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As you might expect, this issue of *Research* is dedicated to the outstanding research and scholarship occurring daily across the Baylor campus. This is certainly nothing new since every issue of *Research* carries this message. What is different about this particular issue is that it is focused solely on the research conducted by our faculty with their *undergraduate* students.

The first imperative of Baylor 2012 calls for the creation of an environment where learning can flourish. Baylor has been creating such environments on a daily basis for more than 160 years. Although Baylor has always been known for providing an outstanding undergraduate education, less recognized is the fact that Baylor faculty have long incorporated research and scholarship into the classroom in order to provide their students that outstanding undergraduate education. As you can see in this issue, our students continue to be

Baylor's most important report card, routinely entering the world's top graduate programs and becoming outstanding leaders in their respective fields.

As always, *Research* can relay but a few of Baylor's success stories. I invite you to contact me to learn more or visit our website at www.baylor.edu/research for additional details.

Dr. Truell Hyde
Vice Provost for Research

As VPR, you have the big picture of research at Baylor. How does undergraduate research fit into that picture, and why have you chosen to devote a full edition of *Research* to undergraduate research?

At Baylor, excellence in both teaching and undergraduate research was occurring long before I arrived on campus! This long-standing tradition has been strengthened with the advent of Baylor 2012 and the enhanced scholarship opportunities it offers our undergraduates. I can think of no better way to continue to strengthen the learning environment than by promoting learning within a research setting. An undergraduate working with a faculty mentor within the area of scholarship of most interest to him or her, receives the full attention of that faculty member. The resulting focused educational experience provides the student the absolute best education Baylor can deliver.

This issue of Baylor *Research* is dedicated to undergraduate research because I agree with those who have gone before me: undergraduate research is essential to the Baylor experience and integral to the commitment we make to provide our students a world-class education.

Are there special elements in the research environment at Baylor that facilitate undergraduate research?

Absolutely. Baylor faculty have always spent a large amount of their time interacting with undergraduates. In fact, Baylor is known as a wonderful undergraduate university primarily because the faculty care so deeply for their students. This same drive provides our students a wonderful research environment. Baylor undergraduates are taught by senior faculty and through them, exposed to the cutting-edge of their disciplines. It's routine to find undergraduates in research labs, studios or classrooms, interacting as colleagues with graduate students and faculty. Through these experiences, our students find that Baylor faculty are not only willing, but eager to share their scholarship with their students.

What's exciting to me is that this is true across campus. Everywhere you look, you'll find faculty pouring their time into one-on-one scholarship relationships with their undergraduates. The examples of this that spring to mind are limitless. Suffice it to say that students within departments in the College of Arts & Sciences or the Honors College as well as the Schools of Business, Education, Engineering, Music, Nursing and Social Work are all routinely involved in research. The enormous amount of time our faculty devote to their students in this manner serves to prepare them to enter the professional community as scholars in their respective disciplines.

How specifically does participation in research help prepare Baylor students for success in their chosen fields?

I think this is an important and interesting question. Let me answer in part with an example. When I go to the doctor, I certainly don't want someone who's never been involved in research making my diagnosis. There's a reason the best hospitals in the world are research hospitals. The research experience provides students the ability to operate in an inquiry-based, problem-solving, collaborative fashion. In my opinion, this is one of the most important skills that can be acquired during a student's career.

What people often do not recognize is that research is important across *every* academic discipline, not just the sciences. A student involved in faculty-led scholarship in *any* department will learn at a minimum many of the critical thought processes and writing skills essential to their success in later life. And usually they learn a great deal more.

How does your office encourage and support undergraduate research at Baylor?

The Office of the Vice Provost for Research supports undergraduate research in a variety of ways. Every internal grant awarded through the office encourages undergraduate research as a vital component of that award. Over the past two years, we've also established the Undergraduate Research and Scholarly Achievement (URSA) program, which provides financial and logistical support specifically geared toward widening the undergraduate research experience across campus. For example, URSA provides small grants designed to provide funding for extended undergraduate research experiences with Baylor faculty. URSA is also responsible for the Undergraduate Scholars Week, where undergraduates across campus present their research findings, posters and papers to their peers and Baylor faculty in a conference setting. One of the wonderful things about Scholars Week is that it not only showcases the quality of our undergraduates, but that it also provides everyone involved, both students and faculty, a broader window into the scholarship going on at Baylor.

Teaching without bounds

Dr. Stephen Davis,
the 2008 recipient of the Robert Foster Cherry Award for Great Teaching, incorporates research and scholarship into every one of his classes.

The Cherry Award is the only national teaching award presented by a college or university to an individual for exceptional teaching. The prestigious biennial award comes with a \$200,000 prize to the recipient, as well as \$25,000 to the recipient's home department.



Baylor students, faculty, staff and the community benefit by having the winner teach for an entire semester in-residence.

Davis, distinguished professor of biology at Pepperdine University, says earning this award helps promote the concept of undergraduate research as a form of teaching.

One of the things that set Davis apart from the other finalists was his ability to integrate research and scholarship into his classroom so seamlessly.

"The applicant pool for the 2008 Robert Foster Cherry Award was outstanding..." says Dr. Heidi J. Hornik, professor of art history at Baylor and chair of the Robert Foster Cherry Award Committee. "The Cherry Award committee was greatly impressed with Dr. Davis' ability to integrate superior teaching with undergraduate research techniques in the classroom."

Davis ensures his students have opportunities to participate in research from the onset of their college experience.

"Research is beneficial in problem solving, regardless of the academic field," says Davis. "Through research and scholarship, you learn that not everything is in the textbook and that not everything is known. What's exciting about this is that there is a place for students. Students should not be forced to participate and contribute in research, but it should be an option for them starting their freshman year." Davis believes that a university is doing a disservice to students if it does not afford them opportunities to participate in research as undergraduates.

When students are exposed to research, they begin to take pride in their academics and the research project assigned. In addition, it benefits the field of study. Davis believes students have an advantage because they bring an unbiased opinion to the scientific table and can sometimes see things that professors or scientists may miss because of their knowledge base. "I learn continually from my students and the new things they discover and find," he says.

“Research is beneficial in problem solving, regardless of the academic field,” says Davis. “Through research and scholarship, you learn that not everything is in the textbook and that not everything is known.”

“And it’s not just me. When my students submit their findings, the entire scientific community learns from them.” In fact, at the beginning of every semester, Davis tells his students that he fully expects to learn from them through the research they are going to conduct together.

In addition to exposing undergraduate students to research, Davis also shows genuine care and concern for them. “Through his introduction of undergraduate research to us, Dr. Davis made sure he connected us to other [professors] in the Baylor sciences through our research with the goal of providing networking for future research opportunities and useful connections,” says Rafael Torres Gutierrez Jr., freshman social work major. “In fact, many of my classmates, including myself, have been offered opportunities for undergraduate research as a result of his effort.” Even if a student was not a biology major, Davis made sure to connect with them.

Gutierrez says Davis made him feel valuable in his class and that it was clear he genuinely cares for his students. “I think this was because he made his students feel a sense of worth by constantly building us up and encouraging us to pursue our individual vocations. ... It was an honor to have been his student.”

