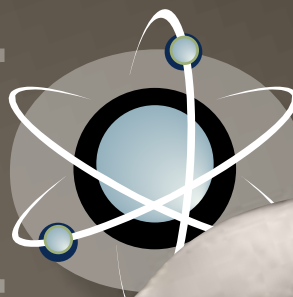


# FUSION



A PERIODIC NEWSLETTER ABOUT THE SCIENCES



## FOSTERING FERTILITY

BOB FILER, M.D., REPRODUCTIVE ENDOCRINOLOGIST AND ALBRIGHT GRAD,  
TREATS INFERTILITY IN AN EVER-CHANGING ENVIRONMENT.

### WHAT'S INSIDE...

GERALD KREIDER,  
PH.D., AND ALBRIGHT  
STUDENTS HELP  
REFINE *SALMONELLA*  
TESTING

JILLIAN BONITATIBUS '11  
AND BRYCE BRYLAWSKI,  
PH.D., DETERMINE THE  
EFFECTS OF TOXINS ON  
NORTHERN LEOPARD FROGS

ALBRIGHT KICKS OFF A YEAR-  
LONG CELEBRATION OF THE  
SCIENCES STARTING WITH THE  
OPENING OF TRUSTEE HALL

**Albright**  
COLLEGE

# jumping

into research



Jillian Bonitatibus '11 has long been interested in herpetology, the branch of zoology dealing with reptiles and amphibians. So when she got the opportunity to study them for an Interim 2010 ACRE project, she jumped at the chance. Working with Bryce Brylawski, Ph.D., she designed an experiment aimed at determining the effects of a locally available graffiti remover on the northern leopard frog, which is common to this area.

"We wanted to see if the remover had lethal effects," Bonitatibus said. "And if not, if it had sub-lethal effects like physical abnormalities, slower nerve conduction speed or behavior dysfunctions."

In keeping with the true-to-life, local applicability of the experiment, Bonitatibus and Brylawski replicated the environment around Albright's Sylvan Pond.

"We wanted to see what effects the chemicals would have in the kind of low-dosage amounts that would result from removing graffiti from the walls near Sylvan Pond," said Brylawski, assistant professor of biology. "So we calculated the volume of the pond and spray painted a piece of cement board, which is the closest we could get to the material the walls are made of. We then collected the effluent that resulted from removing a piece of graffiti."

Each day, Bonitatibus fed the effluent to a series of frogs in a range of doses. "We use frogs because they're easy to work with and you can expand it out to other animals," Brylawski said. "If something's happening to frogs it's probably also happening to fish and insects. So when you go to a watershed or a pond or a river and you see lots of frogs it's usually a sign that it's a healthy area because they're one of the weakest critters out there."

Bonitatibus also conducted behavioral testing to see if the frogs could escape predators by jumping out of the way. "A lot of these chemicals can have neurotoxic effects on the frogs," Brylawski explained. "When they're a little bit off one foot pushes harder than the other and they do a kind of J-shaped jump off to the side. Which isn't good, because when you're escaping a predator you want to jump straight and far."

## ACRE PROJECT HELPS DETERMINE EFFECTS OF GRAFFITI REMOVER ON NORTHERN LEOPARD FROG COMMON TO THIS AREA.

The pair started to identify some trends in the frogs' behavior but weren't able to draw any conclusions from their initial trials. Mostly because they ran out of time. "We wanted to do more trials," Bonitatibus said, "but we only had three weeks during Interim to do the tests and finish everything else we wanted to do."

Fortunately for Bonitatibus, she was the recipient of the first Dr. Gerald L. Kreider Student-Faculty Research Award, which was established in honor of Gerald L. Kreider, Ph.D., professor of biology at Albright. Steven L. Nack, M.D. '75, one of Kreider's former students, made a leadership gift that partially funded the award. A number of other alumni and friends of the College followed Nack's lead by making additional gifts that fully endowed the award. The amount will vary from year to year based on the balance in the account. Bonitatibus received a \$2,000 stipend and just over \$1,000 for supplies.

