McMURRY UNIVERSITY

Not Just Kids' Play:

SNCS & the McMagnets take balloon flight to new heights

Resonance

Volume 4
August 2011

a publication of the School of Natural and Computational Sciences

SCHOOL OF NATURAL AND COMPUTATIONAL SCIENCES

McMURRY UNIVERSITY

Looking Ahead:

A MESSAGE FROM THE DEAN

Dr. Alicia Wyatt
Dean of the School of Natural and Computational Sciences

Welcome! We hope you enjoy this edition of *Resonance* as we tell the story of exciting things going on at McMurry's School of Natural and Computational Sciences.

Students and faculty alike are enjoying the recently renovated spaces in the Finch-Gray Science Center. "Opening Doors to Biomedical Research" (p. 5-6) tells the story of how one biology faculty member working with three students started the movement that resulted in the program in biomedical science these spaces were designed to sustain. Likewise, the new Physics spaces reflect the transformation needed to support the innovative thinking and student opportunities exemplified in "Flying Balloons" (p. 10-11).

From these feature stories, it should be clear that though the spaces and faculty may change at McMurry, some things remain the same. Key among them is faculty investing in the lives of students. That looks different for every department – cancer drug research in Chemistry, environmental estrogen screening in Biomedical Science, population monitoring in Biology, mobile applications development in Computer Science, the multitude of student designed projects that each Physics student completes for his or her senior capstone. In each case, a student puts knowledge and skills into action with the guidance of capable faculty. That is no different from the days of Norton Jones or Virgil Bottom. Faces and spaces and programs may have changed, but the Science Faculty version 3.0 is no less committed to student experience beyond the ordinary success in the classroom.

These new science spaces were carefully designed to promote scientific research and learning while enhancing the interaction and cooperation between faculty and students. Students in biology classes have extracted DNA, engaged in finding natural producers of antibiotics from local soil samples, and engaged with guest lecturers via Skype. Physics students have built a wind tunnel, a working hydrogen fuel cell, and launched an aerial balloon "mission" to photograph the curvature of the earth. Student research and classroom strategies for maximizing learning have definitely been enhanced by spaces that support such activity.

What are our goals? Currency, agility, student-centered learning, building external networks, and developing relationships and opportunities.

We are:

- Adding new pathways to graduate and professional schools, primarily in the areas of biomedical science and allied health fields
- Using social media and face-to-face contacts to connect prospects to McMurry and students to their future
- Building programs where students DO science, not just read about it
- Transforming curricula with a new major in information technology, a new allied-health minor, and new coursework in mobile software development, digital electronics and automated measurements
- Identifying and implementing strategies that lead to student engagement and student success through clubs, tutoring, innovative uses for technology, and highlighting noteworthy student activities.

Excellence does not just happen; it is developed through careful attention to doing the right things and doing them well. The School of Natural and Computational Sciences celebrates the success of its students and faculty, both past and present. And we are ready to meet the challenge of the future!

Highlights in this issue of Resonance are only the tip of the iceberg; there is much more to tell about what's going on here than space allows. We hope you will plan to join us at Homecoming to become reacquainted with the school you once knew and connect with faculty who are keeping the legacy of McMurry's strong science programs fresh and resilient. ■

Resonance

Resonance is a publication of McMurry University developed for the advancement of the School of Natural and Computational Sciences and for the intellectual growth of our scientific community.

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Research & Relationships

Two students bond through advanced cancer research

McMurry University students Heather Whitehead and Erica Rawls teamed up two years ago to work on advanced research aimed at finding new ways to treat cancer, and in the process, they also developed a deep friendship.

Under the direction of McMurry Chemistry professor Dr. Hyunshun Shin, Heather and Erica's honors research targeted cancer, the second most common cause of death for Americans. An estimated 207,090 new cases of invasive breast cancer are expected to occur among women in the U.S. during 2010.

Their research involved synthesizing compounds, which for two years has been the focus of their science classes. The research was specifically geared toward control of breast cancer cells but could be utilized in treatment of other cancers.

In those two years of summer research, they have synthesized two different cancer inhibitors. The two students have tested Heather's compound and found it does inhibit cancer cells.

