FUSION

A PERIODIC NEWSLETTER ABOUT THE SCIENCES AT ALBRIGHT COLLEGE.

Plans for New Science Center Support Interdisciplinary Teaching and Learning

In the last issue of *Fusion* we gave you a sneak peek at an architect's rendering of Albright's new Science Center.

Plans are well underway. Science faculty have been working collaboratively with the architects and engineers to ensure that the Science Center is a model for interdisciplinary science education.

The Science Center has been designed to promote interaction and intense collaboration between students and faculty in biology, chemistry and physics through shared lab spaces, dedicated faculty/student research space, and the location of faculty offices close to labs.

Albright is already equipped with state-of-the-art scientific instrumentation, but the lack of space for shared instrumentation in the current Science Hall has significantly restricted research. With the added space in the new building, the College plans to increase participation in the Albright Creative Research Experience (ACRE), a highly successful summer and Interim student/faculty collaborative research program, by making it a year-long initiative.

Biology, the fastest growing area of science and the most popular science major at Albright, will have the largest amount of space in the new facility. The new space will also allow for the addition of a new neuroscience program that will significantly strengthen the current psychobiology program. The Department of Chemistry and Biochemistry will have the space needed for optimum use of chemistry instrumentation, and the optical physics program will be relocated from the basement of Masters Hall to the new Science Center.

Other features include: all classrooms and labs equipped with multi-media capability; data access to all students through wireless networks; a large gathering space for public and student science events, such as lectures and demonstrations; a greenhouse and an observatory; modern laboratories to house teaching and research activities; and a modern science library. ■

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WHAT'S INSIDE!

Dorothea Lang '56: Fighting the Battles... and Winning!

"Behold the turtle… it makes progress only when it sticks its neck out."

Dorothea Lang '56, who had a poster with this sentiment on it hanging in her office for many years, was never afraid to stick out her neck for what she believed.

For nearly 40 years Lang has worked, advocated and legislated to achieve recognition for the practice of midwifery and quality care for women.

Born the second eldest child to missionary parents in Japan, Lang saw a midwife arrive at home to assist her mother's delivery of her four younger siblings. In the 1930s, 97 percent of women in Japan were delivered at home by midwives. Only those few with complications went to the hospital.

Lang saw the respect that these midwives received in the community. "People had warm feelings towards them," she said, "the same feelings you would have for a family doctor." Intrigued, Lang went on to Albright College with the intention to acquire the science foundation for midwifery education. However, she could find no information on midwifery education in the United States. By 1950, 88 percent of American women were delivered in hospitals by doctors. Home births delivered by midwives were no longer the norm. So, Lang completed a five-year nursing program at Albright and Reading Hospital School of Nursing.

Not long after receiving her bachelor's degree, Lang discovered a new program that taught midwifery at Johns Hopkins University Hospital. Excited about the opportunity, she applied and completed her educational and clinical requirements to become a certified nurse-midwife (CNM). However, when she went to find a job, she found that there were no clinical practice employment opportunities for midwives. Lang took a job as an obstetrical head nurse and junior instructor at New York Cornell Medical Center in New York City.

But in 1962, an opportunity arose that would not only change Lang's life, but the future of midwifery in America. Lang traveled to San Iku Hospital in Tokyo's East Side as a consultant-mission associate. While in Tokyo her collegial relationships with obstetrical professors, nurses, midwives and other allied health team members introduced her to the modern type of health care professional midwifery practice in a hospital setting.

"In Tokyo, midwives were delivering 95 percent of the births," Lang said. "They were doing such a good job with the Japanese women. The doctors were there in the back rooms doing research and writing textbooks, and the midwives were doing all the work. The doctors only saw the patients when there was a problem." That experience, said Lang, greatly influenced her pioneering work to integrate the American professional midwife into both hospital and public health-based maternity services.