Davis’ classes stand out to his students as more than academic requirements to earn a degree. Senior biology major Frank Booc says that, “Dr. Davis’ class was much more engaging than previous lecture courses. Both the graduate and undergraduate students actually contributed to the integration of innovating science with freshman

opportunities.” The premedical student also notes that taking Davis’ class was a privilege.

To Davis, research is not just an exercise, it is life and is continually evolving. He encourages his students to think beyond their textbooks and search for ways to advance their fields of study. “I communicate to my students that I am not the center of knowledge



and neither is the textbook,” he says. Davis says that the focus should always be on what you are studying, the mystery behind a discipline and the fact that knowledge is limitless.

“Research and scholarship know no bounds,” says Davis.

And neither does Davis’ classroom.

Preserving history and creating a future

A chance meeting between two music students and an anthropology professor led to the trip of a lifetime to Guatemala for a clarinet and saxophone player.



Economic changes are forcing the younger generation to leave their communities to find work, says Cook. He wants to record and preserve as much of the surviving Mayan religious tradition as possible.

Chase Peeler and Robert Moore sparked a friendship their freshman year when they both realized they were interested in ethnomusicology, the interdisciplinary study of music-making activities from all over the world. Since Baylor does not offer an ethnomusicology degree, both decided to add anthropology minors to their academic aspirations, with the intent of studying ethnomusicology in graduate school.

Peeler, a 2009 applied music major with saxophone emphasis, says he met Dr. Garrett Cook, professor of anthropology, when he was referred to Cook to discuss his educational interests.

"When I met with Dr. Cook and expressed my interest in ethnomusicology, he immediately recruited me for the research in Guatemala," says Peeler.

Cook says his research is dedicated to understanding how culture is changing in the highland Mayan town Santiago Momostenango, where he has worked since the mid-1970s. He created the Baylor Anthropology Field School in Guatemala in 1990 and Dr. Tomas Offit, assistant professor of anthropology, has been working with Cook since 2005 to further develop the field school.

Economic changes are forcing the younger generation to leave their communities to find work, says Cook. He wants to record and preserve as much of the surviving Mayan religious tradition as possible. The music and other traditions aren't being passed down from generation to generation, and the younger age group has little in common with the lives of their parents and grandparents. Cook had some recordings of the dance-dramas of the Momostenango from the 1970s that he wanted to get analyzed. He asked Peeler if he was willing to listen to the recordings and attend the field school, and if he knew of anyone else who might be interested in the project.

Moore, a 2008 music education major with clarinet emphasis, worked with Peeler throughout the spring 2007 semester to prepare for the month-long field school the following summer. The two learned the chirimia, an instrument used in Guatemalan music, purchased and learned how to use

music recording equipment, and listened to and analyzed Cook's recordings from the 1970s.

While in Momostenango, the pair arranged two formal recording sessions. One session recorded two elderly musicians who played music for the "Monkeys Dance", and the second session recorded two other musicians who played the "Conquest Dance" music.

Once field work was complete, Moore and Peeler spent an additional semester analyzing and translating their recordings. "When we got back, we analyzed the form of the music and looked for the interaction between instruments," says Moore. "We also looked to see if the dancers took cues from the musicians and looked to see how the different musical phrases were put together."

In addition to their analysis, Moore and Peeler ensured the Momostenango music will always be preserved. "All of this music has now been archived at Baylor as part of the beginning of the ethnomusicology program at Baylor," says Cook. "Without Robert and Chase, we would have lacked the technical ability to record the traditional music that is in danger of disappearing with the death of the living generation of elderly musicians and ritualists."

Cook and Offit also included Moore and Peeler's analysis of the "Monkeys Dance" as an appendix to their electronic monograph on the dance. The Foundation for the Advancement of Mesoamerican Studies, Inc. has published the video and report, with a fully-attributed section by Moore and Peeler, on their website.

The undergraduate research experience was a first for both musicians. "My experience in Guatemala allowed me to see how research is actually carried out," says Peeler. He also says that the experience opened his eyes to the difficult and sometimes frustrating field work process. "It takes a lot of patience to make sure that the information you are recording is

accurate. Anything less would be a disservice to the academic community as well as the people you are studying."

The research experience has helped both Moore and Peeler in their academic and future professional pursuits.

"I took many things away from my research experience in Guatemala," says Peeler. "Perhaps one of the most worthwhile was simply getting to experience field work firsthand. Ethnomusicology is a demanding profession, and getting to experience it in an international context solidified my desire to pursue it as a career."

Moore also went on to present a paper he wrote describing the ritual practices and attitudes surrounding the traditional music in Momostenango at the June 2008 Canadian Association for Latin

American and Caribbean Studies. "I wrote the paper myself, but I received a lot of help and input from Dr. Cook, Dr. Offit and Dr. Alfred Colman," says Moore. In 2007, Colman joined the Baylor faculty as an assistant professor of musicology and ethnomusicology.

The mentorship Cook and Offit gave Moore and Peeler was frequent and appreciated. "Dr. Cook was always open to meet with us and he gave us direction whenever we needed it," says Moore. "I can also tell that he is genuinely concerned with what direction I am going to take in life."

So, what will a music degree and anthropology minor allow Peeler and Moore to do after graduation?

Moore received a Fulbright Scholarship and is studying music

education in Kathmandu, Nepal. He desires to continue his graduate studies in an international education upon completion of his Fulbright studies. Peeler has been awarded a graduate teaching assistantship in the ethnomusicology program at the University of Colorado at Boulder.

The lasting impact that a chance meeting had between two music students and the anthropology department will be remembered forever.

A culture's dying traditions have now been preserved.

And Moore and Peeler are following their dreams.



If you spot a child wearing sunglasses attached to a seven-foot fabric elephant's trunk on your next zoo visit, please do not call security. It is not a prank by mischievous kids.



You are likely in the middle of a math class enriched by research, and if the scene appears too lively to be a traditional class, then both the research and the teachers behind it are successful.

The desire to make math more accessible forms the core of a new investigation by undergraduate students that uses local museums as laboratories to determine how best to teach math through informal exhibits. And yes, it includes getting children to don an elephant's trunk attached to sunglasses so they can visualize seven feet.

What does this approach reveal? For one thing, students will likely remember the lesson forever. For another, they will learn that math is not only a study of addition, subtraction, long division and fractions, but also a tool for living.

Jordan Sandefur, a 2009 elementary education graduate, says she has learned how to incorporate different strategies into first grade education. She also learned that classroom teachers have the ability to encourage research. "Rather than just teaching math problems, this is teaching math in fun and different ways."

The pursuit of discovering new ways to teach math began in 2008 under the tutelage of Dr. Sandi Cooper, associate professor of curriculum and instruction. This year, Cooper has been working with Sandefur and three other Baylor undergraduate students in continuing to find methods that insert math into places outside the classroom. Students Caroline Fisher, Sheridan

Research education at work



Rainey and Melissa Merritt all work on the research project, which first began with only Cooper and a graduate student.