"Besides having a wonderful time, I gained a tremendous amount of knowledge [from my research experience]," Heather said. "Most of the techniques I learned during the year in Organic Chemistry were used again during the summer with the addition of a few. This gave me a chance to reinforce what each technique was used for and exactly how it worked.

"When I was working in the lab this summer, there were six steps to synthesize the [enzyme inhibitor]. I became very dedicated to getting a pure product with optimum percent yield. I absolutely love studying Chemistry, and after having the opportunity to work in the lab, I'm 100% sure that this is what I want to spend the rest of my life doing."

Heather, from Merkel, Texas, and Erica, from Andrews, Texas, met while taking an organic chemistry class together. While working in the lab together during the summer research project, the two became close friends. Since, they have found they have much in common beyond the lab. Both women are getting married this summer to fiancés they met at McMurry, so "we even have that in

common," quips Erica.

Erica said she greatly enjoyed the time she and Heather spent in the lab together, especially as it allowed them to gain self-assurance.

"The actual work in the lab was quite fun, and I feel like I have gained valuable efficiency in many techniques of organic chemistry like TLC, Column, extraction, NMR, IR, among others," she said. "During lab, we synthesized various intermediate steps of the multi-step process to make a new oxime-functionality ODC inhibitor. The various steps were intricate and often took many hours or days, but after learning the steps first with Dr. Shin and taking good notes, we were then able to do it on our own. This sense of independence allowed us to make mistakes, learn from them, and gain confidence in our abilities."

In February 2011, Heather was invited to present a poster on her research at the Undergraduate Research Day at the Texas Capitol. The District 71 representative, Mrs. Susan King, stopped by to quiz Heather on her research. There were 81 posters from 53 schools at the event. Heather's poster, entitled Potential Anticancer Agents targeting Arginine Biosynthesis, was one of three from Abilene universities.

Dr. Shin believes that the summer research provides a laboratory experience that enhances basic science knowledge and skills and deepens students' interest in chemistry and science. In addition, it simulates the professional and personal challenges encountered in graduate schools and professional medical facilities.

The two McMurry honors students will no doubt find good use for their research experience as they both move on into graduate school at the Texas Tech School of Pharmacy in Abilene. There they will decide whether to pursue research or to move into retail pharmacy. They are thankful for their McMurry experiences. Erica is especially thankful for being able to play basketball and participate in the honors program.

"I don't think I would have had all the opportunities that I had at McMurry if I had attended another school," she said.

Heather agrees, adding, "I owe Dr. Shin a lot. She helped us prepare for graduate school by challenging us to enter our work in competitions. When we interviewed for graduate school, we had these experiences we could talk about."

Whatever path Erica's and Heather's careers take, their shared summer research opportunity served as the catalyst for a lasting friendship and a unique bond to their university. ■

FACULTY SPOTLIGHT

Dr. Gary Wilson

Professor, Department of Biology

What influenced your selection of 2010-2011 student projects? More and more evidence points to chemicals in the environment affecting the quality of human development and health. Our emphasis on public health is a natural fit to use biological indicator systems to look for such contaminants and find ways to remove them from particularly troublesome sites so that their impact on health is minimized. Tom Benoit, professor of Biology, and I can put our experience and expertise to use in guiding students to see and address this problem using the knowledge and skills they've picked up in the BIMS program.

Why is this area important for students?
Environmental chemistry impacting human health is a problem that won't go away on its own. I think the next 20 years will be a critical time in turning the tide. Understanding how to use modern tools of biology to explore the magnitude of the problem and find creative solutions to implement will equip our students to play significant roles in the effort. Having done it on a small scale at McMurry prepares our graduates to help lead the effort.

What kinds of projects do you have your eye on for the future? My next goal is to get students involved in several old projects that I've started but never completed that have to do with bacterial nutrition and spore ecology. I found long ago that the percentage of glucose in growth media influences the size of spores, and that the size of spores influences their resistance to heat, harsh chemicals, and UV light. In short, spores created in one environment are better suited for germinating in a different environment, and so this represents an ecological mystery. I want my students to solve it.

