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Boston University
The tradition of excellence in the Department of Surgery at Boston University School of Medicine can be traced to the department's first chairman, Israel T. Talbot, shown here at his desk in the late 1800s.
Through aggressive recruitment of recognized specialty surgeons, new investments in basic and translational research, and a commitment to centers of excellence, the Boston University School of Medicine (BUSM) Division of Surgery is prepared, according to Chairman James Becker, MD, “to become the premier surgery department in New England and one of the most advanced in the country.”

The tradition of innovation began in 1873 when Israel T. Talbot, MD, served as both dean of BUSM and chairman of Surgery—a post he held until 1899. During his tenure, BUSM continued to engage in the controversial—and, in its day, “outrageous”—practice of providing medical education to men and women simultaneously. An innovator in the surgical treatment of respiratory illnesses, Talbot also had a passion for the treatment of idiopathic and traumatic diseases—so much so that waggish medical students made a play on the first two initials of his name and labeled the doctor, “Idiopathic Traumatic Talbot.”
While the school and its surgery division outgrew its controversial roots, it continued to emphasize innovation. With the 1946 appointment of Reginald Smithwick, MD, as chairman, the Division of Surgery entered its modern era. Smithwick created a team of surgeons who developed the procedure of surgical sympathectomy for the treatment of hypertension, as well as innovative approaches for management of vascular and gastrointestinal diseases and surgical infections. Smithwick's successor, Richard Egdahl, MD, strengthened the school's efforts in research, creating one of the first surgical laboratory fellowship programs in the United States. Subsequent chairs continued to expand the depth of the division's surgical expertise while overseeing dramatic changes in Boston's hospital and teaching landscape.

**General Missions and Specific Expertise**

Becker joined BUSM in 1994 as James Utley Professor and chairman of the Division of Surgery. He immediately embarked on a threefold mission: to recruit top specialist surgeons who would complement BUSM's historic strength in trauma and critical care; to build a research program that competes with the best in the country; and to mold the Division of Surgery into a top academic department. Toward that end, Becker has recruited—and continues to recruit—a staff of surgeons that has become a virtual "Who's Who" of the country's top talent (see sidebar, next page).

On the academic front, the division's recruits have been selected with an eye toward reinforcing or initiating new research efforts. Arthur Stucchi, PhD, working with Becker, is conducting basic research into the underlying mechanisms for inflammatory bowel disease, including studies of the intestinal epithelial function. Gastrointestinal fellows are also collaborating with other disciplines at BUSM to conduct multicenter clinical trials of newly developed antiadhesion membranes.

Peter Thomas, PhD, and a large team of investigators were recently recruited from the Harvard Medical School. Thomas is internationally known for his research regarding the role of carcinoembryonic antigen in the liver and its influence on the development of hepatic metastases, and, with strong support from the National Institutes of Health, he has established a Surgical Biology Laboratory at BUSM with R. Armour Forse, MD, PhD, and Peter Burke, MD.

In March 1999, Becker reached a milestone in his own complementary clinical area of expertise (the surgical treatment of inflammatory bowel disease) when he performed his five-hundredth ileoanal “pull-through” operation. The procedure was developed and refined by Becker for the treatment of ulcerative colitis and familial polyposis, conditions that had previously required the total removal of the colon and rectum, and the installation of a permanent ileostomy. In the pull-through, surgeons begin by removing the colon and the rectal mucosa. The lower GI tract is then reconstructed by creating a reservoir or pouch—a functioning rectum—from the terminal ileum and securing it to the anus with the anal sphincter intact.

The pull-through and other procedures are taught to Boston Medical Center (BMC) residents and attract, according to Becker, "surgeons from all over the world who come to observe and learn."

**Minimally Invasive Surgery Across Multiple Disciplines**

At the intersection of research and direct clinical applications is BUSM's commitment to minimally invasive surgery. As one of the first initiatives identified and funded by the BMC Board of Trustees as a center of excellence for clinical development, the Minimally Invasive Surgery Center provides an opportunity for the school to formalize its efforts for clinical research and education. While such surgery had been recognized as a significant development, it had not been defined as a focus area. Under the guidance of Timothy Babineau, MD, director of the center and chief of Gastrointestinal Surgery, the center
Division of Surgery Recruits

Some of the country's premier surgeons have brought their services to Boston University Medical Center since Becker was named chairman in 1994.

Timothy Babineau, MD
Chief of Gastrointestinal Surgery
Director of BUSM's Minimally Invasive Surgery Center, a leader in the laparoscopic approach to GERD surgery

Andrea Basile, MD
Plastic surgeon specializing in hand surgery

Peter Burke, MD
Trauma surgeon specializing in trauma and critical care

James Chrzan, DPM
Expert in diabetic foot disorders

Peter Dewire, MD
Orthopedic surgeon specializing in foot and ankle surgery

Thomas Einhorn, MD
Chairman of the Department of Orthopedic Surgery

R. Armour Forse, MD, PhD
First recipient of the newly endowed Dr. Laszlo N. Tauber Professorship in Surgery
Nationally renowned authority on bariatric surgery and surgical nutrition

Gary Gibbons, MD
Pioneer in the treatment of diabetes-related foot problems
Codirector of the new Foot Specialists of Boston Medical Center

Kenneth Grundfast, MD
Chairman of Otolaryngology Surgery
Authority on pediatric otolaryngology

Geoffrey Habershaw, DPM
Expert in diabetic foot disorders

Christine Hamori, MD
Plastic surgeon specializing in reconstructive surgery

Steven Moulton, MD
Pediatric surgeon specializing in trauma care

Donna Pacicca, MD
Expert in pediatric orthopedics

Haroon Patel, MD
Pediatric surgeon specializing in minimal access surgery in children

Raffi Der Sarkissian, MD
Otolaryngologist
Expert in head and neck reconstructive surgery

Stephen Sentovich, MD
Chief of Colon and Rectal Surgery
Expert in colorectal motility disorders and cancer of the colon and rectum

John Sledge III, MD
Orthopedic surgeon specializing in spine, hip, and trauma surgery

Daniel Smith, MD
Otolaryngologist

Andrew Stein, MD
Orthopedic surgeon specializing in hand surgery

Paul Tornetta III, MD
Director of Orthopedic Trauma
Vice Chairman of Academic Affairs
Expert in trauma surgery

Ralph de la Torre, MD
Cardiothoracic surgeon specializing in minimal access cardiac surgery and surgical treatment of heart failure

will serve the entire Division of Surgery as a state-of-the-art facility for providing training in minimally invasive techniques.

