

ETSU School of Graduate Studies

# Illuminated

Graduate Student Research Magazine



Volume 1 (1)  
Summer 2012



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## Editor

Karin Bartoszuk,  
Assistant Dean, School of Graduate Studies



## Writer

Mariam Ayad,  
Graduate Student, Professional Communication



## Layout and Graphic Design

Jerome Morrison,  
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### FROM THE SCHOOL OF GRADUATE STUDIES

The East Tennessee State University School of Graduate Studies is proud to present ILLUMINATED — a magazine that showcases the excellent work of our graduate students and their faculty advisors.

There are over 2000 graduate students enrolled in graduate programs at ETSU. ILLUMINATED will present some of our students' research and creative works that make meaningful contributions to various disciplines, and contribute to our strong graduate programs. ILLUMINATED features research and creative projects that are currently ongoing on campus and provides updates on former ETSU graduate students who have graduated from ETSU.

Enjoy!

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East Tennessee State University  
Box 70720  
Johnson City, TN 37614-1710  
<http://www.etsu.edu/gradstu>  
Phone (423) 439-4221

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## PREVENTING HEARING LOSS AMONG DENTISTS

The long-term effects of high frequency drill noise on the human ear

Krisztina Johnson  
Graduate Student

Dr. Marc Fagelson, Dr. Jacek Smurzynski,  
and Dr. Saravanan Elangovan  
Faculty Advisors



Written By Mariam Ayad  
Design By Jerome Morrison

Just the sight of a dentist's drill can make a patient uneasy. But the sound of the drill is more than just unpleasant for dentists. It might be permanently damaging their hearing over the years.

Krisztina Bucsi Johnson, a doctoral student in the Department of Audiology and Speech-Language Pathology, is working on a research project designed to investigate whether the shrill, high-frequency sound of a dental drill impairs dentists' hearing sensitivity. She is also investigating the benefits of ear plugs in minimizing these negative effects.

"I would really like to open dentists' eyes, and I want all of them to realize how important it is

[to use hearing protection],” she said.

To conduct the study, Krisztina checked the hearing of 23 dentists in the region before they began their work day and again after their normal work day had ended, which usually lasted about eight hours. She then compared the audiograms, which are graphic representations of hearing sensitivity, from before and after a day’s work.

So far, Krisztina has found that after a normal work day, the dentists had good hearing in low and mid frequencies, but that their ability to hear high frequencies was poorer. The sound of the dental drill is high frequency, so it is likely that the drill’s sound energy is associated with the hearing loss.

In another trial, Krisztina asked the dentists to plug one of their ears all day using an ear plug designed especially for dental professionals. This ear plug allows dentists to block out the sound of the drill without limiting their ability to hear low frequency sounds, like conversation with their patients and assistants.

“So now, I not only find out if they have hearing loss at the end of the day, but also I know if the ear protection is helping,” Krisztina said. “Even though I’m not done with data collection and analyzing what I have, I’m already seeing — and it’s really exciting — I’m already seeing something called a temporary threshold shift.”

A temporary threshold shift occurs when the ear is exposed to loud noise, especially for hours at a time. The inner ear contains thousands of small sensory cells that can become damaged after exposure to loud sounds. The damaged cells can lead to temporary hearing loss, like after a live rock concert or hours next to a dental drill. Krisztina’s research showed this temporary hearing loss in dentists after just one work day.

Sometimes these damaged sensory cells heal themselves, but over time they can become permanently damaged. Because our bodies do not reproduce these cells, once we lose a cell it’s gone forever. The fewer sensory cells we have in our ears, the more our ability to hear decreases.

“You’re born with all those sensory cells that you’re going to have,” Dr. Marc Fagelson said. “They can

sustain some damage and then heal up, but their capacity to do that is limited.”

Although the dentists’ hearing loss was temporary from Krisztina’s day-to-day measurements, previous research shows that five years of continual exposure will be more likely to produce permanent damage. After decades in the dental profession, dentists can suffer from significant hearing loss from exposure to the sound of the drill.

However, when Krisztina ran a trial with ear plugs, the dentists had an insignificant amount of temporary hearing loss.

“I would say the ear plugs really help,” she said.

