Twelve years ago I received a letter from the Howard Hughes Medical Institute informing UNC Chapel Hill that it had won funding for the science education proposal establishing the Partnership for Minority Advancement in the Biomolecular Sciences (PMABS). Thus, PMABS began an adventure of bringing together seven North Carolina Historically Minority Universities (HMUs) into a consortium with a research university to achieve diversity among those going into biomedical and biomolecular careers.

I have reflected on PMABS’ accomplishments many times, and have always ended up asking the question, “Why has PMABS been successful for so long?” Without doubt, the answer lies within the Partnership’s HMU faculty. Their willingness to take chances has allowed them to develop new courses, to explore how business practices can improve education, and adopt instructional technology in the classroom. They push for changes, always with an eye on what would benefit students the most.

Harold Shapiro, former President of Princeton University, captured the essence of this vitally important human characteristic of risk-taking when he said, “The willingness to risk failure is an essential component of most successful initiatives. The unwillingness to face the risks of failure—or an excessive zeal to avoid all risks—is, in the end, an acceptance of mediocrity and an abdication of leadership.” By following this philosophy, PMABS has been able to provide students with the enriched learning experiences they need to achieve their career goals in the 21st century.

Today, because of its risk-taking inventiveness and longevity, PMABS can share the “education stories” of students whom the Partnership’s faculty have nurtured and motivated to excel. Through their education, these individuals have also become skilled at risking failure and achieving success as a result. It is to these outstanding students—and to many more like them—that we devote this special edition of the PMABS newsletter.

Sincerely,

Skip Bollenbacher
Executive Director
“I want to join a college faculty at an undergrad institution,” Bennett says. “Eventually I want to work my way through administration: department chair, dean, maybe even vice chancellor or president.”

A MAN ON A MISSION

Jabbar Bennett knows high school students; last year, he taught while completing his doctoral dissertation at Meharry Medical College in Nashville, Tenn. Too often, he learned, they picture scientists as older white men with German accents who wear lab coats and mix different colored solutions. He wants students to see through his example that stereotypes don’t necessarily fit reality.

The man his students saw at the front of the classroom was—and is—a man on a mission. This fall finds Jabbar at Harvard University as a postdoctoral fellow in the department of pathology, working on post-transcriptional gene regulation. It’s the next step in his ambitious career plans.

“I want to join a college faculty at an undergrad institution,” Bennett says. “Eventually I want to work my way through administration: department chair, dean, maybe even vice chancellor or president.”

His experiences in the department of biology at North Carolina A&T State University helped him chart his career. Bennett says, “After I finished high school at the North Carolina School of Science and Math in Durham, I thought I wanted to go to medical school. But after my first year as a biology major at A&T, I realized that I wanted to teach.”

Jabbar believes that PMABS courses and partner faculty effectively prepare undergraduates to enter biology graduate programs. “I had some professors who really helped my development—Dr. Thomas Jordan opened my eyes to molecular biology, which is my area of research now, and Dr. Joseph Whittaker helped guide me through my four years there,” he explains. “And we worked with some really nice equipment. I’ve worked with lots of the same equipment in the lab where I do my research now.”

His pursuit of the future hasn’t distracted Bennett from the present. He loves music, cooks, exercises a couple times a week, helps in his church—and devotes countless hours to his research.

If past performance can predict the future, expect to someday find Jabbar Bennett on the list of university presidents.

—By Scott Lowry
“There is so much you can do with biology,” Tyrell marvels.

DIVINE INSPIRATION

In a list of accomplishments as long as Tyrell Carr’s, what kind of a difference could a PMABS research assistantship make? To this Elizabeth City State University grad studying genetics at Iowa State University, it made a big difference. The program completely changed his perspective on biology. Carr says, “I gained a better appreciation for molecular biology. I learned tools that will help me in my graduate studies and also used computers for solving biology problems. It was my first time using software to really solve a problem in research.” He says it made him realize the importance of computers in biology.

Carr’s e-mail mentor from UNC Chapel Hill, PMABS’ Dr. Susanne Bockholt, introduced him to Dr. David Worthylake, who designed a summer laboratory experience for this exceptional PMABS Fellow. Carr spent that internship studying protein structure and X-ray crystallography under Worthylake’s guidance.