Opening Doors to Biomedical Research

No more "Closet" creatures for SNCS; Cutting-edge molecular biology program develops from humble beginnings

When April Wynn had the opportunity to conduct independent research through the McMurry Honors Program, she approached Dr. Brian Waters, professor of Biology with a specialty in plant molecular biology, to be her thesis advisor. As is typical of the nature of McMurry faculty in addressing the needs of their students, Dr. Waters worked diligently to find space, equipment, supplies, and a location for April and two other students, Drew Hillhouse and Gina Jester (now Nichols), to complete their work. Supplies and equipment were borrowed from others in the biology and chemistry departments, and the School of Natural and Computational Sciences agreed to purchase other more expensive, but necessary, equipment and supplies.

Since lab and classroom facilities were already overcrowded, finding space for students to conduct their research without disturbance over a period of months posed a unique challenge. The only space available was a small 8 foot by 8 foot room that was used as a closet for lab equipment. According to April, conducting research in the closet provided some difficulties.

"It was hard to observe our advisor/others and learn techniques because there was no space for more than one person," she said. "The lack of space meant that our plants were not grown in our lab space, and there wasn't a sink in the lab space to prep plant material. If we had wanted to attempt a different type of project or a larger scale one, we would not have been able to complete it in a timely manner."

Despite the challenges posed by "The Closet," April and her classmates were able to complete meaningful research on plant efficiency aimed at developing more nutritious crops for third world countries. Besides fulfilling the requirements for the three students' honors program, the nature of their research and the demonstrated abilities of students to conduct important research proved to be a catalyst for the biology faculty to move forward in its plans to implement a degree program in molecular biology. Student interest in pursuing careers in biomedicine and emerging career opportunities in molecular biology highlighted a void that was "begging" to be filled.

Though the need was proven and the potential for success was clearly demonstrated, plans were slowed because of the absence of faculty with a specialization in molecular biology. In 2008, Dr. Heidi DiFrancesca was hired to fill the void. Dr. DiFrancesca involved students in breast cancer research, and student interest in the new Biomedical Science degree program led to overcrowding in classes,

such as genetics. With space limitations and antiquated equipment threatening to stunt further growth, the McMurry Board of Trustees and the leadership of the Shaping the Future capital campaign included the renovation of lab and classroom space as a funding priority.

The result of the renovation of the first floor of Finch-Gray Science Center, completed in 2010, is a state-of-the-art space that provides maximum flexibility and seamless transition between lecture and experimentation by providing comfortable classroom space that also houses the highest quality lab equipment. To maximize student research opportunities, proximity locks are placed on doors to enable after-hours research, and additional spaces are provided for students outside the classrooms to set up and leave projects undisturbed through the duration of their research. Students are now able to conduct research using high-tech equipment housed in spacious surroundings in well-designed areas that are ergonomic and efficient—a far cry from "The Closet."

While an obvious enhancement to the educational experience at McMurry, the emphasis placed on molecular biology coupled with the enviable facilities will insure that all of our students, not just a few, are well-prepared for graduate and medical schools.

"Students will have more experience with the types of equipment and facilities they will be using in competitive graduate programs," Wynn said. "It will also entice more students to seriously consider research and scientific exploration as a career."

While state-of-the-art facilities do lure students and enhance the experience, April's experience indicates that other variables most certainly contribute to one's success. On track to complete her PhD in Genetics from North Carolina State University in 2013, April credits her professors at McMurry for going beyond the call of duty to insure that she was prepared for the rigors of graduate school.

"I think that the one-on-one interaction I had with faculty members and the support of the faculty and staff really gave me an advantage and a confidence in graduate school that other students did not have," she said. "My teachers worked hard and demanded much from us and from themselves."

Future research plans include developing a system for students to test the environment for estrogen compounds to better understand the proliferation of estrogen-fueled cancers, a fascinating undertaking with long-range implications for involving students in cutting-edge biomedical research. From humble beginnings in a closet with three students to a world-class program training future scientists and doctors, McMurry is committed to using this program as a vehicle to change lives and impact the world.