Out of the 23 dentists that Krisztina worked with for the study, none of them were using any ear protection before she met them. None of them knew they had to.

“All of them were kind of shocked when I showed them what is happening,” Krisztina said. “They keep telling me ‘Nobody taught us this, not even in dental school, how important ear protection is for us.’”

Krisztina’s passion for the dental field has aided her in completing her research, but her interest in dentistry began far before she reached ETSU. Krisztina worked as a dental assistant for eight years before she began the audiology program here.

“I loved it,” she said. “I wanted to become a dentist.”

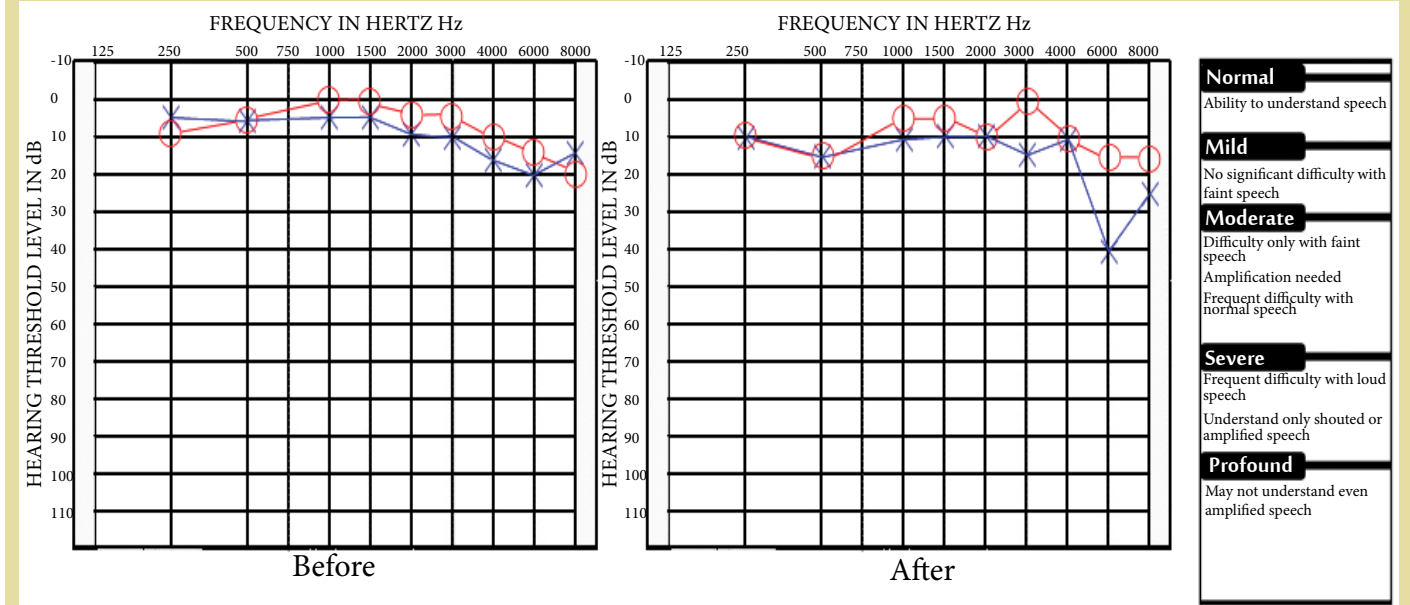
Unable to get into a dental program, Krisztina instead aimed to work in the field of audiology, not realizing that her ties to dentistry were not over.



Krisztina Johnson explains the inner workings of the human ear.

## Audiographs of Hearing Loss Among Dentists

### Temporary Threshold Shift of Dentist BEFORE and AFTER Normal Work Day



This subject was a right-handed dentist, so his left ear received more noise exposure (see the notch at 6000 Hz on the left audiogram). On the testing day, his right ear was protected during working hours, and the left ear was exposed. As you can see, the notch expanded and deepened after the dentist was exposed to the drill for 75 minutes. This hearing loss is called a temporary threshold shift.

Upon entering the program, Krisztina discovered that she needed to complete a research project as part of her degree requirements. She remembered often wondering during her days as a dental assistant if the sound of the drill had any impact on long-term hearing. She immediately knew this was the research project she wanted to pursue.

