

THE MISFOLDED MYSTERY

How BUSM researchers are helping to unravel the mystery of misfolded proteins behind Alzheimer's and other diseases.



Message From The Dean

DEAR ALUMNI, FRIENDS, AND COLLEAGUES,

Boston had an incredibly cold and snowy winter but as the glacier around the Medical Campus recedes, academic signs of spring are unmistakable. On the morning of Match Day (see article), our faculty announced prizes and honors earned by senior class members and then further distracted them by having them pose for their class picture. With the countdown to the noon distribution of match envelopes, we effectively launched our senior class. They did exceptionally well, matching in competitive residencies from Boston to California and from Michigan to Texas.

The next major event is Alumni Weekend. Boston University School of Medicine is at an exciting point in our evolution, and I look forward to speaking with many of you about our efforts to advance excellence across our missions of education, research, patient care, and community service.

Our faculty is committed to teaching the next generation of scientists, physicians, physician assistants, and other health care professionals. We completed the integration of the second-year curriculum a few years ago and Dr. Douglas Hughes, our associate provost of academic affairs, has now launched efforts to integrate our first year's medical course of study. We also are experimenting with providing leadership training (negotiating skills, conflict management, and even spreadsheets and accounting) for our medical students. Managing a clinical service or a laboratory research team requires skills we weren't taught in medical school.

You may have noticed that we have changed the name of this publication from *Campus and Alumni News* to *Boston University Medicine* to best reflect our mission and our message. As you will see in this first issue of *Boston University Medicine*, through the generosity of our alumni and friends, we continue to invest in student scholarship aid, faculty recruitment, and classroom and laboratory renovations to enhance our students' experience on campus. You will read about the transformation of an empty lot behind the student residence into a recreation area with basketball and volleyball courts, a field for soccer, Frisbee, or football, and even nine raised bed planters for growing vegetables.

Our faculty is engaged in an incredible breadth of discovery and innovation, from basic curiosity-driven science, to the study of clinical interventions, to studies of neighborhoods and populations to transform health care. We remain deeply committed to Boston and our community.



Discovering underlying patterns in disease mechanisms is central to developing better treatment and prevention. Our faculty has developed outstanding clinical and research reputations in a number of seemingly diverse diseases

(Alzheimer's disease, amyloidosis, prion infections, and sports-related chronic traumatic encephalopathy), each of which is characterized by the accumulation of abnormally folded proteins. We cover some of the faculty doing this research in the current issue and on the cover.

As evidenced by their research and teaching, outstanding faculty and our ability to recruit and retain them are key to the School's success. Endowed professorships help make this possible. The Department of Dermatology celebrated the installation of two accomplished physicians, Drs. Vincent Falanga and Michael Lichtman, as the Barbara A. Gilchrest Professor of Dermatology and the Peter E. Pochi Assistant Professor of Dermatology. The two chairs honor two of our most distinguished dermatology faculty, Drs. Gilchrest and Pochi, and support a senior investigator and launch a promising assistant professor, respectively. We congratulate all four faculty members and the department's chair, Dr. Rhoda Alani.

Also in this issue we pay tribute to one of the School's most renowned faculty members, Alan Peters, who recently retired. Dr. Peters is a legend in the field of neuroanatomy as well as on the Medical Campus. Last fall we celebrated his long and productive career and we wish him well in his retirement.

Last winter we lost two of our most respected colleagues, Kenneth Edelin and Joel Alpert. Dr. Edelin headed our Department of Ob-Gyn for many years and also served as associate dean for minority affairs. A 42-year member of the BUSM community, Dr. Alpert chaired the Department of Pediatrics as well and served as assistant dean for student affairs. We will miss both of them.

Best regards,

Karen Antman, MD
Provost, Medical Campus
Dean, School of Medicine
Professor of Medicine

Boston University Medicine

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Boston University's policies provide for equal opportunity and affirmative action in employment and admission to all programs of the University.

SPRING 2014

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Students celebrate Match Day 2014 on March 21



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Field of Dreams

Space for recreation and gardening offers students welcome respite

By Leslie Friday

Claire Wang (MED'16) examines the green beans growing in raised beds on the Field of Dreams.

Just over a year ago, Dean Karen Antman, MD, was strolling past the newly opened Medical Student Residence on Albany Street when she spotted students tossing a football in the small courtyard abutting the building. The tight space called for some creative, and potentially dangerous, catches. “They kept careening into the benches and rose bushes,” says Antman, who also serves as Medical Campus provost. “Clearly they needed a field.”

Coincidentally, there was a wide-open space behind the building, where two additional residences will be built once funding and city approval are secured. Realizing that students needed recreation space immediately, Antman approached John Barton, Medical Campus executive director of facilities, with the idea of transforming the site into a green space that could be used for sports and other activities. Working together, they developed a plan and a budget. Antman says that Barton was the one who dubbed the space the “Field of Dreams.”



One of the amenities of the Field of Dreams behind the Medical Student Residence on Albany Street is the NBA-sized basketball court, where students can play a pickup game.



Red bell peppers were among the many vegetables planted last summer.

Without the field, most students would have to go to a gym, the Charles River Campus, or the South End to play sports. “It definitely allows students to have access to their hobbies.”

There’s still some work to do on the field. Barton points to the volleyball court, which he’d like to expand in the coming months, and the grass that’s been reluctant to take hold. Still, the field is already popular. On a recent weeknight, students were playing a pickup basketball game on the new court. And the garden, although tired and wilting after a long growing season, produced a nice crop of eggplants, kale, brussels sprouts, tomatoes, and a wide variety of herbs.

Claire Wang (MED’16) comes to the garden occasionally to pick bell peppers and chilies to mix into stir-fries, and she sees people playing basketball nearly every night. Without the field, most students would have to go to a gym, the Charles River Campus, or the South End to play sports, she says. “It definitely allows students to have access to their hobbies.”

Jackson recruited students via email to participate in the garden. Those interested compiled a wish list of fruits, vegetables, and herbs. Some even solicited suggestions from parents knowledgeable about gardening. After pruning their choices, the students presented a list to Jackson, Antman, and Barton, and Barton’s team planted them in early summer.

“This year was trial and error,” says Barton, who envisions planting fruit trees and blueberry bushes in the future.

Although the field is enhancing the quality of life for current BUSM students, it will eventually be replaced by two buildings that will provide critically needed additional housing. The first will eliminate the raised beds and sand volleyball court; the second will occupy the remainder of the field.

“Given the fundraising required for either building,” Antman says, “I believe we will have most of the field for some time.”

This story first appeared in BU Today. ■

“The name stuck,” says Antman, BUSM’s John Sandson Professor of Health Sciences. “I presented a plan at our Dean’s Advisory Board this spring, and volunteers had funded it by the end of the meeting.”

The donors, who prefer to remain anonymous, covered the \$90,000 construction cost, and work was completed in August. The field now boasts an NBA-sized basketball court, a sand volleyball court, and a grass field for sports like soccer, Ultimate Frisbee, and football as well as nine raised vegetable beds, where students can help themselves to fresh produce.

The Field of Dreams offers an essential respite to the stress of medical school. “No matter how wonderful a student you were

before, medical school is difficult,” says Angela Jackson, a BUSM associate professor of medicine and associate dean for student affairs. “It’s more demanding, more anxiety-producing, and just being able to balance life is impossible.” And while extracurricular activities are available for BUSM students, Jackson says, “there is something about just getting your hands in the dirt and eating the product of your work.”

On a recent autumn afternoon, Barton swipes his BU identification card to enter the gated field. Any BU student with a valid ID has access to the area. So far, Barton says, the University has had no problems with trespassing or vandalism, despite the high-traffic area.



From left: Jag Bhawan, MD; Barbara Gilchrest, MD; Michael Lichtman, MD; Rhoda Alani, MD; Dean Karen Antman, MD; Vincent Falanga, MD; Peter Pochi (MED'55); Michael Rosenbaum (MED'78).

Dermatology Professorships Honor Longtime Faculty

Drs. Gilchrest and Pochi recognized for dedication to excellence

TWO RENOWNED dermatologists and longtime BUSM Department of Dermatology faculty members were honored during a professorship installation ceremony held on the Medical Campus on November 8, 2013. Former Dermatology Chair Barbara Gilchrest, MD, and former Herbert Mescon Professor of Dermatology Peter Pochi (MED'55) were lauded for their seminal contributions to the field and recognized with named professorships.

“Our recent professorship installations allowed the Department of Dermatology at Boston University School of Medicine to celebrate its illustrious past, outstanding present, and bright vision for the future,” says Rhoda Alani, MD, Herbert Mescon Professor and Chair of the Department of Dermatology. “This was truly a celebration of the dedication to excellence that epitomizes Boston University.”

Barbara Gilchrest served as BUSM professor and chair of dermatology for 23 years, growing the department from 1.5 members to more than 40 full-time clinicians and researchers. An internationally recognized expert in skin aging, pigmentation, and other effects of light on normal and diseased skin, she has authored or co-authored more than

450 articles and books, served in leadership roles in all major US dermatologic organizations, and is repeatedly named among America’s Top Doctors. A member of the Institute of Medicine, Gilchrest is a charter member of the National Academy of Inventors. She currently serves as editor-in-chief of the *Journal of Investigative Dermatology*.

“Barbara Gilchrest is a truly remarkable person,” says Jag Bhawan, MD, professor

Both Drs. Falanga and Gilchrest are widely viewed as true visionaries in their fields of translation wound healing research, and photobiology, skin pigmentation, and photoaging, respectively.

of dermatology and pathology and head of the Dermatopathology Section. “Under her leadership, four endowed professorships, one career development award, and two international fellowships were established in our department. In addition, she was able to convince BU leadership to give dermatology its own building. How many departments in the country have their own building?”

The first occupant of the Barbara A. Gilchrest Professorship of Dermatology is Vincent Falanga, MD, vice chair for research and program director for the Department of Dermatology and research professor of biochemistry. “Dr. Vincent Falanga was appointed as the Barbara A. Gilchrest Professor of Dermatology, connecting two world-renowned leaders in skin disease research and two former department chairs through this new professorship,” Alani notes. “Both Drs. Falanga and Gilchrest are widely viewed as true visionaries in their fields of translation wound healing research, and photobiology, skin pigmentation, and photoaging, respectively. It is truly amazing to have two such legendary figures in dermatology at our institution and to honor them in such a fashion.”

A Harvard Medical School graduate, Falanga completed his internship and residency in internal medicine at the University of Miami Jackson Memorial Hospital, a dermatology residency at the University of Pennsylvania, and a dermatopathology fellowship at Roger Williams Medical Center. He has been a BUSM faculty member for 15 years, also serving as assistant dean of clinical and faculty affairs and director of the BUSM Ambulatory Medical Clerkship at Roger Williams Medical Center.

A specialist in wound healing, Falanga was the first to successfully test and use autologous cultured bone marrow-derived mesenchymal stem cells in human chronic wounds and the first to use a human recombinant growth factor in nonhealing wounds. He led the research showing the effectiveness of living bioengineered skin in venous ulcers, which became the first-ever FDA-approved bioengineered skin for wounds. Falanga also discovered the effectiveness of anabolic

steroids for cryofibrinogenemic ulcers. As vice chair for research, he directs studies related to tissue injury, repair processes, and regeneration.

“We were also delighted to appoint Dr. Michael Lichtman as the Peter E. Pochi Assistant Professor of Dermatology,” says Alani. “A longtime member of the BU Dermatology faculty, Dr. Pochi is currently professor emeritus at BU, where he had an illustrious career in academic dermatology and dermatologic research. His most notable accomplishments were in critical discoveries related to the roles of hormones and retinoids in the development of acne in patients. His discoveries were critical to the development of retinoid and hormonal therapies for the treatment of recalcitrant acne and his previous contributions were recognized by his appointment as the first Herbert Mescon Professor of Dermatology. Dr. Pochi retired from practice in 1991; however, he continued to make significant contributions to our institution through his generous donation of time and resources to the School of Medicine, for which he received its Distinguished Alumnus Award.”

A 1955 BUSM graduate, Pochi completed his internship and dermatology residency at BUSM. The author of more than 150 publications, he was associate editor of the *Journal of Investigative Dermatology* and on the editorial boards of the *Archives of Dermatology* and the *Journal of the American Academy of Dermatology*. He was elected to the board of directors of the American Academy of Dermatology and was vice president of the Society for Investigative Dermatology. Pochi also has received the BUSM Frederick Jackson Faculty Award for Excellence in Teaching.

Clinical Associate Professor of Dermatology Michael Rosenbaum (MED’78), recalls that when he was a dermatology resident, “Dr. Pochi showed me by example, great wisdom, compulsive tenacity in clinical problem solving, and total respect for each individual patient’s unique life situation and personality. In addition to being the heart and soul of BU dermatology for decades, Dr. Pochi has been a tireless and loyal supporter and builder of the School of Medicine as a whole.”

“In naming Dr. Lichtman—a new faculty member in dermatology—as the Peter E. Pochi Professor, we link the department’s illustrious past to its brightest and best hope

for the future,” adds Alani. “Dr. Lichtman will be pursuing a translational research program dedicated to the use of stem cells to treat patients with recalcitrant wounds. He will work collaboratively with Dr. Falanga in these efforts, thus bringing the entire celebration full circle. We were delighted to honor these tremendous leaders in dermatology and to celebrate their accomplishments and contributions to our specialty in such a meaningful way.”

Lichtman graduated from the University of Washington School of Medicine and completed his internal medicine residency at New York Presbyterian-Columbia University Medical Center and dermatology train-

ing at the University of Texas Southwestern. Simultaneously, he was a postdoctoral fellow at Brigham and Women’s Hospital, where he served as clinical director of the Angiogenesis and Wound Healing Center. His research focus is on the interface between immunology and stem cell biology to improve treatment of complex wounds.

“This event celebrates four careers, all active within the School of Medicine,” says Dean Karen Antman, MD. “Drs. Falanga, Gilchrest, and Pochi are eminently distinguished professors of dermatology. Dr. Lichtman is launching his promising career with the resources of the Peter E. Pochi assistant professorship.” ■

Play Me

In September, a piano was delivered to Talbot Green as part of the “Play Me, I’m Yours” Street Piano Festival through the Celebrity Series of Boston. Some of the School’s musically talented students and faculty stopped by to play, filling the air with lovely music. ■



Dean's Advisory Board Holds Annual Meeting and Scholarship Dinner

Topics include research, BUSM Class of 2017, scholarship funds

The School of Medicine Dean's Advisory Board held its annual fall meeting on October 24. Following an update on the School by Dean Karen Antman, MD, faculty presenters included Robert Witzburg, MD (MED'77), associate dean for admissions, who spoke about the BUSM Class of 2017; and Caroline Apovian, MD, director of the Nutrition & Weight Management Center and director of the Research Program in Nutrition & Weight Management at Boston Medical Center, who discussed her research on obesity.

Board members later joined scholarship donors at the Hotel Commonwealth for a dinner to celebrate the impact of scholarship funds. Guests heard a moving presentation by scholarship recipient Anthony Esposito (MED'14), about his road to BUSM and post-graduation career goals. Please visit www.bu.edu/supportingbusm for more information. ■



(left) Dean Karen Antman, MD, John Avellino, and Jonathan Gertler, MD; (right) Robert Witzburg, MD (MED'77); (below) Caroline Apovian, MD, Suzanne Cutler, PhD, and Sarkis Kechejian (MED'63)



(top left) BUSM scholarship donors and students; (top right) Aaron Der (MED'14), Donna Barnard (MED'65), and Douglas Barnard (MED'65); (bottom right) Alvaro Donoso (MED'16), Leslie Serchuck (MED'90), and Claudia Sotillo (MED'14); (bottom left) Aram Chobanian, MD, Anthony Esposito (MED'14), and Jasmine Chobanian



Physician Assistant Program Launched

Division of Graduate Medical Sciences to offer innovative education for aspiring PAs. **By John O'Rourke**

In an effort to address the critical shortage of physicians—especially in the field of primary care—forecast for the coming decade, the School of Medicine recently announced a new Master of Science Physician Assistant (PA) Program, to be administered by BUSM's Division of Graduate Medical Sciences.