According to Becker, surgery in the twenty-first century will continue to move toward minimally invasive approaches, and these changes will require a corresponding change in the way surgical residents are trained. To that end, BUSM is developing a training program for medical students and residents that will expose them to the tools, techniques, and animal models to prepare them for the complexities they will face in the operating rooms of tomorrow.

Advances in Pediatric Surgery

BUSM's Pediatric Surgery Department provides an excellent example of the surgery division's multidisciplinary approach, embracing clinical work in minimally invasive surgery and research in therapeutic products for treating adhesion. In July 1995 Steven Moulton, MD, a specialist in pediatric trauma, arrived at BUSM to bring focus to the school's and the medical center's surgical care of children. Moulton notes that BMC manages more traumas than any other hospital in Boston and often treats the most severely injured. In the four years of Moulton's affiliation, the Boston University Medical Center caseload has increased by approximately 35 percent and admissions have increased by 45 percent.

To meet the growing demand, BUSM recruited Haroon Patel, MD, an expert in pediatric laparoscopic surgery. Patel's surgical talents complement BUSM's general emphasis on minimally invasive surgery and add another dimension to the surgical care of children at BMC.

While managing an expanding caseload, Moulton has also directed research from a lab he started in 1996. Today, Moulton works with three graduate students from BUSM who are concentrating in two areas: wound healing and intra-abdominal adhesions. Since appendectomy is the most commonly performed pediatric surgery, the control of adhesions is an important factor in the surgical treatment of children. In a multicenter trial directed by Becker, it was shown that more than 90 percent of patients with abdominal surgeries will form adhesions, and of those, 10 to 20 percent will develop complications that arise from the adhesions.
"I believe that to be the effective leader of a department whose heart and soul revolve around the care of the patient who has multiple injuries, I must be directly involved."

Thomas Einhorn, MD

Moulton’s lab is examining the basic science of adhesions, conducting research into the roles of inflammation and angiogenesis, and examining what effect the attenuation of either element has on the probability of developing adhesions. To date, their studies of two anti-angiogenic agents, TNP-470 and endostatin, have shown that intra-abdominal adhesions and angiogenesis are temporally and spatially related.

On the therapeutic front, the lab has two grants from Genzyme General to analyze the efficacy of Seprafilm, a bioreabsorbable anti-adhesion surgical product. Initial work has been promising, with evidence that Seprafilm inhibits angiogenesis and may help prevent adhesion formation.

From Trauma Care to Molecular-Level Research in Orthopedics

Thomas Einhorn, MD, chairman of the Department of Orthopedic Surgery, came to BUSM in May 1997 with an unusual combination of interests: reconstructive and traumatic orthopedic surgery, especially of patients with multiple injuries; and basic research into the molecular genetics of bone repair and regeneration. His background has embraced both areas, having held positions as professor of orthopedics and director of Orthopedic Research at Mt. Sinai School of Medicine in New York, and as chairman of the Orthopedics and the Musculoskeletal Study Section at the National Institutes of Health. Einhorn believes that his position at BUSM’s Orthopedic Surgery Department is a unique opportunity to translate research interests and clinical experience into an academically fruitful venture for advanced patient care and the development of new technology.

Taking a hands-on approach to his chairmanship, Einhorn leads his team of eleven orthopedic surgeons by example—by including himself on the trauma call schedule. "I believe that to be the effective leader of a department whose heart and soul
In the search for a practical molecular marker, Spanjaard and his associates are investigating a new "DNA chip" process for the mass identification of gene expression in different tissues.

revolve around the care of the patient who has multiple injuries," Einhorn says, "I must be directly involved."

Since 1997, Einhorn has displayed a similar dedication to research, building an orthopedic surgery laboratory from scratch. To accomplish this, he recruited a world-class bone researcher, Louis Gerstenfeld, PhD, who was formerly an associate professor at Harvard. Together they oversee two additional PhD faculty scientists, three post-doctoral fellows, and one Boston University mechanical engineering graduate student, in investigating the molecular mechanisms of bone regeneration.

"We've already made one breakthrough observation," Einhorn says. Experiments in his lab have demonstrated a direct correlation between the inhibition of tumor necrosis factor and the inhibition of bone formation, an important insight into the nature of skeletal healing. The lab is also pursuing a project studying the possibility of regenerating whole joints. Although the project is in its preliminary stages, Einhorn says the data have been encouraging.

In fall 1999, Einhorn and his colleagues opened the Boston University Sports Medicine Center, a collaborative effort with Sargent College that he expects to be "a leading center for clinical care and research in sports medicine." Intended to serve anyone from the "weekend warrior" to the high-performance intercollegiate athlete, the center is staffed by two BUSM orthopedic surgeons and a team of physical and occupational therapists from Sargent College. In addition, the center will employ an exercise physiologist with a nurse practitioner degree who will serve as the research coordinator.

Patient-Centered Otolaryngology
One of BUSM's most recent recruits is Kenneth Grundfast, MD, chairman of the Department of Otolaryngology Surgery—Head and Neck Surgery, who came to BUSM in August 1999 with a special interest in hereditary hearing impairment and an expertise in surgery for chronic ear disorders—especially cholesteatoma. He leads a team of four surgeons who operate in a clinical environment substantially different from their colleagues in other surgery departments. According to Grundfast, only one in four patients seen in an otolaryngologist's office requires surgery, and if an operation is needed, it is frequently done in the office or on an outpatient basis.

For Grundfast, the primary clinical challenges are communication and patient service. "We're building a system that enables patients to get additional information after an office visit," he says. "As surgeons, it's often difficult for us to respond quickly to patient questions." At the same time, Grundfast wants to expand physician availability to accommodate increasing referrals. To meet both demands, he and his colleagues are assembling a team that "can offer information to patients at and between office visits."

Academically, Grundfast intends to reorganize and revitalize the didactic aspects of the residency teaching program and expand elective opportunities for third- and fourth-year medical students. The department is also working with Somnus Corporation to offer a course to New England otolaryngologists on the use of new radiofrequency technology to alleviate snoring, chronic nasal obstruction, and sleep apnea.