"The research conducted by three students in 'The Closet' planted the seeds for the Biomedical Science program, the new teaching and research spaces, and a new approach to teaching that insures every student gets to experience the way science is done and discoveries are made." said Dr. Gary Wilson, professor of Biology. "I doubt many college programs anywhere are as intentional in this as we are at McMurry." ■

FACULTY SPOTLIGHT

Dr. Robert Watson

Chair, Department of Computer Science

What influenced your selection of 2010-2011 student projects? The rise in popularity of Android powered phones. This year several of the students own an Android phone. That probably wouldn't have been true last year. I like giving students the opportunity to propose their own projects. I believe this greatly improves students' interest in the course because it makes the course more relevant to the world outside of my classroom. The lab manager project fit this goal perfectly because the student applied the phone he already owned to address the needs of his work in another department.

Why is this area important for students? First, it shows students that what they have learned at McMurry is current. Second, it is the next step in their transition from theory to application. Third, it is an opportunity to teach problem solving techniques on projects that are less constrained than typical course projects. Lastly, it validates what I hope was their initial assumption about Computer Science—it is fun!

How do you tie student projects to your own research interests? We have contemplated a course such as this for some time. It wasn't until I began to create mobile applications for my own work that the course became a reality. Because my work gave me some familiarity with the Android platform, I didn't need to rely on highly structured course content. I was able to let the students and their projects guide our discussion.

Mobility Matters

Computer Science Department Initiates Android App Development

By Dr. Robert Watson

Mobile devices have been growing rapidly in their importance in almost all segments of our society and economy, and for good reason. Often, technological advances bring new burdens for users. Mobile devices are different because they bring together familiar technologies in an ultra-portable form. When combined with a cell phone, they reduce the number of items the user must carry, instead of increasing them. With no increase in "things", the user gains significant computing capability everywhere, all the time, complete with Internet access.

Mobile devices are realizing some of the goals of "ubiquitous computing", a vision of technology where we are surrounded by computer enabled devices that support our lives routinely and unobtrusively. To accomplish this vision, we must rethink what computing means. When you can hold so much power in your hands and carry it anywhere, what should it do? Many answers have been found, but many more remain to be discovered. The students in our mobile applications class have contributed a few answers of their own.

Why teach app development? Students can write mobile applications that have real-world utility, essential in building a sense of relevance for the discipline. Students have the opportunity to apply many of the often abstract concepts they have been taught in other courses. In this way, the course has the feel of a capstone course but in a less formal setting.

Mobile devices are very much the current "big-thing"

for software professionals. They represent opportunities for our graduates and an attraction for prospective students. Students are exposed to a technology that is attracting much attention from the industry. We have seen an increase in solicitations for job candidates that include mobile development as a desired skill.

What next? I intend to revisit this subject in the near future, either in the same format or with changes. We may possibly emphasize local communications (i.e. Bluetooth) because I believe these devices have great potential as a rich user interface to tiny cost sensitive embedded devices. This is similar to the OnStar application that lets car owners manage their car from their cellular phone, except that there is no monthly fee and it works with any machine, even your lawn mower!

About the Course

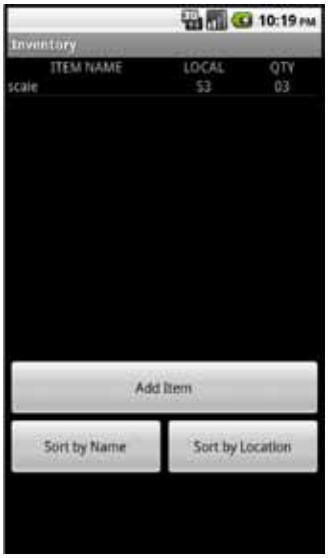
The CS department chose Android for its teaching platform. Android is representative of the mobile application platforms available today—cell phones as well as tablet devices. Android devices account for a large share of the mobile device market, and experience on this platform should serve the students well.

The course teaches students to recognize the role that mobile devices can play in a user's life. They learn about the modes of interaction that are employed by mobile devices, which are often very different from what they use with larger computers.

Because this is an upper level course, special emphasis is placed on teaching students how to gather the information they will need to write applications on these devices. Students work outside the classroom, and instruction becomes a process of mentoring students through their projects. Time in the classroom is used to collaboratively solve the particularly difficult problems that are encountered, discuss project designs, and evaluate progress.