In 1965, after completing a master's degree in public health at Columbia University, she went to work for the Maternal-Infant Care project in New York City as a nurse educator. Her goal was to introduce midwives into the system and convince the New York City Health Department that midwives were the key to improving and personalizing maternity care. In 1968 Lang was appointed director of midwifery. Under her administrative guidance, the number of hospitals that employed midwives went from two to 23, and through her efforts the fullest scope of nurse-midwifery practice was demonstrated in urban settings. Now, across the US, more than 40 universities offer midwifery education and more than 10,000 midwives have been educated to provide the "midwifery model of care" to families of all cultural and socio-economic levels.

> *"Do not try to go where things are already great. Go where the individual needs of the women are the greatest."*

That missionary trip to Tokyo in the early 60s taught Lang another thing – midwives shouldn't be required to have a nursing background in order to practice midwifery. Midwives in Japan didn't require nursing backgrounds and were very well respected. "A doctor doesn't need to be a nurse before they become a doctor, so why should a midwife need to be a nurse first," she argued. That argument, and her persistence for more than 20 years, led to a Board of Midwifery in New York State that recognizes certified nurse midwives and certified midwives. The law, established in 1992, stated that

prerequisites to midwife education may be nursing education or the academic science equivalent, such as psychology, anatomy, physiology, pre-med, etc. For Lang's pioneering efforts, she was given New York Midwife License Number 000001.

Honored with the Hattie Hemschemeyer Award in 1986, the most prestigious award presented by the American College of Nurse Midwives (ACNM), Lang's mandate to midwives sums up her philosophy best: "Do not try to go where things are already great. Go where the individual needs of the women are the greatest. That is where you will show what you as a midwife can truly bring to health care and the community."

In 2002, the Dorothea M. Lang Pioneer Award was established by the American College of Nurse Midwives Foundation to acknowledge those midwives who have demonstrated why midwifery care could and should be on the health care team. "I'd like to think that maybe my work gives courage to other people to reach beyond what's existing today."

Lang hasn't stopped since retiring in 1998. Today, she remains active at both the local and state levels working toward achieving a friendlier mother-baby environment within the health care system. She's involved in community-based organizations in central Harlem to help improve maternity care there, and she represents the International Confederation of Midwives (ICM) as a nongovernmental organization at the United Nations. In addition, she continues her pioneering efforts at the State University of New York–Brooklyn where she is working to establish a doctoral program in midwifery, which she hopes will be available within the next 10 years.

"I still have a lot of energy," she said. "We haven't won all the battles yet." ■

Biology Bridge Course Helps International Students with Language Skills

About five percent of Albright College students are international students. This year, for the first time, a bridge course to assist international students with their English language skills was offered in the sciences.

The course, "The Changing Face of Human Disease," taught by Gerald Kreider, Ph.D., professor of biology, is typically offered during Interim for non-science majors. Delving into the mysteries of emerging or re-emerging infectious diseases, the bridge course is taught the same way as the regular course, with one exception, said Kreider. While writing assignments are a part of the regular class, the bridge course places an even stronger emphasis on reading and writing assignments to help the students improve their language skills.

Eight students from four countries – Iran, Kenya, Republic of Korea and Nepal – are enrolled this semester. "My hope," said Kreider, "is to bring the students' language skills up to speed a little more so they are better able to handle regular classes."

Each week students are given an issue to research and then must write a one-to two-page response on the topic. "I also take more time to go over the assignments with them," Kreider said. "Sometimes they ask about scientific terminology, but often it's just English phrases, colloquial expressions, or the interpretation of words."

Writing assignments range from evaluating the health-related dangers that resulted from Hurricane Katrina to researching health issues in the students' countries of origin.