"The Kreider Award allows students to do an ACRE-style project but on a much larger scale," Brylawski said. "Because we're able to use some of the funding to pay the student as if they were working at a part-time job on campus, they can devote more time to their research than they might be able to otherwise."

"This type of award and the work associated with it help the student explore an in-depth question collateral to their coursework," added David Osgood, Ph.D., associate professor of biology and chair of the Biology Department. "The research gives the student valuable experience in how to do scientific research and helps them stand apart from their peers when applying to graduate schools or pursuing professional work."

"Winning the Kreider research award was a great achievement," Bonitatibus said. "The money helps me buy the supplies I need to continue this research project, which I'm passionate about. Plus, being able to say that I've won a research award is quite an accomplishment in the science world."

Thanks to help from the Kreider Award, Bonitatibus was able to extend her research to two full semesters and make it part of her senior thesis. "Having the entire fall semester and part of the next semester gives me much more time to run more trials and get solid, concrete data to analyze," she said, noting that she planned to complete the trials in the fall semester and analyze the data and write her report in the spring.

"She's ramped up the level of toxicity," Brylawski explained. "So instead of simulating the effect of removing essentially a one-square-foot piece of graffiti, she's simulating a commercial removal that would use lots of chemicals."

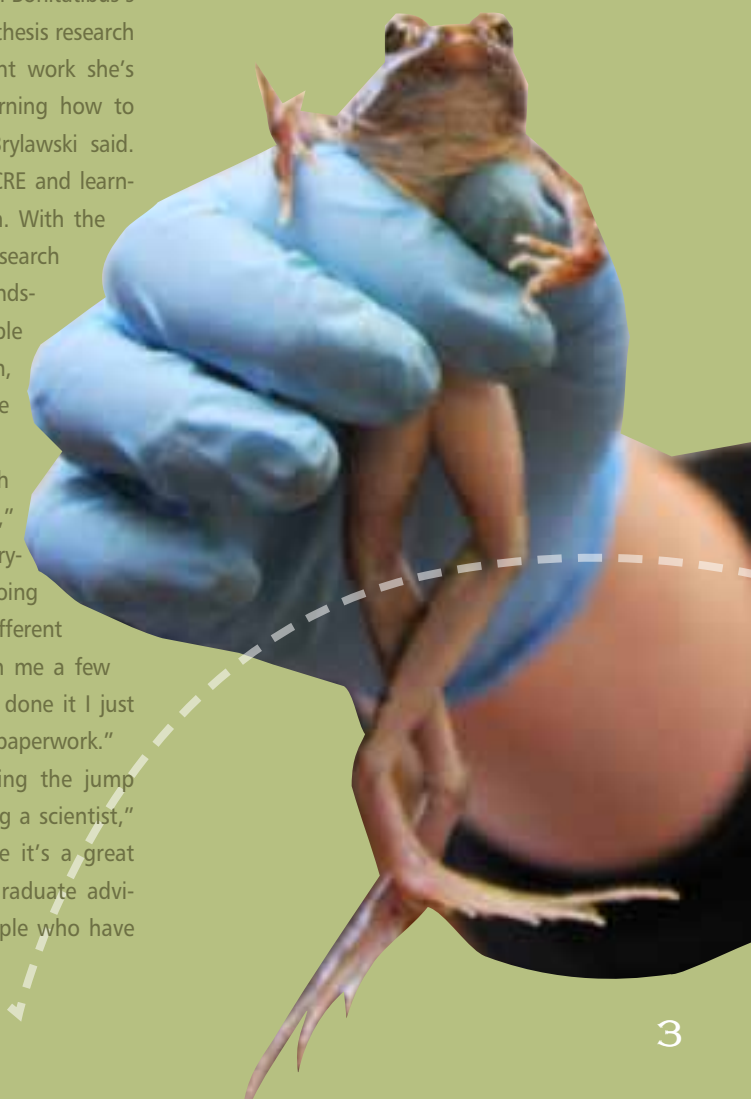
Another difference between Bonitatibus's ACRE research and her senior thesis research is the amount of independent work she's been doing. "She's been learning how to do science independently," Brylawski said. "She started off doing the ACRE and learning some experimental design. With the independent senior thesis research I'm able to take more of a hands-off approach. She's responsible for much more of the design, and I let her have more of a free hand."