Student Projects

GPA Calculator - Developed by Janne Herfurth
Janne is a student and alumnus who audited the course and works in the registrar's office at



McMurry. Part of her job requires frequent calculation of grade point averages. While this seems like a simple enough task, GPA values can be computed in different ways when used for different purposes. When courses are transferred from other institutions, institutional variations must be taken into consideration. Her term project was a GPA calculator that computes values using the criteria adopted by McMurry. The resulting application is not only useful in her daily work, but can be made available to students to assist in computing their own GPAs.

Lab Manager - Created by Michael Herriage
This application is used to manage equipment and supplies in a science laboratory. It manages an inventory database, listing all available materials with quantity on hand and location in the stockroom. The application can be used to check and update inventory levels and assist in locating items in the stockroom. Planned features support reordering supplies and coordinating lab prep work between instructors and assistants.

Auction Client - Developed by James Freiheit
This application was suggested by the West Texas Rehabilitation Center for their annual telethon. They currently have a website that can be used to view and place bids on available items. A mobile application can provide a richer user experience than is possible with a web page. An application prototype was created that can display items in the auction, search available items, place bids and track bid status.

Arithmetic Calculator - Created by Casey Tindall
A traditional four function calculator in a form suitable for use on a smartphone.

Statistics Calculator - Developed by Josh Parks
This application allows the user to enter a list of numbers. It then displays a variety of statistical properties of the list. Unlike ordinary hand-held calculators, the user can edit the list of numbers after they have been entered. This is an example of how mobile devices can improve existing solutions. ■

Sam Spence

Paying it Forward

Longtime Abilene dentist Sam Spence credits McMurry University with preparing him for a career in dentistry. He returns that favor by helping McMurry students to explore their options in dentistry through an internship program.

Intern Kenna Cornelius

Dr. Spence, an Abilene resident, came to McMurry in 1973 from Abilene High School and majored in biology. He also worked part time to pay for college. He especially remembers his professors and how they helped prepare him for dental school.

"In biology, we had Dr. Beasley, Dr. Pilcher and Dr. Moore, and in chemistry we had Dr. Jones for lab and Dr. Klassen for lecture," Dr. Spence said. "Dr. Sonntag was a really good professor. They all got me ready for dental school."

After McMurry, Dr. Spence attended the University of Texas Dental Branch at Houston and then returned to Abilene to set up his practice in 1981.

Dr. Spence has remained a great friend to McMurry through the years, providing affordable dental services to many faculty, staff and students. He also has provided apprenticeships for student interns to help them decide if a career in dentistry is what they want to pursue. Some, like Ryan Higley and Amanda Copeland, did indeed choose dentistry as a career, while others decided to follow different paths.

"It's similar to a work program," Spence said. "They learn a lot, assisting me and running the front desk. They get a good feel for what's going on here. Combining that experience with McMurry's preparation helps students get ready for dental school or other pre-professional programs. It teaches them how to learn, how to get it done."

Through his connection to McMurry with his wife Ann, a longtime professor and administrator, he gets to know the students a lot better than some would.

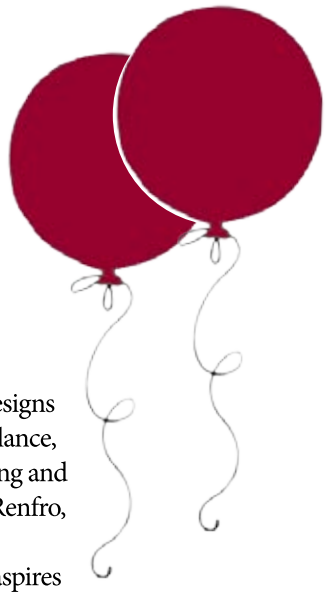
"I think that's what makes it a lot more fun," he said.

Currently, McMurry student Kenna Cornelius is working in Spence's office as an intern. Dr. Spence plans to continue his internship program assisting McMurry students to prepare for their future. It is his way of giving back to the University that helped him prepare for his future. ■

Are you interested in offering student internships at your business or organization?