Kathy Ozment, chair of modern foreign languages & literature, designed the bridge program. "We are hoping to lower the anxiety level many students who are non-native speakers of English experience when they are asked to contribute in the classroom," Ozment said. "The smaller class also allows for more interaction on a personal level between the professor and student. We are hoping to connect the student to at least one professor academically so that their transition in the spring semester to all regular classes will be easier and we will have addressed some of their basic questions about American academia." ■

New Faculty Member Joins Department of Chemistry and Biochemistry

Ian J. Rhile, Ph.D. of Seattle, Wash., joined Albright in August as assistant professor of chemistry and biochemistry. His research interests include mechanistic details of organic and inorganic reactions, including organometallic reactions. Rhile previously served as a research associate, laboratory instructor, undergraduate mentor and instructor of general chemistry at the University of Washington. He earned a bachelor of science degree from Ursinus College, where he was the valedictorian of his graduating class, and a doctorate in chemistry from Cornell University. ■

STUDENTS AND FACULTY...
PARTNERS IN RESEARCH

ION EXCHANGE RESINS TO BAT ECHOLOCATION CALLS: INTERDISCIPLINARY RESEARCH IN SCIENCE

Biochemistry and biotechnology major Charles Frankhouser '06 certainly knows the meaning of interdisciplinary – one of Albright College's core academic values.

Frankhouser is the first student at Albright to have done Albright Creative Research Experience (ACRE) projects in all three of the sciences biology, chemistry and physics. His most recent project, completed during the summer of 2005, was interdisciplinary in itself, spanning the areas of biology and physics.

"In some ways, this sort of research demonstrates the blurring of the boundaries between different scientific disciplines that is so commonly experienced by our students in both their coursework and other real-world applications, and underlies the importance of a broad basis of collaboration and understanding in addressing any research question," said Karen Campbell, Ph.D., P. Kenneth Nase, M.D. '55 chair in biology.

During the summer of 2003, Frankhouser collaborated with Campbell on a project concerning the habitat use of two different species of bats.

Campbell said, "[The project] was designed to learn more about the roosting and foraging requirements of two species of tree-roosting bats, the Northern long-eared bat and the Eastern Pipistrelle. Basically, we captured bats, affixed radio-transmitters to their backs and tried to learn more about where they roost, how long they forage each night, where they forage relative to where they roost … just some basic background that's more commonly known for other species, but not so common for these."

Then, in the summer of 2004, he collaborated with Christian Hamann, Ph.D., assistant professor of chemistry and biochemistry, on a project in organic chemistry that involved "the synthesis of water purification reagents designed to remove perchlorate from drinking water."

Frankhouser and Hamann produced ion exchange resins, small bead-like particles containing acidic or basic groups, for the purpose of removing perchlorate from drinking water. "Perchlorate is a toxic material that enters groundwater from anthropogenic and natural sources," said Hamann. "In the body perchlorate interferes with the proper uptake of iodide, interrupting the synthesis of thyroid hormones."


Ryan McFadden

Charles Frankhouser '06 presents his summer 2005 ACRE project, "Quantifying Variation in Bat Echolocation Calls."

Hamann said, "Through Chuck's diligent efforts we were able to realize preliminary success in the synthesis of novel resins."

And, just this past summer, Frankhouser worked on a biophysics-related project, which focused on the quantification of variations in bat echolocation calls.

Working with Devon Mason, Ph.D., assistant professor of physics, and again with Campbell, Frankhouser said the purpose of the project was to identify bat calls and categorize them by species. Using state-of-the-art equipment, they sought to find patterns within these calls in order to distinguish between the different species of bats as they were flying.

Bats use echolocation calls while they are out at night hunting insects, Frankhouser said. Bouncing back to their ears, the echolocation calls allow bats to perceive speed, direction and how big something is. "It's kind of like our sight," he said, or bird calls, only "we can't hear what bats are saying."

During the summer of 2005, Frankhouser and Campbell worked at Great Swamp National Wildlife Refuge in New Jersey, near a hibernaculum that historically housed Indiana bats, which are a federally-protected endangered species. Using 30-foot high mist nets, they caught 12 of these endangered bats, and were able to obtain recordings from them. Although these bats are very similar to the common Little Brown Bat, both in appearance and echolocation call characteristics, they hope to be able to identify call features that will allow researchers to distinguish between the species in flight.

Frankhouser said it was fun and interesting to get to watch the bats. "It's much better than being cooped up in, say, the library," he joked. "Once you get past your initial fears, they are interesting creatures."

