, titled "Survey of Isotretinoin Use in Women." **Celgene Corporation** awarded $693,847 to underwrite Mitchell's project, "Evaluation of Thalidomide Fetal Exposure Prevention Program." Additionally, **Bayer, Inc.** has funded Mitchell's research project "Characteristics of Aspirin Use in the U.S." **Nitro-med Inc.** granted $188,000 to support the research of **Joseph Loscalzo, MD, PhD**, Wade Professor and chairman of the Division of Medicine, research professor of biochemistry, as well as director of the Whitaker Cardiovascular Institute, on "S-Nitrosothiols in the Metabolism and Action of Exogenous Nitric Oxide Donors." **Wyeth-Ayerst Pharmaceuticals** paid $187,500 to support the project of **Stephen Pelton, MD**, professor of pediatrics, titled "Identification of Children with Invasive Pneumococcal Disease in Massachusetts and Immunologic Evaluation of Vaccine Failures."

Semaco awarded a total of $300,000 to **Barbara Gilchrest, MD**, professor and chairman of the Department of Dermatology, and professor of pathology and laboratory medicine, for her project "Semaco Research Program in T-Oligos." **Joseph Loscalzo, MD, PhD**, Wade Professor and chairman of the Division of Medicine, research professor of biochemistry, as well as director of the Whitaker Cardiovascular Institute, has, during the past several years, received $160,000 in support of his research "Dairy Intake—Its Determinants and Its Relation to Healthy Diet Patterns Throughout Childhood" from **Dairy Management, Inc.**

Jack Spivack, a long-time member of BUSM's Board of Visitors, established an irrevocable trust two years ago to endow the **Spivack Center for Behavioral Neurosciences**. This center will serve researchers working on autism, Alzheimer's disease, Parkinson's disease, stroke, and those interested in memory, among others. A dedication ceremony last fall celebrated Spivack's generosity in providing ongoing support for continuing work in these increasingly important fields. He also has recently enhanced his partnership with BUSM by establishing a gift annuity of $1,325,000 that, upon maturation, will also be used to help support the Spivack Center researchers' work.

Nancy Bucher, MD, research professor in pathology, has continued her support of the research work in that department with a gift of $200,000. Michael O'Brien, MD, MPH, professor and chairman *ad interim* of the Department of Pathology, as well as director of the Mallory Institute of Pathology, states, "We are most grateful to Dr. Bucher for her

steadfast support of the research activities in our department. Without her support, it would be very difficult to accomplish some of the important work that goes on here."

Gifts from the estates of **Idea Fiering, MD**, and **Edward MacNichol, PhD**, offer financial aid to BUSM students, an area of the highest priority for the school. The Idea Fiering estate contributed $250,000 to the "Dr. Abraham M. and Idea S. Fiering Scholarship Fund" at the school; Dr. Fiering was a 1929 BUSM graduate. Edward MacNichol, a former faculty member in the Department of Physiology, designated $100,000 in his will for the Edward MacNichol Scholarship.

Several BUSM researchers have been awarded nearly $700,000 in grants from the **U.S. Department of Defense Breast Cancer Research Program: Remco Spanjaard, PhD**, associate professor of otolaryngology and research assistant professor of biochemistry, $484,500; **Sajal Ghosh, PhD, MSc**, assistant professor of medicine, and a member of the Cancer Research Center, $121,125; and **Marganit Farago, MSc**, a PhD student in the graduate program in Molecular Medicine at the Division of Graduate Medical Sciences, $90,000. The researchers won the awards in a global competition for novel concepts in breast cancer research.

Rebecca Silliman, MD, professor of medicine, has been awarded a five-year, $1.5 million grant from the **National Cancer Institute** to study breast cancer survivorship in older women. Silliman's project will combine interview data collected during a 10-year period with Medicare claims data to describe patterns of breast cancer and non-breast cancer care, as well as factors associated with successful and unsuccessful survivorship.

UNIVERSITY NEWS

Board of Trustees Elects New Member

The Board of Trustees recently elected Bishop Peter Weaver of the New England Conference of the United Methodist Church. Weaver, a native of Pennsylvania, received degrees from West Virginia Wesleyan College and Drew University before earning a doctorate from the Boston University (BU) School of Theology. He was ordained a deacon in the United Methodist Church in 1967 and an elder in 1969, and he served as senior pastor of Pittsburgh congregations for many years before being elected bishop for the region of eastern Pennsylvania in 1996. As a minister, Weaver helped found a shelter for homeless women and launched several ministries with an aim of aiding the poor in Pittsburgh. In 2004, Weaver was named president of the United Methodist Church's Council of Bishops, which serves 11 million Methodists worldwide. He moved to the Boston area last year to lead the church's New England Conference.