“I thought, ‘I would love this because I still love dentistry,’” Krisztina said. “I wanted to bring together audiology and dentistry.”

Setting up the project wasn’t easy, however. The audiology program usually encourages students to pair up with a professor who is already conducting research. Students typically work with that professor toward similar research goals. Because Krisztina’s idea was completely unique, she had to start from scratch. But with the support of three professors in her department — Drs. Marc Fagelson, Jacek Smurzynski and Saravanan Elangovan — Krisztina was able to take on the project and is on her way to completing the study.

“It was hard to start from zero, but I enjoyed every minute of it,” she said.

And perhaps dental school will be in Krisztina’s future after all, but in a very different way than she had originally planned — as a place to teach rather than learn.

“I would love to go to dental schools and

present my research because it’s really important,” she said. “They are young, but it’s so important for them to start [using hearing protection]. You don’t start when you already have hearing loss. You start when you don’t have hearing loss and you conserve your hearing.

To help with this fascinating project, Krisztina received a \$5,000 research award from the National Hearing Conservation Association Scholarship Foundation. She has also been invited to present her findings at the association’s national conference in February of next year.



(From left to right) Krisztina sits at an audiometer machine with Dr. Fagelson and Dr. Smurzynski.

Written By Mariam Ayad  
Design By Jerome Morrison

# Fun

# With

# Ramps & Pathways

## Using Ramps and Pathways to spark scientific curiosity and creativity in kindergarteners

Mary Myron  
Graduate Student

Rosemary Geiken, Ph.D.  
Faculty Advisor

Learning upper-level math and science theories can be difficult at any age, but Mary Myron thinks the solution for making it easier to learn these concepts is starting early — in kindergarten. She's not talking more homework or testing though. Mary believes that creativity and problem solving skills are the keys to learning more complex concepts and that a new early childhood Pre-K-2 program called *Ramps and Pathways* can provide children with the skills they need to succeed later in life.

"My initial goal in the doctoral program was to find a way for children to be able to show the people that developed the curricula... that children who have these kinds of activities will perform better because they have had opportunities to use their creativity," Mary, a doctoral student in the Department of Early Childhood Education, said.

*Ramps and Pathways* is a program in which children have to find a way for small objects to get from one place to another using wooden cove moldings of different lengths. They can use blocks to support the long pieces of wood, and then try out their ramps using marbles, cotton balls, plastic eggs and other small objects. The goal is to move the small object from one place to another using creative thought and problem solving.



Two of Mary Myron's kindergarten students discover the effects of gravity and momentum during her *Ramps and Pathways* program.

"There isn't any right or wrong answer. I just give them the material and they start out," Mary explained. "I say to them, 'How can you move this without touching it?' Therein it starts, and from there they try inclines, they try bridges, they try multi-level structures. They work very collaboratively with one another. They have an idea in mind about what they want to do, and if it doesn't work, they try something else, and if that doesn't work, they try something else."

Mary, a teacher at ETSU's University School, started using the program with her own kindergarten class two years ago. Since then she has also helped implement the program in the school's first, second and third-grade classrooms.

Mary implemented the *Ramps and Pathways* program under the supervision of Dr. Rosemary Geiken, an assistant professor in the ETSU Department of Early Childhood Education. Dr. Geiken is one of the original developers of *Ramps and Pathways*, which started in Iowa.

"The research right now, although preliminary, is showing that children who engaged in [*Ramps and Pathways*] increased in physics knowledge, and that was as young as 3,

4, 5 years old," she said.

In the long run, Dr. Geiken hopes to get a grant to conduct a controlled experiment on the effectiveness of the *Ramps and Pathways* program. In a controlled environment, the influence of many potential confounding variables can be factored out such as teacher style and training, children's home environment and their families' economic levels.

But until a controlled experiment can be practically set up and conducted, Mary's study will greatly contribute to the current literature on the program.

For her dissertation, Mary is interested in starting a longitudinal study on the long-term effectiveness of the *Ramps and Pathways*. She wants to use cognitive ability and creativity indexes to evaluate children before and after they participate in the program. She also wants to use standardized test scores, and expects to find that children who were exposed to the *Ramps and Pathways* at a young age achieved higher test scores in middle and high school because of better problem solving skills. Mary also expects to find that these children will have more physics knowledge because of the program.