Mason's primary role in the project was determining "the exact physics of what we were doing," said Frankhouser. He also handled the technology aspects of the project.

While the research took the entire summer to conduct and will go into the winter months, Frankhouser said that "the advent of technology that we have made it a lot easier than old methods."

Frankhouser plans to use his most recent ACRE project as the topic of his senior thesis. And, along with Campbell and Mason, he may present the project at the National Conferences on Undergraduate Research (NCUR).

David Osgood, Ph.D., associate professor of biology and director of the ACRE program, said, "ACRE participants gain insight into their discipline that transcends the typical college experience. The intense exploration of a topic and acquisition of new skills increases their competitiveness for professional positions and graduate school." ■

Additional Albright Creative Research Experience (ACRE) projects in the sciences include:

Timothy Boyle '07 *(Karen Campbell, Ph.D.)*
Foraging Habits of Myotis lucifugus

LaKeisha Hall '07 *(Karen Campbell, Ph.D.)*
Diet Analysis of Little Brown Bat Females during the Reproductive Season

Christopher Laliberte '06 *(Stephen Mech, Ph.D.)*
A Study of Mesopredator Densities in French Creek State Park

Kristen Myers '07 *(David Osgood, Ph.D.)*
Using Biotic Integrity to Assess the Health of a Stream Prior to Restoration

Meghan O'Donohue '06 *(David Osgood, Ph.D.)*
Creation of a Water Quality Baseline for a Stream Restoration on Angelica Creek

Darren Stoltzfus '06 *(Brian Buerke, Ph.D.)*
Application of Optical Tweezers to Undergraduate Education

Sherri Young '07 *(Christian Hamann, Ph.D.)*
Analysis of Structure-Function Relationships in Activated Methylene Compounds (supported by the Merck Summer Undergraduate Research Fellowship)

Ryan McFadden

Environmental science major Meghan O'Donohue '06 presents her ACRE project, "Creation of a Water Quality Baseline for a Stream Restoration on Angelica Creek."

PATIENCE VS. PATIENTS:

JANEIL GILYEAT '07 FOCUSES ON A CAREER IN RESEARCH

Most college students heading home for the summer have a few things in mind; a part-time job, reuniting with hometown friends, heading to the shore and relaxing after a tough semester. For Janeil Gilyeat '07, the past two summers have been spent at John Hopkins University School of Public Health.

As a senior at Thomas Stone High School in Mechanicsville, Md., Gilyeat had the privilege of shadowing a representative at Johns Hopkins. Little did she know this experience would provide a future opportunity. After completing her freshman year at Albright, Gilyeat, a biochemistry major, was invited back to Johns Hopkins as a research assistant where she worked with doctoral candidates in the lab. She was offered the position again after completing her sophomore year.

"The lab experience was great. I spent most of my time purifying proteins and making stock buffer solutions for lab experiments," Gilyeat said. "On occasion, I would get to work with DNA which was really interesting."

Purifying proteins involves a fast protein liquid chromatography machine, which takes a solution and can single out a single type of protein. These are then used to bind to other molecules, including cancer cells, to understand how cells react to the different proteins. It is the hope of the researchers at John Hopkins that they will be able to use this data to prevent and treat diseases such as cancer.

What did Gilyeat learn? "Patience, without a doubt," she said. "Some of these processes would take four or five days to complete a single batch. When something didn't work out the way it was expected, you would have to go right back to the beginning."

The experience also helped Gilyeat focus on a career path. After considering pre-med she realized she would prefer to work in research rather than with the day-to-day treatment of patients. "There are a lot of advances in medical research that can save a lot of lives," she said. "I would love to work in cancer and stem cell research in the future."

Johns Hopkins has asked Gilyeat to return this summer, but she isn't sure yet what her plans will entail. She is currently considering an Albright Creative Research Experience project. ■

Q & A WITH...