Department research has two areas of concentration: a collaborative effort with a team of bioengineers to study dizziness and imbalance; and basic research into squamous cell carcinoma of the head and neck, led by Remco Spanjaard, PhD. After five years at the Howard Hughes Medical Institute and three at Brigham and Women's Hospital, Spanjaard came to BUSM in December 1997 to confront the challenges raised by this malignancy. "The first issue," Spanjaard says, "is that the curative rates haven't changed much in the past twenty years. The second is the lack of predictive, prognostic markers for identifying the likelihood of tumor recurrence."

In the search for a practical molecular marker, Spanjaard and his associates are investigating a new "DNA chip" process for the mass identification of gene expression in different tissues. In this process, pools of DNA from known highly aggressive and less aggressive tumor tissues are tagged with different fluorescent colors. The tagged
DNA is then applied to a glass DNA chip of approximately ten thousand individual cells from the tissue under investigation. Similar molecules bind together; by carefully analyzing the pattern of fluorescence in the sampled tissue, the pathologist can measure the tumor's relative level of aggressiveness.

Spanjaard says the researchers are also examining a chemoprevention protocol appropriate for patients with premalignant lesions or those at high risk for recurrence. Some of the most promising work involves retinoids and is being performed in collaboration with Douglas Fallar, MD, PhD, director of the Cancer Research Center at BUSM.

New Foot Center Offers Hope to Diabetics
In August 1999, the Foot Specialists of Boston Medical Center opened its doors on 930 Commonwealth Ave., across the street from the old Armory and Boston University's former football field. The center is guided by three leading vascular and podiatry surgeons who specialize in the treatment of diabetic patients with ulcers in the lower extremities: Gary Gibbons, MD; Geoffrey Habershaw, DPM; and James Chrzan, DPM.

According to Gibbons, the occurrence of diabetes is increasing at an alarming rate. An estimated sixteen million Americans are affected by the disease, and of these, 16 percent will develop foot ulcers. In fact, more than half of all amputations in the United States are performed on diabetes patients, with foot ulcers preceding 85 percent of all diabetes-related amputations.

The center is an important resource for diabetics and other patients with foot care needs, as well as those seeking opinions concerning amputations. "Our goal," says Gibbons, "is to provide a comprehensive, multidisciplinary foot care program, combined with education, that offers cost-effective intervention to heal wounds, restore circulation, reduce pain and suffering, prevent amputation, and allow patients to return to function and well-being."

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"We expect that our clinical and research efforts will involve more multidisciplinary cooperation," says Becker. "Ultimately, we hope that the Division of Surgery will serve as a model for progressive surgical care and related research."
In the field of contemporary radiology, diagnostic imaging continues to be greatly influenced by developments in computer sciences and telecommunications. Radiologists at Boston University School of Medicine (BUSM) are now working to meld those fields and move into the twenty-first century using novel methods that provide increased accuracy, better workflow, and greater access to diagnostic images.

Joseph Ferrucci, MD, chairman and professor of Radiology, is excited about the potential for electronic imaging, particularly in light of the recent technological advances.

Electronic Imaging in Action
To understand the movement of diagnostic imaging toward what Ferrucci hopes will be a "filmless" world, it is vital to consider the effect of telecommunications and computer image science. With the advent of the personal computer (PC) as a common component of home and business life, physicians correspondingly approach the PC as an accepted aspect of medical practice. "Physicians now see the PC as an appropriate and necessary part of their daily lives," says Ferrucci. "We look at Web sites for research, we use e-mail, and increasingly, we accept Web-based education."

As the PC has become an important part of the practice, delivery, and study of medicine, advances in computer photographic imaging, including scanning and digital compression, have resulted in "filmless" photography. Fields outside of radiology and diagnostic imaging were among the first to adapt this technology to decrease costs and improve workflow. As enhancements to the information technology systems of many hospitals and universities continue, the concepts advanced in computer imaging for radiology will become more prevalent.

Implications for Cost and Care
Electronic imaging, as envisioned by Ferrucci and his staff, will provide an increasingly
effective workflow for physicians, especially in providing emergency care. According to Ferrucci, a typical example might involve an emergency department handling a spinal cord injury patient. If the particular radiological expert in spinal trauma is off-site, the “film” of the injury could be transmitted electronically for review and diagnosis.

In addition, experts from multiple specialties would be able to meet “virtually” and review data from numerous external sites, eliminating the physical restrictions of a one-site meeting. Several systems in development also provide for the review of data in real-time. According to Ferrucci, the ideal system would allow for a review of a stroke patient’s CT scan data as the stroke is evolving. This acceleration of time-independent data exchange is teleradiology’s future, and the increased physician productivity associated with that exchange should help to keep health care costs down.

Filmless benefits extend to include other aspects of medical practice not immediately associated with patient care. According to Ferrucci, film library systems, which involve significant personnel costs in accessing and preserving film, will eventually be eliminated. He also says an electronic filmless solution eliminates the concerns associated with film storage, such as light exposure, humidity, and even handling—elements that do not affect images stored as binary data.

Outside the medical campus, teleradiology is being used at the Boston HealthNet health centers, where three out of the five designated centers are up and running. As one of BUSM’s primary teaching affiliates, Boston HealthNet is the ideal venue for the initial implementation of a comprehensive computed radiography system.

As advances continue to be made in the areas of data storage and telecommunications, it is expected that teleradiology will become even more cost-effective. Faster data transfer, novel methods of data storage, and clarity in imaging systems are all currently being developed for use in patient care and physician training. Academic medical centers like BUMC are key players behind the push to make those advances available to hospitals and clinics on an ever-larger scale. “This is something that requires vision and planning,” says Ferrucci, “both of which we have in abundance here at BUSM.”

Virtual images in use

In the field of electronic imaging, the future is now. BUSM physicians are conducting groundbreaking trials using computer imaging to conduct virtual colonoscopy. During the procedure, sequential sections of tissue are scanned by software that integrates still pictures into a three-dimensional, movie-like image. The “movie” can be played forward or backward, or viewed as a freeze-frame. According to Ferrucci, in a paper published in the Nov. 10, 1999, New England Journal of Medicine, a trial of one hundred patients screened for colorectal polyps showed that the virtual technique is comparable to the conventional technique for polyps larger than 6 mm.