The Association of American Medical Colleges estimates that the United States will face a shortage of 91,500 doctors by 2020, up from the 62,900 forecast for 2015. The reasons for the shortage? An aging baby boomer generation that will require increasing medical resources and the health insurance coverage to some 32 million currently uninsured Americans made possible by the Affordable Care Act by 2019.

Physician assistants are licensed to practice medicine as part of a team that includes physicians. Along with nurse practitioners, they have become a growing part of medical practices, largely because the bill for their services is less than that for physicians. The US Bureau of Labor Statistics estimates that the number of PA jobs is expected to grow by 39 percent between 2008 (74,800) and 2018 (nearly 104,000).

"The United States needs a larger health professional workforce to care for aging baby boomers, and the demand for midlevel medical providers is increasing rapidly," says Dean Karen Antman, MD. "The currently available PA programs are

"The United States needs a larger health professional workforce to care for aging baby boomers, and the demand for midlevel medical providers is increasing rapidly. The currently available PA programs are turning down very qualified candidates for lack of slots."

—Karen Antman, MD, MED dean and Medical Campus provost

turning down very qualified candidates for lack of slots."

Like their medical school counterparts, physician assistant students enrolled in the new BU program will learn medical sciences, clinical sciences, and clinical skills. The 28-month curriculum, divided into seven semesters, will consist of 12 months of traditional lectures and seminar sessions, followed by 16 months of hands-on clinical education in hospitals and clinics. PA



Mary L. Warner, MMSc, PA-C

students will also be required to submit a thesis proposal.

Physician assistants are educated as generalists, says Mary L. Warner, MMSc, PA-C, a BUSM assistant professor of medicine and program director of the Physician Assistant Program. "Unlike physicians, physician assistants change specialties at least three times over the course of their career," Warner says. "The most common way PAs learn to practice in new specialties is the apprentice model, with on-the-job training by their supervising physicians." While PAs are not required to do residencies after earning their degree, short-term residency programs in specialties like obstetrics are available.

Physician assistants perform many of the same tasks as doctors. Among their responsibilities are performing physical exams, ordering lab tests and diagnosing illnesses, prescribing medications and developing treatment plans for patients,

and—when working in surgical settings—assisting in surgery.

First launched in 1965 at Duke University, the physician assistant profession was initially intended to address the primary care shortage in rural and underserved areas. The BU degree program is designed to educate PAs who will care for a diverse population of patients in a variety of health care settings.

BU's PA Program offers several innovations not found at other schools. Students will benefit from a flipped classroom, where professors assign video lectures and online reading to be completed at home, with classroom time reserved for problem solving and answering questions. The anatomy lab, says Warner, will offer a full dissection lab, unusual for PA programs, and a physiology lab, also not widely available at other programs, as well as a strong research curriculum. "In our partnerships with Boston Medical Center and the VA Boston Healthcare System," she says, "the clinical education will focus on learning to care for patients from vulnerable populations."

More than 1,000 people have applied for the 28 slots in the inaugural class, which Warner attributes to the shortage of primary care providers and the strong projected growth prospects for the profession—as well as BUSM's national reputation.

More information about BU's Physician Assistant Program can be found at www.bu.edu/paprogram. ■

“You Are Amazing”

BUSM Class of 2014 Match for Residency

Amid snapping cameras and cheerful balloons, the Class of 2014 received their National Residency Matching Program letters with family, friends, faculty, and staff joining in the excitement.

“You are amazing,” Associate Dean for Student Affairs Angela Jackson, MD (MED’77) said to the class. “You have worked hard for this day, and we congratulate you.” Also congratulating the class was Robert Witzburg, MD (MED’77), associate dean for admissions: “We are proud of you and salute you for not only what you have accomplished but for who you are.”

Dean Karen Antman led a toast to the class noting, “You will remember this day long after you even remember your graduation day.” She highlighted some 2014 residency statistics, including the fact that 175 members of the class matched in residencies across the country, with 44 staying in Massachusetts. Thirty-seven percent of the class is entering primary care residencies in internal medicine, family medicine, and pediatrics. Eighteen graduates will stay on the Medical Campus training at Boston Medical Center (BMC) and two graduates are in the combined BMC/Boston Children’s Hospital pediatrics program. Surgical residencies increased this year to nine percent of the class from three percent in 2013, and emergency medicine continues to be an area of particular interest with seven percent of the class matching in this specialty.

“You are now ours and we love having you as alumni,” Jean Ramsey, MD, associate dean for alumni affairs, said to the class. “We will work with you to help keep you in contact and keep your class together.” ■



APPOINTMENTS

ASSOCIATE DEAN FOR CONTINUING MEDICAL EDUCATION

Daniel Alford, MD, MPH

(SPH'86, MED'92), has been appointed associate dean for Continuing Medical Education (CME), stepping up from his previous position as assistant dean. A BUSM faculty member since 1996, he is an associate professor of medicine, program director for the Addiction Medicine Fellowship, and director of the Safe and Competent Opioid Prescribing Education Program. He is also medical director of the Office-Based Opioid Treatment Program at Boston Medical Center.

Dr. Alford replaces **Barry M. Manuel, MD** (MED'58), who has been CME associate dean since 1980. Dr. Manuel retired at the end of 2013 after 59 years at BUSM, where he served as executive director of the School of Medicine Alumni Association for more than 35 years and as faculty councilor to the BU chapter of Alpha Omega Alpha, the national honor medical society, for 23. He was a founder and president of one of the first HMOs in Massachusetts, and a founder and board member of the Massachusetts Professional Standard Review Organization (PSRO).

Dr. Manuel served for 12 years as Chair of Coverys, one of the largest medical malpractice carriers in the US; upon retirement he was honored with the title of Chairman Emeritus. He founded and for seven years served as chairman of the Professional Liability Foundation, Ltd., an organization composed of Massachusetts health care providers dedicated to reforming our tort system. Upon retirement, he



Daniel Alford, MD, MPH

was honored with the title of chairman emeritus. He has served as president of both the Massachusetts Medical Society and the Massachusetts Division of the American College of Surgeons. Dr. Manuel has also served a maximum six-year term as a member of the Board of Governors of the American College of Surgeons and as chairman of the Board of Governors Committee on Professional Liability as well as chairman of the Regents Committee on Patient Safety.

He has spoken extensively on reforming our system of dealing with medical errors and has published many articles on the subject and conducted many post-graduate courses on professional liability and patient safety for the American College of Surgeons. He has published editorials on health policy, professional liability, and patient safety in leading US newspapers and co-edited a book on patient safety.

Dr. Manuel received many honors during his career, including the American College of Surgeons's Distinguished Service Award, the Massachusetts Medical Society's Lifetime Achievement Award, and BUSM's prestigious Distinguished Alumni Award. The CME office will be renamed the Barry M. Manuel Office of Continuing Medical Education at Boston University School of Medicine. ■

PRINCIPAL INVESTIGATOR OF FRAMINGHAM HEART STUDY

Vasan S. Ramachandran, MD,

professor of medicine and chair of the Section of Preventive Medicine and Epidemiology at BUSM, is stepping up as the principal investigator (PI) of the Framingham Heart Study (FHS). As of January 1, 2014, Dr. Ramachandran replaced Philip Wolf, MD, who had led the FHS since 1989.

A professor of neurology and epidemiology at BUSM, a FHS investigator since 1967, and the study's PI for nearly 25 years, Dr. Wolf has authored more than 350 articles. His research focuses on the epidemiology of stroke, dementia, and cognitive decline. He served as chief of the Stroke Section (1969-2000) and is a fellow of the Stroke and Epidemiology & Disease Prevention Councils of the American Heart Association. Dr. Wolf has been PI of grant awards from the National Institute of Neurological Disorders and Stroke (NINDS), *Precursors of Stroke Incidence and Prognosis* (1981-2014); and from the National Institute on Aging (NIA), *Epidemiology of Dementia* (1989-2015), *MRI, Genetic & Cognitive Precursors of AD & Dementia* (1999-2017) and *MRI, Cognitive, Genetic & Biomarker Precursors of AD & Dementia in Young Adults* (2009-2013). He has received numerous awards, among them the Jacob A. Javits Neuroscience Investigator Award (NINDS); the Award for Excellence in Clinical Stroke (The American Heart Association [AHA] Stroke Council); the Mihara Award of the International Stroke Society (1996); and the Distinguished Scientist Award (AHA). He



Vasan S. Ramachandran, MD

is a fellow of the American Neurological Association, the American Academy of Neurology, the American Heart Association, and the American Epidemiologic Society. Dr. Wolf will continue to be an active FHS investigator and PI on a number of RO1s and other research studies.

Dr. Ramachandran, a cardiologist and cardiovascular epidemiologist, has worked with the FHS since 1993, initially as a fellow, then a senior investigator. At the FHS, he serves as the co-director of the noninvasive vascular testing and echocardiography laboratory, and co-director of its fellowship program in cardiovascular epidemiology. The author of more than 500 publications, Dr. Ramachandran is an associate editor of the journal *Circulation* and editor-in-chief of the journal *Circulation: Cardiovascular Genetics*. Dr. Ramachandran's team includes two co-principal investigators, Drs. Adrienne Cupples and Emelia Benjamin.

Dr. Cupples, professor of biostatistics at Boston University School of Public Health, has worked at the FHS for several decades and is renowned for her work in biostatistics focused on genetics. Dr. Benjamin, professor of medicine and a cardiologist and cardiovascular epidemiologist in the Department of Medicine at BUSM, also has worked at the FHS for more than two decades. Her research focus is atrial fibrillation. ■



Left to right: Benjamin Wolozin, MD, PhD, professor of pharmacology and neurology; John Berk, MD, associate professor of medicine at BUSM and clinical director of the Amyloidosis Center; David Harris, MD, PhD, professor and chair of biochemistry; Carmela Abraham, PhD, professor of biochemistry. Not pictured: David Seldin, MD, PhD, professor of medicine and microbiology and director of the Amyloidosis Center.

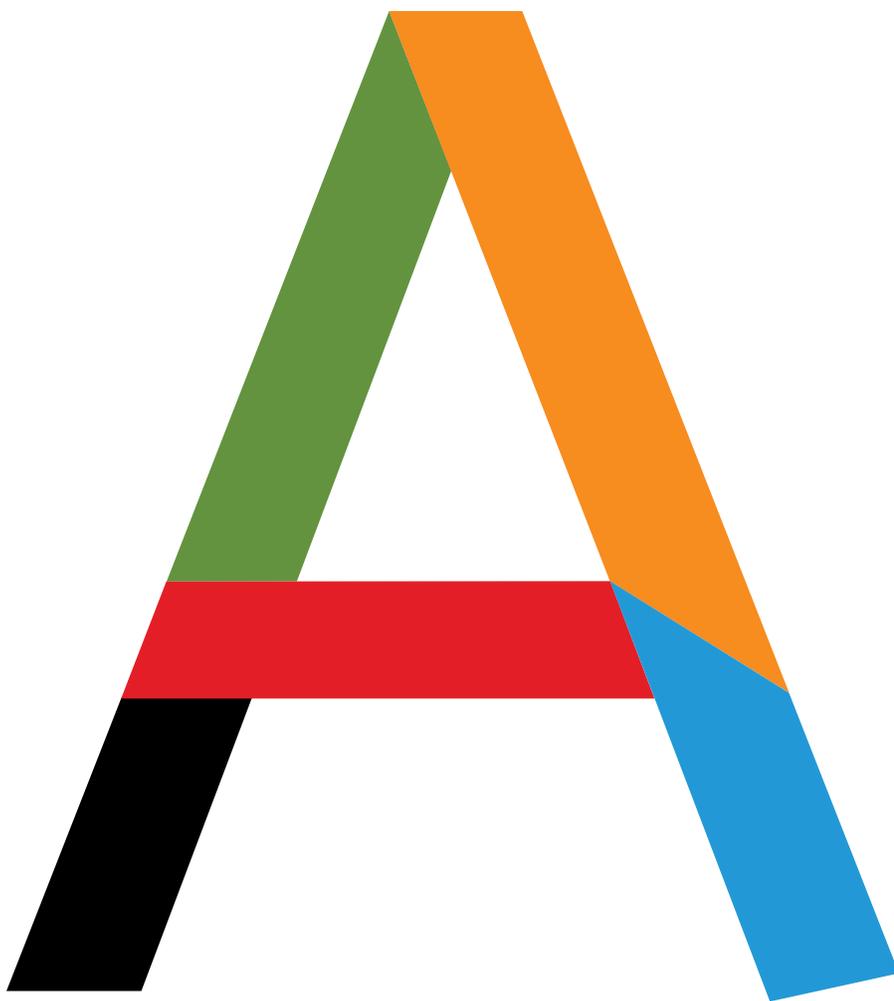


THE MISFOLDED MYSTERY

A formidable team of BUSM researchers is delving into the science of some of the body's most devastating hidden enemies.

BY MARY HOPKINS

PHOTO: CONOR DOHERTY; ILLUSTRATION: ©2014 BRIAN STAUFFER C/O THE SPOT.COM



Alzheimer's disease (AD) is the sixth leading cause of death in the United States, with five million Americans currently afflicted. It costs the nation \$203 billion a year, an amount expected to increase to \$1.2 trillion by 2050. **Parkinson's disease (PD)** afflicts as many as one million people, costing approximately \$25 billion in treatment, disability, and lost income from work. While **amyotrophic lateral sclerosis (ALS)**, prion diseases, and the various amyloidoses are rarer, the course of these degenerative diseases still has much to teach us. ■ What they and other devastating and costly diseases such as cancer and diabetes have in common is that there is a growing understanding of the role that **misfolded proteins** plays in their occurrence.

Humans are perfect examples of biological self-assembly, and proteins are the building blocks of this formation. They make us who we are. They are the engines of vital functions such as growing and differentiating cells, catalyzing metabolism, stimulating immune responses, and building muscle. They function inside and outside of cells carrying signals between them or protecting them.

Proteins are chains of amino acids whose sequences are determined by our genes. What ordains a protein's function is how the amino acid chain folds into a three-dimensional structure. A properly folded protein is able to carry out its intended function.

BUSM researchers are studying how this process goes awry, leading to the misfolding and aggregation of proteins that then accumulate in tissues, resulting in a variety of pathological conditions. Teams of basic science and clinical investigators focus on broadening our understanding of this biochemical malfunction, creating a knowledge base for developing therapeutics to prevent or treat a variety of degenerative diseases like Alzheimer's, Parkinson's, ALS, or amyloidosis.

"Cells have normal mechanisms to cope with misfolded proteins," says David Harris, MD, PhD, professor and chair of biochemistry. "Perhaps one-third of the proteins that a cell makes misfold, but there are adaptive mechanisms that cells employ to degrade the misfolded proteins or to refold them in a proper way."

Harris explains that sometimes those adaptive mechanisms are overwhelmed and misfolded proteins start accumulating in cells either inside the cell or outside of it, inhibiting the normal function of the cell or becoming toxic to it. Protein misfolding can be caused by genetic mutations and environmental influences. Age is a common predisposing factor in that as cells age, they may not be as capable of dealing with the stresses that cause proteins to misfold.