Contact Alicia Wyatt at (325) 793-4748 for details.

Flying Balloons



Not Just Kids' Play

The presence of the 5th Grade Math and Science Magnet School on the McMurry University campus for the past three years has proven to be a win-win collaboration for the university community as well as the Abilene Independent School District. Students entering a career in education have a perfect lab experience for honing their craft within the borders of our 40-acre campus, and the benefits for the McMagnets (as the 5th graders are affectionately labeled) is access to state-of-the-art facilities and faculty resources, as well as exposure to a higher education environment. Faculty in all disciplines have utilized the interaction with young protégés as a proving ground for their students to test theories and reinforce and accelerate the absorption of information. Nowhere has this phenomenon been more evident as in a recent experiment conducted jointly by the McMagnets and the Department of Physics.

The Society of Physics Students (SPS) presented a proposal for a hot air balloon launch and the project was approved and paid for through grant funds awarded to the Magnet School. They then approached students in the School of Education to develop lesson plans appropriate for teaching concepts of physics to McMagnets. Included in the curriculum were principles such as the Archimedes Principle, asserting that when gases of differing density are present together, the lighter density rises while the heavier density sinks. Also included was the Bernouli Principle that affirms that low pressure occurs the faster that air flows over the surface of an object. When air moves slowly over the surface of an object, high pressure results. This theory is evidenced by the ability of an airplane to fly.

Teaching advanced theories of physics to 5th grade students proved to be challenging for the college students. According to Ms. Sharlyn Bammel, Magnet School teacher, "The students had a tough time bringing the concepts down to the kids' level, but getting them to give examples helped the kids to understand."

While SPS continued to test the balloon launch process, the McMagnets undertook the task of building gondolas to attach to the balloon. They learned about geometric nets, that is, the graphic representation of a "flattened out" three dimensional object. Their research of various designs allowed them to wholly participate in the scientific process of testing theories and trying out ideas.

"They tested how much wind the designs could withstand, and they also tested balance, weight and strength—all basic engineering and aerodynamics principles," said Dr. Tim Renfro, professor of Physics.

Isaiah Martinez, a McMagnet who aspires to one day become an architectural engineer, asserted that "the sleek rounded design is better, and it moves faster, like a Corvette."

After weeks of research and preparation, students were ready to launch the balloon apparatus, which included a balloon filled with helium, attached to a gondola containing an insulated camera. The balloon was attached to a fishing line, which was released gradually from a fishing rod. Colored ribbons were tied on the line every ten feet to allow students to monitor altitude. Even though there appeared to be minimal wind on the ground, the balloon and gondola took a beating at altitudes of 500 feet.

"I learned that wind currents are always greater in the air than on the ground," said McMagnet Jolee Lane.

Despite wind challenges, the camera photos were clear enough to show the curvature of the earth, a discovery that students found fascinating. Dr. Renfro commented that "students were surprised at how much different the campus looks from the air than on the ground, and there were a lot of mesquite trees."

The first McMurry/McMagnet balloon launch was deemed a success, and plans are already in the works for next year. Dr. Renfro hopes to purchase a high altitude balloon capable of altitudes of 24,000 feet. Included on the gondola will be a GPS to track its location. Then, when the balloon pops at a high altitude, a parachute will deploy to bring it safely back to earth. He believes that "interest in balloon flight will continue to increase because of the expense of rocketry."

In the meantime, Ms. Bammel looks forward to a new year with a new class of McMagnets and is confident that this class will love McMurry as much as the classes before them.

"They are treated like adults in many ways," she said. "The technology available to them is invaluable, and their interaction with faculty and students here make them feel important."

Expectations for the future of the 5th Grade Math and Science Magnet School are high—higher than a hot air balloon. ■

SPS members prepare the hot air balloon for flight as McMagnets build gondolas to attach to the balloon. The gondola project was built into their fifth grade curriculum to teach them about the physics theories behind the balloon launch. Once in flight, the balloon reached 500 feet into the air and took photos of the curvature of the earth.

SNCS Students Complete Summer Research

Sponsored by the Welch Foundation

For many years, our students and their faculty supervisors have tackled research projects during the summer months. This year, they are working to unravel some of modern medicine's most vexing problems—fighting cancer and "superbugs".