The technique is noninvasive for the patient. It requires less time, which may lead to increased productivity for physicians. The noninvasive nature of the procedure may encourage patients to receive screenings, leading to earlier detection of colorectal cancers.

With the discovery of X-ray technology in the late nineteenth century, X-ray laboratories sprang up in office buildings and private homes. Above, a man is examined in a typical lab, where some of the apparatus include a large induction coil and a variety of tubes. Photo courtesy of Radiology Centennial, Inc.
A review of notable campus events and changes of the past year

Around Campus

Gracing the entrance of the medical campus, a fifteen-foot, four-sided clock now greets faculty, students, and visitors on the Talbot Building lawn facing Albany Street.

Signage upgrades continue throughout the Boston University Medical Campus, making the campus easier for patients and visitors to navigate. Below, a worker mounts a new sign at the corner of Albany Street and Massachusetts Avenue.
Workers use a crane to hoist a walkway that connects the two BioSquare buildings on Albany Street. A grand opening celebration for the new Evans Biomedical Research Center is scheduled for early spring.

Suzanne Sarfaty, MD, assistant dean for Student Affairs (left), congratulates Stephanie Aguilar, a first-year medical student, at the 1999 White Coat Ceremony.

The new MRI Building at Boston University Medical Center houses the latest MRI and CT Scanning technology, as well as consultation rooms for body imaging and neuroradiology. (See story, page 8.)

In November 1999, BUSM received a small sapling from the Hippocrates tree, which was planted more than two thousand years ago by Hippocrates. The tree was a gift from the people of Kos, Greece. A bust of Hippocrates was also presented to the school.
As a leader in academic medicine, Boston University School of Medicine (BUSM) is training students for careers in the expanding field of biomedical research through its new Graduate Program in Molecular Medicine (GPMM).

According to Joseph Loscalzo, MD, PhD, director of GPMM, and Wade Professor and chairman of the Department of Medicine, the new program is the natural result of a shift toward increasing integration of the biomedical sciences. Likewise, as basic biomedical research has begun to influence the clinical practice of medicine and the time span between scientific discovery and clinical application has decreased, it has become increasingly important to have faculty members who are outstanding basic and classical investigators working in an integrated environment. Loscalzo adds that several other factors, including a steady decrease in the pool of qualified physicians interested in research and an increased focus of research on the molecular and cellular basis of disease, have contributed to the need for the development of such a program.

The first-year program is administered by the Department of Medicine and has three potential broad areas of study: basic molecular medicine, clinical research, and health services research. The department offers faculty representation and expertise in all of these areas. The GPMM is not limited to post-MD candidates; traditional graduate students who wish to pursue a PhD in biomedical sciences are also welcome, as are those enrolled in the dual MD/PhD program.

**Class Structure**

The curriculum for the program has been clearly defined, and Loscalzo says that it will provide a very unique framework to look at basic aspects of disease and to use for clinical application. During the first year of this two-year program, GPMM students study basic science courses within the Division of Graduate Medical Sciences. Topic areas include biochemistry, molecular medicine, clinical research, and health services research. The department offers faculty representation and expertise in all of these areas. The GPMM is not limited to post-MD candidates; traditional graduate students who wish to pursue a PhD in biomedical sciences are also welcome, as are those enrolled in the dual MD/PhD program.

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Because the program aims to provide a broad framework for translational medicine—the conversion of basic mechanistic observations into early clinical application—the GPMM team has developed a year-long course to examine the clinical implications of pathophysiology. Titled “Molecule to Man,” the course will be a key component...
in year two of the GPMM. According to Loscalzo, students in the course will take a single disease entity and investigate the molecular basis for the disease, including didactic instruction and laboratory demonstrations as well as animal models. Eventually, the students will progress to determine the more clinically relevant applications for the basic principles of the disease process, such as designing drugs to inhibit a certain aspect of the disease process. Finally, students will design a clinical trial to test the efficacy of the drug and develop the tools to build the later stages of clinical trials.

Looking Forward from Year One
While the program is in its infancy, the students have considerable resources available for mentoring. David Seldin, MD, PhD, associate director of GPMM and assistant professor of medicine and microbiology, became involved with the planning committee during the development process of the GPMM. His own interests in laboratory science, along with his MD/PhD credentials, were shaped by wider curiosity about the molecular basis for disease.

Seldin affirms that a disparity in training has existed between MD and PhD candidates. Institutions such as the National Institutes of Health (NIH) have long recognized the importance of including the basic sciences approach of rigorous training in solving clinical problems. According to Seldin, the NIH has been continually recruiting people who have medical training, as well as those with strong research skills. Several NIH-sponsored programs had been established to develop those specific skills; however, no university had instituted a formal program at the graduate or post-graduate levels.

Other factors driving the development of GPMM include private sector needs, specifically the growth of the biotechnology and pharmaceutical research industries. Seldin says that the goal of the GPMM program is to build on the idea that studying the basis of disease should be a focus for clinician scientists as well as for basic researchers. “Both industries require that cross-pollination of knowledge,” he adds.

In addition, Seldin believes that GPMM will help to legitimate molecular medicine as an area of science on par with biochemistry or physiology. “Medicine and human diseases have an equal scientific basis and value. This area is worthy of the same level of training and input you give to a pure basic science field,” he says.

Unique Environment at BUMC
The program itself might not have existed but for the highly integrated environment at BUSM. Both Seldin and Loscalzo credit that atmosphere as largely responsible for helping to give birth to the GPMM. “This is a campus and an institution where the hospital-based researchers and the medical and graduate school-based researchers work together very closely,” says Seldin.

Unlike most other academic medical institutions, Boston University Medical Center has all the academic, research, and hospital buildings on a unified campus. At many medical centers, strict barriers exist between hospital research and school-based research, between students and faculties, and among the very buildings themselves. According to Seldin, the average academic medical campus does not promote the cross-functioning necessary to train students enrolled in this type of program.

Many researchers expect that molecular medicine will be one of the fastest growing areas of development, and for those involved with clinical medicine and research, it is vital that the GPMM continue to thrive. The more students the GPMM can train with strong research skills and an understanding of human disease, the more likely it will be that those students will make an impact on fighting disease.

