

MIT Center for Biomedical Innovation

LAST SUMMER SAW THE BIRTH OF THE MIT Center for Biomedical Innovation (CBI). It is a new Institute-wide collaboration of faculty from the MIT Schools of Engineering, Management, and Science, the Harvard-MIT Division of Health Sciences & Technology (HST), and their counterparts from government and industry. The center is committed to identifying, researching and facilitating the implementation of innovative methodologies and approaches that will transform the discovery, development and distribution of accessible therapeutics, diagnostics and medical devices.

Frank L. Douglas, Ph.D., M.D., executive director of the center, says he feels the pharmaceutical industry is facing serious challenges, and that the recent recalls of some widely utilized products make it particularly important to break through traditional silo thinking. The challenges of innovating and making accessible novel drugs and devices require a collaborative effort among industry, academic and government experts. After all, there is nothing more rewarding than contributing to improving the well-being of mankind."

CBI's goal is to make strides in leading-edge health care for patients and society. To accomplish this, engineering faculty, students and researchers will join forces with others across MIT and Harvard, as well as in industry and government. Dr. Douglas, who will be the opening keynote speaker at the BSCP Conference in March, has the perfect background to lead such an effort.

Before joining CBI, he was executive vice president, Drug Innovation and Approval, and Chief Scientific Officer of Aventis SA, where he oversaw global pharmaceutical research, development and regulatory activities. He was also a member of the Board of Management at Aventis. He was the recipient of the Global Pharmaceutical R&D Director of the Year Award in 2001 and 2004.

Born in British Guiana (now Guyana), Dr. Douglas received his undergraduate degree from Lehigh University and his Ph. D. in physical chemistry and an M.D. from Cornell University. He trained in internal medicine at The Johns Hopkins Hospital, held a fellowship in neuroendocrinology at the National Institutes of Health, and taught medicine and clinical pharmacology at the Pritzker School of Medicine at the University of Chicago, where he also directed the Hypertension Clinic. He is an elected member of the High Blood Pressure Council, and in 1987 received the Lewis B. Russell Memorial Award from the American Heart Association. Dr. Douglas also received the J.W. von Goethe Frankfurt University Medal of Honor in 2004.

Dr. Douglas first joined the pharmaceutical industry in 1984. His advice to students interested in the field is, "Although it is important to be conversant with Molecular Biology, it is more important to understand the molecular basis of disease and how enzymes work." The Center for Biological Innovation will provide opportunities for students through their professors who have a relationship with the Center. ■



FRANK L. DOUGLAS, PH.D., M.D.

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**NANOMANUFACTURING CENTER OF
EXCELLENCE AND NSF CENTER FOR
HIGH-RATE NANOMANUFACTURING –
UNIVERSITY OF MASSACHUSETTS LOWELL**

TWO INTERRELATED NANOMANUFACTURING centers at the University of Massachusetts Lowell combine the University's strengths in polymer and composites manufacturing at the nanoscale, the identification and evaluation of health,

STUDENT PROFILE

Plamyenne Penka

AS AN UNDERGRADUATE studying education at Boston College (BC), Plamyenne Penka had no interest in the sciences. When her two sisters, who were both involved with the BSCP, tried to bring her to the 2000 Biomedical Science Careers Student Conference, she was not interested. "I told them, 'I hate blood. Leave me alone,'" she recalls.

But she went. And, as she puts it now, "I started thinking about science." The guest speakers drew her in, as well as "being surrounded by young people interested in sciences and health. No matter what's happening in your life, health is important and we take it for granted," says the Cameroon native who came to this country with her family when she was nine years old. "The mentors and other people were so welcoming."

After graduating from BC, Penka took a job as a clinical assistant in the Medical/Surgical Department at Children's Hospital Boston. "I wanted the reality of what nursing is about," she says. "I wanted to see the worst scenarios ever. At the beginning it was scary, because I'd never done anything like this in my life."

As a clinical assistant, Penka's responsibilities included ambulating and feeding patients, priming intravenous fluids, doing patients' EKGs and other hands-on tasks. "It's not just washing and bathing patients," she says. Rather than scaring her off, the experience convinced her to become a nurse. She spoke to BSCP director Lise Kaye about her desire to attend

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Beryl J. Davis, M.N.

Dean, Nurse Education and Health Professions, Bunker Hill Community College

WITH AN ONGOING SHORTAGE OF nurses in the health care field, there are currently more people trying to get into nursing programs than there are slots available. But that should not discourage people who are truly inspired to make their career in what can be a rewarding, if demanding, profession.