"At this point in my research I'm pretty much on my own," Bonitatibus agreed. "Dr. Brylawski just makes sure I'm doing things right. It was a little different over Interim; he had to teach me a few things. Now that I've already done it I just need help with deadlines and paperwork."

"Ultimately it's her making the jump from being a student to being a scientist," Brylawski added. "Career-wise it's a great opportunity, because every graduate advisor is always looking for people who have

had research experience. It's extremely difficult to get into graduate school and become a scientist unless you've done science. The ACRE and the Kreider Award have given Jillian the chance to do some really nice research that a lot of other people don't get the chance to do."

Bonitatibus presented a poster depicting her ACRE project at the Undergraduate Research and Creativity Conference sponsored by the Higher Education Council of Berks County and held at Albright in April. She has also been chosen to present her latest findings at the National Conference on Undergraduate Research to be held at Ithaca College, Ithaca, N.Y., in the spring. ■



“IT CAN BE EMOTIONALLY DEVASTATING... A LOT OF COUPLES FEEL THAT THEY’RE IN IT ALONE. THAT PRESENTS US WITH A UNIQUE OPPORTUNITY... TO HELP THEM EMOTIONALLY AS WELL AS MEDICALLY.” – BOB FILER, M.D. ‘77

# Fostering fertility

## Louise Brown, the first child conceived

through the use of in vitro fertilization, was born in Oldham, England, in July 1978. In those pioneering days of the technique, the pregnancy success rate was around 8 percent per cycle per try, according to Bob Filer, M.D. ‘77. Last year, the pregnancy rate per cycle per try at his clinic, The Fertility Center of York, Pa., was 63.8 percent.

“A lot of it has to do with subtle changes in the techniques, the lab, the procedure itself,” Filer said. “It’s everything from what medicines we use, to how we retrieve the eggs from the woman, to what happens in the lab, to the transferring of the embryos. There have been changes that have caused dramatic increases in pregnancy rates, but a lot of them are month-to-month, year-to-year changes that improve everything over time.

“It’s constantly changing, so there are always new aspects or variations on the treatments,” Filer added. “It’s exciting,

and I don’t think I’d be happy if I was in a field where I was doing exactly what I was doing in 1987.”

A reproductive endocrinologist and the owner, president and medical director at the Fertility Clinic, Filer graduated from Albright with a bachelor’s degree in biology. He received his M.D. from Hahnemann Medical College, Philadelphia, Pa., and completed post-graduate work in the departments of obstetrics and gynecology at both Monmouth Medical Center, Long Branch, N.J., and Thomas Jefferson University, Philadelphia.

“At Albright I was interested in medicine, but I wasn’t sure which field I would end up in,” Filer explained. “During medical school, I realized that my greatest interest was in the field of obstetrics and gynecology, and I thought that when I graduated and went into my residency I would be a generalist. Then, in my senior year, I spent four weeks with a specialist and absolutely loved it. I realized that it was what I wanted to do.”

Around the time he completed his training, Filer learned that York Hospital was interested in helping a reproductive endocrinologist establish a private practice in the area. “They wanted to get someone in the field to start a practice here because their residents need to be exposed to this subspecialty in order to be certified in obstetrics and gynecology,” he explained. “There was no one else in the area performing these services, so the need was there. It would also give me the opportunity to teach residents.”

What’s more, the location was fairly close to family for Filer and his wife, Wanda D. Filer, M.D., a family physician with a practice of her own. “So everything was exactly what I was looking for,” he said.

While Filer also deals with other hormonal problems that may affect the menstrual cycle, menopause, early puberty and delayed puberty, the majority of his work at the clinic involves

infertility diagnosis and treatment. And that, he says, is a particularly satisfying aspect of his practice.