"They don't know it, but they're actually dealing with physics and the laws of engineering as well as creative thought and problem solving," Mary said about the kindergarteners in the program. "What might look just like play to you, they actually go through Newton's three laws."

Mary has been teaching kindergarten at the University School for 16 years. She and Dr. Geiken regularly travel to present the *Ramps and Pathways* to child care centers at regional and national conferences.

Mary Myron (left) sits with Dr. Rosemary Geiken (right) and their array of items used with their *Ramps and Pathways* program.



# Suicide: The Importance of Problem Solving Skills

Kristin Walker  
Graduate Student

Dr. Jameson Hirsch  
Faculty Advisor

Written By Mariam Ayad  
Design By Jerome Morrison

Tens of thousands of Americans die from suicide each year, and even more exhibit active suicidal behavior, such as thoughts of suicide or plans for a suicide attempt. Doctoral student Kristin Walker hopes to decrease this number by expanding research on a model of prevention of suicidal behavior focused on the role of problem solving. She, along with Dr. Jameson Hirsch, is investigating the role of social problem solving ability in increasing or decreasing suicidal behavior.

“There’s actually a beautiful line in a training that we do, it’s a gatekeeper training for suicide prevention, and it says to ‘Remember that suicide is not the problem. Suicide is the solution to a perceived unsolvable problem,’” said Kristin, who studies in ETSU’s Department of Psychology.

Helping people learn how to cope with those perceived unsolvable problems is what Kristin is most interested in.

Social problem solving refers to a person’s ability to solve real-world problems such as those occur-

ring in the workplace or at school. Previous research indicates that people with fewer or less adaptive social problem solving skills are at a higher risk for suicidal behavior.

“That’s what gets people to contemplate suicide ... that there are problems, and if you feel that you can’t solve those, that there’s no way to work with them, then you get hopeless,” Kristin said. “If you get hopeless, then it makes a lot of sense that you might start contemplating suicide as a way to get out, a way to escape it.”

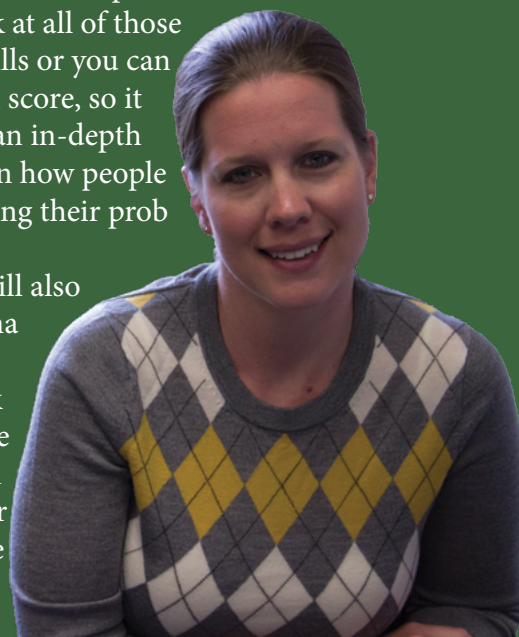
Kristin will survey a group of patients at a primary care clinic for low-income families, a place at which she used to work as a behavioral health consultant. She believes findings from this type of population will add to the research on social problem solving and suicidal behavior.

“It’s people that are going to be at risk for psychopathology because of some of their life circumstances and life situations, ... [like] not having health insurance or potentially having poor social support systems.”

Using a shortened version of a social problem solving inventory, Kristin will gather survey data about each patient’s perceived ability to cope with everyday problems. This measure assesses both positive and negative aspects of social problem solving ability including problem orientation (negative vs. positive) and problem solving styles.

“The neat thing about [this inventory] is that it assesses both risk and protective factors,” Kristin said. “You can look at all of those individual skills or you can look at a total score, so it really allows an in-depth perspective on how people are approaching their problems.”

She will also gather information about a variety of risk and protective factors for suicidal behavior and assess the prevalence of suicidal ideation and suicide at



Graduate Student Kristin Walker



Faculty Advisor  
Dr. Jameson Hirsch

Kristin said. “So, how does it directly predict suicidal behavior, and how does it interact with other variables to influence suicidal behavior? We’ll be able to look at [the association] in both ways.”