FRIEDA L. TEXTER, PH.D. '72, PROFESSOR OF CHEMISTRY AND CHAIR OF CHEMISTRY & BIOCHEMISTRY DEPARTMENT


John R. Pankratz

How long have you been teaching at Albright?

"I started teaching at Albright in the fall of 1977, so I have been teaching here for 28 years."

You are a 1972 graduate of Albright. Why did you decide to come back as a faculty member?

"I was nearing the end of my experimental work on my Ph.D., so the timing really worked out well. This was my first job, and I decided to stay. My father was an Albright alumnus. He had always talked about Albright, and he brought me to see Albright. So I have a family connection. My two brothers did not go to school here, but my father was happy to get one out of three."

What are the most significant changes you have seen at Albright?

"The number of students has gone up and down during my years here. There were 1,200 students here when I was a student. In the early '80s, we topped out at over 1,400 students. After that, the number of students went down as low as 900. Now the number of students is high again [1,639]. I have also seen the number of science majors go up and down over the years."

Why did you decide to focus on chemistry?

"I had a really good high school chemistry teacher. I was undecided about what to major in, so I started undeclared. Freshman year, I took general chemistry and calculus, and I really liked it. At the end of that year, I declared chemistry as my major. Chemistry is mathematics intensive. I always liked the logical aspect of algebra, that always made sense to me. I had some friends at Albright who were biology majors, and I started hanging out in the biology labs with them. That is when I realized that the chemistry I liked best was biochemistry - what was going on in living organisms. When I went to Purdue University for my Ph.D., I focused on biochemistry."

You were the first Albright faculty member in biochemistry?

"Yes, Albright was really on the ground floor in biochemistry. It was introduced as a major when I was in school, between 1968 and 1972. For a long time, we were the only school in the region with a biochemistry major. Now, three members of our Chemistry and Biochemistry Department are biochemists."

Was it difficult for you as a woman in a male-dominated field?

"No, I have been very lucky. When I started at Albright as a student, most of the science professors were male, but they were very supportive and encouraging. Many of the same professors were still here when I came back to Albright to teach. They went out of their way to be very polite to me. We have always had a high percentage of women among our science majors. I think it helps that we have female faculty in the sciences, so the role models are here."

What is the most rewarding part of your job?

"I really enjoy working with students on independent research projects. When working on research, you interact with students in a different way than in the classroom. I have become very good friends - lifelong friends - with some of the students that I have worked with on research projects. I think that is also due to Albright's small size. People can really get to know each other well here, and develop close friendships.

Once I went to a science meeting with one of my former students who is a close friend of mine, and I met a speaker at the meeting, Dr. Robert Matthews, and started working on research with him. I ended up spending four summers at Penn State University working on that research. That meeting changed the entire focus of my research. It is interesting the way friendships and networking can do that."

What has been the focus of your research?

Since 1988, that first summer at Penn State, I have been working in the area of protein folding and stability. In 1998, I began a collaboration with Dr. Carstairs Wagner, a member of the School of Pharmacy at the University of Minnesota. We originally met during my summers at Penn State. We have been studying arylamine N-acetyltransferase, an enzyme that has been linked to several different types of cancer. My students and I have used protein folding techniques to study the stability of one of the isozyme forms of this enzyme. Our work may contribute a small part to the understanding of how this enzyme functions. Ultimately, that enzyme could be a target for a cancer-fighting drug.

When you were a student at Albright, you were a member of Phi Beta Mu sorority. As a faculty member, you have volunteered for many years as an advisor to the current related sorority, Phi Mu. Why do you serve as an advisor?

"I really enjoy it. I get to know students in a completely different way than the typical professor/student relationship. I have also met some very good friends among the alumnae volunteers from around the country. A group of us travel abroad every other summer. We have been to Scotland, Ireland and England together."

Any stereotypes about scientists that you would like to break?

"Many of our science majors enjoy participating in theatre or musical groups. Many of our science majors are also athletes. Some of our science faculty are also involved in the arts or sports. That is what is nice about Albright. At bigger schools, only the music majors are in the musical groups, and only the theatre majors are in the plays. Here, our entire community is involved. It takes a lot of organization on the part of the student to find time for everything, but it makes for a healthier student."