"Some of the most common degenerative diseases like Alzheimer's or the rarer ones like prion diseases, both of which I study, are diseases that result from misfolding of proteins in the central nervous system," he says. "This has therapeutic consequences since, if these diseases

share a common underlying mechanism, then the compounds used to treat the diseases can be used for more than one disease. Or, at least some of the strategies used to treat one disease may be applicable to others.”

Harris has been studying prion diseases—which are unusual due to their infectiousness—for 20 years. “The whole prion field has attracted the attention of scientists for a long time because of the nature of the infectious agent,” says Harris. “With bacteria and viruses we understand how they propagate and grow, but the infectious compound that causes prion diseases is not a bacterium or a virus. It is a naked protein molecule that is actually an altered version of a normal protein that sits on the surface of cells and has a normal function in the body. During the course of infection, the normal protein is continuously converted into a form with an abnormal shape in a self-perpetuating process akin to ice crystal formation.”

Harris researches how this abnormal protein damages neurons and what forms of it are the most pathogenic. Although prion diseases are rare, the prion protein exists throughout nature. “There is evidence that other neurodegenerative diseases like Alzheimer’s that are not infectious propagate through the central nervous system by a prion-like or self-templating mechanism,” he says. “The A β peptide involved in Alzheimer’s disease misfolds, causing other A β peptides to misfold, thereby producing a self-perpetuating effect. This doesn’t mean that Alzheimer’s disease can be transmitted from one person to another, but it does mean that the abnormal proteins that aggregate in the brain can spread along neuroanatomical pathways in a mechanism that is similar to what prions do.” Plaques, the abnormal aggregation of misfolded proteins that build up between nerve cells in the brain, are made of the A β peptide. This buildup is believed to inhibit signaling between cells, resulting in memory loss and the other intellectual and physical declines associated with Alzheimer’s disease.

Benjamin Wolozin, MD, PhD, professor of pharmacology and neurology who



“Cells have normal mechanisms to cope with misfolded proteins. It is estimated that perhaps one-third of the proteins that a cell makes misfold, but there are adaptive mechanisms that cells employ to degrade the misfolded proteins or to refold them in a proper way.”

DAVID HARRIS, MD, PhD,
professor and chair of biochemistry



“The essential point of the process is that stress granules form based on the same type of protein aggregation that occurs in disease. This process is not random aggregation; it is controlled and reversible. Once the stress goes away, the stress granules disperse and protein synthesis returns to normal. So, that means that an intracellular function we thought was unchangeable is totally changeable.”

BENJAMIN WOLOZIN, MD, PhD,
professor of pharmacology and neurology

studies Parkinson’s, Alzheimer’s, and ALS, realized a different model for looking at abnormal protein activity in neurodegenerative diseases.

“What I am working on in one sense fits in with what everyone else is doing, but in another sense sets out an entirely new paradigm for understanding what is going on,” Wolozin says. “Proteins allow you to be yourself. What happens when you are injured? Your body recognizes the problem and adapts by temporarily shifting the kinds of proteins it makes from the specialized proteins that give rise to the amazing variety of biological activities occurring in normal body function, to proteins to deal with the injury. This shift in the types of proteins produced is accomplished by a class of proteins termed RNA-binding proteins. These RNA-binding proteins normally reside in the nucleus, which in response to stress flood out into the cytoplasm, where they bind up RNA, forming RNA-protein complexes that are termed stress granules.

“The essential point of the process is that stress granules form based on the same type of protein aggregation that occurs in disease. This process is not random aggregation; it is controlled and reversible. Once the stress goes away, the stress granules disperse and protein synthesis returns to normal. This means that an intracellular function we thought was unchangeable is totally changeable.”

According to Wolozin, the misfolding and aggregation is in equilibrium. Normally, the aggregation of proteins to form stress granules rapidly reverses after the stress is removed, but with chronic disease, whether caused by genetic mutations as in ALS or with Alzheimer’s, the dispersal part of the process, for different reasons, does not occur. “What happens in Alzheimer’s is a pathological protein, tau, mis-localizes and accumulates,” says Wolozin. “In its benign state, tau actually helps axons extend. Under stress it redistributes, in part to stimulate stress granule formation. The RNA-binding proteins bind with the misfolded tau protein, forming stress granules in the neurons. We have shown that presence of tau in neurons is okay, and transient coupling with RNA-binding proteins to form stress

granules is also good, but chronic coupling gives you disease.

“When we look at one neurodegenerative disease after another it is all the same story,” Wolozin adds. “There is a common pathway. You normally sequester the RNA-binding proteins into stress granules for a short period of time, and then they disperse. However, if you bang your head a lot, as in sports-related concussions, or when there is a genetic mutation or a chronic disease like diabetes that reduces blood flow to the brain, you have chronic stress to the brain that causes these protein aggregates to form, persist, and get bigger; these persistent, pathological stress granules disrupt nerve function. If they don’t disaggregate, pathology and disease result. We are working on developing methods to reverse the growth of stress granules, and in fact have identified a nontoxic compound that reverses a type of pathological stress granule (TDP-43) found in ALS.”

Wolozin’s discovery of a single system of protein aggregation for an array of neurodegenerative diseases has important implications for developing therapeutics for these conditions. “The idea that the body needs protein aggregation and there is one system built around this that chronic disease and aging hijack, causing dysfunction, opens up new avenues for basic science and translational research discovery.”

Carmela Abraham, PhD, professor of biochemistry, and members of her laboratory conduct both basic science and translational research; the former to determine the function of certain proteins in the brain and the latter to produce compounds that can be developed as drugs to treat Alzheimer’s and other neurodegenerative diseases.

“When we look at the brains of patients who died of Alzheimer’s disease, we can observe under the microscope two hallmarks of the disease—plaques made of the protein A β peptide and tangles made of the protein called tau,” says Abraham. “As a result of misfolding, these proteins aggregate and precipitate in the brain, and when they precipitate in the brain they become toxic.” Her lab uses high throughput screens to identify molecules that inhibit

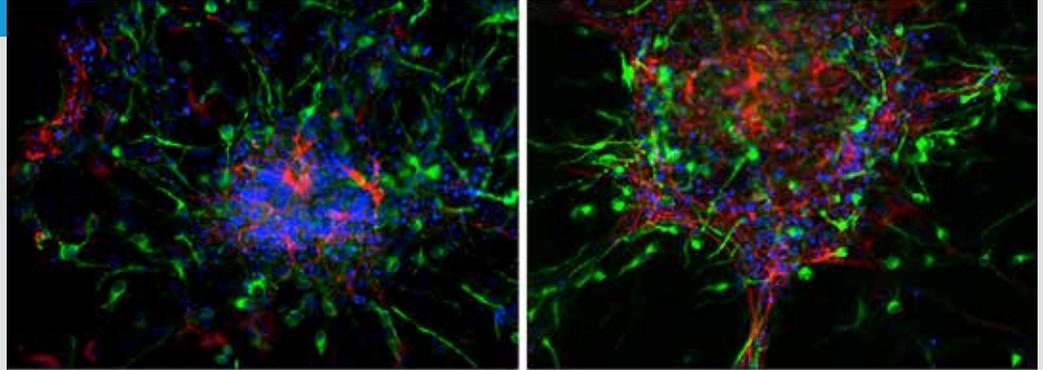
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CARMELA ABRAHAM, PhD,
professor of biochemistry



DAVID HARRIS, MD, PhD

Neural stem cell cultures containing prions.



BENJAMIN WOLOZIN, MD, PhD

Clockwise from top:

NIA AD Pathology:

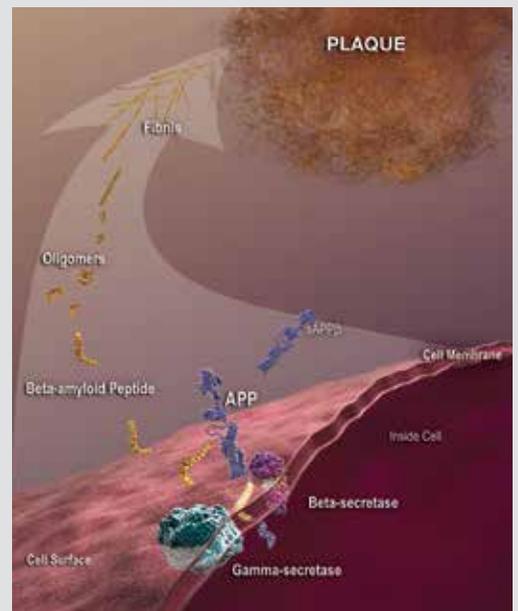
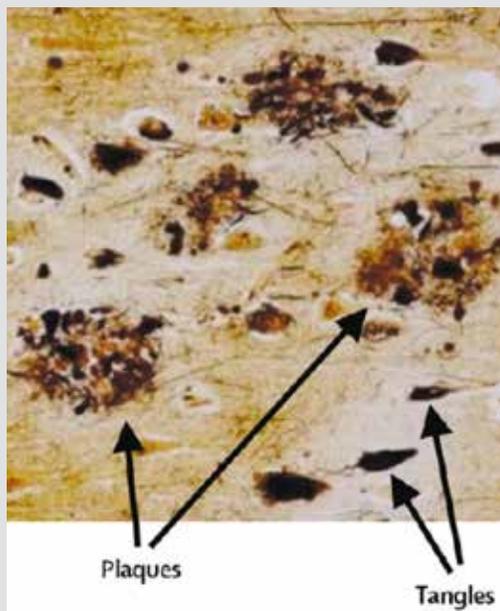
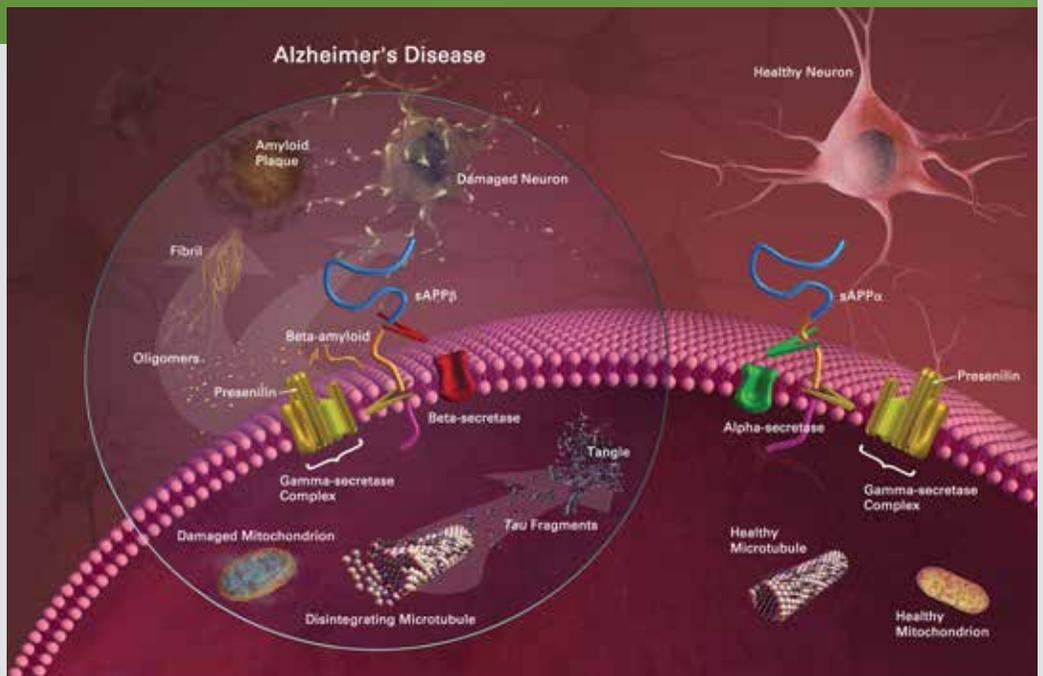
Pathological pathways in Alzheimer's disease. Beta-amyloid is generated from cleavage of amyloid precursor protein (APP) by beta- and gamma-secretases. Secretion and aggregation of beta-amyloid causes degeneration of neurons, which is associated with misfolding of microtubule-associated protein tau. Diagram provided by the National Institute on Aging.

NIA Plaque Formation:

Cleaved beta-amyloid forms toxic oligomers, which are secreted. These oligomers aggregate further to form neuritic plaques, which can be observed pathologically. Diagram provided by the National Institute on Aging.

Plaques and Tangles:

Neuritic plaques and neurofibrillary tangles are pathological hallmarks of Alzheimer's disease. Neuritic plaques accumulate outside of neurons, while neurofibrillary tangles accumulate inside neurons. Figure provided by Benjamin Wolozin.



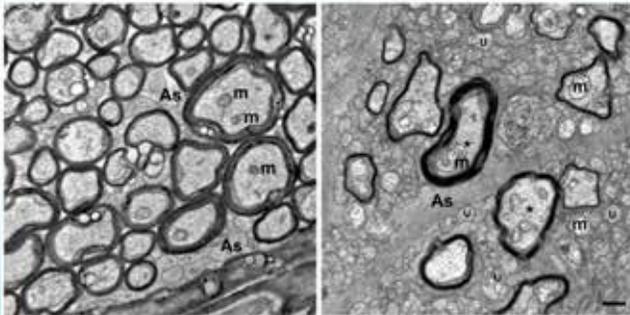
Age-related neurodegeneration in Alzheimer's and Parkinson's diseases occurs in the autumn of life. The brain loses neurons just like the tree loses its leaves, but unlike the tree renewal we enjoy in the spring, nerve loss is irreversible.



Klotho deficient mice have abnormal myelin

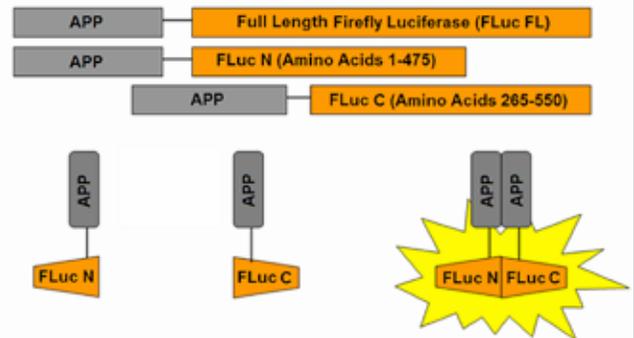
Wild type littermate
90% fibers are myelinated

Klotho knockout
10% fibers are myelinated

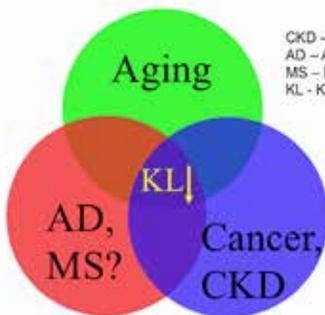


Chen et al., J. Neurosci 2013

Schematic of the *Firefly* luciferase enzyme system used for the high throughput screen

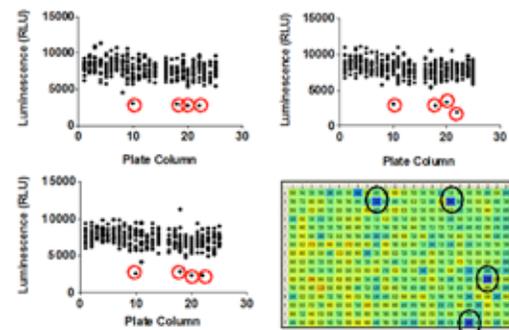


Decreased expression of the Klotho gene is seen in normal aging and illnesses such as AD, CKD, cancer



CKD – Chronic Kidney Disease
AD – Alzheimer's Disease
MS – Multiple Sclerosis
KL - Klotho

Reproducibility of the high throughput screen for Amyloid beta inhibiting compounds



A β peptide from forming. “We are working to develop compounds that prevent the formation of A β peptide that clogs the brains of people with Alzheimer’s.”