The ongoing goal is to determine the level of mathematical thinking in museum exhibits. Last year, Cooper's research took her to Baylor's Jeanes Discovery Center, Mayborn Museum, as well as two City of Waco attractions – Cameron Park Zoo and the Dr. Pepper Museum – to collect data on which exhibits had the most potential to promote mathematical thinking in children ages five to 12.

The study involved observing visitor interaction at museum hot spots, exhibits "rich with potential for mathematical thinking." The researchers' hypothesis was that mathematical interest could be influenced by such things as signage or the way an exhibit is arranged.

"In teams of two, we staked out exhibits," she says. "The elephant exhibit was a hot spot." Researchers spent an hour at a time at different times of the day and the week. "We collected narrative data on how the children interacted with the exhibit and with their parents or other adults." They noted whether the children asked questions and how the adults used the questions to encourage more interaction.

Next, the team studied at what point it was necessary to help adults prompt a conversation. After collecting the information and writing a report, Cooper and her four students created "MathPacks" during the spring 2009 semester. Children can check out these math-enriched backpacks at the museum and find guides to exhibits, as well as items like tape measures or stopwatches.

Remember the seven-foot elephant's trunk? That is part of a zoo MathPack, too.

"Questions in the guide prompt us to think about how long is seven feet," Cooper says. From inside the bag, the child would pull out a fabric elephant's trunk attached to sunglasses, "so they can put it on their face and see how long their nose would be if it were seven feet."

An interactive exhibit at the Mayborn Museum features a water table with pieces that children can insert to reroute the water. "The guides prompt them to arrange the path of water by moving the different rectangular pieces," Cooper notes. Their MathPack adds to the exhibit by giving the children stopwatches to time the change.

None of the exercises requires them to put anything on paper, Cooper adds. "They might be measuring to compare, but everything is visualized. These are important foundational lessons for early learners."

For ongoing research purposes, the MathPacks include comment cards for parents and teachers. "We want feedback from teachers who use them with their classes as part of our data collection," Cooper says. "We want to make adjustments based on feedback."

The four undergraduates who undertook the research are all elementary school interns preparing to be classroom teachers. They spent five hours weekly on the research.

Cooper's research is funded by two grants from the Office of the Vice Provost for Research, including the Young Investigator Development Program. "The grants are key to me being able to do this," says Cooper, who is also seeking continuing funding from the National Science Foundation.

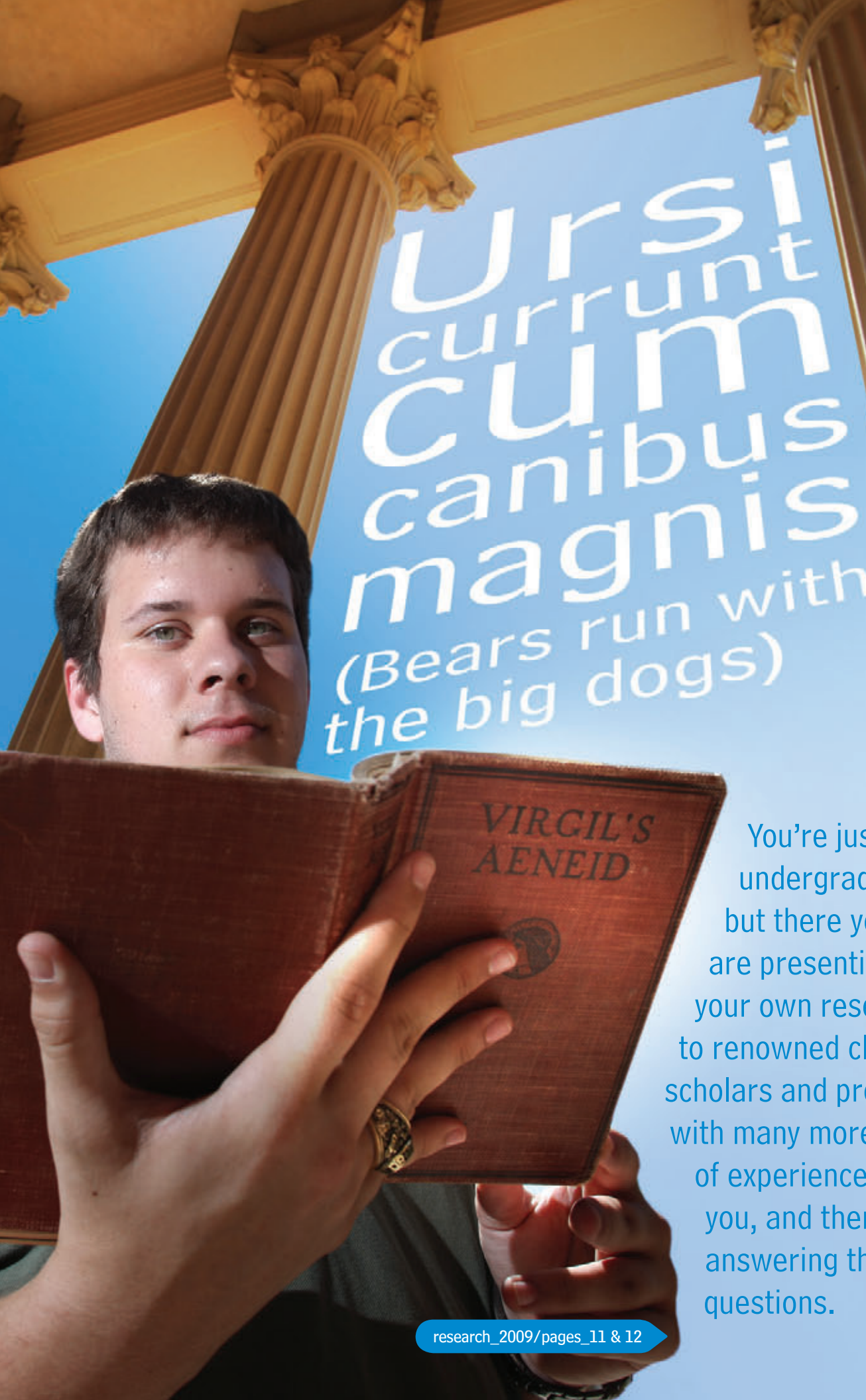
Because of the project, Cooper and her students shared a poster presentation for Undergraduate Research and Scholarly Achievement Scholars Week at Baylor, gave a formal presentation to museum

educators in Waco, and presented to a national audience in Dallas at the Association of Teacher Educators conference.

All students should participate in undergraduate research if they get the chance, adds Sandefur. "This opened my eyes to a different part of academia. It's been a great learning process and increased my professional development."

Sandefur, meanwhile, is thinking about teaching in a new way. "When I started this, I didn't know how it would help," she says. "I always pictured myself in front of 20 children, teaching them as much as I could in a year. Dr. Cooper has taught us that research can be taught by classroom teachers."