Carr almost missed his chance to study biology. “When I was in high school,” he explains, “I thought [studying] biology meant being a medical doctor.” This misconception deterred him from pursuing biology until a teacher encouraged him to reconsider. He is glad he did. “There is so much you can do with biology,” he marvels. Tyrell believes that he received more personal care and assistance at a Historically Minority University (HMU) than he would have elsewhere. He says, “Most HMUs are smaller and the class sizes are smaller, so you get to interact better with your professors. They understand you and you understand them. Also you have programs that encourage minorities to go into sciences. I think that you have a better chance of learning certain stuff at a small university.”

Carr cites a long list of mentors who contributed to his success, including Dr. Gary Harmon of ECSU’s biology department. But he also says his faith in God has been invaluable. He quotes a Bible verse from the book of Philippians: “I can do everything through him who gives me strength.” This verse gives him encouragement and motivation, he says. Carr will draw on that strength as well as his solid foundation in biology while he works at Iowa State toward his goal of becoming a professor and research scientist.

—By Lisa McConnell

Tyrell Carr

IOWA STATE UNIVERSITY, PhD CANDIDATE, GENETICS
ELIZABETH CITY STATE UNIVERSITY, BS, BIOLOGY, 2001
PMABS RESEARCH FELLOW, ECSU
PMABS SUMMER RESEARCH INTERN, UNC CHAPEL HILL
HERMAN G. COOKE RESEARCH EXCELLENCE AWARD
WHO’S WHO AMONG STUDENTS IN AMERICAN UNIVERSITIES AND COLLEGES
BETA BETA BETA BIOLOGICAL HONOR SOCIETY
INCENTIVE SCHOLARSHIP, ECSU
ECSU TALENT SEARCH ACHIEVEMENT AWARD
When Roshonna Clark was a junior in high school, she knew exactly what career she wanted. That summer, she participated in an apprenticeship in medicine program at the Medical College of Wisconsin. After shadowing a family practitioner, she was hooked. "That opened my eyes to the field of medicine," she remembers. "Since then, that's what I've wanted to do." She says she wants to become a medical resource for families, available to counsel them in their health needs.

Completing the first major step last May, Roshonna graduated with honors from Johnson C. Smith University with a degree in biology. She plans to enter medical school in the fall of 2002.

Her interest in biology began even earlier when Roshonna was in middle school, and she hasn’t lost that fascination. “I have to admit after I had taken my first year of biology [at JCSU], I tried other fields, but I always came back to biology. I don’t think that other majors challenged me like biology. I would have been bored by anything else,” she declares.

Roshonna was able to handle the challenge of a biology major due to the support of a few dedicated mentors. Her father is at the top of her list: “My father had the most impact on me to succeed in science. He always said, 'If you put your mind to it, you can do it.' At times when I said 'I can't do this!' he would encourage me. He’s been there all along saying 'If that's what you want to do, you can.'"

Another positive guide for Roshonna was JCSU’s Dr. Marilyn Sutton-Haywood. Sutton-Haywood brought her into PMABS as a research assistant. Roshonna was in charge of maintaining the molecular lab, where she learned lab techniques that many of her classmates did not have access to. “They may have gotten it in a textbook, but I had a chance to actually apply it,” she notes. The experience prepared her for a summer research program at UNC Charlotte. In addition to lab training, Roshonna gained a friendship with Sutton-Haywood. Roshonna explains, “She watched out for me and got me on the right path.”

And Roshonna has the determination to stay on that path until she reaches her final career goal as a physician in family medicine.

—By Lisa McConnell
When Tamara Hedgebeth wants to lose herself in a good mystery, she does not reach for a novel. She looks no further than the genetics lab. There she can find a mystery complete with characters and a plot. Currently, the focus of her research at East Carolina University involves chromosome 16 gene rearrangements in association with acute myeloid leukemia.

Tamara’s lab training began at Elizabeth City State University. Through an incentive scholarship program, Tamara assisted Dr. Gary Harmon in the cell biology laboratory. That experience, coupled with her semester in PMABS’ “Frontiers in Biomolecular Sciences,” caused her to look to biology professors Dr. Harmon and Dr. Ronald Blackmon for career advice. She says they offered a balanced perspective on careers in industry versus academia, and believes that ECSU’s small size enabled those mentoring relationships.

At ECSU, becoming a doctor was Tamara’s dream. But a detour shifted her goals. An internship at Glaxo Wellcome and a year of working as a Cytogenetic Laboratory Technician for GeneCare Medical Genetics Center persuaded her to return to the lab.

When her Masters is complete, Tamara’s interest in epidemiology and health sciences will direct her job search. She hopes to work in public health searching for the answers to North Carolina’s perplexing health dilemmas.