The first relationship Kristin will investigate is between social problem solving ability and suicidal behavior with interpersonal needs as a mediating variable. Interpersonal needs include perceived burdensomeness, or the belief that one is a burden on others, and thwarted belongingness, or the sense of feeling disconnected from others. Previous research has shown that these feelings and beliefs can lead to suicidal behavior. Kristin expects to find that poor social problem solving ability is predictive of an increase in these thwarted interpersonal needs which, in turn, leads to an increase in suicidal behavior. Of course, the opposite may also be supported, Kristin noted. She also plans on conducting statistical analyses to see if higher levels of social problem solving ability result in decreased risk for thwarted interpersonal needs and suicidal behavior.

“That’s why I like the topic of problem solving so much,” Kristin said. “When I came into the lab, I had only done work on risk factors, ... and as I developed in the lab and started painting my own pictures of risk and protection, I sort of stumbled across problem solving. It’s so great because it works as both ... to see what happens when people are not good problem solvers, which increases risk, as well as what happens when people are good problem solvers.”

In the second part of her dissertation, Kristin

attempts in this population.

Kristin will examine the role of social problem solving in three different ways using the survey data. “The way that Dr. Hirsch and I structured the dissertation project was to be able to look at problem solving at different parts of the relationship,”

is examining the interaction between social problem solving ability and general health functioning as it relates to suicidal behavior. She will analyze whether social problem solving ability interacts with health-related quality of life, including physical and psychological health, to impact suicidal behavior.

In the third section, Kristin will examine social problem solving as a mediator of the relationship between neuroticism, a maladaptive personality factor, and suicidal behavior. Additionally, she’ll investigate whether this mediated association is further influenced by hopelessness. Kristin is hypothesizing that neuroticism will be related to poorer problem solving ability, which, in turn, will be associated with greater risk for suicidal behavior. Furthermore, she hypothesizes that this relationship will be stronger for individuals with high levels of hopelessness.

Kristin hopes her work will aid intervention research in the future.

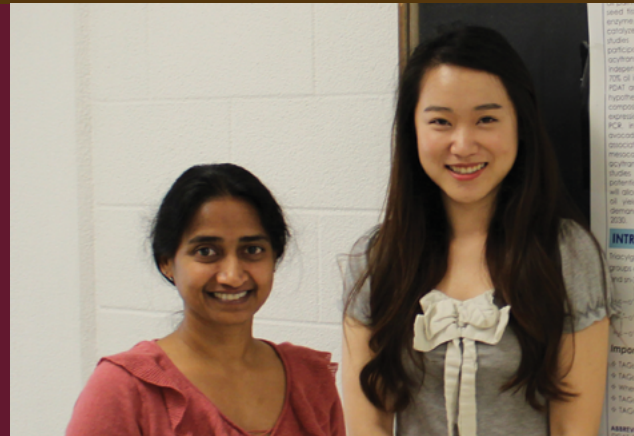
“If we can help people to learn how to effectively solve their problems, suicide doesn’t have to be on the table,” she said. “It doesn’t even have to be an option.”

Kristin started the psychology doctoral program, concentration in clinical psychology, in 2009. Since then, she has earned numerous awards and recognition for her research. She won first place for her oral presentation at the Appalachian Student Research Forum for two consecutive years, in 2010 and 2011. She received second place for her poster at a Tennessee Psychological Association conference. Kristin also co-authored work that won the Association of Psychological Science’s RISE award. In addition to national recognition, she was recently awarded a student research grant from the ETSU School of Graduate Studies for her dissertation research. She is also the project coordinator for a federally-funded campus suicide prevention grant, called ETSU PEAKS. She has co-authored four manuscripts and has one under review. Kristin also teaches classes in psychology at ETSU and Tusculum College, and she was awarded the Excellence in Teaching for Graduate Teaching Associates by the ETSU School of Graduate Studies.

“Our program is fortunate that we have a lot of great students, and students in doctoral programs are strong students, but I don’t think it would be overstepping any boundaries to say that Kristin is an exceptional student and does go above and beyond what most students do in the program,” Dr. Hirsch said.