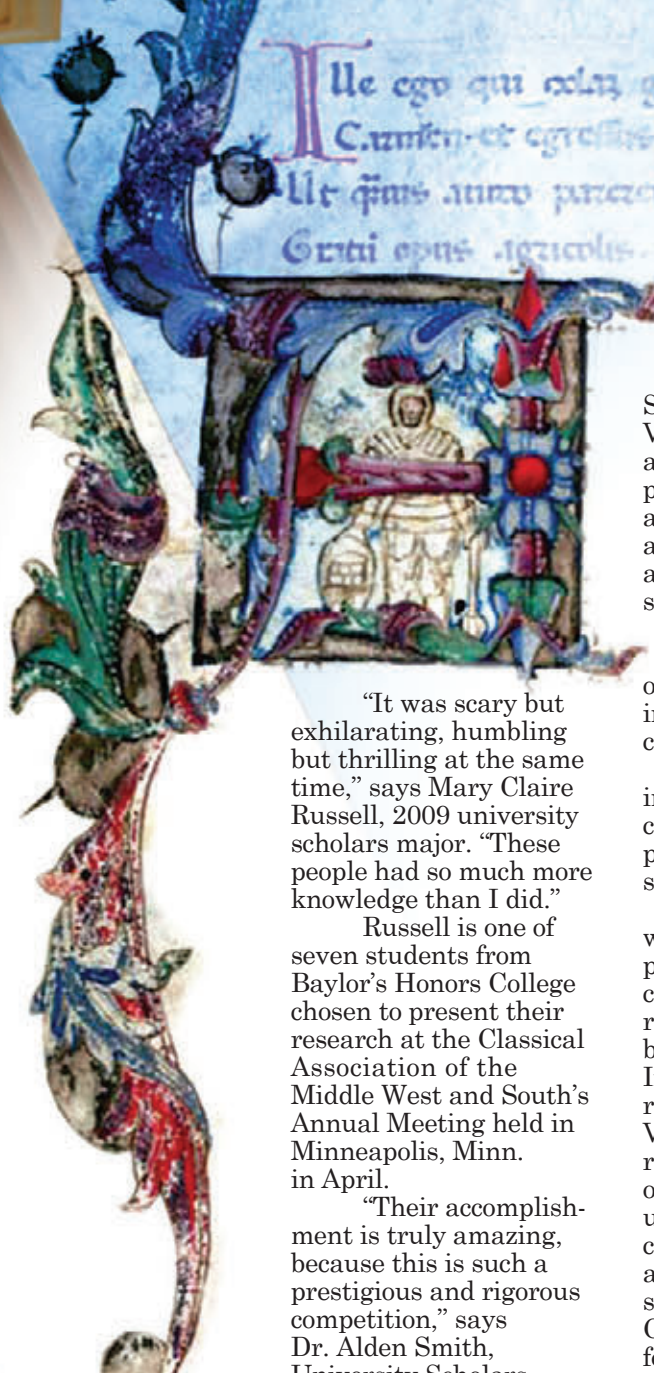




Ursi
currunt
cum
canibus
magnis
(Bears run with
the big dogs)

You're just an undergraduate, but there you are presenting your own research to renowned classics scholars and professors with many more years of experience than you, and then you're answering their questions.

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Ille ego qui celas gratia modulatus aenea
Carmen et egregius filius incana cecro
Ille quis ante parentis Anna color
Certi opus agricolis

What happened in April started in fall 2008 when Smith had his advanced Virgil students write an abstract and paper and present their research at a mini-conference, just as if they were at the annual meeting of classics scholars. The students quickly realized the deep, detailed and often painstaking work involved in scholarly classics research.

"You have to invest time, effort, curiosity, determination, persistence, and patience," says Russell.

Ashley Crooks, whose work was also presented at the conference, says that researching is always a bit of a stab in the dark. In her case, she was relatively unfamiliar with Virgil, so she began by reading his writings in the original Latin to better understand the grander constellation of texts and criticism. Because she knew more about Catullus, she decided to focus on Virgil through the lens of Catullus' influence. A common phrase she found in both Catullus' "Carmen 64" and Virgil's "Eclogue 6" interested her, and she began to investigate the connection between the two poems. She was curious about why Virgil would allude to Catullus and how this should affect the reading of Virgil's poetry.

"It was scary but exhilarating, humbling but thrilling at the same time," says Mary Claire Russell, 2009 university scholars major. "These people had so much more knowledge than I did."

Russell is one of seven students from Baylor's Honors College chosen to present their research at the Classical Association of the Middle West and South's Annual Meeting held in Minneapolis, Minn. in April.

"I realized that no one had made a connection between the two poems with this phrase," says Crooks, university scholars major, "and critical evidence supported my reading of the textual interplay." She continued researching,

writing the paper and then ultimately editing her findings into a one-page abstract.

"I had to engage scholarship of three sorts: criticism of Virgil's Eclogues, scholarship about allusion, and scholarship concerning Catullus," she says. "It was really hard, but my professors and friends helped me along the way."

Impressed with the quality of the students' work, Smith suggested that they submit their papers to the upcoming classics meeting. He also prepared them for rejection, telling them that they would be up against dozens of professors and doctoral students.

"I thought, 'go for it,'" says university scholars major Anna Sitz, "Even if you aren't selected, it will give you great experience." Once selected, she and her classmates moved on to the next stage: getting ready to present at the conference.

"We did well because we were so well prepared," she says. As soon as word came of their acceptance, faculty came together in what Sitz calls "typical Baylor fashion." The entire classics department worked with the students, reading and critiquing their papers and creating a conference situation so they would feel comfortable presenting their papers and fielding unrehearsed questions.

But support went beyond training and encouragement when Dr. Thomas Hibbs,

"For these undergraduates from the honors college to be competing successfully against graduate students and established professors," says Hibbs, "is testimony to their hard work and to the kind of mentoring that goes on at Baylor."

distinguished professor of ethics and culture and dean of the honors college, and Dr. John Thorburn, associate professor and classics chair, drew from the excellence fund to cover the students' travel expenses. "For these undergraduates from the honors college to be competing successfully against graduate students and established professors," says Hibbs, "is testimony to their hard work and to the kind of mentoring that goes on at Baylor."

Callie Redding is a believer that one person can change the world, and that's exactly what she's set out to do. When she came to Baylor, she was looking for something that could open doors for her future.

Golden opportunity to go green

"It's way beyond anything that I thought I'd be doing when I was a sophomore," says Redding of her research to determine the feasibility of installing a wind turbine for Texas Education Agency's Region 12 Education Service Center in Waco.

The American Wind Energy Association notes that with the appropriate development, wind energy could supply 20 percent of U.S. energy needs. Texas currently leads the way for wind power capacity due to the number of sites in operation, and Baylor plans to be part of the effort powering the state's energy supply.

Redding, an environmental science major, says, "It started off at the beginning of the semester. My [research] partner and I were like, 'Oh, we're going to get a wind turbine up in Waco. It's going to be the coolest thing ever.' Slowly we realized that it takes a lot more time than just a few months."