“Every couple is unique, but I think that infertility is a very difficult situation for any couple to be in,” he said. “It can be emotionally devastating and very isolating, because a lot of couples feel that they’re in it alone. They may not know other couples who are going through the same thing. That presents us with a unique and great opportunity to provide support for those couples and to help them emotionally as well as medically.

“What I enjoy the most is working with patients one on one or one on two,” Filer said. “To be able to talk to them, to understand their struggles and their pain, and to help them get through the whole process. At the same time, I want them to realize that it’s not just me. It’s the whole team I have assembled here. Everyone cares about them and is here to help them get through it.”

That includes informing patients about their options and respective chances of success. “Education is a critical part of what I do,” Filer said. “As patients come in I not only evaluate what the causes of their particular problems are and come up with a diagnosis, I also educate them about their options for treatment.”

And those options are changing all the time. “What I can offer to patients today is greatly expanded over what I could offer in 1987, when I started the practice,” Filer said.

To help them decide which course of action is best for them, Filer shares historical data with his patients. “We track success rates based on different medications or different treatments they’re going through. Most of our treatments are based on the woman’s menstrual cycle, so we keep track of our pregnancy rates per menstrual cycle of that treatment. That allows us to counsel our patients and give them realistic expectations as they start a treatment so they know what their chance of becoming pregnant that cycle is.” ■



## Students Help Refine

# Salmonella Test

One of the many things that Gerald Kreider, Ph.D., has learned in his 35 years of teaching at Albright is that the best way to engage students is to give them practical projects to pursue.

"We try to get students to work on something they see as interesting and of value," said Kreider, professor of biology. "We also want them to ask questions about the proper way to do research or how relevant the results are. If you can give them an opportunity to improve on the technique while they're at it, it makes the whole experience all the more meaningful and rewarding."

Kreider began developing one such opportunity about six years ago after attending a meeting for members of the American Society for Microbiology who teach at small colleges and universities. At these meetings, attendees describe or demonstrate lab exercises they've developed for their own students, then make them available for other educators to use as is or modify for their own purposes.

Kreider was intrigued by an exercise that determined if chickens showed evidence of contamination with *Salmonella*, not by identifying the presence of the bacterium itself, but by identifying the antibodies that chickens make when they're exposed to *Salmonella*.

"It's a peculiarity of chickens that they put their antibodies not only in their blood, but also in their eggs," Kreider explained. "I thought the technique was nice because we can extract a small amount of yolk from the egg and look for the antibodies there. Normally if I wanted to do an experiment that allows the students to see how we can detect these antibodies they'd have to find a vein, take a needle, and stick it in the animal. That's a little bit dangerous and time consuming, and not a lot of fun."

"Plus, you have to have the animals there or you have to go out to where they are," Kreider continued. "Since these antibodies appear in the chickens' eggs as well as in their blood, all

you have to do is buy some eggs. We still use a needle, but now we just poke the egg. If the chicken was exposed to *Salmonella* it will have the antibodies in the yolk."

The process Kreider took away from the conference used ELISA (enzyme-linked immunosorbent assay), a commonly used laboratory test to detect antibodies in the blood. To see if the process would be practical for use in his immunology seminar, he asked Kate Hodge '05 to run through the process as part of her senior honors thesis.

What Kreider and Hodge found is that, while ELISA is a precise, quantitative technique, it's also time-consuming. That means it's not practical for use in a lab project for students who have a limited amount of time.

So Kreider asked Diana Mendez '07, also a senior thesis student, to speed up the process by replacing ELISA with a rapid immunoblot technique. Unlike ELISA, the immunoblot process shows the reaction right away. It's not nearly as precise as ELISA, but that's just fine for Kreider's purposes.

"Our main goal was to develop a technique that's fast," he said. "The tradeoff is that it's not a quantitative test. It doesn't tell you how much anti-*Salmonella* antibody is in the egg, it just gives a yes or no answer. But if you're merely asking if a flock of chickens has been exposed to *Salmonella*, you don't need to use a quantitative method like ELISA. And it's always nice if students can do something in one lab period and see the results the same day."