Tamara says, “In rural North Carolina, there are high rates of certain diseases in certain individuals. The diseases or conditions may be caused by disparities in salary or insurance, genetic predisposition, or certain types of behavior. We need that research to supplement medicine.” Tamara is puzzled by the region’s exceptionally high rate of strokes and infant mortality, for example. “It’s just like a mystery,” she says. “You have all the clues and you see the players and you think you know who’s the murderer. ... But the answers are not clear cut.”

Tamara may not know where she is headed next, but this doesn’t bother her. She explains, “In many ways, I am still a work in progress. I’m still that kid, trying to grow up and figure out what I want to do. It can be frustrating and scary at times, but it will work itself out.”

—By Lisa McConnell
“Cardiology is the best area where I can reach a lot of people.”

Jonathan Hefner
JOHNS HOPKINS UNIVERSITY SINAI
HOSPITAL, INTERNAL MEDICINE,
RESIDENT

MICHIGAN STATE UNIVERSITY SCHOOL
OF MEDICINE, MD, 2000

NORTH CAROLINA CENTRAL UNIVERSITY,
BS, BIOLOGY, MAGNA CUM LAUDE,
1992

MSU MINORITY MEDICAL STUDENT
ASSOCIATION, CO-PRESIDENT

PMABS SUMMER RESEARCH INTERN,
UNC CHAPEL HILL

STUDENT HEALTH COALITION
VOLUNTEER PROGRAM

BETA BETA BETA BIOLOGICAL HONOR
SOCIETY

Life Support

Somehow in the midst of a hectic schedule, Jonathan Hefner has managed to stay focused. As a resident of Johns Hopkins University Sinai Hospital internal medicine program, Jonathan barely has time to discuss his goals. Now he sits with his five-year-old daughter, Jayla, surrounded by medical textbooks and children’s toys. One thing has not changed in his life since his 1991 PMABS summer internship: he is determined to become a cardiologist.

In ten years, Jonathan has graduated from North Carolina Central University, completed medical school at Michigan State University, worked with an HMO at Vanderbilt University, married, and become a father of two. Jonathan strives to spend quality time with his family whenever he can escape from his demanding career.

As he glances at a plastic model of the human heart sitting on his kitchen table, Jonathan explains his fascination with cardiology: “Ultimately I think of the heart as a pump and the electrical activity of the heart as sort of a circuit. That’s really what the heart is. If you can understand that from a fundamental level, cardiac physiology is interesting and pretty easy to grasp. Moreover, heart disease is running rampant in the African-American community. I think there are not enough cardiologists out there to treat all of the people. Cardiology is the best area where I can reach a lot of people.”

Jonathan’s plan to reach the community involves preventative cardiology as well. He believes that the key to prevention is educating people about the risk factors of heart disease, such as hypertension, high cholesterol, poor diet and exercise, diabetes, and smoking. Educational seminars in the community are part of his plan to provide people with information. Hopeful about the future, Jonathan says, “I think I can make a difference.”

Until his residency is complete in 2003, Jonathan relies on the support of his friends and family. One friend who has been most valuable to Jonathan is Chris Tubbs, a fellow grad of NCCU. Their close friendship began when they were assigned to be roommates during their PMABS summer internship. Although their fields are different, the two men have shared a love of science and a desire to excel. Jonathan is well on his way to excelling as a cardiologist treating those in greatest need.

—By Lisa McConnell
“Science seems to come into play in every aspect of life. No matter what you are doing, science plays a part. You can’t hide from it; it’s just there.”

In Her Mother’s Footsteps

For Cotteka Johnson, a career in science was unavoidable. Her passion for the subject developed in high school when she realized the universal nature of science. She says, “Science seems to come into play in every aspect of life. No matter what you are doing, science plays a part. You can’t hide from it; it’s just there.”

It is no wonder Cotteka felt that science surrounded her. Her mother Joy has taught high school biology and agriculture for all of Cotteka’s life. As a single mother of three, Joy set an example of diligence and independence for Cotteka. Although Joy encouraged her to earn good grades, she did not pressure Cotteka to pursue science. “She never had any preconceived ideas for me,” Cotteka remembers.