Nathan Worley - *From Artesia, NM*

Working with Dr. Ed Donnay

Chromium Polypyridyl Complexes: Nathan's research project is to synthesize and fully characterize chromium polypyridyl complexes that contain acidic or basic functional groups for possible future use in photodynamic therapy. Photodynamic therapy, or PDT, is a cancer treatment method that involves damaging DNA by using light and a photoactive compound. Only those cells that are exposed to a certain wavelength of light are damaged, allowing the therapy to be targeted to only tumor cells. Chromium polypyridyl complexes are known to have desirable and tunable photochemical properties and can bind DNA strongly depending on the structure of the polypyridyl ligands. This project is in its second year.

Tara Williams - *From Ballinger, TX*

Working with Dr. Hyunshun Shin

Metabolic Polyamine Biosynthesis: Tara is synthesizing new analogues of polyamines. While specific types of cancer can vary dramatically with respect to cell type affected and tumor physiology, one property of all cancer cells is unregulated proliferation. Evidence suggests that tumor tissues have significantly higher polyamine levels than surrounding tissues and polyamine analogues have considerable activity against many solid tumors, including breast cancer.

Jonathan Urbanczyk - *From Abilene, TX*

Working with Dr. Hyunshun Shin

Gram-Negative Bacteria: Jonathan is returning for a second year of research. His project is centered on the discovery of a potential antibiotic against a wide range of Gram-negative bacteria. The evolution of resistance toward commercially available antibiotics results in constant and serious problems in the treatment of infectious diseases, such as septic shock, or a strain of *Pseudomonas aeruginosa* in cystic fibrosis patients. It is necessary to develop a new generation of antibacterial agents. He is designing and synthesizing small molecules, which are potential antibiotics based on structure-activity relationship studies. His poster, "Synthesis of Analogues with Phenanthroline Functionality Targeting Biosynthesis of Lipid A in Various Gram-negative Bacteria", has been accepted by the Division of Medicinal Chemistry for the technical program of the 242nd ACS National Meeting, to be held in Denver, Colorado, Aug. 28-Sept. 1, 2011.

Amanda Gensling - *From Lakewood, NM*

Working with Dr. Hyunshun Shin

Cancer-Fighting Drug: Amanda's research project is focused on the discovery of a potential drug against cancer. Her aim is to design and synthesize inhibitors of an enzyme called ornithine decarboxylase (ODC) which has become increasingly recognized as a potential key target for tumor or cancer therapies. Studies have shown that ODC inhibitors decrease the proliferation and growth of breast cancer and various other tumor cells. Her research efforts on new proposed compounds should be a promising development in anticancer agents on a wide variety of different cancer cell lines.

Oluwatoyosi Adewunmi - *From Humble, TX*

Working with Dr. Ed Donnay

Chromium Polypyridyl Complexes: Toyosi's research project involves separation and resolution of chromium polypyridyl complexes via High Performance Liquid Chromatography (HPLC). Identifying synthesized chromium compounds is hampered because there are few analytical techniques that work well. Furthermore, many chromium polypyridyl complexes are produced as racemic mixtures, meaning they contain equal amounts of "left-handed" and "right-handed" versions of the compound. Resolving the two versions is a difficult and time consuming process. The use of HPLC with a chiral stationary phase should allow for a simple direct means to identify how many different complexes are in a sample as well as to resolve the different versions formed.

McMurry's Natural Legacy

Natural history collection storage facilities prior to the 2010 renovation of Finch-Gray Science Center.

By Dr. Joel Brant

Wrinkling her nose as she removes another toad from a jar, Cassi Stapp, senior Life Science major, examines the animal for diagnostic characters to determine its species identity. Based on the toad's relatively indistinct cranial ridges and crescent shaped tubercle on its foot, Cassi identifies it as a Texas toad, *Bufo speciosus*. This specimen is one of several collected from a tank adjacent to US 277 on July 18, 1959, and it has spent the past 50 years residing in McMurry University's natural history collections.