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Soon after Aram Chobanian, MD, was appointed dean in 1988, he made a commitment to substantially increase the number of students in the MD/PhD program and strengthen the physician-scientist training program. After a concerted recruitment effort, enrollment more than doubled to approximately fifteen new dual degree candidates each year. A guaranteed stipend and tuition scholarship during the graduate school years helps attract talented students. In the 1999/2000 academic year, eighty-four students were enrolled in the combined degree program.

"These students are among the best medical students and the best graduate students in the nation," says Carl Franzblau, PhD, associate dean for Graduate Medical Sciences. "While they’re in the lab they learn to think like a scientist, and then they win slots in outstanding residency programs."

While most students in the program apply from undergraduate or graduate programs, a few opt to apply after a year of medical school. The typical trainee completes the preclinical years and takes the United States Medical Licensure Examination at the end of the second year, before entering into the research phase. The research years, usually three, come to an end in a way that permits entry to third-year clinical clerkships in a timely fashion.

Doctorates are offered in the seven basic science fields (anatomy and neurobiology, biophysics, biochemistry, microbiology, pathology and laboratory medicine, pharmacology and experimental therapeutics, and physiology) and in behavioral neuroscience, cell and molecular biology, and molecular medicine.

To capture a snapshot of BUSM graduates at the turn of the century, we interviewed the MD/PhD class of 1990—eight young doctors launching their careers. We asked them to tell us about the direction their careers took after graduation and what difference the program made.

JOHN CHARPIE
Assistant Professor
The University of Michigan Congenital Heart Center

After graduation, Charpie completed an internship and residency in pediatrics at Massachusetts General Hospital in Boston, followed by three years of subspecialty fellowship training in pediatric cardiology at the University of Michigan in Ann Arbor. After his fellowship in 1995, he was appointed to the faculty at the University of Michigan, where he is currently completing his fourth year as an assistant professor in the Division of Pediatric Cardiology.

With a faculty appointment calling for 30 percent clinical and 70 percent research, Charpie’s clinical responsibilities include his position as attending physician in the Pediatric Cardiac Catheterization Laboratory and the Pediatric Cardiothoracic Intensive Care Unit. His primary research interests focus on the various signal transduction pathways that regulate blood vessel tone and remodeling in pathophysiological conditions characterized by vascular injury, such as hypertension, diabetes, and atherosclerosis.

"The combined degree program at BUSM provided me with the background knowledge, skills, and intellectual curiosity necessary to pursue a successful academic career with both a basic science and clinical emphasis," says Charpie, whose PhD was in physiology. "Throughout my career, I was led to believe that one couldn’t possibly excel in both the basic science and clinical realms. However, I think that MD/PhDs can play a unique role in medicine by translating basic science research to patient-related issues and by incorporating a rigorous scientific approach to clinical research and clinical problem solving."
THOMAS CRISMAN
Private Practice, Cardiology
Denver, Colorado

After leaving BUSM with a PhD in biochemistry, Crisman spent a year in Omaha, Neb. He completed his residency in medicine at the University of Colorado in Denver and remained there as a fellow in cardiology for three years. He then entered clinical practice with the Denver Cardiology Group, one of the largest of its kind in Denver, Colorado, Private Practice, Cardiology.

DANIEL KOHANE
Instructor in Pediatrics
Harvard Medical School
Assistant in Pediatrics
Pediatric Intensive Care Unit, MGH

Upon graduating from BUSM with a PhD in physiology, Kohane completed a residency in pediatrics at the Children's Hospital, Boston, a residency in anesthesiology at Massachusetts General Hospital (MGH), and a fellowship in pediatric critical care, also at Children's. “During my fellowship, I began benchtop research on the controlled release of drugs from polymer-based systems, with an emphasis on the development of prolonged duration local anesthetics,” he says. Currently an attending physician in pediatric critical care at MGH, Kohane has spent much of the past few years examining the interactions between sodium channel blockers and other drugs in order to discover more effective drug combinations for local anesthesia. “I am very interested in selected aspects of drug delivery to the nervous system and am employing a combination of minimally invasive and controlled release technologies to provide both prolonged duration local anesthesia and prolonged drug delivery to the central nervous system. It would appear that I am likely to achieve NIH funding later this year,” he adds.

“One often hears the remark that the PhD helps one have a rigorous approach to day-to-day clinical medicine. I doubt that is true: there are plenty of rigorous doctors without PhDs,” Kohane says. “Scientific training does, however, train one to critically assess the meaning and validity—i.e., standard of proof—of the scientific underpinnings of one’s clinical practice. I think this is crucial. Another big effect of having a PhD is largely cosmetic (but important): a PhD gets you noticed when you are applying for a position. The biggest benefit for me as a fledgling academic clinician, however, was that my PhD sensitized me to the research side of life, so that I was inundated with research ideas as I went through my various clinical experiences. A minor benefit is that the PhD training makes it easier to do research at the end of clinical training.”

“Editor’s note: Kohane was recently funded with a K08 Grant (Mentored Clinical Scientist Development Award). The award provides an opportunity for promising clinically trained individuals to develop into independent biomedical investigators. The grant, titled “Prolonged Duration Local Anesthesia,” proposes to develop controlled release devices to provide local anesthesia lasting days to weeks.

PETER MOGAYZEL JR.
Assistant Professor of Pediatrics
Anesthesia and Critical Care Medicine
Medical Director, Pediatric Lung Transplantation Program
Johns Hopkins University

Mogayzel completed his residency in pediatrics at the University of Washington, Seattle, and then accepted fellowships in Pediatric Critical Care and Pediatric Pulmonary Medicine at Johns Hopkins Hospital, Baltimore. He is currently leading a research program funded by the Cystic Fibrosis Foundation to elucidate regulation of the CFTR gene. Since 1988, he has held a Shwachman Clinical Investigator Award from the Cystic Fibrosis Foundation.

“My research training has also enhanced my ability to care for patients.”

“My schedule is now 75 percent in the research lab, and 25 percent clinical,” says Mogayzel. “But my research represents a shift from protein chemistry, which I studied at BUSM, to molecular biology.