When Cotteka arrived at JCSU from her home in the Bahamas, she found herself completely on her own. She wasted no time in developing a support system of professors, church members, and peers. She received valuable guidance from two professors in particular: Dr. Marilyn Sutton-Haywood and Dr. Joseph Fail, Jr. Cotteka developed a mentor relationship with Dr. Fail while participating in PMABS-sponsored ecological research. Their study compared pollution levels in downtown Charlotte with areas outside of the city. Dr. Sutton-Haywood was Cotteka’s advisor and recommended her for many scholarships and educational programs. She considers their mentorship to be significant. “On a personal level, I got to know them, and they helped me in whatever I was doing,” she says.

Cotteka is excited to have entered Ohio University’s graduate and doctoral program in biomedical sciences this fall. Fascinated by advancements in neurology, she says, “In terms of research, every day they are finding out new things. That’s something I want a small part of.” She also looks forward to becoming a teaching assistant at OU, and hopes her future will include both research and teaching. “If I could do both, that would be it for me,” she says with a smile.

—By Lisa McConnell
“Programs like PMABS open your mind, letting you discover that anything is possible if you can just imagine doing it.”

Karen Mackenzie

Tulane University, General Surgery Resident

University of North Carolina School of Medicine, MD, 1998

Fayetteville State University, BS, Biology, Cum Laude, 1993

PMABS Summer Research Intern, UNC Chapel Hill

Sarah Kenan Scholarship

Glaxo Wellcome Women in Science Scholar

Alpha Kappa Mu Math and Science Honors Society

Beta Kappa Chi Science Honor Society

Who’s Who Among Students in American Universities and Colleges

Community of Caring Award

Today, Dr. Karen Weaver Mackenzie is sure about her abilities as a senior surgical resident at Tulane University Medical Center and as a wife and mother at home. But that confidence had a modest beginning. “I was quite intimidated about going to the PMABS research internship,” recalls Mackenzie. With a strong nudge from FSU’s Dr. Valeria Fleming, she arrived in Chapel Hill the summer of 1992. Mackenzie remembers Dr. Fleming telling her the least she could do was try. Mackenzie gave research a try and succeeded.

Mackenzie says she began the molecular section of the internship “without a clue about new technologies such as probes, the polymerase chain reaction (PCR), and genetic engineering.” But soon, that changed. “I became completely smitten with PCR. I became so interested that I bought a number of books about its remarkable creator, Nobel Prize-winning chemist Kary Mullins. This process revolutionized genetics as we knew it and is pushing science in exciting new directions. That cutting-edge, here-and-now subject matter is just one of the many things that make PMABS such an incredible experience.”

Mackenzie’s life is exciting in its own right. She was on the fast track, graduating from FSU in just three years and returning to UNC Chapel Hill for medical school. Currently, she somehow keeps on top of her demanding fourth year residency schedule and still finds time to fill her role as wife and mother of two—her son just a few months old.

Looking back on her experiences, Mackenzie sees PMABS as “a good springboard” for future opportunities. Throughout her internship she encountered students and professors achieving their academic goals. “For the first time, I thought, ‘I could do this stuff, too.’ Since then, that idea has persisted. PMABS provides the introduction to current technology and research. It lets you see that medical and dental school, the traditional science fields, are not all that is out there, and that they may not be right for everyone.”

Although medicine was the right choice for her, Mackenzie advises students to go after many experiences. Karen says, “Programs like PMABS open your mind, letting you discover that anything is possible if you can just imagine doing it.”

—By Nancy Barnes
What is it like to balance teaching with her education? "‘Difficult’ would be an understatement," says Karma.

A Tight Fit

Karma Pace truly leads a double life. By day she teaches biology at the Community College of Philadelphia. But by night she is an aspiring scientist working on her Ph.D. in molecular biology at Drexel University. What is it like to balance teaching with her education? "‘Difficult’ would be an understatement," says Karma, who barely has time to eat as she runs from one campus to another.

Pace took PMABS’ course “Research Methods and Techniques” in 1996 while earning her graduate degree in biology at North Carolina A & T State University. When she entered the course, the sophisticated equipment and experiments intimidated her. But Karma found that the right instruction and practice simplified her work. She remembers that she and her classmates were not deterred by countless hours of lab work that the course required. “We liked the class, so we didn’t mind spending the extra time. We wanted to learn the techniques,” she says. She notes that her experience changed her focus from environmental ecology to DNA technology.

Not only did Pace find her focus through the PMABS course, she gained something else: her current teaching style. Dr. Thomas Jordan taught the class using probing questions that built on their knowledge. She has applied this presentation method at the high school and college levels. Karma, who describes herself as a natural teacher, teaches Introduction to Biology, Anatomy and Physiology, and Science Technology and Society.