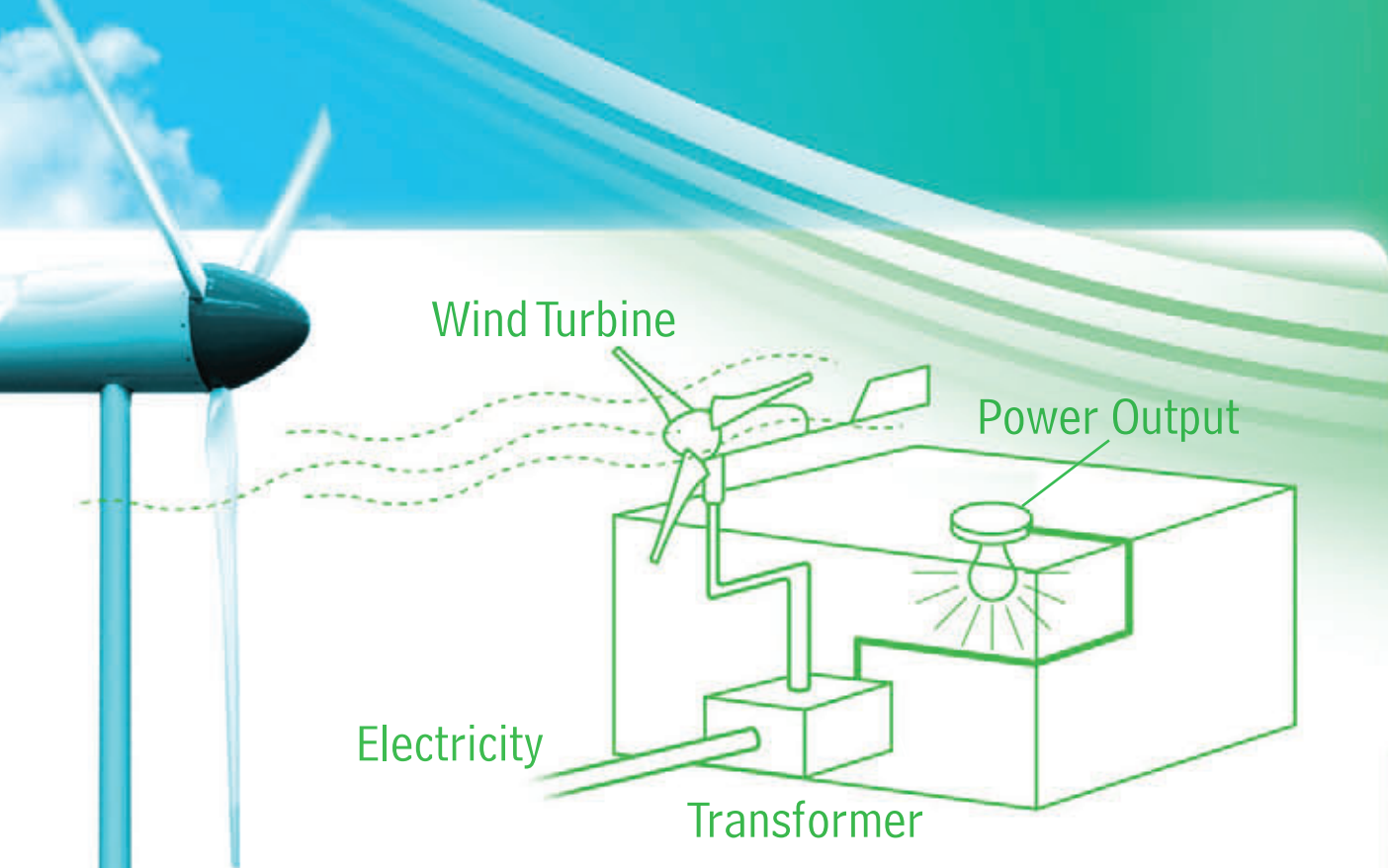
An Engaged Learning Group, or ELG, is providing the vehicle for undergraduate research being conducted by students like Redding, who is a member of the 2007 inaugural class. ELGs are interdisciplinary groups of up to 40 students who live together and explore a specific topic over three or four semesters.

Students from a variety of majors, including nursing, drama, business, engineering and environmental science, applied to join the Energy and Society ELG, which is now in the implementation phase of its energy proposals.

Dr. Ian Gravagne, associate professor of electrical and computer engineering, along with Dr. Ken Van Treuren, professor of mechanical

engineering, and Dr. Larry Lehr, lecturer in environmental science, meet with the students weekly. "...We're interested in developing our students so they're educated to be able to participate in renewable energies," says Van Treuren, who oversees the wind turbine research.

Redding and her research partner Lauren Hammond, a mechanical engineering major, are busy taking soil samples, examining topography, looking at wind maps and working with the city.



“We are giving students the chance to do inquiry-discovery learning at a much earlier stage of their development than is usual,” says Gravagne.

“This research will help me a lot after I graduate. I’m working on a mechanical engineering degree and was thinking about doing something with green energy,” says Hammond.

The two students work closely with Van Treuren, who made the initial contact for the Region 12 project, and says, “What needs to be determined for a site survey is the kind and quality of wind.”

Once anemometers are put in place to take wind measurements, data will be taken for around a year to cover every season’s wind energy. The ultimate goal is cost savings. “We need to look at the kilowatt

usage to give them a number of how much energy the wind turbine would produce,” says Redding.

In addition to Baylor funds of over \$50,000, the National Science Foundation awarded the ELG a three-year grant of more than \$145,000 to pursue the learning community concept, to develop a curriculum to be shared with other universities and to purchase equipment.

“We are giving students the chance to do inquiry-discovery learning at a much earlier stage of their development than is usual,” says Gravagne.

Once the research is conducted, Redding and Hammond hope to present a culminating report on the site evaluation so that Region 12 can make an informed decision and install a small wind turbine. As for her future plans, just like her ELG, Redding says she’ll focus on energy and society. “I want to do green energy and have a scientific background, but I really want to work with people.”



Additional energy and society ELG topics being explored by undergraduates include the following:

The effect of rooftop gardens on reducing air-conditioning and heating loads in buildings.

Katie Barney

Lauren Chapman

The effect of motion-activated lights on energy consumption.

Daniel Keith

Ron Martin

The performance of conventional petroleum-fueled vehicles versus hydrogen fuel cell-powered vehicles.

Frank Marquez

Ruben Nunez

Jordan Quint

The performance of different types of solar molecules.