12 Appointed to the Board of Overseers

The Board of Trustees recently appointed 12 members to the Board of Overseers, an advisory body it created in May 2004. The board advances BU's mission in a variety of ways: Its members consult on special projects, assist with fund-raising and community relations, provide advice and counsel, and recommend candidates for membership on the Board of Trustees. Members are selected on the basis of their individual interests, special expertise, ability to assist in fund-raising, vision, dedication to the advancement of BU, and willingness to participate in the life of the university. The Board of Overseers meets twice yearly, once in conjunction with a meeting of the Board of Trustees.

The 12 newly appointed overseers bring total membership of the board to 19. The new appointees are:

- **Merwyn Bagan**, a retired neurosurgeon and former president and chairman of Healthsource, a New Hampshire-based health maintenance organization
- **James Berluti**, cofounder, president, and CEO of Eastern Connection, Inc., a regional overnight courier service
- **Derek Davis**, a partner in the business department and member of the public finance group at the Boston law office of Nutter, McClennan & Fish
- **David Ellis**, a partner in the Boston law firm of Foley, Hoag, LLP
- **Norman Gaut**, former president and CEO of PictureTel Corp., a maker of videoconferencing systems, in Andover, Mass., and an honorary trustee
- **Joseph Hagan**, a higher education consultant and former president of Roger Williams University in Bristol, R.I., and Assumption College in Worcester, Mass.
- **Sarkis Kechejian**, a cardiologist and

president and treasurer of Alliance Health, Inc., and president and CEO of medical clinics in Texas under the K-Clinics and K Med Centers names

- **Rita Mehos**, a retired musician who, for the past several years, has been assisting with an international music program at the Salzburg Seminar in Salzburg, Austria, and a former trustee
- **Peter Paul**, founder and CEO of Paul Financial, a mortgage banking company
- **Jay Roewe**, senior vice president of production for HBO Films
- **Joe Roth**, founder and majority owner of Revolution Studios and former chairman of 20th Century Fox and Walt Disney Studios
- **Laura Walsh Strandskov**, former president of Recordkeeper Archives Center, Ltd., an off-site archiving service, and an honorary trustee

BU Launches Presidential Website

The BU Presidential Search Committee launched a website that will make it easy for anyone who has comments or suggestions about the search to register them with the 14-person group that has been charged with identifying the best possible candidate to lead the 165-year-old institution. The site will also provide information about the search committee, as well as its process and progress to BU's *many constituencies*. The site's address is *http://www.bu.edu/presidentsearch.*

"The website opens up one more line of communication to anyone who is interested in the search and wants a quick, easy, and ongoing way to share their views and suggestions with the search committee," says David D'Alessandro, chairman of the Search Committee and vice chairman of the Board of Trustees. "We believe that type of access and inclusion is important to this process, and we look forward to hearing from people."

The website includes a section that covers the most commonly asked questions and answers about the search. It provides names and background information on search committee members and a "contact us" feature so that people can quickly and easily submit their comments and suggestions to the committee.

Sargent College Names New Dean

Gloria Waters, PhD, a widely published researcher on language and memory processes, became dean of the Sargent College of Health and Rehabilitation Sciences (SAR) this past January. Waters is also professor of communication disorders and chair of the Health Sciences Department at the school.

A member of the SAR faculty since 1997, Waters has researched extensively sentence comprehension in aphasia, acquisition of reading skills in normally developing children and deaf children, and how different areas of the brain are involved in language processing. Her current work focuses on how aging and dementia affect language skills, as well as the neural basis of syntactic comprehension. She collaborates in these projects, which are funded by the National Institutes of Health, with her husband, David Caplan, a professor of neurology at Harvard University and director of the Neuropsychology Laboratory at Massachusetts General Hospital.

Among her goals as dean will be to encourage faculty and students involved in basic research to collaborate with those who specialize in clinical practices and vice versa. She also plans to promote interdisciplinary research and study. "One of Sargent College's strengths is that it offers programs in every major rehabilitation area," she says. "That gives students an opportunity to learn not just about their own field of study, but also about the fields of other professionals they will have contact with on the job."

"Dr. Gloria Waters is a well-respected scientist in her field," says Provost *ad interim* David Campbell, "and we feel she is most capable of leading Sargent College in this period of great change related to American health care."

IN MEMORIAM

Joseph Korn, MD, of Newton, Mass., on March 6, 2005, at the age of 58. Dr. Korn was the chief of Rheumatology, the director of the Arthritis Center, the Alan S. Cohen Professor of Medicine in Rheumatology, and a professor of biochemistry at Boston University School of Medicine (BUSM). He also founded and directed the Boston University Scleroderma Program, the largest such program in the Northeast.