For Karma, the PMABS course also reinforced the concept of mentorship. For years she has sought opportunities to mentor others. Currently, she directs the Community College’s science camp and mentors sixth graders. She also volunteers in numerous educational programs, such as Bridges to Baccalaureate, a program for high school students planning to attend community college and transfer to a four-year institution.

Once Karma finishes her Ph.D. researching the odorant receptors of fruit flies, she hopes to teach at a university and continue her community service. She offers this recommendation to science students: Pursue as many programs as you like, and you’ll eventually find your niche. Karma’s pursuits may keep her busy, but she has definitely found a habitat she loves.

—By Lisa McConnell and Mildred R. Mickle
A LOOK BACK
AT PMABS’ STUDENT

THE EARLY YEARS
1989-1994

INNOVATIVE COURSE DEVELOPMENT

One of PMABS’ early goals was curriculum reform. Innovative science curricula supported by the Partnership provided new opportunities for undergraduates at seven Historically Minority Universities (HMUs). “Frontiers in Biomolecular Sciences,” taught by HMU faculty since 1991, continues to be a cornerstone of the program to the present day. This multidisciplinary course, covering “hot topics” in cell, developmental, and molecular biology, utilizes scientific articles as well as textbooks and laboratory experiments in the teaching/learning process.

UNDERGRADUATE RESEARCH ASSISTANTSHIPS

Undergraduate biology students also benefited from an innovative internship program. During six to seven-week summer research sessions, select “Frontiers” students applied their knowledge in a contemporary, fully equipped laboratory at UNC Chapel Hill. From 1991 through 1994, Ph.D. scientists instructed each of four cohorts of undergraduate interns in cell, developmental, and molecular biology, translating the content they had previously studied into practical applications. Research techniques included epifluorescent and video microscopy, protein and DNA gel electrophoresis, tissue culture, sea urchin fertilization and development, and plasmid insertion into bacteria to name a few. Students then designed and conducted their own experiments in these fields, presenting their findings at an end-of-summer symposium. Students received free room and board and a generous stipend to offset the salaries they would have earned from summer jobs.

Networking and Mentoring: An unanticipated benefit was the camaraderie that developed among students when surrounded by peers with common interests in science and respect for high achievement. The skills acquired with greater understanding of the underlying scientific concepts gave many students an advantage when moving on to masters and doctoral programs or professional schools.
Decentralization was the overriding principle during PMABS’ second phase. To significantly increase the number of minority students motivated to pursue science careers, PMABS’ first major revision was to equip and supply the HMU biology departments with a teaching lab similar to the one used by student interns at UNC Chapel Hill. The payoff was that each of the seven “Frontiers” labs could be used year round in multiple courses and research projects, thereby exposing a greater number of students to biomedical and biomolecular sciences.

Capstone Laboratory Course: Once this investment was in place in the form of lab equipment for students and computers for the faculty, new PMABS-supported, intensive laboratory courses popped up throughout the Partnership. This launched biotechnology minors and concentrations within the biology major. As a result, undergraduates had access to cutting-edge equipment throughout the academic year, and molecular biology began to infiltrate anatomy and physiology, cell biology, and genetics courses. Additional North Carolina Biotechnology Center grants catapulted HMU biology departments far into the biomolecular future.

Undergraduate Research Assistantships: PMABS Research Fellows, supported by assistantships, now had exposure on their own campuses to the latest equipment and research techniques, which they would encounter later in graduate school or other science careers. These select undergraduates also gained experience preparing for and assisting in the teaching of laboratory courses, conducting research projects, developing computer skills, and presenting at scientific meetings. More importantly, any biology major could participate in PMABS-supported courses, enabling him or her to develop a wider view of possible careers in science and to catch the bug: a love for science!

Access to Summer Research Internships

PMABS saw such value in research experiences in outside labs and in the connections students were making through them that it created a National Clearinghouse Database of Summer Undergraduate Research Opportunities. First in notebooks and later in an electronic format, this program helped many students to win these elite positions.

This program is available at www.unc.edu/depts/pmabs/summer.htm
The Later Years
1998-2002

INFORMATION TECHNOLOGY ARRIVES

The internet resources available to students and the increasing dependence of science on information technology made it imperative that PMABS learn to use these tools, driven by educational principles rather than those of technology.