Ben Henderson

John Newcom

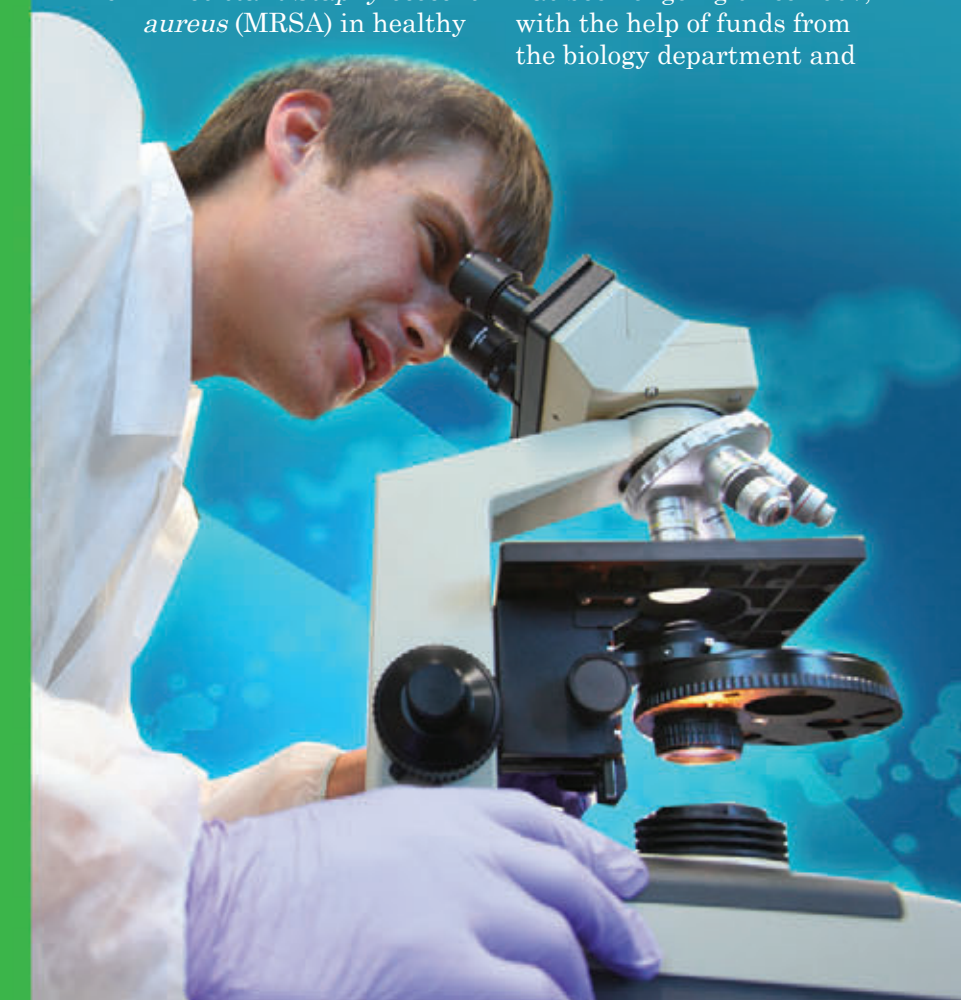
Vema Reddy

Swabs for science

Swabbing your nasal cavity is now normal procedure for freshman biology students. The swabs are part of a research study conducted by Baylor undergraduates and instructors in the biology department.

More than 1200 nasal samples have been taken from students to determine the nasal carriage rate of methicillin-resistant *Staphylococcus aureus* (MRSA) in healthy

individuals while applying sterile technique, microbial analysis, molecular analysis and statistics. This research has been ongoing since 2007, with the help of funds from the biology department and





“Students often need confidence and working alongside them in the lab is the best way to deliver that,” says Adair. “Mentoring students in research is definitely a rewarding experience.”

an individual less experienced in a field of expertise for the purpose of giving social support, while teaching the knowledge required for working in that field.”

Amanda Hartman, who has a premedical emphasis, also views her instructors as mentors and says Adair encouraged her to mentor the new students. “I’ve worked with Dr. Adair in some capacity or another since the summer of 2006, and definitely consider her an important mentor,” she says. “Dr. Adair and Dr. Hartman have also encouraged me to grow as a mentor in the past year, allowing me to help the students newer to the project get oriented in the lab and learn some of the techniques.”

“Students often need confidence and working alongside them in the lab is the best way to deliver that,” says Adair. “Mentoring students in research is definitely a rewarding experience.”

the Undergraduate Research and Scholarly Achievement (URSA) program through the Office of the Vice Provost for Research.

The idea for the research came to Dr. Diane Hartman, microbiology and bacteriology labs coordinator, after attending a conference that reported on MRSA in prisons, schools and other populations.

“[Hartman] noticed that few studies actually collected samples and performed the research on healthy individuals,” says Dr. Tamarah Adair, senior lecturer in biology, “We began reading the literature and decided that this would be a feasible project for undergraduates.”

The research has involved more than a thousand undergraduates over the past four semesters. The students obtained information by collecting consent and survey forms, used mannitol salt agar as a screening medium for the simultaneous detection and differentiation of MRSA, and accessed computer databases to compile and organize results and statistics.

Amanda Hartman, senior biology major and no relation to Diane Hartman, says she has definitely benefited from learning some of the newer techniques and how to conduct them. “I’ve learned the benefits of doing these tests in the proper order so we weed out anything that may not be [*S. aureus*] or MRSA and don’t end up wasting media and supplies later by running unnecessary tests.”

The information collected does not point to an MRSA outbreak on- or off-campus.

“[The] data indicates that in a healthy population, each individual is as likely as the next to be a carrier,” says Adair. “The percentages are within the average carriage rates reported for the U.S. population.”

While data can be analyzed and used to establish trends, the intangible benefits of side-by-side research, although unseen, can have a lasting impact on both students and researchers.

Working as a mentorship team helps the lab run smoother and makes scheduling easier, says Adair. “Students also work better when they work with someone. Fewer mistakes, better critiques, new ideas all come from learning to communicate. This is the main way that science progresses.”

Kevin Farquhar, sophomore biology major, considers both Adair and Diane Hartman his mentors. “... A mentor, in my opinion, develops a relationship with

According to the students, the rewarding experience goes both ways and the exposure to research as an undergraduate is invaluable. Farquhar says that both Adair and Diane Hartman pushed him to work independently, but that he was supervised when needed. Research isn’t always straightforward and Adair guided him to ask scientific questions and to solve experimental setbacks. “My involvement with them during this study helped me understand my potential and my limits while giving me the invaluable research experience necessary for graduate school and a possible career in research.”

The project has been such a success that an URSA program grant has been awarded to partially fund a new, research-based course for sophomores and juniors. The course, Molecular and Microbiology Education and Research, starts in fall 2009.

The class will incorporate the MRSA sampling experiment and seminar material consistent with undergraduate classes. “The course will ensure that lab students are receiving formal instruction on scientific communication and reading the appropriate journals and that the students that previously enrolled only in seminar will have lab experience,” Adair says.

The following students participated directly in the testing and analysis conducted during this project:

Kristin Brown
Kevin Farquhar
Ayla Farris
Amanda Hartman
Melissa Lagrou
Richard Longoria
Ly Nguyen
Peter Nguyen
Kiana Parker
Trevin Rube
Breck Sandvall
Brooklyn Sandvall
Courtney Schoessow
James Thien Vu
Youssef Ybarra
Andrew Volk



Mud on the Wall

The 2008 presidential candidates realized early on that traditional media is fast becoming old media.

To keep up with the changes, the candidates embraced the new media trends in order to reach potential voters. Twitter, YouTube, video games and the Internet were used in ways they have never been used before in a presidential election.

Dr. Mia Moody, assistant professor of journalism, and her undergraduate journalism students also embraced the changes and set out to see how candidates' websites reflected the change in media during the 2007-2008 presidential primaries.

