Three generations of Albright chemists investigate a new chemical reaction...
New chemical reaction leads to senior thesis & internship
Research project brings three generations of Albright chemists together

When Professor Emeritus Robert Rapp, Ph.D., recently discovered a new chemical reaction, he turned to his former student, Pamela G. Artz ’87, Ph.D., associate professor of chemistry and biochemistry, and asked her to recommend a student to assist him with this new line of research that could simplify the preparation of some medicinal compounds.

Artz immediately thought of Sherri Young ’07, a chemistry major and recipient of the undergraduate organic and analytical chemistry awards.

“Sherri is the ideal Albright student,” says Artz. “Her work ethic is tremendous. She makes her research a priority, and she works well with other people.”

Young began working with Rapp on the project, “The Rearrangement of Heterocyclic Imines,” during spring 2006. Rapp encouraged her to apply to the Center of Emeritus Scientists in Academic Research (CESAR) program at Lehigh University for a summer internship.

She was accepted into the program and received a stipend for her work with Rapp and Ned D. Heindel, Ph.D., the Howard S. Bunn Professor of Chemistry at Lehigh University. CESAR, which fosters research interaction between undergraduates and retired scientists, is the only program of its kind in the nation.

Young will present the research to the Albright community this May as her senior thesis. Artz serves as her thesis adviser. Rapp, Young and Heindel intend to publish the work in a professional journal.

The project brought three generations of Albright chemists together – Rapp, Artz and Young.

“It was a great hands-on experience,” says Young, 21, of Long Valley, N.J. “I am taking advanced organic chemistry, and most of the things we are learning I have already been exposed to.”

Young, a recipient of the Dean’s Scholarship, serves as a teaching assistant in chemistry labs, and as a conference group leader for organic chemistry, instructing younger students. The soft-spoken senior also played varsity tennis for four years, and is now working on applications to study chemistry in graduate school.

“Sherri has great potential as a scientist,” says Rapp, a full-time faculty member at Albright from 1967 through 1992, who has continued his research at Albright and Lehigh University since retiring. “She is very intelligent, but her intelligence does not interfere with her learning because she is down to earth and pays attention. She is excellent.”

Rapp says unexpected discoveries are the rewards of chemical research.

“Most of the work I do relates to medicinal agents,” Rapp explains. “In the course of carrying out synthetic reactions, we discovered this new reaction. It has the potential to simplify the preparation of some classes of medicinal compounds.”

When you swallow a prescription drug, you actually ingest a complex molecule that has been carefully designed for its new, unique function, he says. Many medicinal agents are designed to inhibit natural enzymatic processes of the body.

“Most medicinal agents are synthesized by a number of steps,” says Rapp, 76, who first discovered his love of chemistry at age 14. “Organic molecules are usually constructed in parts. This research hopefully will provide a better route to prepare one part of a complex molecule.”

Young is synthesizing a number of compounds to test the extent of the new reaction, says Rapp. Their goal is to be able to generalize about the synthetic utility for a certain class of compounds using specific conditions.

Young says it is exciting to work with senior scientists on research that has potential for advances in the field of medicinal chemistry such as anti-fungal, anti-bacterial and anti-tumor agents.

“I have learned so much,” she says. “I was able to apply all the techniques I learned during the past three years.”
“It has the potential to simplify the preparation of some classes of medicinal compounds.” — Professor Emeritus Robert Rapp, Ph.D.
ACRE on the road...

Good ideas can develop during road trips

During one long ride home from the National Conference for Undergraduate Research (NCUR) in Lexington, Va., four faculty members dedicated to the Albright Creative Research Experience (ACRE) decided they should share this exciting program with others across the country.

“We had attended a session on undergraduate research, and we realized that we do more student research than a lot of other colleges, and we do it better,” recalls Christian S. Hamann, Ph.D., assistant professor of chemistry and biochemistry. “We decided to create a bold statement that emphasized our interdisciplinary approach to student research.”

Their presentation, “Cultivating a Multi-Disciplinary Learning Atmosphere for Undergraduate Research: The ACRE Success Story,” was born.

The faculty in that car — Hamann, Stephen G. Mech, Ph.D., assistant professor of biology, David T. Osgood, Ph.D., associate professor of biology, and Lisa A. Wilder, Ph.D., associate professor of economics — contacted other faculty in the natural sciences, the social sciences, and the arts and the humanities to tell the ACRE story. Andrea E. Chapdelaine, Ph.D., associate professor of psychology and now provost, Wayne E. Vetteson, assistant professor of theatre, and Teresa Billiams, Ph.D., assistant professor of English, joined the presentation team.