Abraham is also examining the role of the anti-aging protein Klotho in normal aging and disease. Her projects focus on identifying Klotho receptors in the brain and defining the signaling pathways by which Klotho exerts its protective effects on neurons and oligodendrocytes, the myelin-producing cells. She is also studying Klotho’s transcriptional regulation and has identified compounds to therapeutically exploit these protective effects.

“We found that Klotho expression is considerably decreased in the aged brains of monkeys, rats, and mice,” she says. “It is even more reduced in Alzheimer’s. The idea is to find out why it is reduced and how to bring it back to levels found at younger ages. In animal models, a higher level of Klotho resulted in healthier mice and an increased life span of up to 30 percent. This suggests to us Klotho is a protective protein that is good for all of us to have.”

Klotho circulates in the blood and cerebral spinal fluid and binds to an unknown receptor that Abraham is trying to find. “It initiates some biochemical pathways in the cell that make the cell protected from all sorts of insults,” she explains. “One of its protective properties is against oxidative stress, which is correlated to misfolded proteins.”

The Klotho research entailed high throughput screening of some 150,000 molecules to identify those that elevate Klotho to the levels determined to be protective. Abraham’s research with animal models has found that genetically engineered mice with Alzheimer’s who also have higher levels of Klotho do not have all of the symptoms of the disease, such as learning and memory deficits.

Her group also found that Klotho helps repair myelin, the insulating material around neuronal axons that allows for cell-to-cell communication. This is an important discovery for the potential treatment of multiple sclerosis in which an autoimmune attack destroys the myelin.

Abraham recently published a paper on genetic mutations that change the DNA of Klotho in some people, which has an effect on health and life span.

People with two copies of the genetic mutation are adversely affected, whereas one copy actually has protective properties. “We are explaining the basis for this—which we believe may have something to do with protein folding and misfolding—but more work needs to be done to test this hypothesis,” she says.

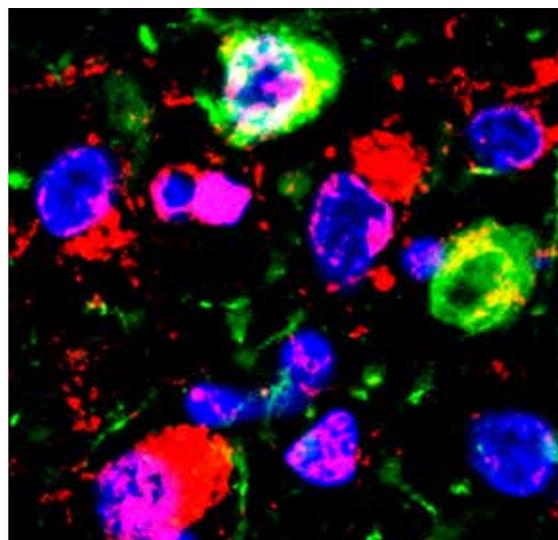
Additionally, Klotho is reduced in all cancers. “We don’t study cancer, however, if we find molecules that are effective in increasing Klotho, we can look to produce drugs that may be effective in cancer treatment and prevention as well as in neurodegenerative disease,” she notes. “We will do this in collaboration with cancer researchers as we focus on what we know best, neuroscience.”

Amyloidosis is a term for diseases that have the extracellular deposition of insoluble fibrillar proteins in tissues and organs in common. Amyloids are protein aggregates created from misfolding of proteins and are associated with numerous diseases including Alzheimer’s, Parkinson’s, type 2 diabetes, prion diseases, and amyloidoses caused by a plethora of different proteins.

For more than 50 years, the BU Amyloidosis Center has been a world leader in the research and treatment of systemic types of amyloidosis in conjunction with Boston Medical Center, which has 600–700 amyloidosis patient visits each year. In addition, as an accredited diagnostic laboratory, the center receives samples from all over the world.

The most common form of amyloidosis in the US is AL or primary amyloidosis, which is an acquired plasma cell disorder where amyloid fibrils made up of immunoglobulin light chain proteins build up in organs of the body. Symptoms can occur in any organ of the body and include heart failure, protein in the urine or kidney failure, enlarged liver, neuropathy, or enlarged tongue.

Secondary, or AA amyloidosis, is caused by a chronic infection or an



Stress granules highlight novel molecular pathology in the Alzheimer’s brain. The red is the RNA-binding protein identifying pathological stress granules; the green is the pathological tau protein; the yellow is the overlap between the stress granules and tau protein.

inflammatory disease such as tuberculosis, osteomyelitis, rheumatoid arthritis, familial Mediterranean fever, or inflammatory bowel disease. Infection or inflammation causes elevation of an acute phase protein, SAA, a portion of which deposits as amyloid fibrils. AA amyloidosis usually begins as disease in the kidneys, but other organs can also be affected. Medical or surgical treatment of the underlying chronic infection or inflammatory disease can slow down or stop the progression of this type of amyloid. A second clinical trial to evaluate a new treatment with a targeted inhibitor molecule, Kiacta, has just begun.

There are several types of inherited amyloidoses, the most common of which is caused by a mutation in the transthyretin (TTR) gene that produces abnormal transthyretin protein. The abnormal TTR protein deposits as amyloid fibrils. Symptoms of disease are usually neuropathy and cardiomyopathy and occur in mid-to late-life; untreated

patients die 10–15 years after disease onset. Treatment traditionally has been liver transplantation. In collaboration with George Murphy, PhD, of the BU Center for Regenerative Medicine and assistant professor of medicine, it has been possible to recapitulate this multi-organ disease. “George used the iPSC (induced pluripotent stem cell) technology to take cells derived from patients to make stem cells in the lab to generate cells similar to the patient’s liver cells that produce the misfolded proteins,” explains David Seldin, MD, PhD, professor of medicine and microbiology and director of the Amyloidosis Center. “He also was able to generate target tissue cells, neuronal and heart cells.”

In a recent study published in the *Journal of the American Medical Association* (JAMA) in December, led by John Berk, MD, associate professor of medicine at BUSM and clinical director of the Amyloidosis Center, researchers demonstrated that diflunisal, a generic anti-inflammatory drug, successfully reduced neurological decline and preserved the quality of life in patients with familial ATTR. Diflunisal is an inexpensive and safe medication marketed over the past 40 years for arthritis and pain.

“The proteins of origin for these degenerative diseases are very different, and the function or sequence of an antibody light chain or A-beta or TTR or prion protein doesn’t seem to be very similar, but the amyloid fibrils and structures they form are identical under the electron microscope, so there is something similar in the pathologic structure that the precursor proteins assume,” says Seldin. “In addition, the mechanisms of tissue damage are probably similar; that is an active area of research.”

Seldin stresses the importance of misfolded protein research. “You can view this body of research as the key to aging. If we could prevent proteins from misfolding in the brain, people might not lose their memory and develop dementia. In the rest of the body, we might keep organs functioning normally longer than they now do. Understanding and correcting misfolded proteins could be the key to helping people to live better and longer.” ■



“In one fell swoop, the findings from our NIH- and FDA-funded international trial provided the first highly effective, cheap, widely available, pill-based treatment to a population previously resigned to a slow death, while offering new purpose to an obsolete drug previously relegated to the shelf. The pill is by no means perfect, but in the world of lethal orphan diseases, we darn near hit a home run.”

JOHN BERK, MD,
associate professor of medicine at BUSM and
clinical director of the Amyloidosis Center

Major Research Grants

Parkinson's disease, breast cancer/obesity link in African American women among research funded

■ BUSM Awarded \$3M NIH Grant to Study Link between Obesity and Breast Cancer in African American Women

Gerald V. Denis, PhD, associate professor of pharmacology and medicine at BUSM, and Julie Palmer, ScD, professor of epidemiology at the Slone Epidemiology Center at BU, have been awarded a five-year, \$3 million grant from the National Cancer Institute (NCI) to study the implications of obesity on breast cancer in African American women.

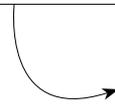
"Breast cancer mortality is higher in African American women in the US when compared to white women and access to care does not fully account for the difference," said Palmer. "Our hope is that a better understanding of the interplay of obesity with cancer will lead to better outcomes for women with breast cancer."

"Breast Cancer mortality is higher in African American women in the US when compared to white women and access to care does not fully account for the difference."



Previous research has shown that inflammatory adipose tissue is associated with metabolic status; however, about 28 percent of obese persons remain metabolically healthy. In metabolically abnormal obese (MAO) individuals who express this inflammation, cardiovascular disease and breast cancer are more prevalent. Until now, MAO and metabolically healthy obese (MHO) individuals

"BUSM and BMC announced that they will participate as one of 23 clinical sites of the Parkinson's Progression Markers Initiative's (PPMI) new arm to study populations who may be at increased risk for developing Parkinson's Disease (PD)."



have been grouped together. This research will explore the unique immunometabolic features of the MHO subgroup to distinguish important mechanisms that affect cancer risk.

"The American Cancer Society has estimated that the annual number of American women who will be diagnosed with breast cancer may approach double the current number of 220,000. This increase is attributable solely to the metabolic and immunological complications of insulin-resistant obesity," said Denis.

Using basic laboratory and epidemiological population data to identify the relationships between co-morbid obesity and cancer and pharmacological solutions, the researchers aim to achieve their long-term goal of understanding and using the relationships among obesity, inflammation, and breast cancer outcomes to reduce the effects of obesity on cancer incidence and mortality.

This research was supported by the National Cancer Institute of the National Institutes of Health under Award Number U01CA182898.

■ BUSM and BMC to Investigate Risk Factors for Parkinson's Disease

The Michael J. Fox Foundation is seeking people without Parkinson's disease to participate in a landmark biomarker study the foundation is sponsoring.

BUSM and BMC announced that they will participate as one of 23 clinical sites of the Parkinson's Progression Markers Initiative's (PPMI) new arm to study populations who may be at increased risk for developing Parkinson's disease (PD). The additional arm of the \$55 million landmark observational clinical study was added to better understand potential risk factors of the disease. Volunteers will not have any of the classic motor problems associated with PD. The "pre-motor" arm of PPMI will enroll participants over the age of 60 who do not have Parkinson's disease and are living with either a reduced sense of smell, rapid eye movement sleep behavior disorder (RBD), or a mutation in the LRRK2 gene (the single greatest

genetic contributor to PD known to date). If one of these risk factors clearly leads to PD, the risk factors could enable earlier detection of PD and open new avenues in the quest for therapies that could slow or stop disease progression.

The initial study was launched in 2010 and is focusing on defining biological markers of PD in order to better diagnose and track the disease. Enrollment in the initial study is complete, with over 600 participants. BUSM and BMC have been part of PPMI for three years and are expected to begin enrollment for the new, pre-motor arm of the study immediately.

"Understanding risk factors for Parkinson's disease could help to identify therapies that may prevent the onset of motor symptoms in future generations of PD patients," said Principal Investigator Samuel Frank, MD. "We are proud to participate in this innovative research and will look to the local community to continue to volunteer for this key study."

Volunteers can easily get involved in this research by being one of 10,000 individuals to complete a brief online survey about their sense of smell. Those over the age of 60 who do not have Parkinson's disease are needed to take the survey at www.michaeljfox.org/get-involved/smellsurvey-screen.php.

■ BUSM and BMC Partner with Jawaharlal Institute of India to Study TB

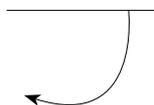
BUSM and BMC are partnering with the Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER) to study tuberculosis (TB).

Based in Pondicherry, India, the joint program will establish cohorts of TB patients and their household contacts (people who live in the same household) who have been exposed to the disease. This will allow the researchers to determine the impact of co-morbidities—such as smoking, alcoholism, worm infections, diabetes mellitus, and malnutrition—on the risk of developing TB and patient response to treatment.

"India accounts for 30 percent of the global burden of TB and is one of the countries with the highest burden of the disease," said Jerrold Ellner, MD, professor of medicine at BUSM, chief of the section of infectious diseases at BMC, and US principal investigator. "This study will identify new diagnostic biomarkers that will help determine who, among heavily exposed persons, is at greatest risk of contracting the disease and targets for intervention," he added.

This research is supported by a five-year, \$2.5 million grant from the Indo-US Vaccine Action Program (VAP).

"India accounts for 30 percent of the global burden of TB... This study will identify new diagnostic biomarkers that will help determine who, among heavily exposed persons, is at greatest risk."



■ Pediatricians Warn That Cuts to SNAP Program Will Harm Children

In a commentary in *Lancet*, Boston Medical Center pediatricians call the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program), one of the most cost-effective and successful public health programs in the country. According to the authors, not only does SNAP make life much better for children and families, it also saves society money. Unfortunately, they also point out that despite convincing evidence of the beneficial effects of SNAP on child health, legislators have targeted SNAP for cuts as they struggle to address the federal budget, lagging economy, and the US Farm Bill.

"SNAP acts as a vaccine against food insecurity and hunger," said lead author Deborah Frank, MD, director of BMC's Grow Clinic for Children and founder and principal investigator of Children's HealthWatch. Food insecurity is the measure of a household's ability to get enough healthful food in socially acceptable ways so all of its members can live active, healthy lives. "Our research consortium, Children's HealthWatch, has for more than a decade accumulated data on the impacts of food insecurity and interventions to decrease food insecurity among low-income babies and young children," Frank explained. She and her colleagues found that the youngest Americans and their families are at highest risk of food insecurity.

"Infants and young children in the first three years of life—the most critical period for the growth of the body and brain—are the most physiologically vulnerable to lasting ill effects of food insecurity on health and learning. Our research and the research of many others has convinced us that food insecurity, which affects approximately 16 million US children (21.6 percent), is one of the greatest public health threats that our nation faces. SNAP

"Infants and young children in the first three years of life—the most critical period for growth of the body and brain—are the most physiologically vulnerable to lasting ill effects of food insecurity on health and learning."



is the most important and effective public health program we have for reducing the health impacts of food insecurity,” added Frank, who is also professor of child health and well-being at BUSM.

According to the authors, there is strong evidence of the beneficial effects of SNAP on childhood food insecurity. When utilized by pregnant women, SNAP benefits are associated with decreased rates of low birth weight. In households with children, SNAP reduces the risk of food insecurity; enhances intake of B vitamins, iron, and calcium; and lowers the risk of anemia, obesity, poor health, developmental delays, hospitalization for failure to thrive, low academic test scores, and reports for child abuse or neglect. Children aged five through nine from SNAP-participating families had better academic outcomes and less obesity.

“Scientific evidence shows that SNAP is a wise investment in the brains and bodies of American children—an investment that should be increased, not curtailed,” stressed Frank.

■ **Common Anti-Inflammatory Drug Can Treat Amyloidosis**

A study led by researchers from the Amyloidosis Center at BUSM and Boston Medical Center demonstrates that diflunisal—an inexpensive, generic, and safe anti-inflammatory drug marketed over the past 40 years for arthritis and pain—successfully reduced neurological decline and preserved the quality of life in patients with familial transthyretin amyloidosis (ATTR).

Published in the *Journal of the American Medical Association (JAMA)*, this study is one of the first examples of successful repurposing of a generic drug to treat a rare disease. The National Institutes of Health has advocated this research strategy as a way to increase the availability of treatments for rare diseases such as amyloidosis.

John Berk, MD, associate professor of medicine at BUSM and clinical director of the Amyloidosis Center, designed the trial, led the international consortium of researchers, and served as the study’s corresponding author. Jeffrey Kelly, PhD, a biochemist at the Scripps Research Institute, and Peter Dyck, MD, a neurologist at Mayo Clinic Rochester, were instrumental in developing the study.

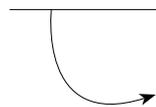
Familial amyloidosis is a rare inherited disorder in which mutated transthyretin protein aggregates in the blood and forms insoluble fibrils that cause tissue damage. Patients with hereditary ATTR amyloidosis develop debilitating peripheral and autonomic nerve damage, heart disease, and weight loss.