About 30 undergraduate students in Moody's public relations programming classes compiled more than 2,000 press releases and coded 735 of them into three categories – negative, positive or neutral - from the candidates' websites. Three students, including Catherine Baker and Megan Malouf, then entered the coded data into a spreadsheet. The Baylor Department of Statistical Science helped analyze the data.

The third student, senior journalism major Victoria Bongat, says, "People should take advantage of opportunities to do research under faculty because it's a supplement to everything in the classroom. You get to use the skills that you've been taught without having to worry about a grade."

Twitter

The Office of the Vice Provost for Research provided an Undergraduate Research and Scholarly Achievement (URSA) grant that helped support Bongat's time as a student researcher.

Moody's study explored two hypotheses and one question. The first hypothesis says that underdog candidates are more likely than the front-runner opponents to include a negative tone in their online news releases, which the data confirmed.

The second hypothesis says that underdog candidates are more likely than the front-runner opponents to attack their opponents in their online news releases, which was not supported, as candidates at all levels took part in some mudslinging.

The question asks – Are the policy priorities in news releases of Democratic and Republican candidates closely aligned with the policy priorities of Democratic and Republican voters respectively?

Results show the potential for a relationship between the two exists, more so for Democrats than Republicans. Students looked at the topics of taxes, the economy, health care and the war in Iraq.

Candidate mudslinging methods were explored as Bongat notes, "Governor Romney's were pretty pleasant sounding, nothing bashing his opponents. Senator Clinton's seemed to be more pointed critiques..."

An additional 2,000 news releases await analysis in phase two, which will build on the previous study.

"I think the experience was valuable because it was a concentrated effort, a focused project. Dr. Moody had a goal in mind, and there were several steps that needed to be taken to carry it out," says Bongat, who will soon be attending law school and believes this experience will help her with the course load she'll be facing.

Moody collaborated with Dr. Joseph Brown, associate professor of political science, on a paper she submitted for presentation to the Association for Education in Journalism and Mass Communication. Her ultimate goal is to get the research published in a major journal, where the student researchers would receive acknowledgment for their work.

"[These students] were able to make a contribution to a finished product, that when published it's something that will be a historical reference to an historical election," says Moody.

YouTube



Shedding light on autism

Holly Hodges can still remember the frustration and confusion her parents felt in the early 1990s when her then four-year-old brother, Joe, was diagnosed with autism.

With little more than a few quick words and a reference to the movie *Rain Man*, her parents, Kenny and Kaye Hodges, were sent home. “They were pretty much left to fend for themselves,” she says, “to learn more about the disorder, find resources and tailor an educational program that could meet my brother’s unique needs.”

Looking back, Hodges hesitates to fault the physicians working with her family. At the time, the medical community had little information about autism and Autism Spectrum Disorders (ASD), a range of disorders characterized by varying degrees of repetitive behaviors and impairment in communication skills and social abilities. Since that time, there has been an increase in diagnoses of ASDs. The most recent statistic from the Center for Disease Control reports that approximately one out every 150 children is diagnosed on the spectrum.

Her family’s experiences stayed with Hodges, a 2008 Baylor Honors College graduate now studying at Baylor College of Medicine in Houston, and she decided to make autism the focus of her honors thesis. “I was especially interested in learning what is available today for children with ASD and their families,” she says. She searched the Baylor website for an autism expert and found Dr. Julie Ivey, assistant professor of educational psychology, who had extensive experience in the field. Ivey founded the Baylor Autism Resource Center in January 2008 and serves as the center’s director.

For two years, Ivey served as Hodges’ thesis advisor and mentor, guiding her readings in the current literature and helping her narrow her research. “Holly is an amazing student and an intelligent and focused researcher,” Ivey says. “She also has great insight and

compassion, qualities that will serve her well as she continues toward her dream of becoming a [physician].”

The mentor and student partnership proved to be a dynamic and rewarding relationship. In addition to the discussions and research, Hodges was able to work alongside Ivey in the Baylor Autism Resource Center to interact with client children and their families.

Ultimately, Hodges narrowed her focus on pediatricians and the tools available to them for diagnosing ASD. She was also curious how

comfortable and confident pediatricians felt with their own ability to recognize the developmental disorders, and their knowledge of outside resources available for parents. She found a study conducted among Northeastern pediatricians and, with the previous author’s permission, adapted the survey for pediatricians in Texas and Mississippi. Funding for this research was provided through a grant from the Undergraduate Research and Scholarly Achievement program within the Office of the Vice Provost for Research.

As they analyzed results and compared them to the previous survey, Ivey and Hodges discovered progress, showing that pediatricians work hard to understand and more effectively diagnose autism. However, the physicians also indicated a lack of confidence in their knowledge about ASD and expressed a need for greater medical school training in diagnosis and management practices.

Ivey and Hodges recently received positive responses to their presentations and findings at local conferences and submitted their research to the Autism Society of America. Their work was

Dr. Julie Ivey



accepted for presentation at the group's 2009 national conference. The study is also under review for future publication.

"It seems that every time I present my thesis results," Hodges says, "someone in the audience approaches me telling about family members with autism or an autism spectrum disorder." Often, their examples of uncertainty and unavailable resources for their family member or friend mirror the frustration her own family felt.

"My mother knew her son," Hodges says, "and she knew that the definition of autism the doctors gave her in no way resembled her child." Joe's diagnosis was later reestablished as Asperger's syndrome; he has since completed high school and wants to go into screenwriting and animated film production.

"He is one of the most brilliant individuals I have ever met and extremely and uniquely talented," Hodges says. "I have the utmost admiration for his courage and strength. My brother and my parents never cease to amaze me and inspire me."



The Baylor Autism Resource Center offers a range of resources to children and families dealing with ASD. Current services include social circle groups aimed at improving social skills of children and teens, resource information and ongoing research.

The center was founded in January 2008 and is supported by Baylor University and the Baylor Waco Foundation. For more information call 254-710-6222 or e-mail autism@baylor.edu.



Kristin_Kan

2005 university scholars major, plans on adding M.D. to the end of her name because she wants to make a difference.



Kan is scheduled to graduate from the Johns Hopkins University School of Medicine in 2010, but she took a year off to complete her master's of public health in 2009, because she "... feels like someone interested in medicine has a place in public service and public policy." Kan's passion for public health began while she was still an undergraduate at Baylor. She was awarded the Truman Scholarship in 2004, becoming Baylor's seventh Truman Scholar since the program's inception. During the grueling application process, Kan says she had to defend her position on health care.

"As much as health care reform is important, sometimes the focus is on the clinical process and not law reform," she says. "I love clinical medicine, but at the same time, I know I need to be involved in something bigger than the day-to-day patients."

As an undergraduate, Kan focused on indigent care and worked with Dr. Gaynor Yancey, professor of social work, on her thesis.

Yancey walked Kan through the entire research process and how to recruit a focus group. "I would have had no clue about how to go through the research process if it wasn't for Dr. Yancey," says Kan. "Undergraduate research taught me how to form a research question, protect a sample population, ensure no conflict of interest and how to come up with a research proposal."