They shared the ACRE success story at two national conferences in 2006; the National Conference for Undergraduate Research (NCUR) in Asheville, N.C., and the Council on Undergraduate Research Biennial Conference in DePauw, Ind.

Since the ACRE program was founded in 1997, students have completed 138 projects. Last summer, 14 students participated, the largest group in the program’s history.

“We realized that a lot of people’s ideas of interdisciplinary research are different than ours,” says Osgood, director for undergraduate research. “For example, interdisciplinarity was contained to a certain set of related disciplines, such as between biology and chemistry. Other schools did not include as great a breadth of interdisciplinary connections as we enjoy.”

For example, Darren Stoltzfus ’06 brought together physics and education during his ACRE project, “Application of Optical Tweezers to Undergraduate Education.” And Michael Thompson ’07 gained experience in both economics and political science research by completing his ACRE project, “Smart Growth in Reading, Pa.: Economic Development in the North Riverside Community.”

Other strengths of the ACRE program include close collaboration between students and faculty mentors, increased opportunities for students to publish and present research, and enhanced competitiveness for graduate school placements and jobs. Many ACRE projects, such as environmental monitoring, also offer direct service to the local community. ACRE features a competitive proposal process open to all students, stipends and free room and board during the summer or the January Interim.

Each week during the program, all ACRE students and faculty mentors meet to hear one or two students formally present their research. An interdisciplinary discussion follows. After they complete their ACRE projects, students present them to the College community in either oral or poster format. Students also regularly present ACRE projects at national conferences in their disciplines and at NCUR.

In the future, the faculty plan to seek more opportunities to share the ACRE success story at national conferences. They also hope to attract additional funding through gifts and grants, to increase stipends and the number of students who can participate.

“The multi-disciplinary nature of the program allows students and faculty to expand their experience beyond their specialization and truly incorporate liberal arts learning into their research,” Mech says. “We strive for, and I think achieve, a community of scholars which leads to a more cohesive campus community.”


...collaboration, increased opportunities to present research, and enhanced competitiveness for graduate school and jobs...
Sitting in a dugout canoe on the Amazon River, Abigail Harris ’07 casts her simple fishing rod — “a stick with a piece of string on the end” — into the water. Minutes later a sharp-toothed piranha dances on the end of the string. Lunch time.

Harris, a psychobiology and biotechnology major, experienced piranha fishing for the first time along with eight other students at the Tahuayo-Tamshiyacu Communal Reserve in Peru in July 2006. The Reserve is comprised of tropical river, lowland rainforest, wetlands and several native villages, and is located on a tributary of the Amazon River.

The journey was the capstone to the interdisciplinary course, “Ecological and Anthropological Field Study in Peru.” Taught by David Osgood, Ph.D., associate professor of biology, and Barton Thompson, Ph.D., associate professor of anthropology, the course introduced students to the basics of field studies within the anthropological and ecological disciplines. It culminated with a final on-site project on a topic of the students’ choosing that combined conservation biology and anthropology.

Albright Trustee Kathleen Grant, M.D. ’72, who accompanied the students on the trip, says she was impressed with the students’ work. Topics ranged from the effects of the zip line (a system of stainless steel aircraft cables more than 100 feet in the air that enable easy movement from treetop to treetop) on animal populations to the nutritional basis of local food. Harris’ project focused on medicinal plants in the region. Working with Chris LaLiberte ’07, the pair met with a local shaman and discovered that natives use many medicinal plants in perfect harmony with more traditional medicines.

But their learning experiences went far beyond final projects.

“It was a completely spiritual experience,” says Harris. The rainforest is an environment unlike anything in the United States, she says. “You can’t go and see it and not be astounded by it. It’s unbelievable. You realize how small you are in the scheme of things.” Harris says she also realized how powerful the rainforest is. “You have to respect that the forest knows what it’s doing. You bump into a tree with three-inch spikes once and you learn not to do that again!”

Daily activities included piranha fishing – a favorite for Harris – exploration of the upper rainforest canopy via a tandem zip line system, lowland and upland forest hikes, bird watching and visits to local villages.

Grant, who says traveling to the Amazon had been on her “to-do” list for a while, was in awe of the Amazon’s beauty. Bird watching at night was one of her favorite activities. “It was always very quiet except for the natural sounds. You’d listen to the insects and the birds, and look at the stars….I’ve never seen so many stars.”