# Unlocking the Secrets of Avocado Oil

Written By Mariam Ayad  
Design By Jerome Morrison



Dr. Aruna Kilaru  
Faculty Advisor

Ha-Jung Sung  
Graduate Student

**A**vocados are like mini oil-making factories. Up to 70 percent of the fruit is made of oil — the healthy kind that dietitians encourage people to consume. But how is the oil in the fleshy part of an avocado made? That's what Ha-Jung Sung, a graduate student in the Department of Biological Sciences, is trying to find out. Ha-Jung is working in Dr. Aruna Kilaru's laboratory to investigate which enzymes avocados and similar plants, like olives and oil palms, use to make their abundant oil reserves.

Ha-Jung is looking at two parts of the puzzle. First, she wants to know which enzymes are involved in the process. It's possible that multiple enzymes are involved, in which case she'd want to learn how they interact. Second, she wants to know what is regulating the enzymes at work.

"If we can identify these two key factors, then we can manipulate leaves or other tissues to accumulate more oil, for food or fuel purposes," Dr. Kilaru explained.

Although much research has already been done on oil production in seed tissues, less is known about how oil is synthesized in non-seed tissues of plants. Because avocados have abun-

dant oily non-seed tissue, it is an ideal food to use to mine for molecular information about oil production in this part of a plant.

"We want to understand if non-seed tissues make oil differently than seed tissues, and if non-seed tissues make oil differently, what enzymes they are really using," Dr. Kilaru said.

Previous research shows that triacylglycerol (TAG) oil in seed tissue is made using a four-step process called the Kennedy Pathway. Ha-Jung and Dr. Kilaru are concerned with the final step of this process, which they believe to be different in non-seed tissue. The Kennedy Pathway shows the DGAT

enzyme as responsible for the final step in the process. Ha-Jung and Dr. Kilaru hypothesize that an alternate enzyme, PDAT, may play a role, independently or in coordination with DGAT, in TAG biosynthesis in non-seed tissues.

"If we can figure out if PDAT is the one that is predominantly used in non-seed tissue, then we can manipulate that idea to make other non-seed tissues make oil," Dr. Kilaru said. "That's perhaps a far-fetched idea, but that's the motivation and the long-term goal."

Ha-Jung will conduct quantita-

tive gene expression analyses to identify which of the genes, encoding DGAT or PDAT, are predominantly expressed during the development of avocado fruits. She will analyze avocado fruit tissues at seven different stages of growth. She will determine the oil content of the tissues at different stages of fruit development using a method called gas chromatography with flame ionization detector. Ha-Jung will then compare the oil content and gene expression patterns among the tissues during development to determine what is exclusive to oil-rich tissue. If a particular gene is expressed at high levels in a stage with high oil content, then it is most likely that the enzyme encoded by this gene is primarily aiding in oil production.

"If you compare a tissue that makes oil and a tissue that does not make oil . . . , you can figure out what is expressed just in the oil-making tissue, and within that you can also correlate it with the amount of oil being produced," Dr. Kilaru explained.

Dr. Kilaru's previous and current research focuses mainly on TAG oil production in non-seed tissue. When Ha-Jung received an email from Dr. Kilaru about her research, she was drawn to the idea because of her own interest in plants.

"I got really interested whenever I read it because I believe that plants have potential to make a difference in our daily life, and I think that avocado has it, too," Ha-Jung said.

However, Ha-Jung's long-term goals for her research are slightly different from Dr. Kilaru's. She is interested in the cosmetic industry and wants to help make avocado oil production cheaper.

"Because TAG [oil] has high levels of oleic acid, it can improve the human skin defense system," Ha-Jung said. "If I can figure out this chemistry of TAG biosynthesis, I can generate more oleic acid from avocado and also other fruits and contribute to more natural cosmetic products."



## Kathryn Duvall

**Degree:** Master's in Professional Communication, emphasis in health communication

**Year of graduation:** 2010

**Program/Department:** Communication

**Current employer:** ETSU

**Title:** Tutor Coordinator for ETSU's TRiO program  
Student Support Services

**Location:** Johnson City, TN

### What are your work responsibilities?

We are a federally-funded TRiO program. We work with 225 undergraduate students at ETSU that have to qualify, so they're either low income, first generation students or have a documented disability. I'm very proud to say that we have a higher graduation rate than ETSU does. I'm in charge of the tutoring that happens there. We offer free one-on-one tutoring to the students that qualify for our program. The idea of the program is to break the cycle of poverty as well as to be a support network to our students.