Investigators found that diflunisal dramatically inhibited the progression of neurologic disease while preserving quality of life when compared to placebo treatment. Known to physicians as Dolobid, generic diflunisal is inexpensive and readily available.



Investigators found that diflunisal dramatically inhibited the progression of neurologic disease while preserving quality of life when compared to placebo treatment. Known to physicians as Dolobid, generic diflunisal is inexpensive and readily available.

While previous research demonstrates that individual alcohol policies can reduce risky drinking and alcohol-related harms, this is the first study to characterize the effect of the overall alcohol policy environment.



To date, no other drug treatment has achieved this level of benefit for this rare disorder.

“Our results show that diflunisal represents an alternative to liver transplantation, the current standard of care for this devastating disease,” said Berk. “We hope that this study prompts the identification of other widely used generic drugs for treatment of rare diseases.”

Funding for the study was provided in part by the National Institute of Neurological Disorders and Stroke, the Food and Drug Administration Office of Orphan Products Development, the Young Family Amyloid Research Fund, the BU Clinical and Translational Science Institute, and private donors. Merck Sharp & Dohme donated the diflunisal.

■ **Strong State Alcohol Policies Protective against Binge Drinking**

According to a study led by BUSM, BUSPH, and BMC researchers and published in the *American Journal of Preventive Medicine*, a novel composite measure consisting of 29 alcohol policies demonstrates that a strong alcohol policy environment is a protective factor against binge drinking in the United States.

Binge drinking is a common and risky pattern of alcohol consumption that is responsible for more than half of the 80,000 alcohol-attributable deaths that occur each year in the United States. “If alcohol policies were a newly discovered gene, pill, or vaccine, we’d be investing billions of dollars to bring them to market,” said Tim Naimi, MD, MPH, senior author of the study, and associate professor of medicine at BUSM and attending physician at BMC.

While previous research demonstrates that individual alcohol policies can reduce risky drinking and alcohol-related harms, this is the first study to characterize the

effect of the overall alcohol policy environment. States with stronger policy scores had lower rates of binge drinking, and states with larger increases in policies also had larger decreases in binge drinking over time.

“Unfortunately, most states have not taken advantage of these policies to help drinkers consume responsibly, and to protect innocent citizens from the devastating secondhand effects and economic costs of excessive drinking,” added Naimi.

Overall, analyses showed that the policy environment was largely responsible for state-level differences in binge drinking. “The bottom line is that this study adds an important dimension to a large body of research demonstrating that alcohol policies matter—and matter a great deal—for reducing and preventing the fundamental building block of alcohol-related problems,” said Naimi.

The study was supported by a National Institutes of Health grant.

■ Molecule That Could Aid Lung Cancer Detection and Treatment Identified

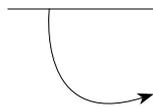
BUSM researchers have discovered a molecule that could help lead to noninvasive detection of lung cancer as well as treatment. Using RNA sequencing, the team looked at airway epithelial cells and identified a regulatory molecule less abundant in people with lung cancer that inhibits lung cancer cell growth. The findings, published in the *Proceedings of the National Academy of Sciences*, suggest that this molecule may aid in diagnosing lung cancer in its

“These results suggest measuring the levels of microRNAs like miR-4423 in cells that line the airway could aid in lung cancer detection through a relatively noninvasive procedure.”

earlier stages and could potentially, when at healthy levels, aid in treating the disease.

MicroRNAs are a new class of molecules classified as important activity regulators of other genes. In this study, the research team used a next-generation RNA sequencing technology and identified that a microRNA named miR-4423 in epithelial airway cells plays a major role in how these cells develop. In epithelial cells from the airway

Intimate partner violence is a major public health issue, particularly among women receiving medical care at VA facilities.



of smokers with lung cancer, levels of miR-4423 were decreased.

“These results suggest measuring the levels of microRNAs like miR-4423 in cells that line the airway could aid in lung cancer detection through a relatively noninvasive procedure,” said Avrum Spira, MD, MSc, Alexander Graham Bell Professor of Medicine and chief of the Division of Computational Biomedicine at BUSM and one of the study’s senior authors.

“Our findings open up the option to study whether returning miR-4423 levels to normal in the airway could help stop cancer growth and potentially be a way to treat lung cancer,” said Catalina Perdomo, PhD, a researcher in the Division of Computational Biomedicine at BUSM and the paper’s lead author.

This study was funded in part by the National Institutes of Health’s National Cancer Institute Early Detection Research Network; the National Science Foundation Integrative Graduate Education and Research Traineeship; and Merit Review grants.

■ Screening Tool to Detect Intimate Partner Violence among Female Veterans Identified

BUSM researchers have identified a promising screening tool to detect intimate partner violence (IPV) in females in the VA Boston Healthcare System. The findings, which appear in the *Journal of General Internal Medicine*, accurately detected 78 percent of women identified as abused within the past year by a more comprehensive and behaviorally specific scale.

IPV is a major public health issue, particularly among women receiving medical care at VA facilities. The researchers cite lifetime reports of IPV as high as 74 percent among this population, reinforcing the critical need for both brief and accurate screening tools. The four-item screening tool studied is called HITS (Hurt/Insult/Threaten/Scream) and can be used in under four minutes; it is unique in that it assesses psychological IPV in addition to physical aggression.

The study found that nearly 29 percent of women who had been involved in a recent intimate relationship reported physical, sexual, and/or severe psychological IPV in the past year. The tool demonstrated good sensitivity and specificity in detecting IPV in this sample. Report of IPV in the past year was associated with higher scores for depression and Post Traumatic Stress Disorder (PTSD). The use of the HITS screening tool was also found to assess sexual IPV with a sensitivity of 87 percent, signifying that very few cases of sexual IPV go undetected.

“Further research is needed to validate questionnaire answers by mail with in-person clinical assessment, however, HITS has the potential to effectively and efficiently identify a high proportion of female VHA patients who have experienced past-year IPV,” explained lead author

Katherine Iverson, PhD, assistant professor of psychiatry at BUSM and clinical research psychologist at the VA Boston Healthcare System and the VA's National Center for PTSD.

According to Iverson, the screening tool can quickly identify high-risk patients and coordinate referrals to more comprehensive support services.

This research was supported by the Department of Veterans Affairs, the Veterans Health Administration, and Health Services Research and Development Services as part of Dr. Katherine Iverson's HSR&D Career Development Award.

■ **Study Shows Veterans Psychologically Impacted by Boston Marathon Bombings**

According to a study, many Boston-area military veterans diagnosed with Post Traumatic Stress Disorder (PTSD) experienced flashbacks, unwanted memories, and other psychological effects as a result of the Boston Marathon bombings in April 2013. The study raises awareness of the effects that tragic events such as terror attacks and mass shootings have not only on those directly affected but also on those with PTSD and other pre-existing psychological conditions. The researchers urge health care systems to be prepared in the future to treat individuals who were either directly or indirectly affected by such tragedies.

Led by researchers at BUSM and the US Department of Veterans Affairs National Center for PTSD in Boston, this study was published online in the *Journal of Traumatic Stress*.

PTSD is a psychiatric disorder defined by serious changes in cognitive, emotional, behavioral, and psychological functioning that can occur in response to a psychologically traumatic event. Previous studies have estimated that approximately eight percent of the US population will develop PTSD in their lifetime. That number is significantly greater among combat veterans; as many as one out of five suffer symptoms of the disorder.

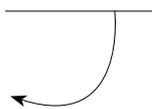
Using data from an ongoing study of Boston-area veterans diagnosed with PTSD, the researchers conducted 71 telephone interviews within one week of the bombings. Because the researchers had symptom data from participants approximately two months before that event, they were able to compare those levels with results from the interview one week after it.

Of those interviewed, 38 percent reported that they were emotionally distressed by the bombings and the subsequent lockdown of Boston and other communities. A majority of those participants said that the bombings caused them to experience flashbacks and the re-emergence of unwanted memories relating to their own past traumas.

"The effects felt by the veterans were likely due to thematic similarities between the Marathon explosions and



The study raises awareness of the effects that tragic events such as terror attacks and mass shootings have not only on those directly affected but also on those with PTSD and other pre-existing psychological conditions.



the veterans' own traumatic combat experiences, especially for those deployed to recent conflicts characterized by attacks involving improvised explosive devices," said Mark Miller, PhD, associate professor at BUSM and a clinical research psychologist at the National Center for PTSD at the VA Boston Healthcare System, who served as the study's principal investigator.

There was no significant change of symptoms between the pre- and post-event data across the sample as a whole. However, for those who reported being personally affected, there was a strong correlation between distress

“The effects felt by the veterans were likely due to thematic similarities between the Marathon explosions and the veterans’ own traumatic combat experiences.”

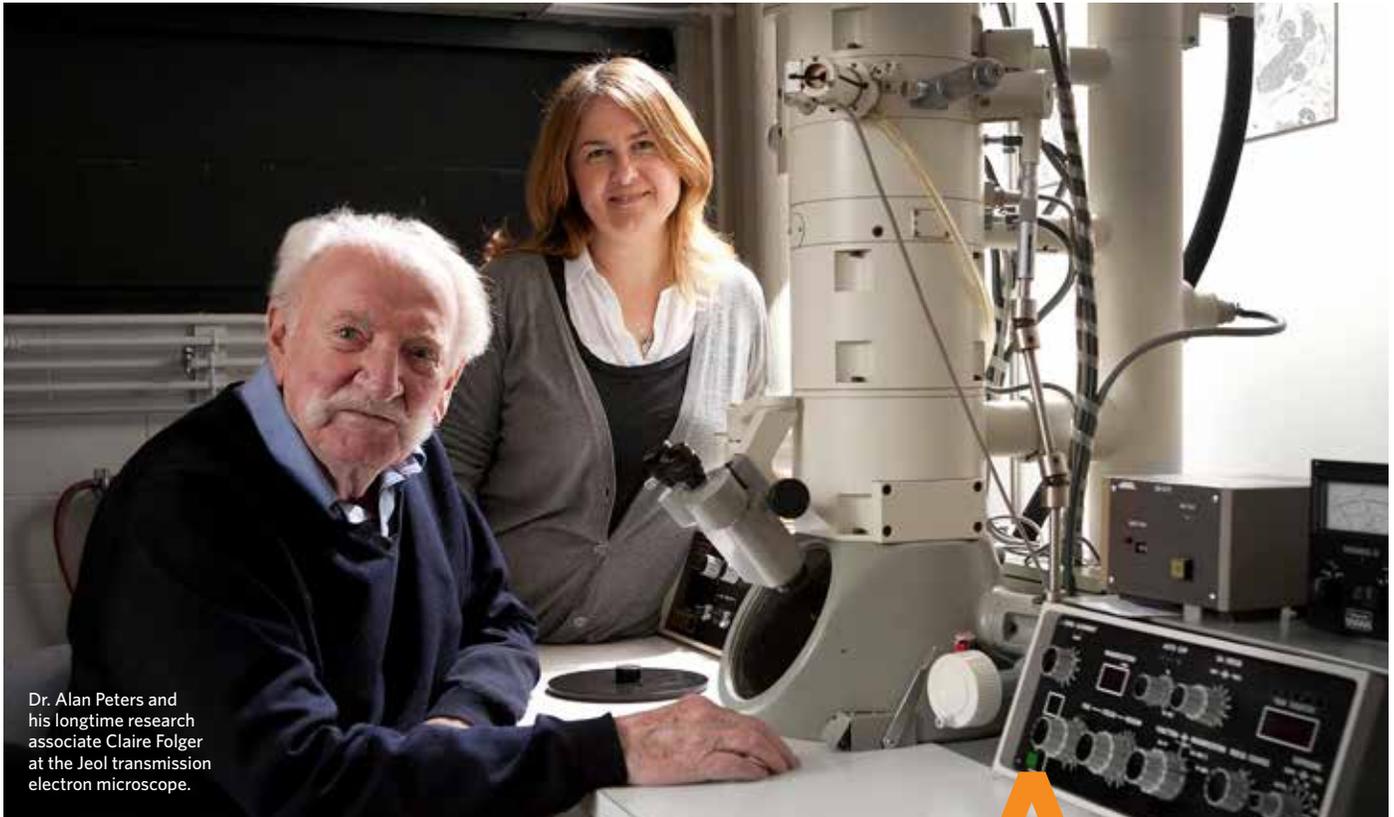
at the time of the bombings and change in the severity of PTSD symptoms. According to the researchers, this change was primarily attributable to increases in intrusion and avoidance symptoms.

"This study highlights the fact that tragic local and national events of this type can have a significant impact on the health and well-being of individuals already suffering from PTSD," said Miller. "It is crucial that relevant health care organizations understand this phenomenon and be prepared in the wake of tragedy to care not only for those who are directly impacted, but also for those with pre-existing psychological conditions, including our nation's veterans with PTSD."

This study was funded by the US Department of Veterans Affairs.

Untangling the Brain's Wiring

Alan Peters, PhD, Pioneering Neuroanatomist



Dr. Alan Peters and his longtime research associate Claire Folger at the Jeol transmission electron microscope.

“Alan Peters is one of the foremost anatomists of the mammalian nervous system. He was one of the first to determine the structure of myelin sheaths in the central nervous system and use light and electron microscopy to characterize the ultrastructure of neuroglia and neurons, as well as the micro circuitry and organization of neurons in the cerebral cortex and the organization of thalamocortical projections.”

—*The History of Neuroscience in Autobiography, Volume 5*, ed. Larry R. Squire



ALAN PETERS, PhD, former BUSM chair and Waterhouse Professor of Anatomy and Neurobiology, retired last fall after 47 years on the Medical Campus. In the late 1950s and early 1960s, when he was a lecturer in anatomy at the University of Edinburgh, Scotland, the detailed, or fine structure of the brain was not well understood. However, a revolution in better understanding the central nervous system was under way, as electron microscopic and neuron-tracing techniques were developed. It was the beginning of

understanding the characteristics of nerve and neuroglial cells and how neuron cells connect to each other through synapses. Peters was pivotal to this revolution in knowledge and characterization of these structures. He was the first to show the spiraled structure of the central myelin sheath and among the first to examine the development and comparative anatomy of nerve sheaths.

This work and his early examination of the fine structure of the cerebral cortex, about which little was known at the time, not only advanced the understanding of the nervous system, it brought Peters to the attention of BUSM.

The School was looking for a chair for the Department of Anatomy, which was essentially a teaching department with little in the way of a research program. “They were looking for a scientist who would build up the research program,” recalls Peters. In 1966, at the age of 36, he became chair of the department and served in that position for 32 years. He was also named Waterhouse Professor of Anatomy and Neurobiology.

According to Peters, when he came to BUSM in 1966, there were five faculty members teaching approximately 80 medical students and the department “had some reputation for studying the nervous system.” Today, the Department of Anatomy & Neurobiology houses some 29 core faculty members, 22 affiliated faculty members, and seven postdoctoral fellows. In addition to teaching medical and dental students, the department is training 18 PhD and MD/PhD students along with 16 master’s degree students. The department’s research comprises 12 laboratories and is funded by the National Institutes of Health, the National Science Foundation, the Veterans Administration, and private foundations and industry.

Born in Nottingham, England, Peters received his undergraduate (1951) and doctoral (1954) degrees in zoology at the University of Bristol, England.

“In the old days in the British school system, you took an exam to go to grammar school at the age of 11,” says Peters. “The brightest were assigned to read classics, the second, or A group did German and physics, while a third group, mine, did biology, and the fourth group did general studies.

“We wanted to know how behaviors change and which components of the brain might be responsible for cognitive decline. We tried to figure out how the two fit together.”