The one thing Grant says she could have done without...the “bugs on steroids,” she jokes.

Sampling grubs, a Peruvian delicacy, was an adventure that Harris won’t miss. Although, she says, “They’re not bad, if you can just forget that they’re grubs.”

What Harris plans to never forget though are the Peruvian people who taught her the pleasures of living a simpler life. There’s no electricity and people don’t have cars, but instead, travel by canoe. “They wake up when the birds wake up and go to bed when it’s dark,” Harris says. “There’s no excess. People don’t want it or need it…and they just seemed happier.”

Surrounded by all that nature, she says, “I can’t imagine why anyone would want to live any other way.”
Outstanding mosses & liverworts

Biology professor publishes book on Pennsylvania mosses and liverworts

For students in Professor Susan Munch’s Mosses Lab, learning about mosses was sometimes a challenge, given the only book about mosses for beginners was published in 1924.

So, Munch took it upon herself to write her own book. Outstanding Mosses & Liverworts of Pennsylvania & Nearby States was published in 2006, thanks to assistance from the Pennsylvania Wild Resource Conservation Program. The book includes 50 kinds of mosses and liverworts, most of which are very common, distinctive, and large in size.

Munch’s book is geared to beginners in the field and formatted in an easy and understandable way. Small and lightweight, and just 89 pages, Munch says it’s a quick and easy read for those who don’t have the time to learn the “technical details” and is easy to carry when identifying specific mosses in the wild.

Munch’s research of mosses was conducted during different seasons and in varying conditions. Although most of her research was done in eastern and central Pennsylvania, she also used Ohio, Maryland, New Jersey and New England, and consulted with a New York botanist. Munch even served as chief photographer, while her twin brother contributed the illustrations on the inside and back covers.

“I wanted to teach about plants better, and this was a tool to do so.”

- Professor Susan Munch

In Pennsylvania, there are more than 300 species of mosses. Some of these stand out from others in forests and wetlands, and some are even located in cities. The mosses described in the book are the ones that people see most often.

Since the book’s release, Munch has given many talks on mosses and liverworts. “Because the grant was from the state, I promised to go to state parks to give talks, some of which included nature walks. Already, I’ve visited about 17 parks,” she says.

In addition to being sold at her lectures, the books have sold at nature stores and even overseas to countries like New Zealand. “People like to know what mosses are like in other parts of the world,” explains Munch. Dickinson College has purchased a copy of the book for every student in a lab about mosses.

Munch hopes that readers will come away with an appreciation for mosses, know that there are many different kinds and be able to accept them as individual species that grow and reproduce. “There was such a lack, or hole, in this area and I just wanted to fill it,” says Munch. “I wanted to teach about plants better, and this was a tool to do so.”

Brain Teasers Answers, Summer 2006

Congratulations to the following winners of the summer 2006 Brain Teasers: Karen (Mace) Bush ’94, David J. Long ’03, Lieutenant Colonel Russell M. Luck, USAF (Ret.) ’47, Mary (Chempiel) Ochs ’78, Dom Reigle ’01, Alphonse Sherkness ’01, Jason Worchel ’94

Q: Why does the pitch of wind instruments increase as an orchestra warms up? Why does the pitch of string instruments decrease? 

Hot air increases wave frequency in the winds, thus elevating pitch. Heat decreases the tension of the strings, thus lowering the pitch.

Q: How long does it take light to travel from the sun to the earth?

About eight minutes

Q: How long ago did the Big Bang occur?

13.7 billion years ago

Q: What makes the sound when a whip is cracked?

It’s a sonic boom. The end of the whip is moving faster than the speed of sound.

Q: How many types of neutrinos are presently known?

Three
Q & A with

JAMES SCHEIRER, Ph.D., PROFESSOR OF CHEMISTRY AND BIOCHEMISTRY

After 35 years of teaching on the Albright campus, Dr. Scheirer will retire at the end of the spring 2007 semester.

Q: Where were you educated?
A: I graduated from Ursinus with a bachelor's degree in chemistry and then went to the University of Pennsylvania where I received my doctorate in physical chemistry. I also did some post-doctoral studies at the State University of New York at Buffalo.

Q: When did you begin teaching at Albright?
A: I started here in 1972. I grew up in Pottstown and then went to Ursinus and Penn, neither of which were very far away. I never would have believed that I would end up this close to home.