THE COLLABORATIVE ELECTRONIC LEARNING LABORATORY

PMABS created a unit to serve HMU faculty and their students: the Collaborative Electronic Learning Laboratory (CELL). The goal of CELL is to integrate technology into the learning environment at many levels in the educational hierarchy. Staffed by Ph.D. scientists and computer consultants, CELL is pushing the envelope by creating and delivering new courses along a distributed learning network among universities within the Partnership.

MULTIMEDIA CLASSROOM WITH SMARTBoard

To their delight, students now find class syllabi, writing assignments, problem sets, quizzes, and even microbiology media recipes and lab safety rules on their professors’ course web pages. PMABS trained partner faculty in the process of designing and building web pages for the courses they teach. PowerPoint presentations, prepared by students and faculty alike, deliver material to the rest of the class using an interactive white board, projector, VCR, computer, and even a color printer—all part of the multimedia package PMABS purchased for each university partner’s science department. Now students prepare symposium talks and communicate their discoveries through animated PowerPoint presentations with inserted pictures and data. The same technologies also enhance faculty lectures and review sessions.
FRONTIERS AND CAPSTONE LABORATORY COURSES

The “Frontiers” course is still taught on each campus along with a full-blown laboratory course, customized to fit each department’s existing curriculum. Undergraduates still receive research or teaching internships to enhance their laboratory skills and to support the development of close contact with other mentor scientists. These two areas—curriculum and student development—are the bread and butter of PMABS-supported activities. The next goal is to establish the infrastructure for video conferencing among Partnership university biology departments.

This will allow all students in the system to benefit from courses taught by the consortium’s expert professors and to interact with students from other campuses and research scientists around the world.

ACADEMIC AND PROFESSIONAL MENTORING

With two courses in place, students are able to develop close relationships with a variety of mentors, some at their home universities and others through summer externships at research universities. In addition, an E-mentoring program piloted at two institutions electronically paired students with corporate scientists.

—By Nancy Barnes
“I was able to help other students hands-on and say, ‘This is what I learned. This is how we did it.’”

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**A FAMILY AFFAIR**

The life of a pharmacist is a perfect fit for Chenise Pinckney. The job combines her medical and scientific knowledge, her teaching abilities, and her desire for human connections. Pinckney, a student at Temple University’s School of Pharmacy, says, “I want to interact with customers; I don’t want to be stuck in a lab somewhere.”

When this Shaw University grad is outside of class, she works as an intern at a CVS pharmacy in Philadelphia. She says her job is “stressful, but I love it. I like being able to counsel parents or children of older parents on how to administer medication. Educate them about their disease state. Keep them updated on the current drug regimens that are available. A lot of people respect that. They respect that you actually care about them.” She enjoys getting to know families and other repeat customers in the community.

When Chenise took the PMABS-supported “Frontiers” course with Dr. Eugene Baskerville, she had already done research internships at Purdue University and North Carolina State University. She says the course provided good reinforcement of research methods and her first experience in an instructional role. “I was able to assist other students in the class who maybe had not had a chance to do an internship anywhere,” she explains. “I was able to help other students hands-on and say, ‘This is what I learned. This is how we did it.’”

Chenise says her motivation to succeed academically comes from her family, which she describes as “very large, very close knit.” She adds, “It was always stressed how important education was, how important it was not to slack off in school. If you want to get these things out of life, you have to make school one of your top priorities.” In fact, family is so important to Chenise that she keeps one family member especially close at hand. Denise Pinckney, Chenise’s twin sister, also attends Temple’s Pharmacy School. The sisters went to Shaw University together and are still roommates. “I wouldn’t be roommates with anyone else right now,” Chenise shares. It seems Chenise is extending her family to include the people she is determined to help as a pharmacist.

—By Lisa McConnell
Will Richardson’s motivation for becoming a physician goes beyond a desire to help others. As a Native American, Richardson seeks to serve that community with the knowledge that he gained at East Carolina School of Medicine and his internal medicine internship. As he steps into the role of dermatology resident in Albuquerque, N.M., it is the result of determination, a mentor’s influence, and training provided by PMABS.

While studying at the University of North Carolina at Pembroke, formerly Pembroke State University, Richardson took two PMABS-sponsored courses: “Biotechnology” and “Frontiers in Biomolecular Sciences.” These courses provided him with training in new techniques in biomolecular science tests that he used as a medical resident at the Medical University Hospital of Charleston, S.C. His first-hand knowledge of the tests gave him an advantage. He says, “I know what the tests are, how they’re done, the errors that can occur, and the reliability of the tests since I have done them myself.”