According to Beryl J. Davis, M.N., dean of Nurse Education & Health Professions at Bunker Hill Community College, nursing is a science-based discipline that requires good oral and written communication skills and strong critical thinking skills. Interested students will have to understand anatomy, physiology and math, as well as basic microbiology and chemistry. "You can't understand the disease phases without these basic courses," she explains.

Basic nursing programs are either two or four years. After two years, students can take the nursing boards and, if they pass, earn an R.N. that will allow them to practice in any medical setting. A four-year program will provide a basic nursing foundation as well as humanities courses. Graduates of four-year programs earn a B.S.N. and also are required to pass their boards before being allowed to practice. Nurses can also continue for advanced degrees, including Master's and Ph.D.s, and can become certified as nurse practitioners. "Nurses have a choice. They can decide how they can develop their own profession, and that's a wonderful thing," Davis says.

A self-described "child of the 60s," Davis, who will be an advisor at the Biomedical Science Careers Student Conference in March, took an interesting path herself. The daughter of a professor, she grew up in Boston but spent her high school years in Nigeria. She started college at Mount Holyoke, but having heard that Atlanta was "a mecca for African Americans," and being an adventurous sort, she transferred to Georgia State University, where she earned an Associate Degree in Nursing. She went on to earn her B.S.N., then an M.N.

While she continued her education, and raised three young children, Davis worked as a nurse at Emory University Hospital for 14 years. When she left, in 1994, she was the manager of Inpatient Oncology Bone Marrow Transplant.

After leaving Atlanta Davis returned to Boston to be closer to her aging parents. She spent four years at New England Medical Center, in the same position she had held at Emory. Then she worked at Dana-Farber Cancer Institute and Anna Jacques Hospital in Newburyport, Massachusetts, before settling in at Bunker Hill. "I liked teaching and I wanted to see what it was truly about. I was always on the outskirts [of academia] with my father as a professor," she says. "I applied for the position. I didn't really think I would get it."

Davis describes nursing education as very much a hands-on experience. In addition to the classroom learning, students go into nursing homes, skilled transitional care facilities and hospital units to learn nursing care skills. There is a critical component with every nursing course. "The Nursing Education Program at Bunker Hill is a very rigorous course of study," she says. Though some people know what they want to do before they begin their education, for others, specialization develops over time. Many nurses choose their specialty; for others, it develops as they go along.

Davis says she has not seen studies but is sure nursing graduates will have a relatively easy time finding jobs in today's market. "Ninety to 95 percent of our graduates are placed," she says. ■

UPCOMING EVENTS

EVENING OF HOPE

*Thursday, April 27, 2006
The Boston Park Plaza Hotel*

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Be Prepared for Each Step

Glen B. Zamansky, Ph.D., Assistant Dean for Pre-Medical Studies at Boston University and Associate Professor of Microbiology at Boston University School of Medicine

YOU KNOW THAT YOU WANT TO BE A doctor, dentist, or another health care professional. At times the possibilities seem exciting and invigorating, but at other times the tasks that lie ahead make you wonder whether you will ever get them all done. There are resources that can help make the journey more predictable, people who want to help you, and choices you can make that will help you be prepared for each step along the way. Here are a few pointers:

- **Pace Yourself** — Build a curriculum that includes the required courses for applying to professional school and a major that you will enjoy. Select courses that will enable you to create a strong foundation and be successful. There is no need to rush, and there are no “rules” that dictate a predestined academic path to reach your chosen profession.
- **Take Advantage of the Resources Available to You** — There are places to go when you need help. Course instructors make themselves available to assist students with questions. Some schools also provide peer assistance for students. At many schools, there is a health professions advisor (often called the “pre-medical advisor”) who will discuss your personal and professional goals and assist you with academic planning, finding volunteer opportunities or internships, and learning about the application process. If your school does not have a health professions advisor, you may seek the assistance of a volunteer advisor listed on the website of the National Association of Advisors for the Health Professions (www.naahp.org). Take advantage of summer enrichment programs designed for students who belong to groups that are under-represented in medicine or come from disadvantaged backgrounds. These programs provide generous stipends and a supportive environment for academic, clinical, and/or research opportunities.
- **Explore the Health Professions** — It is important that you learn about the profession you want to enter through first-hand experi-

ences, like volunteering in a clinical setting or shadowing clinicians in their practices. Many hospitals and community clinics seek volunteers to assist in a broad range of departments. In metropolitan areas, hospitals may even have specific pre-medical volunteer programs. Use your networking skills and be adventuresome.