—Alan Peters, PhD

“When it came time for me to attend university, I was accepted at Cambridge to study medicine, but at that time those returning from the war got preference for University places so that I would have had to wait for two years to start medical studies. I didn’t want to wait that long, and so I decided to study zoology instead.”

After obtaining his PhD, Peters fulfilled his two years of military service, after which he went to the University of Edinburgh as a postdoctoral fellow in anatomy. “I decided I liked anatomy more than zoology, and I thought

the brain was the most interesting part of the body to study,” he says. “Not much was known about the detailed structure of the brain at that time, and so it seemed a good topic for study.”

Peters’s early work focused on light microscopic silver staining of nervous tissue, one of the few methods available for examining the nervous system by light microscopy in tissue sections. While this represented a continuation of his graduate work, he soon became interested in the emerging field of electron microscopy. “Very little was known at that time about the fine structure of nerve cells and their supporting neuroglia, and so almost every time we examined a thin section by electron microscopy, we saw something new and profiles of pieces of various cells types,” he explains. “The problem was to identify the origins of the various types of profiles that we saw in thin sections being examined by electron microscopy.”

While a visiting professor at Harvard Medical School from 1963 to 1964, Peters began work with Sanford Palay, MD, Bullard Professor of Neuroanatomy at Harvard, and Henry deF. Webster, MD, who became chief of the section of neuropathology at the National Institutes of Health. In 1970 the

THOUGHTS ON ALAN PETERS

By Deborah Vaughan, PhD, professor of anatomy & neurobiology

ALAN PETERS is an exceptional neuroscientist whose uncompromising standards of excellence throughout a long and remarkably productive career have advanced the art and science of our field, most notably related to a presentation of the fine structure of the nervous system. He has set global standards for understanding how the nervous system is organized at the cellular level and how it ages. His generous dedication as a scientist, fueled by his inexhaustible curiosity and remarkably vast depth of knowledge, produced a legacy of highly respected graduates and postdocs—as well as many others whom he less formally mentored—who have made significant contributions to the discipline.

I attribute my professional accomplishments and love of my career to Alan Peters, my mentor since I first came to BUSM as his postdoctoral fellow in 1972. He taught me to capture the beauty that resides in the art of electron microscopy and has been a trusted source of realistic appraisal and encouragement. He ingrained in me the belief that extremely high standards are attainable and to never settle for just “good enough” in both scientific thinking and the written expression of it. He exemplifies that clarity in all forms of expression is key to the successful communication of ideas. No one has had his degree of influence on my professional development.

As a mentor, department chair, and friend, Alan Peters has been unfailingly fair, supportive, and generous with his time. He is always professional and leads by example. He is notably accessible, respectful, and approachable. Indeed, he is a genuine model of the complete gentleman and academician.

FIGURE 1

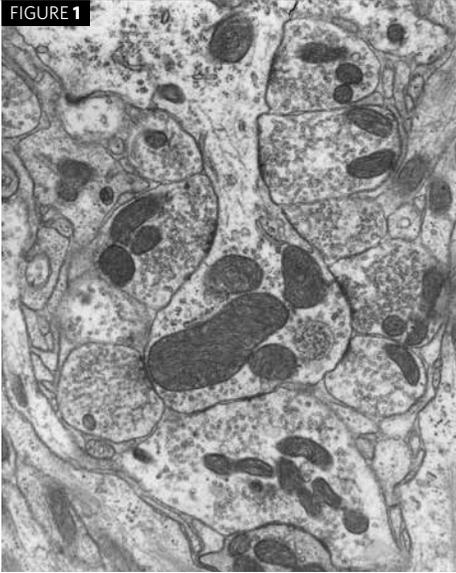
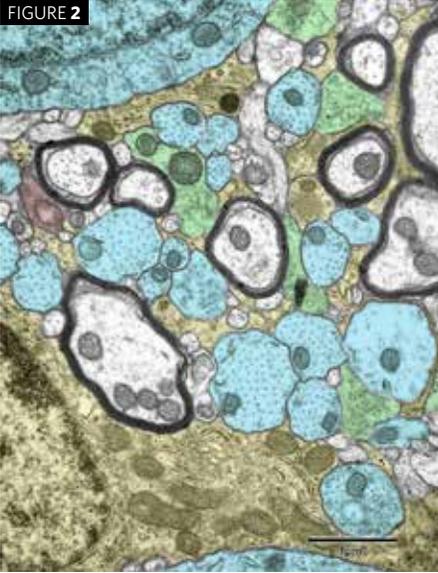


FIGURE 2



(Figure 1) Electron micrograph of a dendritic spine receiving an excitatory synapse from *The Fine Structure of the Nervous System*. **(Figure 2)** Colorized electron micrograph of the neuropil from Dr. Peters's collection of micrographs located at: www.bu.edu/agingbrain. Dendrites are indicated in blue, astrocytes in yellow, axon terminals in green, and oligodendrocyte processes in red.

three researchers produced the definitive text, *The Fine Structure of the Nervous System*, which was so successful that three editions were eventually published, the last in 1991.

In the late 1960s there were few studies of the characteristics of cells and their processes in the cerebral cortex. "In reality, the only way to approach the problem of the identification of characteristics of the various components of the cerebral cortex was to sit down at the electron microscope for long hours and take pictures of anything that looked interesting. We would then go over the micrographs and use grease pencils to try to label each profile and assign it a cell type," Peters recalls.

Peters and his associates published some of the first studies that described the components of the cerebral cortex, including the classification of dendritic spines. They developed methods for estimating the number of synapses on the surfaces of neuronal cell bodies and described the organization of pyramidal cells in the cerebral cortex into modules. With visiting researcher Alfonso Fairen, he also developed a Golgi/EM technique that made it possible, for the first time, to examine neurons by light microscopy and then by electron microscopy to unravel their synaptic connections.

In the early 1970s, Peters began studying changes in the normal brain as it ages; he and his colleagues were among the first to establish that normal cognitive decline is not due to significant neuronal loss from

cerebral cortex, which had been the accepted assumption until then. Working with Marrot Sinex, MD, BUSM chair of biochemistry at that time, they obtained the first program project grant from the National Institute on Aging to study the effects of aging on the brain. After the first five years, Peters became the principal investigator on the grant, which was subsequently funded for 30 years.

"We wanted to know how behaviors change and which components of the brain might be responsible for cognitive decline," explains Peters. "So we tried to figure out how the two fit together." In 1974, he and Deborah Vaughan, PhD, now BUSM professor of anatomy and neurobiology, published one of the first studies of the effects of age on neuroglial cells.

(Some of the electron microscopic images that show the effects of aging on the various components of the brain can be found at www.bu.edu/agingbrain, a website Peters and his longtime collaborator Claire Folger recently created.)

Today, Peters continues his work in the department's Laboratory of Electron Microscopy, where he focuses on the effects of normal aging on the cerebral cortex and white matter.

During his career, Peters served as an affiliate scientist at the Yerkes Regional Primate Research Center of Emory University in Atlanta. Among his many honors, Peters received the Henry Gray Award from the American Association of Anatomists and

the Sanford L. Palay Award from the *Journal of Comparative Anatomy*. He is a fellow of the American Association of Anatomists and received an honorary doctor of science from the University of Edinburgh in 2011. He served as president of the American Association of Anatomy and chairman and president of the American Association of Anatomists. In 1995, a special issue of the *Journal of Comparative Neurology* was dedicated to him, and his portrait was included in a 2001 photo exhibition of Boston-area leaders titled "Beautiful Minds." He has been included in *Who's Who in America*, *Men of Achievement*, *International Who's Who in Medicine*, and *Who's Who in Frontiers of Science and Technology*. He has authored more than 200 scientific publications and authored or co-authored 19 books.

At age 83, with more than half a century of seminal research to his credit and the legacy of having created an outstanding program that helps advance the careers of scientists who themselves have made major contributions to understanding the structure of the brain, Peters believes it is a good time to retire. He fondly characterizes his BU years as "excellent and collegial" and cites the many opportunities for collaboration that the Boston scientific community afforded him.

"It has been a great privilege and joy to have had the opportunity to work with Alan Peters, who is a true giant in the neuroanatomical sciences, as well as a gracious, warm, and thoughtful colleague," says Jennifer Luebke, PhD, associate professor of anatomy and neurobiology and director of the department's graduate program. "His vast knowledge of the fine structure of the brain, his deep scientific insights, his extraordinarily beautiful and elegant body of work, and his uncompromising and exemplary standards have been a constant inspiration to me, as they have been to countless others around the world. Without question, Dr. Peters's seminal work on the fine structure of the nervous system will continue to inspire and motivate generations of neuroscientists to come."

"Boston University School of Medicine has been singularly privileged to have had the decades of scientific rigor, pioneering discovery, and exemplary mentoring that Dr. Alan Peters has given to our School and community," says Dean Karen Antman, MD. "His remarkable career highlights how enriching the pursuit of scientific knowledge is and how much it contributes to the world." ■

HONORS

Richard K. Babayan, MD, professor and chair of the Department of Urology and chief of urology at BMC, has received the Joseph B. Dowd, MD, New England Section Lifetime Achievement Award from the American Urological Association (AUA). Since its inception in 1999, the Dowd Award has been given to just three other urologists, who were recognized for their exceptional service and dedication to the New England Section of the AUA. Babayan was honored for mentoring young urologists throughout New England, with whom he shared his time, insight, and passion for the field.

Gary J. Balady, MD, professor of medicine and director of the BMC Noninvasive Cardiovascular Labs and Preventive Cardiology, has been selected to receive the prestigious 2014 American Heart Association (AHA) Paul Dudley White Award. Named for Dr. Paul Dudley White, one of Boston's most revered cardiologists and a founding father of the AHA, the annual award is presented to a Massachusetts physician who has made a distinguished contribution to the association's mission of building healthier lives that are free of cardiovascular disease and stroke. Dr. Balady will be honored at the AHA Heart Ball.

Balady has been involved with both the local and national AHA for twenty years; locally, he served as president of the Greater Boston Division and the Founders Affiliate. Nationally, he has served as chair of the Council on Clinical Cardiology; as a member of the Physical Activity Committee and the more recent Advocacy Coordinating Committee; and as chair for the Fellowship and International Members Task Force. He has also been active in many AHA writing groups on the topics of cardiac rehabilitation and exercise testing and is presently an associate editor for the AHA's journal, *Circulation*.

He has dedicated his career to preventive cardiology and cardiac rehabilitation and is an outstanding educator and mentor to his patients, trainees, and colleagues. In 2010, he was recognized as a superb clinician when the AHA named him Physician of the Year.

David Center, MD, and **William W. Cruikshank, PhD**, have been named fellows

of the National Academy of Inventors (NAI). Center and Cruikshank are recognized for their prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society.

Center is the Gordon and Ruth Snider Professor of Pulmonary Medicine and chief of pulmonary, allergy, and critical care medicine at BMC. He also is associate provost for translational clinical research at Boston University and directs the BU Clinical & Translational Science Institute funded by the National Institutes of Health.

Cruikshank, professor of medicine, pathology and laboratory medicine and director of immunology, conducts research on the development of asthma as well as mechanistic steps involved in the onset of cutaneous T-cell lymphomas. As director of the Summer Undergraduate Research Program at BUSM, Cruikshank focuses on increasing diversity within the graduate programs and providing summer research opportunities for underrepresented minorities.

Hui Feng, MD, PhD, assistant professor of pharmacology and medicine, was honored with the Ralph Edwards Career Development Professorship, which recognizes junior BUSM faculty members who have been at the School for less than two years and have held no prior professorships. The award is for accomplishments in areas of study, passion for creating and transmitting knowledge, and efforts to enhance the student experience, and was made possible this year by the estate of obstetrician and gynecologist Ralph Edwards, MD (MED'52).

Feng will receive a three-year, non-renewable stipend to support scholarly or creative work and to cover a portion of her salary. The award is particularly recognizing her groundbreaking work in the BUSM Laboratory of Zebrafish Genetics & Cancer Therapeutics (zebrafish and humans have very similar genetics). In the less than two years since her lab opened, she has identified genes that, when blocked with targeted treatments, could prevent the metastasis of

certain types of cancer, like the most stubborn forms of leukemia.

Rachel L. Flynn, PhD, assistant professor of pharmacology and medicine and a member of the BU Cancer Center, was awarded a \$50,000 grant from the FOSTER (Fighting Osteosarcoma Through Everyday Research) Foundation. Established in 2001 by Stacey Leondis, then a student at New York's Garden City High School, the foundation supports research of osteosarcoma, a rare form of bone cancer primarily affecting children.

Tsuneya Ikezu, MD, professor of pharmacology and neurology, was honored by the Alzheimer's Art Quilt Initiative (AAQI) for his continued efforts in Alzheimer's disease (AD) research. A national grassroots charity that raises awareness and funds research through the donation and sale of small art quilts, AAQI awarded Ikezu \$60,560 for future AD research projects. AAQI representatives presented a quilt to Dr. Ikezu and the Laboratory of Molecular NeuroTherapeutics that displays 54 names of those afflicted with AD—all on the dull side of the fabric, to symbolize the mental fading and loss of skills with which 5.4 million AD patients in this country live. Ikezu's new study is focused on developing a new therapeutic target to treat AD.

Brian Jack, MD, professor and chair of family medicine and chief of family medicine at BMC, has been elected to the Institute of Medicine (IOM), one of the highest honors in health and medicine. The IOM recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. Dr. Jack also earned the Peter F. Drucker Award for Nonprofit Innovation for redesigning hospital discharge procedures. The Drucker Award recognizes existing programs that meet the famous business guru's definition of innovation—"change that creates a new dimension of performance." Project RED won the \$100,000 top prize, which Dr. Jack accepted on behalf of BMC.

David J. Salant, MD, a professor of pathology and laboratory medicine and chief of nephrology at BMC, received the John P.

Peters Award from the American Society of Nephrology in recognition of his leadership in the fight against kidney disease and his contributions to the discipline of nephrology. Dr. Salant has researched immune disorders of the kidneys; his current work focuses on the mechanisms of immune deposition and the role of complement in glomerular diseases as well as the structural biology of the podocyte. He was one of the earliest proponents of the notion that podocyte injury forms the basis of most, if not all, proteinuric kidney disease. He was also among the first to identify the podocyte as the primary target of injury in antibody-mediated glomerular disease.

Sudha Seshadri, MD, professor of neurology, has been awarded the inaugural Jack Spivack Excellence in Neurosciences Award. Spivack established this award in 2013 to recognize and support the research of outstanding BUSM faculty members who are conducting either clinical or basic neuroscience research in Parkinson's disease, Alzheimer's disease (AD), Chronic Traumatic Encephalopathy, or other neurological disorders. Dr. Seshadri is recognized as a leading expert in risk factor and genomic epidemiologic studies of stroke, AD, and brain aging. She has received research grant support from the NIH/NIA as principal investigator (PI) and joint PI on multiple RO1s and is a key investigator at the Framingham Heart Study and in several international genetic collaborations.

Avrum Spira, MD, MSc, the Alexander Graham Bell Professor of Medicine and chief of the Division of Computational Biomedicine at BUSM and physician in the pulmonary, critical care and allergy department at BMC, received the Alton Ochsner Award Relating Smoking and Disease. Named in honor of Dr. Alton Ochsner, who was the first to publish evidence relating smoking tobacco as the primary cause of lung cancer, the award recognizes Dr. Spira's seminal research contributions that have enhanced the understanding of the biological response of lung tissue to tobacco smoke, which can cause lung cancer and chronic obstructive lung disease.