“My lab is examining the DNA elements that control the CFTR gene, which mutated in cystic fibrosis. Although this gene has been sequenced through the genome project, the elements that control its regulation are poorly understood,” he says. “My goal is to try to better define the DNA elements that control CFTR expression. The next step would be gene therapy for cystic fibrosis. We hope to add important elements to a gene therapy vector and get more physiologic expression of CFTR protein once the gene is introduced to patients. The unique aspect of the program is that we are using a yeast artificial chromosome vector system, which allows incorporation of large fragments of DNA. We manipulate the DNA in yeast prior to its introduction into human cells, and then examine the entire CFTR

BOSTON UNIVERSITY MEDICINE
gene, as well as hundreds of kilobases of flanking DNA, to identify distant regulatory elements.

“This work started when I began my fellowships at Johns Hopkins in 1994,” explains Mogayzel. “Although I did my clinical training at Johns Hopkins, my research was done at the National Human Genome Research Institute [NHGRI] at the NIH. This unique fellowship was sponsored by the Cystic Fibrosis Foundation. I began my current project in the laboratory of Melissa Ashlock [MD, director of Vector Development, Division of Intramural Research, NHGRI], and then moved it into a newly renovated lab in the Children’s Center at Johns Hopkins during the winter of 1998. The 25 percent of my time that I spend doing clinical work involves managing pediatric lung transplant patients. These children usually have cystic fibrosis. Currently, lung transplantation is the only viable option for end-stage lung disease, and this is why we are excited about the potential for gene therapy.”

Mogayzel said the MD/PhD program has taught him the fundamentals of research design and how to think like a scientist. “As a result of this training, I have been able to move into new scientific endeavors easily. My research training has also enhanced my ability to care for patients.”

**Jerome Myers**

Chief, Clinical Pathology Services  
Medical Director of Hematology Laboratory  
Co-Director of Flow Cytometry Laboratory  
Medical Director of Microbiology Laboratory  
Staff Pathologist  
Madigan Army Medical Center, Tacoma, WA

Following graduation and his commission as a major in the US Army, Myers traveled to Hawaii, where he completed an internship at Tripler Army Medical Center (TAMC). He then completed a four-year residency in anatomic and clinical pathology at TAMC, before returning home to Boston and civilian life for a one-year fellowship in hematopathology at Beth Israel Hospital and Harvard Medical School in 1995. Myers returned to active duty in 1996 and was assigned to Madigan Army Medical Center at Ft. Lewis, Washington.

“I believe the MD/PhD program has been of distinct value in these early formative years of my career development. The doctoral process in the Department of Pathology taught me not to just accept an answer, but to try and determine why things are the way they are. This has allowed me to develop into a better pathologist because I try to understand the basis of the disease processes and what is causing them.”

**Benjamin Philosophe**

Assistant Professor of Surgery  
Division of Transplantation  
University of Maryland

Philosophe completed a residency in surgery at Washington University, St. Louis, in 1995, and then accepted a fellowship in liver transplant and hepatobiliary at the University of Toronto. In 1997, he moved to the University of Maryland for additional training in pancreas transplantation, joining the faculty in early 1998 as a surgeon specializing in liver, kidney, and pancreas transplants.

With his research focusing primarily on transplantation tolerance, Philosophe says he is particularly interested in portal tolerance. “Experimental animal models have shown that the liver has some immunomodulatory characteristics. Moreover, donor cells or antigen injected through the portal vein can induce specific tolerance, but the exact mechanisms of this are still unknown. Clinically we have seen at the University of Maryland that pancreas transplants that are drained into the portal circulation, as opposed to systemic circulation, have a significantly lower instance of rejection. In my lab, we’re working on identifying or delineating the mechanisms to see whether this is due to the antigen presenting cells in the liver (dendritic cells) or other non-parenchymal liver cells. We’re also trying to determine if apoptosis plays a role in portal tolerance.”

Philosophe says his MD/PhD degree has enabled him to easily overcome some of the common hurdles on the academic path. “For example, it is easier for me to negotiate lab space and start-up money,” he says. “In addition, the training in immunology that I received at BUSM has served as a good background for the research I am doing now.”
Editor's note: After marrying during their fourth year at BUSM, the following two graduates, Elizabeth Pomfret and James Pomposelli, matched together at the Deaconess Hospital in Boston. Their travels since have brought them across the Atlantic to Germany for transplantation training, and back to Boston, where they both hold positions at the Lahey Clinic Medical Center. Both earned their PhD degrees in pathology.

ELIZABETH POMFRET
Director, Living Donor Liver Transplantation
Division of Hepatobiliary Surgery and Liver Transplantation
Lahey Clinic Medical Center

After graduating cum laude, Pomfret completed a surgical residency at Deaconess Hospital, Boston, serving as chief surgical resident in 1994-95. She was a hyperalimentation fellow in Nutrition Support Service at Deaconess Hospital during 1993-94, and a multiorgan transplantation fellow at Beth Israel Deaconess Medical Center, 1996-98. She also received an appointment as instructor in surgery at Harvard Medical School in 1998. Before moving to the Lahey Clinic Medical Center in July 1999, she was attending surgeon, Division of Organ Transplantation and Hepatobiliary Surgery, Beth Israel Deaconess Medical Center, Boston.

Pomfret started the first adult-to-adult liver transplant program in New England after spending a month in Germany, where she was taught to perform the procedure. “I have the ability to sit with people and process the complex issues, such as donating 65 percent of a liver to a loved one,” she says. “Aside from the patient interactions, the intellectual aspect is very challenging as we try to learn from our mistakes and negotiate the immunologic issues that crop up. These are partial liver grafts and they behave differently in the sense that they are more susceptible to rejection because you don’t have the whole liver volume. In general, the gains in adult-to-adult liver transplantation pose some exciting surgical possibilities for patients with end-stage liver disease.”

According to Pomfret, living donor liver transplantation is a surgical innovation that allows surgeons to treat patients who otherwise might not make it to transplantation. “The average wait in New England for a liver is nearly two years,” says Pomfret. “This program offers an opportunity to a whole group of patients who might otherwise die.” She adds that more than eleven thousand patients are awaiting transplants, but only approximately four thousand livers are available from brain-dead donors each year.

Pomfret, who was awarded the American Society of Transplant Surgeons Young Investigator Award in 1997, says her PhD provides a “systematic way of thinking which had been incredibly important throughout training: it taught me to think in a logical, rational manner, and has made a huge difference in the kind of doctor I have become.”