- **Apply to Professional Schools When You Are Truly Ready to Do So** — Whether you plan to begin professional school right after you graduate from college or decide to take additional time to prepare, there are many factors to consider.

The application process requires careful thought and is very different from what you experienced when you applied to college. For example, it is typically a 15-month long process. For many health professions, it will begin with the electronic submission of a primary application to a central application service. You should complete this application as early as possible, which means working on this step in late spring or early summer. In addition, schools will ask you for letters of recommendation. It is important that you seek letters of recommendation from individuals who know you well and individuals from a variety of settings. Applying to professional schools is expensive. Information about fee assistance programs is available on the websites of central application services and the organizations that administer the required standardized tests.

- **Remember Why You Want to Enter the Health Care Professions** — Although there may be many challenges that await you, do not permit them to diminish your passion for entering the health care professions. If there are times when you feel a bit overwhelmed, remember why you want to become a health care professional, seek assistance, take time to regroup, and then begin preparing for the next step. ■

NANOMANUFACTURING

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safety and environmental hazards, and the design and implementation of safe and sustainable systems of production.

According to Julie Chen, Ph.D., professor of Mechanical Engineering and director of the Nanomanufacturing Center of Excellence (NCOE), a leading goal for the NCOE, which is funded by the state and connected with Massachusetts industry, is to develop new technology and jobs for the region. The Center’s stated mission is:

- To lead the research effort in high throughput, environmentally-friendly processing of polymeric materials, devices, and structures and integration of other materials and devices with polymers *with nanoscale control*
- To serve as a focal point and resource for transfer of nanoscience and nanotechnology to industrial application
- To facilitate educational and outreach efforts related to nanotechnology and specifically nanomanufacturing.

Using processes like injection molding extrusion and electrospinning, researchers at the center are working on ways to adapt nano products to commercial use. For example, they are working on multilayer films that are millimeters thick but are comprised of diverse nano-meter thin layers that can be used for packaging; and nanoporous structures and nanofiber membranes that can be used for filtration or for scaffolding in tissue engineering.

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BE PREPARED FOR
EACH STEP

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UPCOMING EVENTS

BIOMEDICAL SCIENCE CAREERS STUDENT CONFERENCE

March 10–11, 2006

The Boston Park Plaza Hotel

The 8th biennial Biomedical Science Careers Student Conference for post-doctoral fellows, medical/dental, graduate and college students and high school seniors and juniors, sponsored by the Biomedical Science Careers Program, encourages students to pursue and complete advanced studies. In addition to keynote addresses, students will attend panel discussions and workshops designed to lead them through the process of applying and gaining acceptance to college, medical and graduate schools as well as to competitive, advanced

training programs. Participants will be matched with advisors/role models from academia, hospitals/medical centers, the federal government and the biotechnology industry. There is no registration fee, but pre-registration is required. For more information, contact Lise D. Kaye at lise_kaye@hms.harvard.edu or (617) 432-0552.

NEW ENGLAND SCIENCE SYMPOSIUM

Sunday, March 12, 2006

The Conference Center at Harvard Medical

Registration deadline February 27, 2006

For information, contact Lise D. Kaye at lise_kaye@hms.harvard.edu or (617) 432-0552, or Janine Matho at janine_matho@hms.harvard.edu.

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NANOMANUFACTURING

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"It's bringing together a lot of different disciplines. That's what's so exciting about it," says Chen. "Whatever area you're interested in can have a nano aspect to it."

The Center is closely affiliated with the prestigious Center for High-rate Nanomanufacturing (CHN). Currently, CHN offers research opportunities for undergraduates during the summer, and occasionally during the academic year. For more information, go to www.uml.edu/research/chn and contact Professor Carol Barry, Coordinator of Education and Outreach. ■

PLAMYENNE PENKA

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nursing school, and Kaye gave her information on several programs.

Penka is currently in her second year of a three-year nursing program at the MGH Institute of Health Professions and will be taking her boards this month. While in school, she has continued to work at Children's Hospital and wants to stay in pediatric practice.

She decided to take the three-year program because she wants to become a nurse practitioner, which she feels will give her more options in terms of how and where she can practice. Nurse practitioners, while always supervised by a physician, have more independence than R.N.s.

They can prescribe medication, assess, and diagnose patients. As Penka puts it, they "do more of what a doctor does."

For anyone interested in nursing, or any health care profession, Penka recommends BSCP. "I tell the students at my school, 'come to BSCP.' You'll meet amazing people.

They want you to keep an open mind. In health care, you can go from a to z. The options are so great." ■



PLAMYENNE PENKA