Faculty in Print

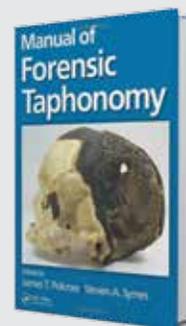
Manual of Forensic Taphonomy
(CRC Press, 2013)
Editor: **James Pokines, PhD**

James Pokines, PhD, DABFA, assistant professor in the BUSM Forensic Anthropology Program, recently co-edited a groundbreaking reference book, *Manual of Forensic Taphonomy*. The word 'taphonomy' derives from ancient Greek, with 'tapho' referring to burial and 'nomos' to laws. The book represents the first update in the field in more than a decade.

The field of taphonomy examines postmortem changes in bodies, for both recent forensic cases and archaeological/paleontological research on more ancient remains. The work studies changes to bones caused by multiple forces,

including the effects of marine and freshwater environments, scavenging, thermal alteration, and human ritual and cemetery practices. The inherent variations in bone structure and morphology affecting their differential survival and the survivability of DNA in varying environments are also examined.

Pokines's research includes vertebrate osteology, zooarchaeology, taphonomy, and paleoecology, and he has ongoing archaeological projects in the Bolivian Andes (Tiwanaku and related sites), the Nile Delta (Tell Timai), and the Paleolithic site of northern Jordan. He is the forensic anthropologist for the Commonwealth of Massachusetts, Office of the Chief Medical Examiner, Boston.



The field of taphonomy examines postmortem changes in bodies, for both recent forensic cases and archaeological/paleontological research on more ancient remains.

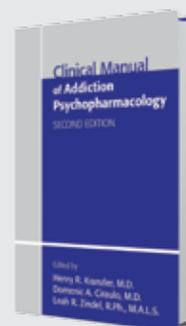
Clinical Manual of Addiction Psychopharmacology, Second Edition
(American Psychiatric Publishing, 2013)
Editor: **Domenic A. Ciraulo, MD**

Domenic A. Ciraulo, MD, professor and chair of psychiatry and chief of the BMC Department of Psychiatry, co-edited the recently published second edition of the *Clinical Manual of Addiction Psychopharmacology*, a thorough update on the pharmacology of drugs and abuse and the medications used to treat dependence. The manual delves into a broad range of addictive substances and covers significant advances that have

been made since the publication of the first edition.

"This book is an invaluable reference for clinicians, including psychiatrists, psychiatric residents and fellows, as well as other mental health practitioners who encounter individuals

"This book is an invaluable reference for clinicians, including psychiatrists, psychiatric residents and fellows, as well as other mental health practitioners who encounter individuals with substance-related disorders in the course of their clinical work."



with substance-related disorders in the course of their clinical work," said Dr. Ciraulo. "The material is presented in an organized fashion with the most up-to-date information on psychopharmacology."

Ciraulo co-edited the manual with Henry R. Kranzler, MD, and Leah R. Zindel, RPh, MALS.

Sixty-eight BUSM faculty members from 30 disciplines were included in *Boston* magazine's annual list of "Top Docs 2013." To make the list, physicians must undergo a rigorous screening process by national medical research firm Castle Connolly.

Alik Farber, MD, associate professor of surgery and of radiology and chief of the Division of Vascular and Endovascular Surgery at BMC, has been included on the list in the vascular surgery category each year since 2010. **Francis A. Farraye, MD**, professor of medicine and co-director of BMC's Center for Digestive Disorders, has held a spot as a top gastroenterologist each year since 2010. **Jeffrey Kalish, MD**, assistant professor of surgery and radiology and BMC director of endovascular surgery, was profiled in "Six Heroic Saves" for his valiant work during the April 15, 2013, Boston Marathon bombings.

AWARDS

Benjamin Wolozin, MD, PhD, professor of pharmacology and neurology, received the Alzheimer's Association Zenith Fellows Award, a \$450,000 grant dispersed over three years. Initiated in 1991, the award supports cutting-edge basic science or biomedical research that addresses fundamental problems related to early detection, etiology pathogenesis, treatment, and/or prevention of Alzheimer's disease (AD). The Wolozin Lab won the award with its proposal "It Takes TIA to Tangle: The Role of RNA-Binding Proteins in AD." The lab already has discovered an RNA-binding protein that induces tau misfolding, one of the essential steps that leads to cognitive loss in AD. This award will allow the Wolozin Lab to experimentally induce the misfolding, investigate the factors that regulate it, and—in the future—possibly design therapeutics to prevent it. ■



Kenneth C. Edelin, MD, on December 30, 2013, at the age of 74. Dr. Edelin was the former BUSM associate dean for Minority Affairs, now Diversity & Multicultural Affairs, professor and chair of the Department of Obstetrics and Gynecology, and chief of Obstetrics and Gynecology at Boston City Hospital, now BMC. He was well known for a 1975 manslaughter conviction for performing a legal abortion, which was overturned on appeal in a landmark test of medical, legal, religious, and political issues surrounding abortion in America. Dr. Edelin was recognized for his concern for indigent patients, and spoke often of the need for legal and safe abortions as a necessary alternative to the dangerous back-alley practices of the past.

Dr. Edelin received his bachelor's degree from Columbia College in 1961 and his medical degree from Meharry Medical College in Nashville, Tennessee, in 1967. He served in the US Air Force from 1968 to 1971, rising to captain with an internship at Wright-Patterson Air Force Base in Ohio. After his discharge, he completed a medical residency at Boston City Hospital from 1971 to 1974. He became the

hospital's first black chief resident in obstetrics and gynecology in 1973, and that October—nine months after *Roe v. Wade*—performed the abortion that led to his arrest.

After his acquittal, Dr. Edelin became a professor of obstetrics and gynecology at BUSM and chair of the department for a decade, until 1989. He also was chief of obstetrics and gynecology at Boston City Hospital and managing director of the Roxbury Comprehensive Community Health Center, the largest provider of primary health services for Boston's African American community. He was chair of the Planned Parenthood Federation of America from 1989 to 1992, and a director of the NAACP Legal Defense and Educational Fund and of the Guttmacher Institute, which promotes reproductive health. He served as associate dean for minority affairs under Deans Chobanian and Antman and was beloved by the many medical students for whom he served as an outstanding role model. He retired from teaching in 2006, but returned to the School frequently during his retirement for academic and student events.

He authored many articles on the prevention of teenage pregnancy and the perils of substance abuse during pregnancy. In 2007 he published a memoir, *Broken Justice: A True Story of Race, Sex and Revenge in a Boston Courtroom*. His case was the subject of a 1978 book, *The Baby in the Bottle* by William A. Nolen, and a play, *As to the Meaning of Words*, by Mark Eichman that was staged in New York in 1981.

**Information contained in this obituary is based on information from the New York Times.*

James Chengelis, MD, former clinical assistant professor of psychiatry and BMC staff psychiatrist, on October 2, 2013. He served as emergency psychiatrist at the Solomon Carter Fuller Mental Health Center, medical director of the inpatient psychiatric service at Melrose-Wakefield Hospital, director of the inpatient Dual Diagnosis Unit and associate medical director of Bournewood Hospital in Brookline, and on the staff of Winthrop Hospital. He recently had been appointed director of Behavioral Services at St. Elizabeth Medical Center in Youngstown, Ohio.

Dr. Chengelis earned his bachelor of science and bachelor of arts degrees from Youngstown State University in Ohio, and master's and medical degrees from the Medical College of Ohio at the University of Toledo. He completed medicine and surgery internships at Waltham Weston Medical Center, and psychiatry residencies at Brigham and Women's Hospital and Massachusetts Mental Health Center, where he served as chief resident. He completed a consultation/liaison fellowship at Brigham and Women's Hospital and an addiction medicine fellowship at Massachusetts General Hospital.

Gerald Stechler, PhD, former chair and chief of child psychiatry at BUSM, on December 18, 2013. A psychoanalyst and researcher, he studied early affective development, the integration of psychoanalysis and family systems, and the interaction of the therapist's own affect with patients. Dr. Stechler's initial studies on infants whose

mothers used opiates changed the way medicine viewed the behavior and neurodevelopment of infants.

He joined BUSM's division of Psychiatry in 1954 as a research psychologist, was named professor of psychiatry in 1968, and served as chair of the Department of Child Psychiatry from 1972 to 1983. He also held positions at Charles River Hospital and Solomon Carter Fuller Mental Health Center and helped establish the Massachusetts Institute for Psychoanalysis and the Psychoanalytic Couple and Family Institute of New England.

Dr. Stechler earned his PhB from the University of Chicago; BS in Psychology from Columbia University; and MS and PhD in Psychology from Yale University. He authored numerous publications and received many honors, including the Massachusetts Psychological Association Career Contribution Award.



Joel Alpert, MD, former professor and chair of the Department of Pediatrics and chief of pediatrics at BMC, assistant dean

for student affairs, and member of the BUSM Dean's Advisory Board, on December 31, 2013, at the age of 83.

Dr. Alpert was a recognized leader in pediatrics. During his 42 years at BUSM and BMC (and its precursor, Boston City Hospital) he pioneered pediatric primary care training, including continuity clinic sites at community health centers and a curriculum that emphasized child development, advocacy, and community care. BUSM's pediatric resident training in health center primary care was among the first in the United States.

A graduate of Yale College and Harvard Medical School, Dr. Alpert completed his residency at Boston Children's Hospital and joined Harvard's faculty in 1961. He became professor and chair of the Department of Pediatrics at BUSM and Boston City Hospital in 1972.

Dr. Alpert served as president of the American Academy of Pediatrics (AAP), where he received the AAP Job Lewis Smith Award in Community Pediatrics in 1994. He also served as president of the Ambulatory Pediatric Association (APA) and received the APA George Armstrong Award in 1992, the APA Lifetime Career Achievement Award in 2000, and the APA Public Policy and Advocacy Award in 2002. In 1992, the Massachusetts Poison Control System presented Dr. Alpert with a Lifetime Achievement Award and, in 1998, he received the prestigious Pew Foundation Award for Achievement in Primary Care Education.

A member of the Institute of Medicine of the National

Academy of Sciences (IOM), Dr. Alpert served on the IOM Governing Council and was the pediatric clinician on the IOM Task Force on the Future of Primary Care. He was a member of the Society for Pediatric Research, Alpha Omega Alpha (Boston University), and the American Pediatric Society, and an honorary fellow of the Royal College of Pediatrics and Child Health (London). He authored numerous publications, including *The Education of Physicians for Primary Care* (1974), which included the definition of primary care adopted by the Bureau of Health Professions for Title VII training in general medicine, family medicine, and pediatrics.

In 2000, Dr. Alpert and his wife Barbara (SPH'79) established the Joel and Barbara Alpert Professorship in Pediatrics at BUSM with the support of the Alpert family, the Department of Pediatrics, and their colleagues and friends. The professorship is held by the chair of the Department of Pediatrics. The first incumbent was Barry Zuckerman, MD, from 2000 to 2013; Robert Vinci, MD, was installed as the second Alpert Professor in June 2013. The Alperets also established the Children of the City Fund at BMC in 2000 to support early career pediatric researchers who study issues of importance to inner-city children served by the hospital.

Dr. Alpert leaves his wife Barbara and three children, including his son Mark, who is on staff in the BUMC facilities department, and eight grandchildren. ■

Students



Stethoscopes for Students

First-year students sporting their new stethoscopes gather to write thank-you letters to the generous donors who provided the funds to purchase the instruments.

Boston University School of Medicine first-year students receive their stethoscope kits—made possible with alumni support—and write thank-you notes to the generous alumni who donated to the Stethoscope Program.

Predoctoral Fellowship in Pharmacology/ Toxicology Awarded

Maya Woodbury, a student in the Graduate Program for Neuroscience and the Biomolecular Pharmacology Program through the Department of Pharmacology & Experimental Therapeutics at BUSM, was awarded the Predoctoral Fellowship in Pharmacology/Toxicology by

the PhRMA Foundation. The two-year, \$20,000-per-year grant is one of 10 that PhRMA awards annually. The PhRMA Foundation's mission is to award young scientists research fellowships and grants related to research in the pharmaceutical industry at the outset of their careers to encourage the leaders of tomorrow to pursue careers in research and education related to drug discovery. Ms. Woodbury's research proposal

is titled "miR-155/STAT3 signaling: A Novel Pharmacological Target for Down Syndrome." She works in the Laboratory of Molecular NeuroTherapeutics under the mentorship of Dr. Tsuneya Ikezu. ■

Class of 2014 Students Elected to Alpha Omega Alpha

Thirty-one students from the BUSM Class of 2014 have been

elected to membership in Alpha Omega Alpha (AOA): Joshua August, Melissa Baldwin, Lauren Collins, Brian Curry, Kaylyn Duerfeldt, Anthony Esposito, Chad Farris, Isaiah Giese, Daniel Gittings, Michael Hwang, Allison Kimball, Tejaswi Kompala, Xiaoxin Li, Vincent Liao, Adam Luce, Kirsten Lyman, Steven Mills, Raed Moustafa, Kaitlin Peace, Alec Peniche, Baijing Qin, David Robinson, Marissa Schwartz, Rima

Sestokas, Evan Shalen, Jamie Sparling, Lindsey Storer, Nilay Sutaria, Joyce Wang, Lindsay Warner, and Pat Whitworth.

AOA, organized exclusively for educational purposes, is the only national honor medical society. Its aims are the promotion of scholarship and research in medical schools, the encouragement of high standards of character and conduct among medical students and graduates, and the recognition of high attainment in medical sciences, practice, and related fields. Its motto is "Be worthy to serve the suffering." The students will have an opportunity to participate in an energetic chapter that is a vital part of the BU Medical Campus. A formal induction ceremony is held in the spring. ■



Fourth-Year Student Esther Han Receives AMA Foundation Physicians of Tomorrow Award

Esther Han, Class of 2014, is one of 21 medical students across the country to receive an American Medical Association

(AMA) Foundation Physicians of Tomorrow Award, a \$10,000 tuition-assistance scholarship for students who are nominated by their medical school based upon academic achievement and financial need.

A native of Virginia, Han graduated from Duke University with a Bachelor of Science in Biological Anthropology and Anatomy and a Bachelor of Arts in Spanish, then earned a master's degree in public health at the George Washington University School of Public Health and Health Services. As a senior health care analyst at the National Committee for Quality Assurance (NCQA) in Washington, DC, Han worked on projects and co-authored several publications promoting culturally and linguistically appropriate health care services, health care quality measurement, care coordination, and patient engagement. She continues to work with NCQA and the American College of Obstetricians and Gynecologists on issues of patient safety and quality improvement.

She served as American Medical Student Association Health Policy Committee co-chair, organizing various health policy and public health speakers and events in conjunction with organizations at BUSPH, and has volunteered with the BUSM Partnering in Alzheimer's Instruction Research Study (PAIRS) program. ■

Pharmacology Student Receives Carl E. Rosow Award

Kendra Kobrin, MD, PhD candidate in pharmacology, received the Carl E. Rosow Award for Pharmacology Education at the Department of Pharmacology & Experimental Therapeutics reception held in September for new faculty and students.

Kobrin graduated summa cum laude from Boston University in



Carl Rosow, MD, PhD, (MED'73) presents the Carl E. Rosow Award to Kendra Kobrin.

2008 with bachelor's degrees in psychology and music. Following graduation, she spent a year as a research assistant in the Dermatology Department at Roger Williams Medical Center before enrolling at BUSM. As a second-year student in the disease and therapy course, Kobrin excelled in the neurology and psychology modules and joined the Department of Pharmacology & Experimental Therapeutics for her dissertation work. In 2011, she joined Dr. Gary Kaplan's laboratory at the VA Hospital in Jamaica Plain, where her research focuses on neuronal morphological changes associated with extinction of opioid use and relapse to drug-seeking behavior in models.