JAMES POMPOSELLI
Senior Staff Surgeon
Institute for Transplantation and Hepatobiliary Surgery
Lahey Clinic Medical Center

During his residency in surgery at the Deaconess/ Harvard Surgical Service at the Deaconess Hospital in Boston, Pomposelli became a nutrition support fellow, working with George L. Blackburn, MD, PhD, S. Daniel Abraham Associate Professor of Nutrition, Harvard Medical School. Upon completing his residency, he accepted a fellowship with the Division of Hepatobiliary Surgery and Transplantation at Beth Israel Deaconess Medical Center. Early last summer, he joined the Lahey Clinic Medical Center’s Institute for Transplantation and Hepatobiliary Surgery, where he and his wife (Pomfret) are part of a team that has begun the only adult-to-adult living donor liver transplant program in New England.

Along with Pomfret, Pomposelli went to Germany where they studied the techniques of live donor liver transplantation with Professor Christolph Broelsch (the father of a living donor liver transplantation recipient). “It is very exciting to be part of such a highly skilled, well-integrated team, which is much larger than the four surgeons involved,” he says.

“Dedicated nurses, social workers, hepatologist, radiologists, psychiatrists, internists, and fellows all contribute to make this new surgical innovation a reality. This is truly a team effort.

“My wife and I have a unique situation in that we went through medical school and surgical training together, and now we are partners at Lahey,” he says. “It is difficult for a lot of people to understand, but it works for us. There is a tremendous advantage in being able to count on each other in literally every aspect of life. We can pinch hit for each other, which we do all the time.”
BOSTON UNIVERSITY SCHOOL OF MEDICINE
DOCTOR OF PHILOSOPHY DEGREES
CLASS OF 1999

Gilles Romeo Bolduc, BS, MA
Combining Phylogeny and Selective DNA Sequencing to Examine a Vaccine Candidate*

Steven Keith Branch, BS
Cholesterol Regulation in Murine Colonic Cells in Vivo and in Vitro
Residency: University of South Florida, College of Medicine
General Surgery, Tampa, Fla.

Kelly Jo Conn, BS
The Role of IGF-I in Transcriptional Regulation of the Elastin Gene*

Rachel Llanelly Cox, BA, MS
Nitric Oxide Synthase in Non-Mammalian Species: Sequence Identification and Phylogenetic Analysis*
Guest Investigator—Woods Hole Oceanographic Institution

Alexi Igorevich Degterev, Chemist
Regulation of Elastin Gene Transcription: Characterization of an NF-1 Element in the Distal Promoter*
Postdoctoral Research Associate—Harvard Medical School

Jet King-Shing Ho, BA
Binding and Transport Properties of Fatty Acids and Acyl Carnitines
Residency: Stanford University Program, Neurology, Stanford, Calif.

Nicholas Ramsey Husni, BS
Tumor Necrosis Factor Alpha and the Diabetic Fibroblast: Implications of Altered Bradykinin-Induced Signal Transduction in the Patient with Diabetes Mellitus
Residency: Lahey Clinic, Plastic Surgery, Burlington, Mass.

Sophia N. Lavrentiadou, BSc
Transcriptional Regulation of Human Apolipoprotein CIII (APOCIII) Gene Part II Generation of Cell Lines and Adenovirus Constructs That Express Human Apolipoprotein E (APOE) Variants
Postdoctoral Fellow—University of California, Davis

John Sang Lee, AB
Role of NF-κB/Rel Transcription Factors in Vascular Smooth Muscle and Endothelial Cell Function
Residency: Hospital of the University of Pennsylvania, Internal Medicine, Philadelphia, Pa.

Nikolaos Makris, MD
Delineation of Human Association Fiber Pathways Using Histologic and Magnetic Resonance Methodologies*
Postdoctoral Fellow in Neurotoxicology/Neuropsychology—Boston Environmental Hazards Center, Boston VA Medical Center

Carole Lee Palumbo, AB
Neuroimaging to Predict Recovery of Language in Stroke Patients with Aphasia
Neuroimaging Research Associate—Boston University School of Public Health

Kenneth Edward Santora, BS
Recombinant Polyclonal Antibody Libraries for Breast Cancer Therapy*
Cancer Research Training Award/Fellowship—National Cancer Institute
Postdoctoral Fellow—Boston University School of Medicine

Mika Adachi Sovak, BA
Constitutive NF-κB/Rel Activity in Breast Cancer
Residency: University of California, San Francisco, Internal Medicine, San Francisco, Calif.

Gizette Vahalian Sperinde, BS
Heparan Sulfate Proteoglycans Regulate the Intracellular Fate of Growth Factors

Kimberly Ann Sullivan, BA
Neurodevelopmental Aspects of Methylmercury Exposure: Neuropsychological Consequences and Cultural Issues
Postdoctoral Fellow in Neurotoxicology/Neuropsychology—Boston Environmental Hazards Center, Boston VA Medical Center

Li Sun, BS, MS
Corynebacterium Diphtheriae Toxin Repressor (DtxR): A Molecular Genetic Analysis*

Alexander Thompson, BSc, MS
The Potential Roles of the Thrombopoietin-Regulated Genes C-Myc and TAFI132 in Megakaryocytopoiesis
Postdoctoral Research Fellow—Queens University, Belfast

Demetrios Vavvas, BS
Regulation of Acetyl-Coa Carboxylase in Skeletal Muscle
Residency: Massachusetts Eye and Ear Infirmary, Ophthalmology, Boston, Mass.

Amy Joy Williams, BS
Mechanisms of Activation and Repression of Platelet-Derived Growth Factor Genes*
Postdoctoral Research Associate—Harvard Medical School

* January 1999 graduates
The American Society for Aesthetic Plastic Surgery has announced that it will rename its Leadership Award the Caspar W. Anastasi Award for Leadership. Caspar Anastasi, MD, clinical professor of surgery, died last year.

Marilyn Augustyn, MD, assistant professor of pediatrics, received the William T. Grant Foundation Faculty Scholar Award.

BUSM students Ashley Ackerman, Ann Marie Francisco, and John Su have been selected as 1999/2000 Boston Schweitzer Fellows.