"Kristin's work was outstanding," Yancey says. "While she knew that she was passionate about this topic, she basically had to learn on her own about research methods and the type of research design that would be most appropriate to use in this type of study. She served as a model student in her diligence and her search for discovery about a population and issue of which she had little knowledge."

The research exposure helped Kan when it came time for her to apply to medical schools, but she wishes she had gotten involved in research sooner. "I very much valued my social work research and internship opportunities while at Baylor," she says. "Unfortunately, I didn't get involved in the design of my research until my senior year and I wish I would have engaged in those opportunities earlier. I feel that every student needs

the opportunity to engage in research, especially if they are applying to [graduate school]."

Her past research experiences have directly benefited her in medical school. "The research introduction I had as an undergraduate helps me understand the process I have to go through today in medical school and public health school," she says.

"Research is about making a difference. I think in many ways, my experience at Baylor is a stepping stone for everything I am doing now," Kan says.

Q alumni profiles



James_Nortey

2008 philosophy major and honors college graduate, now studying at Harvard Law School, has an insatiable thirst for knowledge that took off while he was still at Baylor.

Nortey says his exposure to research at Baylor helped him prepare for Harvard. "Research helped my core values by exposing me to a level of academic research that helped

At Baylor, Nortey relied on Dr. James Curry, professor of public policy and administration, for guidance with his thesis. Nortey was interested in criminal justice and what happens

materials that I provided to him, plus many others that he sought out on his own. ... His thirst for knowledge and answers is inspiring." Nortey's research guided him to study recidivism, the cycle of a person who repeats a criminal behavior after being released from prison, and possible solutions.

Nortey's academic success at Baylor was also noticed by others. He held summer internships with the Friedman Billings Ramsey Group, a real estate investment trust business, and the FBI, and was a member of The Institute for Responsible Citizenship, an organization dedicated to preparing high-achieving black men for successful careers.

Nortey is already establishing a name for himself at Harvard. As a first-year law student, his classroom curriculum is set, but he says he strives to be an agent of social change through public policy outside the classroom. He was surprised to find out that Harvard didn't have an NAACP chapter, so he decided to create one. The chapter now boasts more than 50 members and is growing.

"At Baylor, I developed personally in a lot of ways," says Nortey. "My research gave me academic credit for what I was already thinking about. Research helped me find my path."

me prepare for law school." He adds that he was already accustomed to a lot of reading and that it made the transition from undergraduate studies to law school studies easier. In addition, he says he's positive that his honors thesis helped his application stand out when applying for graduate programs. Nortey applied to nine graduate programs, including Columbia, Vanderbilt and Georgetown Universities, and was accepted by the majority of them.

to people after they enter the prison system. "In a lot of ways, I was very quick to draw conclusions about the prison system," he says. "Dr. Curry challenged me to go back and dive deeper into the research again and again and go beyond the surface issues. He is a great mentor and sounding board, and has a different perspective that I appreciate."

"I would say that James Nortey [possesses] the wonderful combination of curiosity and perseverance," says Curry. "... He eagerly devoured all research



Ellie_Jarrett

Auditioning with nearly 800 other talented opera singers for one of 23 slots is a daunting task and the odds are that you won't make the cut.

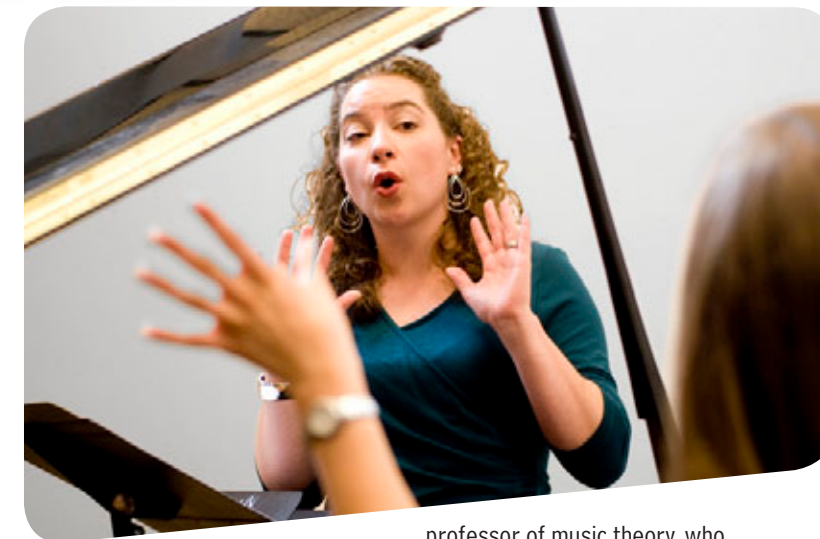
In fact, the first year Ellie Jarrett auditioned for the Merola Opera Program, she did not advance to the finals. However, in her 2008 audition, she not only advanced to the finals, but she was offered one of the coveted slots.

The Merola Opera Program is part of the San Francisco Opera Center and is an intensive, all-expense-paid, 11-week summer program for young artists. Singers participate in daily musical coaching, diction classes, stage deportment, movement, make-up, languages and acting from the distinguished San Francisco Opera staff. In addition, they perform on stage multiple times.

Jarrett, 2005 music major in vocal performance and 2009 Master of Music, says she didn't really discover her voice until she was an undergraduate at Baylor. Jarrett's love for music started with the piano when she began playing at four years old.



At Baylor, she learned she loved opera and wanted to pursue a career as a professional opera singer. The path to becoming a professional musician starts with the basics – theory, musicianship, history and lots of discipline. Dr. Jean Boyd, professor of musicology, mentored Jarrett



in her academics. "She helped encourage me to be serious in my studies because every class we have as an undergraduate molds us into better performers and better musicians. [All my classes] combined to help influence my performing," says Jarrett.

Boyd says she watched Jarrett grow as a person and in her craft and become completely devoted to opera. "I have never met a more dedicated and determined musician in all of the years that I have taught at Baylor. She will

definitely make a memorable mark on the musical world."

"During my undergraduate years, the Baylor Music School taught me discipline, how to meet deadlines, how to research and what it meant to actually do hard work," she says. Jarrett's piano background helped her with theory, but it was her theory teacher, Dr. Eric Lai, associate

professor of music theory, who helped her relate more to the music as a singer. "He was excellent at presenting the material. ... He was able to help me connect to it mentally so I could apply it to my voice," says Jarrett. Likewise, the multiple semesters of musicianship training "... helped tune my ear better so I could tune when I was singing."

Baylor music majors are required to perform in public multiple times every semester of their undergraduate experience. Their performances are critiqued by professors, as well as recorded for the students to study on their own. The scholarship involved in this process takes time, but is well worth the effort. "What most prepared me for my opera auditions in undergraduate was being able to make my own mistakes, and reap my own consequences," says Jarrett. "... Being able to look deep inside yourself and accept criticisms about yourself, problems with yourself ... is such an important component to becoming a successful performer."

"If I hadn't attended Baylor as an undergraduate, I would not be the same me I am today," says Jarrett.

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