After Mendez completed her work replacing ELISA with immunoblot, Kreider had a group of his immunology students evaluate it to see if they could suggest any improvements. Kreider acquired eggs from three local sources—farmers markets, several supermarkets, and a family farm. Each student looked at four eggs each from two of the three sources.

The students completed their work in one lab period. When they were finished, Kreider asked them if they had any suggestions for improving the technique in the interest of speeding it up even further. They came up with several ideas, including reducing the amount of time the eggs were rinsed from ten minutes to five. Since multiple rinses are used in the immunoblot procedure, this expedited the process considerably.

Kreider worked the students' suggestions into the lab over the weekend, then had them go through the revised process during their next lab. Among other things, they found that five minutes of egg rinsing worked just as well as ten.

"The exercise got them involved in the process of developing the lab beyond what the original people had done," Kreider said. "It also allowed them to consider the utility of the overall technique."

The new technique is practical, Kreider said, because students have time to test more eggs in a single lab session. "They can also see that it relates to an everyday problem," he said, "because there are always *Salmonella* outbreaks being reported, such as the one this past summer."

In addition, Kreider said, the experiment helps students understand the scientific process and gets them to evaluate the relevance of their findings. "The idea is for them to consider the strengths and weaknesses of the experiment and what they would do to improve it," Kreider said.

For instance, he asked them if their sample size was big enough. Their answer was "probably not," since a single egg from an individual chicken may be negative, even though the flock it belonged to was exposed to *Salmonella*. "That tells them that they need to test a certain minimum to get a valid result," Kreider said.

Kreider reported the results of the entire project to the Association of Biology Laboratory Educators (ABLE) at their annual meeting in Halifax, Nova Scotia, this past summer. ■

# Science News

## Science Center Opens

The new section of the Science Center was completed in time for the fall 2010 semester. Called Trustee Hall in recognition of the Albright College Board of Trustees' extraordinary generosity and support of the project, the new section added 41,000 square feet of space to the existing Merner-Pfeiffer Hall of Science.

Phase II of the construction—renovation of the existing building built in 1928—will be completed during the spring 2011 semester.

## Year-Long Showcase of the Sciences at Albright

Science at Albright touches every student. As a key element in a rigorous liberal arts curriculum, scientific understanding, as well as experience in scientific thinking and methods, enhances every student's ability to view the world from multiple perspectives. No matter what their major, all students sit in a science classroom. No matter what their choice of career, all students require, more than ever, an unprecedented level of scientific literacy in order to be an informed global citizen.

Now through the fall of 2011, Albright is celebrating the sciences with a number of events that include the grand opening of the Albright College Science Center, exciting research by our faculty and students, and lectures by prominent alumni and professionals.

In November, for instance, author and journalist Lauri Lebo presented a lecture, *Denying Darwin: A Discussion of Faith, Science and Deception in America*, based on her coverage of the 2004 Kitzmiller v. Dover intelligent design trial from its earliest beginnings at local school board meetings.

Lebo, who covered the trial as education reporter for the *York Daily Record*, subsequently wrote *Devil in Dover: An Insider's Story of Dogma v. Darwin in Small-town America*. At Albright, she explored both the history and the future of religiously motivated attacks on evolution and education, and discussed behind-the-scenes elements of the historic First Amendment case involving the Dover, Pa., school board.

For more information on the Celebration of the Sciences at Albright and an up-to-date calendar of events, visit [www.albright.edu/sciencecelebration/](http://www.albright.edu/sciencecelebration/)

## Class of 2014 Lends Hand

The Class of 2014 lent a hand during orientation by forming a chair brigade to move chairs from storage into the new Science Center. Not only did this save the Albright Facilities crew many hours of work, it was also a great way for the students to meet each other and begin to bond as a class.



## Two Faculty Members Join Department

Michele L. Cramer, instructor of chemistry, holds a master's degree in chemistry from the University of Virginia and a bachelor's degree in chemistry from Shippensburg University, where she graduated magna cum laude. She has also worked in industry as a consultant and senior chemist for Rohm and Haas Powder Coatings.