Will adds that the courses gave him “an excellent fund of knowledge regarding the molecular basis of skin diseases” that is getting the attention of his colleagues at the University of New Mexico. His program director recently asked Will to write a textbook chapter on Skin Disease in Native Americans in conjunction with Howard University.

Professor Michele Bridgers taught Richardson’s “Frontiers” course, and based on their interaction during the semester, Richardson and Bridgers developed a relationship that would guide and sustain him as he planned his career. Richardson says that Bridgers inspired him when he lacked self-motivation. “She was influential in pushing me and keeping me going. No matter what stumbling block or what barrier might come up, she was always there to help me push one more time,” he says.

Richardson shares Bridgers’ devotion to improving the lives of others. Because of the connection he feels with other Native Americans, he is grateful for the opportunity to serve them. He says his new position is “truly rewarding.” Richardson explains, “After growing up Native American and becoming involved with the other professional Native Americans, it inspires you to appreciate your culture and want to give back to those who share in your heritage.”

—By Lisa McConnell
“The relationships that you form as an undergraduate will help you throughout your graduate career.”

**A SECOND LANGUAGE**

Jan Lee Santos speaks scientific jargon with ease. The first-year Ph.D. student at Indiana University in Bloomington (IUB) says, “Determining protein structure and function is emerging to be one of the hottest fields in molecular biology today.

“I am interested in studying protein-protein interactions during viral replication. The elucidation of amino acid sequences necessary for successful replication of the viral genome will have a profound effect in developing successful anti-viral treatment. This will allow construction of molecules that will potentially block active sites, therefore hindering viral pathogenesis. Also, viruses are relatively simple entities. The knowledge that we gain from them can be applied towards our understanding of higher and more complex organisms.”

Like many of today’s researchers in molecular biology, Jan Lee went to college intending to become a medical doctor. But his experiences in conducting research at the University of North Carolina at Pembroke (UNCP) and IUB made him reconsider.

Santos explains, “I did two summer research internships at IUB and one semester of independent research at UNCP. During that time, I determined the mechanism of cell death induced by a toxin (Act) in murine macrophage cells.”

Jan Lee credits numerous UNCP professors, including Dr. Lakshmi Ramarathinam, who supervised his independent research. He found two more mentors in the chemistry department. Dr. Siva Mandjiny helped foster his interest in biochemistry and Dr. Len Holmes encouraged him to do summer research internships at IUB. He also gives credit to his mentors at IUB, Drs. Joseph Steinmetz and Jo Anne Tracy from the department of psychology and Drs. Cheng Kao and K. Sivakumaran from the department of biology. “My professors have helped me a lot in the advancement of my career. Two years before you graduate, you need to start to do summer internships so you can network with professors and fellow students. The relationships that you form as an undergraduate will help you throughout your graduate career. Research-intensive courses give you a hands-on of what graduate study involves. Approach your professors and take advantage of opportunities to do research,” Jan Lee advises.

Undergraduate research did the trick for Jan Lee Santos. Just ask him—if you can drag him out of the crystallography lab.

—By Scott Lowry
“I think the internship heightened my interest in research. It was a really memorable experience.”

DILEMMA: TEACHING VS. RESEARCH

Teaching and doing scientific research are challenges that keep Kimberly Snead-McDaniels on her toes. And she loves every minute of it!

When asked about her perspective on science, Snead-McDaniels, who teaches biology at Fayetteville Tech, replies: “When I did the [PMABS summer internship] I enjoyed it. I think the internship heightened my interest in research. The people we worked with were great. It was a really memorable experience.”

The seven weeks of experiments with equipment not available at her undergraduate institution fed Kim’s desire to learn as much about science as she could. She welcomed the chance to get her hands dirty in salt marshes and commune with other college students, some of whom she continues to keep in contact with. She even saved her group’s video microscopy tapes of sea urchin development as mementos.

Recently, Kim balanced her time between teaching and participating in research with Dr. Juliette Bell at Fayetteville State University. Their research was focused on metal mutagenesis.

Kim shares that she would not be where she is today if it had not been for the steady mentorship of Dr. Valeria Fleming, Professor of Biology at FSU and a partner in PMABS. Kim worked in Dr. Fleming’s lab before graduating from FSU in 1993. She explains, “Dr. Fleming served, and she still does serve as a mentor for me. She’s excellent. She’s very honest, straightforward, objective—and that’s important when you’re looking for jobs and direction.”