"Kendra has excelled in both her medical and graduate pharmacology courses, serves as tutor coordinator for the disease and therapy course, and contributes to Pharmacology Department orientation and recruitment events. As the 2013 recipient of the Carl E. Rosow Award for Pharmacology Education, Kendra exemplifies the leadership and academic qualities we seek to foster in all of our graduate students. We are proud of Kendra's accomplishments and enthusiastic about her bright future in research and medicine," said Dr. David H. Farb, professor and chair of pharmacology.

Dr. Carl Rosow, for whom the award is named, is an MD, PhD, graduate of the BUSM Class of 1973, and professor of anesthesiology at Harvard Medical School. Since 1985, Dr. Rosow has honored his doctoral mentor, Dr. Joseph Cochin, an internationally recognized authority on opioids, by teaching this subject to medical students in the second-year curriculum and donating his honorarium to the School. The Carl E. Rosow Award for Pharmacology Education serves both to honor graduate students for their excellence in teaching pharmacology and Dr. Rosow for his continued service to his alma mater and its students. ■

Dean's Club Dinner Recognizes Leadership Donors

Held at the Taj Boston Hotel on October 26, the annual Dean's Club Dinner hosted some of the School's most generous benefactors. Together, they support the institution's priorities including scholarships, enhancements to BUSM's physical plan (such as the new Medical Student Residence), student programming, and operations.



(Top) Aram Chobanian, MD, president emeritus of BU and dean emeritus of BUSM, and his wife Jasmine; (Above left) Rafael Ortega, MD, associate dean for diversity & multicultural affairs, with Barry Manuel (MED'58), former associate dean for continuing medical education; (Above right) Mary Carol and Thomas Moore, MD, associate provost, Clinical Research Office, shown with Marlene Fereshetian and Sahe Fereshetian, MD.

Campaign for Boston University: School of Medicine Update



Please contact the BUSM Development Office at 617-638-4570 or busmdev@bu.edu to help the School of Medicine reach its goal of \$200M.



(Left) Joseph William Payne, one of the performers from the BUMC Arts Outreach Initiative Program, entertaining at the Dean's Club Dinner. The Arts Outreach Initiative is a partnership between BUMC and the BU College of Fine Arts to build relationships between artistic creativity and health care by offering opportunities for access to music, literature, dance, and visual arts to patients and staff on the Medical Campus. (Above) From left: Jack Evjy, (MED'61) and Sheila Ann Evjy; Tim Fitzgerald, assistant director of reunion giving and alumni events; Maria DiChiara and David Dichiara (MED'84).



DEAR ALUMNI AND FRIENDS,

In a few weeks, the Class of 2014's hard work and dedication will be rewarded as they receive their medical, doctoral, and master's degrees at Commencement. It seems like just yesterday that they began their journey at the White Coat Ceremony and the Graduate Medical Sciences welcoming events. I am exceedingly proud to be a part of an institution with such an engaged and qualified student body. While they may be leaving the halls of BUSM, they are joining the distinguished ranks of the BUSM alumni family. They are the new face of the School's alumni and the future leaders of our profession.

I feel fortunate that in my position as associate dean for alumni affairs, part of what I do is bring students and alumni together. A great example of this is the Phonathon program, which gives students a unique opportunity to connect directly with alumni. In just a short conversation, alumni can offer invaluable insight and counsel. In turn, students make alumni feel connected to BUSM, reassure them that their generosity is having a real and meaningful impact, and reinforce the fact that students today are every bit as dedicated as they ever were. I am happy to report that thirty-nine student and alumni volunteers raised more than \$90,000 from generous alumni donors in just two nights!

Another student/alumni collaboration is just around the corner: the 2014 BUSM Alumni Weekend is May 2-3 at BUSM and the Taj Boston hotel. This is a wonderful opportunity for alumni to return to campus and learn what it's like to be a current BUSM student—and what better way of doing that than having student-run tours and discussion panels? Come join your fellow classmates and see firsthand the amazing advancements the School has made!

If you can't make it to Boston, you can still stay connected through this magazine, our alumni e-newsletter, and reunion mailings. Let us know how you are doing by sharing your career and life updates. We look forward to hearing from you.

Jean E. Ramsey, MD'90, MPH'08
Associate Dean for Alumni Affairs
Associate Professor, Ophthalmology and Pediatrics
Vice Chair of Education and Program Director



(Far right) Elizabeth C. Dooling (MED'65) with three dedicated students calling alumni.

PHOTOS BY FRANK CURRAN



Alumni Phonathons Raise \$90,000

Thirty-three BUSM students joined six alumni to call graduates to ask for their support for the School. These annual fundraisers are a consistent source for connecting alumni to each other and to the students.

(Right) First-year student Megan R. Weinand (MED'17) smilin' and dialin' at the Phonathon. (Left) Phonathon Director Donald J. Grande (MED'73) and Peter E. Pochi (MED'55) share a moment at the Fall Phonathon. Six alumni callers and 33 students raised \$90,000 in two nights of calling.



1957 Gilbert A. Norwood of Beverly, Massachusetts, writes, "Still going on. Playing trumpet in four bands. On local hospital committees and mentor BU students in the I. P. program. (Is fun!)"

1961 J. Elliot Taylor of West Falmouth, Massachusetts, writes, "Retired from active practice in April 2013."

1966 Carol and Herbert Rothman of Weston, Florida, write, "We now have a one-year-old beautiful grandson whose mother is a graduate of BU Dental School."

1971 Carol O'Neil of Walpole, Massachusetts, writes, "Retiring 12/31/13 after 34 years as FP and Medical Director of Greater Roslindale Medical and Dental Center in Roslindale, Massachusetts. Recipient of *Boston* magazine's "Top Family Doctor" several times. I have taught many medical students from BU."

1974 Marvin D. Berman and Ronna D. Finer-Berman of Sharon, Massachusetts, write, "Son Adam is a second-year medical student at Albert Einstein. He was just married to Tora Schiff in August. Daughter Lisa is a veterinarian who just

received her PhD in Animal Pathology at Ohio State."

1979 Charles M. Blitzer writes, "Sandy and I continue to enjoy living in Durham, New Hampshire. I am now serving on the board for the New Hampshire Medical Society and Orthopedics Overseas."

1993 Jai G. Parekh of Towaco, New Jersey, reports that he still serves as managing partner at Brar-Parekh Eye Associates in New Jersey and clinical associate professor at the New York Eye and Ear Infirmary. He recently became chief medical officer of 1-800-Doctors, LLC. He and Swati, who is also an ophthalmologist, have been married for 20 years and are busy with their kids, Bela (17), Sima (15), and Tejas (11).

1998 Samir Shah of Gibsonia, Pennsylvania, writes, "I was appointed medical director at Virtual Radiologic, the world's largest radiology practice with over 450 radiologists on the ground (hospitals) and in the cloud globally (teleradiology). I've been working at home for more than six years now, and I love it! The *CBS Sunday Morning Early Show* did a news story about my telecommuting life." ■

1946 ■ Brigadier General (Dr.) **Donald N. Vivian** of Yorktown, Virginia on June 26, 2013. A surgeon, General Vivian became Command Surgeon, US Air Forces in Europe, Ramstein Air Force Base, Germany, in April 1975. He was director of medical inspection, Air Force Inspection and Safety Center, Norton Air Force Base in 1978. His military decorations include the Air Force Distinguished Service Medal, Legion of Merit, Air Force Commendation Medal, Army Commendation Medal, Vietnam Service Medal, American Campaign Medal, World War II Victory Medal, and

the Air Force Outstanding Unit Award. He held the aeronautical rating of Chief Flight Surgeon. He was preceded in death by his wife Maetta Hues Vivian.

1951 ■ **S. Arthur Boruchoff** of Newton, Massachusetts, on May 28, 2013, at the age of 88. A former BUSM professor of ophthalmology, Boruchoff had a long career in private practice and was a faculty member at Harvard Medical School. Husband of the late Anna Silverman Boruchoff (MED'49), he is survived by his son and two daughters.

David Van Nostrand (MED'62) received a distinguished alumni award from his alma mater, Grinnell College. Van Nostrand was recognized for his longstanding commitment to providing better health care to those in life-threatening circumstances. A general surgeon, he founded the Minnesota branch of Wings of Mercy, an organization of volunteer pilots and medical professionals who provide free air transportation to patients needing specialized care at distant hospitals. Since its founding 17 years ago, Wings of Mercy has flown more than 1,000 missions. Van Nostrand is a fellow of the American College of Surgeons and the American Academy of Disability Evaluating Physicians. He has pledged to donate \$1,000 a year for five years to needy BUSM medical students.

20 YEARS TRAINING MEDICAL STUDENTS IN COMMUNITY HEALTH CENTER CARE



Pictured with Dr. Cattell (seated left) is Nan Harvey, MD; Lorraine Stanfield, MD; John Wiecha, MD; Stephen Tringale, MD (MED'90); and Jean Ramsey, MD (MED'90, MPH'08).

Pamela Cattell, MD, BUSM Class of 1990, loves teaching almost as much as she loves caring for her patients at the South Boston Community Health Center. She's been doing the former for 20 years—almost as long as she's been practicing medicine in a community health setting. As a faculty member of the CCHERS (Center for Community Health, Education, Research, and Service) Program, Dr. Cattell includes medical students in her practice and teaches Introduction to Clinical Medicine (ICM) and Integrated Problems (IP) courses.

In recognition of Dr. Cattell's two decades of volunteer teaching, the BUSM Department of Medicine held a luncheon celebration (hosted by the BUSM Alumni Association) at which they presented her with a keepsake clock.

"I love to teach, so when I was asked to participate in the CCHERS Program, I was happy to do so," said Cattell. "I felt I got great clinical training at BUSM and during my residency at the old Boston City Hospital."

Through the CCHERS program, medical students learn basic clinical skills onsite and experience firsthand how health care is delivered in community health centers.

"The dedication of mentors like Dr. Cattell helps make it possible for us to offer our students this kind of intense clinical experience throughout medical school," said Lorraine Stanfield, MD, course director for ICM and director of the Clinical Skills & Simulation Center.

1952 • James O. S. Murray Jr., of Kingston, Massachusetts, on November 1, 2012, at the age of 86. Dr. Murray served his country in the US Army Air Corps and achieved the rank of major. He was a retired surgeon who last worked as the chief health officer of Imperial County, California. He is survived by four children.

1955 • Jordan S. Ruboy, of Boston, Massachusetts, on July 20, 2013, at the age of 85. A pediatrician, Ruboy had a private practice and was a clinical instructor at Harvard Medical School and Northeastern University. He served in the US Army Medical Corps.

1957 • Marvin Neipris of Chelsea, Massachusetts, on October 22, 2011. A surgeon, he served as medical director of quality assurance in Malden, Massachusetts, and as a clinical instructor of surgery at BUSM and senior staff member and trustee at Malden Hospital. He was also a captain in the US Army. He received his master's in public health at BU School of Public Health in 1981. He is survived by his wife, three children, and four stepchildren.

1960 • William R. Clark, of Syracuse, New York, on April 18, 2013, at the age of 79. He was professor of surgery at State University of New York Upstate Medical University for 20 years. He founded and was director of the Clark Burn Center at University Hospital. After retiring from UMU, he was employed by the New York State Health Department in the Hospital and Primary Care Program. A US Army veteran, he served as a flight surgeon in Korea. He is survived by his wife and four children.

1961 • Dennis J. Sanidas, Jr., of Falmouth, Massachusetts and Stuart, Florida, on April 22, 2013. A radiologist, he was the founder of Bay Radiology Associates and served as a radiologist

at Falmouth Hospital and Tobey Hospital. He is survived by his two children.

1964 • Joseph A. Moylan, Jr., of Durham, North Carolina, on May 16, 2013, at the age of 74. He was chief of the burn unit at the University of Wisconsin in Madison prior to joining Duke University's Department of Surgery, where he was chief of the Trauma Service and professor of surgery from 1975 to 1994. He was instrumental in the formation of Duke Hospital's Life Flight program. From 1994 to 1997, he was Lucille & DeWitt Daughtry Professor and Chairman of the Department of Surgery at the University of Miami. He returned to Durham and resumed practice as professor of surgery at Duke. After retiring from Duke in 2007, Moylan continued in medicine as an attending surgeon at the VA Medical Center in Durham. He served as a major in the US Army, Institute of Surgical Research from 1969 to 1972 at Fort Sam Houston, San Antonio, Texas. He is survived by his wife and six children.

1972 • William F. Garvin, of Lincoln, Nebraska, on May 18, 2013 at the age of 66. An orthopedist, he had a practice in Lincoln, Nebraska. He served in the US Air Force at Offutt Air Force Base, where he was chief of orthopedics. He is survived by his wife, Jeanne (MED'72), and two sons.

1974 • John L. Goodman of Wellesley, Massachusetts, on July 13, 2013, at the age of 68. He had a private practice in psychiatry in Dedham and later Needham, Massachusetts. He is survived by his wife and two daughters.

2007 • Bridget D. Wilson-Okafor, of Sugar Land, Texas, on September 5, 2013, at the age of 33. She practiced family medicine. She is survived by her husband, two children, and a stepdaughter. ■

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- ➔ Please contact the BUSM Development Office at busmdev@bu.edu or 617-638-4570, or visit www.bu.edu/supportingbusm.

2014-2015 Calendar

MAY 1

Dean's Advisory Board Meeting
Hiebert Lounge • Thursday, May 1, 2014

MAY 2

Chester S. Keefer Society Dinner with Dean's Advisory Board Members
Four Seasons Hotel, Boston • Friday, May 2, 2014

MAY 2-3

School of Medicine Alumni Weekend
BUSM and Taj, Boston • Friday & Saturday, May 2-3, 2014

MAY 16

GMS/MMS Commencement
George Sherman Union • Friday, May 16, 2014

MAY 17

MD/PhD Commencement
Agganis Arena • Saturday, May 17, 2014

MAY 18

All-University Commencement
Nickerson Field • Sunday, May 18, 2014

JULY 19

BUSM South Bay Event
San Jose, CA • Saturday, July 19, 2014

JULY 20

BUSM Los Angeles Event
Pacific Palisades, CA • Sunday, July 20, 2014

SEPT 20

Dean's Club Dinner
Taj Boston • Saturday, September 20, 2014

OCT 2

Future Leaders/Recent Graduates Reception
Taj Boston • Thursday, October 2, 2014

OCT 23

Annual Scholarship Dinner with Dean's Advisory Board Members
Hotel Commonwealth, Boston • Thursday, October 23, 2014

NOV 8

AAMC Annual Meeting BUSM Dean's Reception
Chicago, IL • Saturday, November 8, 2014



CONTACT US

If you have news, announcements, or creative works you'd like to share with your fellow alumni, please write to the BUSM Alumni Association at 72 E. Concord Street, L120, Boston, MA 02118 or email alumbusm@bu.edu.

BUSM Alumni Association on Facebook



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Alumni Association

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Pictured are donors to the history restoration projects including Douglas Hughes, MD; Robert Meenan, MD (MED'72); Robert Beazley, MD; Gerard Doherty, MD; Robert Vinci, MD; Ruthanne Grundfast, Kenneth Grundfast, MD; Rafael Ortega, MD; John Wiecha, MD; Deborah Vaughan, PhD; and Karen Antman, MD.

A CELEBRATION OF BUSM HISTORY, RESTORATION, AND FACULTY SUPPORT

On September 24, 2013, Boston University School of Medicine held a dedication and reception to celebrate the recently restored historical pieces at the School of Medicine and on the Medical Campus.

"We are pleased to recognize the philanthropic support of BUSM faculty, staff, alumni, and friends whose generous contributions made these restorations possible," said BUSM Assistant Dean for Development Lawrence Crimmins.

Recent improvements include the newly created picnic area on Talbot Green, a display of BUSM artifacts and artwork on the first floor of the Instructional Building, and the refurbished marble fountain in front of the School of Medicine. ■