What do you look forward to in the future?

"Occupying the new Science Center will be very satisfying. This project is about 10 years overdue. Our current building, we fondly refer to it as a classic. One of the major shortcomings of this building is there is very little space for research. Students work on research in the same labs we teach in. In the new building, there will be a big increase in faculty and student research space. Now that the project is planned, we can see the light at the end of the tunnel. The new building will help us recruit more science students. Our instrument collection is excellent, thanks to grants and corporate gifts, and we will be able to use the equipment more in the new building. We will be able to host meetings of regional science organizations here. Now, we have science majors hanging out in the hallways or classrooms to talk. There is no comfortable space for them. In the new Science Center, there will be space for students and faculty to interact and exchange ideas." ■

HISTORY IN THE MAKING
Albright COLLEGE 1856-2006 150

SCIENCE OF THE PAST

Physics lab, Central Pennsylvania College, 1898-99.

Albright kicked off its 15-month-long Sesquicentennial Celebration at a ceremony on October 21. The Celebration will feature a calendar full of Sesquicentennial milestone events, commemorative items, a series of "Sesqui Stories," exhibits placed throughout campus, an interactive web site and much more. For more information, including an update on events, go to www.albright.edu/150.

More historic photos like this can be seen in *Albright at 150: A History in Photographs*, on sale for $19.95 at the Albright Bookstore, or by calling 610-921-7270.

answers...
continued from back page

Q: If white light shines through a red filter, red light will come out the other side. What color of light comes out if white light shines through first a red filter and then a blue filter?

A: No light comes out.

Q: How many states of matter are there?

A: There are six recognized states of matter in the universe. Three states exist in the normal temperature ranges found on Earth – solid, liquid and gas. In addition to these three states of matter, three other states are recognized by scientists – plasma, Bose-Einstein condensate and fermionic condensate.

Q: What is Archimedes' principle?

A: A body immersed in a fluid is buoyed up by a force equal to the weight of the displaced fluid.

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Unfortunately, no one was able to correctly answer all of the physics questions from the spring 2005 issue. Here are the answers:

Q: If the Universe were shrunk so that the Sun is the size of a basketball, how far away would the nearest star be?

A: It would be about 5,000 miles away.

Q: Of the nine known planets in our solar system, which one is farthest from the Sun?

A: Most of the time Pluto is the farthest, as everyone learns in school. But because Pluto's orbit is very elliptical, it is closer to the Sun than Neptune for 20 years out of every 249. This last occurred between 1979 and 1999.

Q: The word LASER is an acronym. What do the letters stand for?

A: Light Amplification by the Stimulated Emission of Radiation

answers...

continued on page 7

Brain Teasers

Time to brush up on your knowledge of chemistry. The first 10 readers to submit the correct answers to the following questions will receive a prize! Answers will be provided in the spring 2006 issue.

1. ***What narcotic asphyxiant is commonly used to add volume to foods such as whipped cream, potato-and-lobster foam, and chocolate mousse?***
2. ***The process of crushing sugar cubes or rubbing two pieces of milky quartz together generates light. What is the name for this phenomenon?***
3. ***What water pollutant exhibits its toxic effect by mimicking iodide in the body?***
4. ***What enzyme is used for the bioremediation of swine manure, removing its phenolic stench?***
5. ***Name the nonflammable, industrially important product that was in short supply as offshore oil platforms were shut down in the Gulf of Mexico due to Hurricane Katrina and Hurricane Rita.***
6. ***There has been a recent upswing in the illegal production of a drug using the over-the-counter decongestant pseudoephedrine as the starting material. What is the name of this drug?***

E-mail your answers to jstoudt@alb.edu or send them to Jennifer Stoudt, Albright College, 13th & Bern Streets, Reading, PA 19612-5234. You can also submit answers via the Albright web site: http://www.albright.edu/fusion/index.html