Established in the late 1950s, McMurry's natural history collections serve as a teaching/reference collection to supplement botany and zoology courses. Throughout its history, the Biology Department at McMurry University has prided itself on the ability to instill in its graduates an appreciation for the grandeur of the natural world. The collections provide an avenue to explore local and exotic biodiversity. It's one thing to talk about the diversity of life; it's another to have examples for the students to handle and experience. The natural history collections are essential for hands-on educational experiences prized by our students and faculty.

In addition to their educational benefits, natural history collections serve as an archive for the natural world. In a dynamic world where a species' geographic range is constantly fluctuating in response to environmental variables, a voucher specimen provides a reference for the presence of a species. Natural history collections ensure the scientific integrity for the disciplines of ecology, biogeography, systematics, and taxonomy by preserving the raw data these studies are based on and making them available for other researchers. Currently, the collection holdings focus primarily on the Southern Rolling Plains (Abilene and surrounding areas). The specimens housed at McMurry reveal biological patterns for the Southern Rolling Plains during the past half century. Combined with the ongoing research activities of our biology faculty, McMurry students have the ability to ask long-term ecological and environmental questions.

By the mid 2000s, the "dry" collections (mammals, bird, insects, and plants) were in desperate need of restoration, and substantial improvements needed to be made to the storage capacity for specimens. This summer, the Biology Department has invested $5,400 to improving the "wet" collections (invertebrates, fish, amphibians, and reptiles).

What's next? Thanks to the improvements to facilities, cabinets and containers, the natural history collections have been rehabilitated. Now it's time to modernize them. The goals for the future include digitizing the collection catalogs to improve their utility and searchability, expanding the collection holdings to make them more comprehensive taxonomically, and supporting undergraduate research in biology. Achieving these goals will increase the likelihood that, in another 50 years from now, students like Cassi will continue to utilize these collections for research and learning, thus ensuring McMurry's natural legacy. ■

Dr. Joel Brant, assistant professor of Biology, and Cassi Stapp study Texas toads in the lab. These toads are part of McMurry's extensive, newly rehabilitated natural history collections, which have been housed on the McMurry campus for more than 50 years.

Building Connections

Social media and networking applications—Facebook, Twitter, YouTube, the "blogosphere"—are frequently in the news! The School of Natural and Computational Sciences uses some of these tools to inform and build connections between students, faculty, alumni, and interested netizens.

There are several SNCS Facebook pages. Want to keep up with the latest from the school? "Like" the page for the McMurry School of Natural and Computational Sciences. Interested in the Biomedical Science program? Do a search for McMurry Biomedical Science Program. Join the McMurry Society of Physics Students for news and photos of activities.

Two blogs provide information about the latest activities and successes for the SNCS community. The Biomedical Science Program blog (*www.mcm.edu/~wyatta/wordpress/*) is authored by Dr. Gary Wilson. Visitors come from all over the world. Dr. Wyatt publishes the main SNCS blog (http://blogs.mcm.edu/sncs/), chronicling school-wide happenings. Both blogs also publish to Facebook pages, so subscribe to the RSS feed or "Like" a page or two. We'd love to have you join us! ■

Join our Family Tree!

The Alumni Board is working to deepen relationships between students and alumni through a new program, The McMurry Family Legacy Network. This effort pairs alumni with new students to help shape their McMurry experience and their future.

To learn more about the McMurry Family Legacy Network and how you can make this a year to remember for yourself and a McMurry student, go to:

www.mcm.edu/newsite/web/univ_relations/legacy_network.htm

For more information, contact Josh Poorman at (325) 793-4608 or *poorman.joshua@mcm.edu.*

CONNECT WITH SNCS

Want to connect with SNCS? Join us on Facebook!
Name: McMurry School of Natural and Computational Sciences

For direct access, use a QR code reader on your smart phone to scan this code:

What is a QR code?
QR Codes are square barcodes that hold a URL and can be attached to a location or object—think window decal, postcard, t-shirt, signage—and link to web accessible content. To view a code's content, you must install decoder software on your smartphone or tablet. The camera on your device scans the code, and the decoder translates the barcode into a URL that can be loaded into a browser window.

SCHOOL OF
NATURAL AND COMPUTATIONAL SCIENCES

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