Q: What is your fondest memory of teaching?
A: There are so many...there were lots of enjoyable classes, lots of enjoyable research experiences. Most recently I’ve been working with linking solubility to the absorption spectroscopy. This arose from a 1999 sabbatical leave where I was working on supercritical fluids using the absorption spectroscopy to estimate solubility and then when I came back from that I had five students all together work on extending that to looking at liquid solvents.

Q: What challenges does teaching present to you?
A: Dealing with varying levels of students interests and abilities has certainly been a challenge through the years. It’s interesting how different one classroom of students will be from another.

Q: What opportunities are out there today for students interested in chemistry and biochemistry?
A: The field is quite open, starting from the beginning with technician positions, through sales and laboratory research. A lot of students in the past have gone on to graduate school and gone into more supervisory jobs. We’ve had several students go on to patent law which is really a great opportunity. There are so few people out there with the technical background who also want to go on to law school. We’ve also sent many students to the pharmaceutical industry.

Q: How many students are currently in your program?
A: Between 45 and 50. It varies during the course of the year. Some people come in as Alphas, and there are other people who come in as biochemistry or chemistry concentrators, encounter their first science classes in college and decide to follow a different path. The program went through a big peak in the early 1980s when we were the only liberal arts school in the area that had a biochemistry program. This was a time when we had more than 100 biochemistry concentrators. A lot of other schools saw how successful our program was and copied it, which gave students more options of where to go, so our numbers leveled off.

Q: How has the interdisciplinary setting at Albright changed your field of study?
A: We had one of the first interdisciplinary programs on campus with the biochemistry program. We have had a tremendous number of students over the years take that and the chemistry program and mix it with other disciplines. Combinations you wouldn’t think of like biochemistry and religion, French and art. Those students have gone on to be very successful in their careers.

Q: Over the years you have seen many changes on campus. What would you say is the most satisfying change?
A: In my discipline I would say that there has been an increase in the quality of the instrumentation and the computerization of the instrumentation which has allowed for a tremendous increase in a lot of the things that we can do. To give you an example, an infrared instrument used to take 48 minutes to get a high-quality spectrum, now it takes just a couple of minutes. The instruments we have now are much more sophisticated than what we had when I came here. In addition, the computerization of data has been a wonderful thing. We had a single mainframe computer on campus when I arrived and all the information was entered from punch cards down in the basement of the library. We had a couple of rooms that were just filled with key punch machines. Now all the data is entered right here on the computer which means you can do things that are much more sophisticated, things that when I started here were research-level experiments, and now are done routinely in the undergraduate laboratory.

Q: I hear you have an interesting avocation?
A: A few years ago I became very interested in the geysers of Yellowstone. I am in a group known as the “geyser gazers.” When you get to my age you could also call us the “geyser geezers.” We go around to the geysers to see them erupt. With some of them, you can see by the level of the pool that it’s getting ready to erupt while others are predictable but within certain time frames. When we call in that a geyser has erupted, the Visitor’s Center uses that information to make the prediction of the next eruption. There are too many geysers and too few park rangers to have them waiting for something to erupt. Yellowstone has more than 60 percent of the geysers of the world.

Q: What are your plans for retirement?
A: I’m spending as much as seven weeks each summer in Yellowstone and I plan to spend a lot more time there once I’ve retired. I also plan to hike through some of the other national parks. My hobbies are photography and travel, so those mixed with the geysers will keep me busy.

Q: What’s the greatest accomplishment of your professional life?
A: I guess you could say that it’s 35 years of teaching with its ups and downs, influencing students to go on to get their doctorate in physical chemistry as well as other fields. I would guess that I have taught somewhere in the order of 2,000 students over the years.

Q: If you could give your students one piece of advice as they graduate, what would it be?
A: Keep working. This is just the start.
Time to brush up on your knowledge of biology. The first 10 readers to submit the correct answers to the following questions will receive a prize! Answers will be provided in the summer 2007 issue.

1) What is the name of the cellular “trash can” that disposes of improperly folded proteins?

2) DNA is wrapped around beads of proteins (H2A, H2B, H3, H4) called what?

3) Storage diseases (such as Tay Sachs) are caused by defects in what organelle?

4) Are tomatoes, peas and eggplants vegetables or fruits?

5) Barr bodies are found in the nucleus of what?

6) Plasmodium, the causative agent of malaria, reproduces itself in the form of which two structures?

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.

Answers to Brain Teasers - summer 2006 - can be found on page 6.