Howard Bauchner, MD, professor of pediatrics and public health, has been appointed a Scholar-in-Residence in Child and Adolescent Health at the Agency for Health Care Policy and Research in Washington, DC. During the coming academic year at the agency, he will work on his own research projects involving early diagnosis of asthma and socioeconomic disparity in antibiotic use, as well as help agency staff determine future funding priorities.

Aram Chobanian, MD, dean of Boston University School of Medicine and provost of Boston University Medical Campus, was appointed a University Professor. The University Professors group comprises distinguished scholars from the different colleges and schools of Boston University.

Timothy Cooley, MD, associate professor of medicine, and Stephen Pelton, MD, professor of pediatrics, recently received the Community Excellence Award from the Community Center for Health, Education, and Research for their outstanding efforts on behalf of children with AIDS.

Thomas Freddo, OD, PhD, professor of ophthalmology, pathology, and anatomy, was named Optometrist of the Year by The Massachusetts Society of Optometrists for his outstanding efforts in the area of interprofessional relations.

Kenneth Grundfast, MD, chairman of Otolaryngology, recently was an invited speaker at the New Zealand Society of Otolaryngology—Head and Neck Surgery 1999 Scientific Conference in Samoa.

Lana Habash, MD, clinical instructor of family medicine, was recognized as one of forty-four physicians nationwide selected by medical students for the 1999 AAMC Humanism in Medicine Award.

Harold Lazar, MD, professor of cardiothoracic surgery, received a grant from the American Diabetic Association to study the effects of glucose-insulin-potassium solution on diabetic patients undergoing coronary bypass surgery.

The National Advisory Council on Aging has selected Mark Moss, PhD, chairman of the Department of Anatomy and Neurobiology, as a recipient of a National Institutes of Health MERIT Award. The award, given in recognition of a sustained contribution to aging and leadership in the field, provides a mechanism to extend his recently awarded five-year grant on "Neurobiological Consequences of Hypertension and Middle Age" from the National Institutes on Aging for up to an additional five years without a competing review.

Barbara Phillip, MD, assistant professor of pediatrics, was chosen to be on the Academy of Breastfeeding Medicine's Board of Directors.
ELEVEN BOSTON UNIVERSITY MEDICAL CENTER PHYSICIANS HAVE BEEN INCLUDED IN THE GUIDE TO TOP DOCTORS: 1999 EDITION by the Center for the Study of Services, Washington, DC. To compile the database, more than 260,000 physicians across the United States were asked to name the physicians they "would consider most desirable for the care of a loved one." The BUMC physicians listed are as follows:

- Timothy Babineau, MD, associate professor of surgery
- James Becker, MD, James Uttley Professor and chairman of Surgery
- Thomas DeLaney, MD, associate professor of radiation oncology
- Carlos Kase, MD, professor of neurology
- Robert Levin, MD, associate professor of medicine
- Sharon Levine, MD, associate clinical professor of medicine
- David McAneny, MD, associate professor of surgery
- Thomas Ryan, MD, professor of medicine
- David Salant, MD, professor of medicine
- Richard Shemin, MD, chairman and professor of Cardiothoracic Surgery
- Robert Simms, MD, associate professor of medicine

THE 1999 EDITION OF WHO'S WHO AMONG STUDENTS IN AMERICAN UNIVERSITIES AND COLLEGES included twenty-seven BUSM students. The students, 1999 graduates of the school, were recognized as outstanding leaders based on their academic achievement, service to community, leadership in extracurricular activities, and potential for continued success. Those named were:

- Kruti Acharya
- Saurabh Agarwal
- Michael Almaleh
- Leslie Beasley
- H. Peter Beauparlant, Jr.
- Matthew Boes
- Michael Caplan
- Ritu Chopra
- Wendy Cole
- Thomas Costello
- Limor Deutsch
- Brian DiGiovanni
- Andrew Doolittle
- Ronald Ebb
- Alexander Farivar
- Dinakar Golla
- Jennifer Gurney
- Stephen Janas
- Scott Laker
- Julie LeMarie
- Scott Lisson
- Robert Lobel
- Margaret Murray
- Selene Parekh
- Anthony Sullivan
- Demetrios Vavvas
- Jane Yeh

Harvard Pilgrim Health Care chose Nicole Prudent, MD, assistant clinical professor of public health, as Physician of the Year. The award acknowledges her contributions, especially regarding the Haitian American Public Health Initiative.

Stephen Sentovich, MD, assistant professor of surgery, was honored at the one-hundredth Anniversary Meeting of the American Society of Colon and Rectal Surgeons in Washington, DC.

A four-year grant, totaling $240,000, was awarded to John Wiecha, MD, MPH, director of Predoctoral Education in the Department of Family Medicine. The grant will assist in the instruction of third-year medical students and fund the design, implementation, and evaluation of an electronically delivered curriculum for students in BUSM's Family Medicine Department. The grant is part of the Robert Wood Johnson Foundation's Generalist Physician Faculty Scholars Program.

Barry Zuckerman, MD, professor and chairman of Pediatrics, received the following awards/lectureships: Pfizer Visiting Professor at Cook County Hospital/Chicago Medical School in Chicago, Ill.; Ray A. Kroc Visiting Professor at the University of Illinois in Chicago, Ill.; Marvin Small Memorial Lectureship at Stanford University/Packard Children's Hospital in Palo Alto, Calif.; and the First Annual Edward Penn Memorial Lecture for the Massachusetts Chapter for the American Academy of Pediatrics.
Welcome to the Boston Medical Center Department of General Surgery. We strive to provide the finest surgical patient care, to conduct world-class research, and to present state-of-the-art education.

The index on the left will link you to an array of information about our department. We welcome your feedback.

General Surgery Website Editor: Dr. Wayne LaMorte

Teaching Conferences and Rounds

The surgical residency tries to engender an atmosphere of critical thought in all resident teaching activities from conferences to individual experiences in the operating room. Many resident conferences stress critical literature review and interpretation in clinical patient care.

Morning Report

This conference, held each Thursday morning by the chief of surgery on the E

Student Research

A physiology experiment at Boston University School of Medicine in the late 1800s.

We have identified a number of research projects which BUSM students may participate in during the summer or on an ongoing basis. Most of these projects are being conducted.

Visit the Department of Surgery Web site at www.bumc.bu.edu.