"Dr. Korn was one of the most remarkable people in medicine I have ever had the pleasure to work with," said colleague Peter A. Merkel, MD, MPH. "He was one of those rare physicians who was truly an outstanding clinician, a renowned scientist, and a master teacher. He was a champion for each of his patients, as well as for the field of scleroderma, an incredibly complex disease that was the main, but not exclusive, focus of his career. Even more importantly, Joe was a warm, kind, and generous man who was a wonderful friend, colleague, leader, and devoted father, husband, brother, and son. He leaves behind a profound professional and personal legacy."

Dr. Korn received his medical degree from Columbia University College of Physicians and Surgeons. He will be remembered as one of the premier intellectual leaders in the field of scleroderma research. He was internationally recognized for his contributions stemming from laboratory investigations, as well as his leadership of clinical therapeutic studies. He was also the co-founder and co-organizer of the biannual International Workshop on Scleroderma Research, an activity that exemplified his central role in the field. He was an outstanding clinician, teacher, and mentor, as well as a member of the Board of Directors of the American College of Rheumatology.

He is survived by his wife, four children, father, and brother.

Richard Tello, MD, MSME, MPH, PhD, of Wellesley, Mass., on March 8, 2005, at the age of 45. An internationally recognized authority on MRI, Dr. Tello was a professor of radiology at BUSM and director of MRI at Boston Medical Center.

Dr. Tello earned his MD from Stanford University, his MSME from the Massachusetts Institute of Technology, his MPH from Harvard University's School of Public Health, and his PhD from the University of Melbourne, Australia. Although physically affected for several years by a chronic and unrelenting condition, Dr. Tello insisted on remaining clinically active and vital to the daily functions of the Department of Radiology. He was considered a passionate teacher, as well as a defining intellectual and academic leader. He had received national and international honors and had numerous publications.

"In addition to being a brilliant and insightful scientist and physician, he really was a thoughtful and wonderful person," said Alexander Norbash, MD, professor and chairman of the Department of Radiology at Boston University Medical Center and a colleague of Dr. Tello. "Richard served as an inspiration to all who knew him; he was thoughtful, proud, and unwavering in his sense of fairness." He added that, even during times when his health was poor, Dr. Tello did not want to be treated differently than his colleagues. "Richard made it clear that he would show up for an assignment, and would under no circumstances allow special consideration. Anything less than this would be unfair to the team, his colleagues, and his department."

He is survived by his partner, Jeanette Pratt-Tello, daughter, Rebecca, mother and stepfather, Mona and Arnold Lener, brother, Antonio, and sister, Debra.

Sidney Carter, MD '38, of Mashpee, Mass., on January 16, 2005, at the age of 92. A pediatric neurologist, Dr. Carter was appointed chief of pediatric neurology at the Columbia Presbyterian Neurological Institute in New York City in 1951. In 1957, he established one of the first training programs in child neurology. He also was a professor of clinical neurology at Columbia University College of Physicians and Surgeons, where he established the Sidney Carter Professorship in Pediatric Neurology.

An Army veteran, Dr. Carter worked in the Seventh General Army Hospital during World War II. While serving in England, he was assistant chief of the neuropsychiatric section and a neurological consultant to both Army casualties and British civilians. During the course of this assignment, he provided medical care to Nazi war criminals standing trial in Nuremberg. Dr. Carter also was former president of the American Board of Psychiatry and Neurology, a former president and member of the board of trustees of the American Academy of Neurology, and former president of the American Neurological Association. Recognized internationally, he authored or co-authored more than 80 publications.

He is survived by his wife, Elizabeth, three sons, a brother, six grandchildren, one great-granddaughter, and many nieces and nephews.

Frederik Rundlett, MD '60, of Carlisle, Mass., on June 29, 2004, at the age of 73. Dr. Rundlett was formerly chief of Radiology at the Bedford (Mass.) VA Center. He also had extensive military service, most recently as a colonel in the U.S. Army Reserves. He is survived by five cousins and many friends.

Donna Warren, MD '86, of Ketchum, Okla., on September 27, 2004, at the age of 57. Dr. Warren was a family practitioner for the Warren Clinic in Vinita, Okla. She also was a member of the American Medical Association and the Oklahoma State Medical Association. She is survived by her husband, Joel Webb, her mother, her sister, three stepchildren, and three stepgrandchildren.

Mark Grippi, MD '98, of LaHabra, Calif., on October 4, 2004, at the age of 35. Dr. Grippi was an orthopedic surgeon at the Los Angeles County–University of Southern California Medical Center. He is survived by his wife, Maria, his parents, and two brothers.

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