Helen M. Hoyt, Ph.D., visiting assistant professor of chemistry and biochemistry, holds a doctorate in chemistry from the University of California, Berkeley, and a bachelor's degree in chemistry from Knox College, where she graduated summa cum laude.

## New Marine and Aquatic Science Program

Students studying biology and environmental science who are also interested in both salt water and fresh water habitats can now enroll in the new Marine and Aquatic Science Program (MASP). This series of classes will enhance students' knowledge of biological systems and focus

their interest about water-based habitats.

In addition to the five-course sequence, students in this program are also encouraged to complete a field station experience with an approved off-campus study or research program, or participate in one of Albright's field study courses. Albright offers biology field study courses in Peru, Hawaii and the Bahamas.

Bryce Brylawski, Ph.D., assistant professor of biology, said, "MASP students will gain the knowledge and skill they need to enter either graduate school or a career in the marine and aquatic sciences." Study in this area can lead to careers in fisheries management, wetland remediation, environmental conservation advocacy, wastewater monitoring and oceanography.

## Albright Receives Grant to Upgrade NMR Equipment

Albright College has received a \$75,000 grant from the George I. Alden Trust to help purchase a top-quality, used nuclear magnetic resonance (NMR) spectrometer from Pfizer, which has been liquidating instruments obtained during its acquisition of Wyeth.

The 400 MHz Varian Unity Inova unit and accessories will be used to upgrade the limited, lower-field 300 MHz NMR currently used in the College's Department of Chemistry and Biochemistry to determine the structure of organic compounds.

Within Albright's chemistry curriculum, the NMR is used from the sophomore level on up. The extensive use of such instrumentation by the College's students often sets them apart when they interview with potential employers, participate in internships, attend graduate or professional schools, or start in industrial or research positions.

Pam Artz, Ph.D. '87, professor of chemistry and biochemistry, played a key role in the acquisition of the equipment. ■

# Albright COLLEGE

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# FUSION



## BRAIN TEASERS

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

- Q. *What element is over-absorbed by the intestine and then oxidized to the point where it poisons body tissues in individuals suffering from hemochromatosis?*
- Q. *Diabetes insipidus can result from the failure to secrete what hormone?*
- Q. *Where in the human body would you find muscles called "lumbricals"?*
- Q. *What is the function of atrial natriuretic peptide (ANP)?*
- Q. *What regions of the digestive tract are retroperitoneal?*
- Q. *What's a gomphosis?*

*Answers may be e-mailed to [rshade@alb.edu](mailto:rshade@alb.edu) or submitted via the Albright web site at [www.albright.edu/fusion](http://www.albright.edu/fusion).*

## Brain Teasers Answers, Spring 2010

Congratulations to Gary Lewis, D.O. '63 and Manish Soni, M.D. '97, the winners of the spring 2010 Brain Teasers quiz.

- Q. What non-metallic element named for an ancient Greek deity found extensive use in photocopying machines? **Selenium of the goddess Selene**
- Q. Before the development of the modern wave-particle theory of light, wherein the term "photon" has become predominant, what other terms were commonly used to refer to light "particles"? **Corpuscle and quanta of light**
- Q. Where does the PE of a spring tied in compressed state go when dissolved in acid (ideal conditions)? **The reaction produces a slightly higher temperature than for the uncompressed spring. Energy is always conserved.**
- Q. If you put your finger into a cup half full of water on a scale without touching the sides or the bottom of the cup, will the scale read a different weight? **The weight will increase. Your finger will displace water and a buoyant force will act on your finger. The reaction of this force acts on the bottom of the vessel, thus increasing the force acting on the scale.**
- Q. What are protons, the positively charged particles in an atomic nucleus, made of? **Two up quarks and one down quark**
- Q. In 2001 scientists discovered that neutrinos, tiny particles given off by fusion in the sun, can change from one type to another. What did this prove about neutrinos? **They have a small amount of mass.**