While Kim contemplates returning to school for an advanced degree in education, she is not sure which career path will win in the end. Kim is torn between her interest in research and her desire to teach those who share her love of science. She says she finds fulfillment in both fields, adding, “Teaching provides you with the opportunity to interact with people, but research provides you with the opportunity to explore new things in science.” Only time will tell which path she will take, and either will sustain her thirst for science.

—By Mildred R. Mickle and Lisa McConnell
“I wanted to expose my students to science and its impact on their lives. I felt also that it was important to actually help them to understand the process of doing science rather than simply listening to lectures.”

Dr. Donna Trollinger knows the importance of diverse perspectives in science education and research. As a high school science teacher for seven years in Greensboro, she took PMABS’ “Frontiers in Biomolecular Sciences” course in Chapel Hill. Trollinger remembers, “I wanted to expose my students to science and its impact on their lives. I felt also that it was important to actually help them to understand the process of doing science rather than simply listening to lectures.”

Donna says that year of working with the latest technology inspired her to earn a Ph.D. in cell biology at UNC Chapel Hill followed by a post-doc at The University of California at Davis. Her research in cardiac heart cells with UNC Chapel Hill’s Dr. John Lemasters provided extensive experience in microscopy and imaging. This enabled her to land a position at Atto Instruments, a biotech company that produces optical imaging devices.

“Atto was looking for someone with expertise in imaging systems for fluorescence microscopy applications,” Donna explains. “Because my role as the imaging specialist at Atto involves direct interaction with our customers to provide technical assistance and training, my teaching background has really helped in this job. A strong knowledge of computer systems has also been important in this role, since another major aspect of my job involves installing our imaging systems, both hardware and software, at customer sites across the country. I work with scientists at the NIH, universities, drug companies, and other research institutions, teaching them to get the most out of our instrumentation for their particular research applications.”

She stresses that students pursuing science careers need to get as much variety as they can. “It’s important to develop relationships with people in the field. And the more experiences you have, the better you understand what you want to do and the better prepared you are for the difficulties,” Trollinger explains.

Donna also believes that keeping an open mind about her goals and interests has allowed her to make wise career choices. She says, “You have to be prepared to take advantage of opportunities that come your way.”

—By Scott Lowry
Christopher Tubbs remembers his 1992 PMABS summer internship with mixed feelings: “During the first week [studying marine biology] at the coast, I was miserable. I learned there that I don’t want to be in the bogs; I’m a lab rat at heart. Then we did the development session with sea urchin eggs and sperm. We also sequenced DNA. Those experiences really blew my mind!”

Tubbs believes that the summer inspired him to earn a Ph.D. in biochemistry at North Carolina State University in 2001, followed by a postdoctoral research fellowship at the University of Minnesota investigating the CRISP protein family. But he warns students considering science careers that their initial excitement isn’t enough. “Talk to people in different levels: graduate students, new doctorates, professors,” Chris confides. “Ask them, ‘What do I need to succeed? How should I prepare?’ Make connections as soon as you can. When you reach grad school, have at least one mentor, preferably two or three. They’ve been through that minefield, and many would be happy to lead you through it safely.”

Professor Goldie Byrd of North Carolina Central University ranks high among Tubbs’ own mentors. “She showed genuine interest in my success from the time I was in the PMABS’ “Frontiers in Molecular Biology” course with her. I stay in touch with her, let her know what’s going on. Every student needs the support I received from her and others,” he says.

Tubbs has long weighed the freedom of joining a university’s faculty and running his own molecular and cellular biology lab against the synergy in the industrial sector’s goals of doing good for society and making a profit. He’s finally decided to pursue a career in industry, but knew all along that whichever his choice, research is his calling. “I love what I’m doing,” Chris says. “I look forward to coming to work every day. Well, not every day, but at least 90 percent of the time. And when I go to bed, I’m excited about what I’ll be doing tomorrow. I don’t think many people are lucky enough to be able to say that.”

—By Scott Lowry

Christopher Tubbs

University of Minnesota, Molecular and Cellular Biology, Postdoctoral Fellow

North Carolina State University, PhD, Biochemistry, 2001

North Carolina Central University, BS, Biology, 1993

UNCF/Merck Postdoctoral Fellowship

UNCF/Merck Predoctoral Fellowship

National Institutes of Health Predoctoral Fellowship

National Science Foundation Predoctoral Research Fellow

PMABS Summer Research Intern, UNC Chapel Hill

GEM Fellowship

National Institutes of Health Minority Access to Research Careers Fellow
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