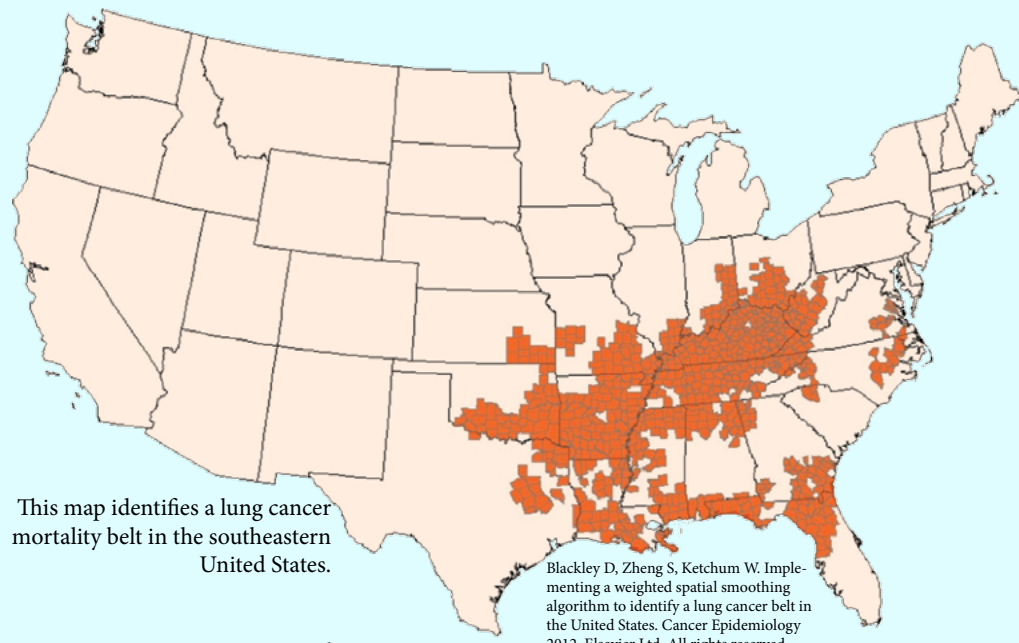
### What do you like about your position?

We have so many people that come in and say, 'I didn't even think I'd make it my first semester, and here I am graduating,' and I'm very proud to be a part of that process for them.

### What else are you working on?

This spring semester, I decided to get a graduate certificate in rural health from the College of Public Health. At one point, I had applied for a job in the

*Continued on pg. 14*



This map identifies a lung cancer mortality belt in the southeastern United States.

Blackley D, Zheng S, Ketchum W. Implementing a weighted spatial smoothing algorithm to identify a lung cancer belt in the United States. *Cancer Epidemiology* 2012. Elsevier Ltd. All rights reserved.

Written By Mariam Ayad  
Design By Jerome Morrison

# Regional Factors

## Investigating the high rates of lung cancer in Appalachia

**David Blackley**     **Dr. Shimin Zheng**  
Graduate Student     Faculty Advisor

The Appalachian region has much to be proud of. Unfortunately, cancer rates aren't one of them. Lung cancer death rates in Appalachia are among the highest in the country. Many possible factors could account for the high number of lung cancer deaths in this region, including behavioral risk factors and limited access to health care. David Blackley wants to zero in on some of the specific factors that might contribute to the high death rate as well as individual factors that may be associated with advanced stage at diagnosis. Specifically, he plans to look at Appalachian residents diagnosed with an aggressive type of lung cancer called small-cell lung cancer.

"I think it's a topic that's very pressing in this area, and not a lot of people are working on it," David, a doctoral student in the College of Public Health, said.

David plans to use data available through the Surveillance, Epidemiology, and End Results program of the National Cancer Institute, which include demographic information and tumor characteristics for nearly every resident diagnosed with cancer in select states. In his study, David will use SEER data for one predominantly-Appalachian state.

"There are certain things as simple as the area that a person lives in or their marital status ... that could end up, after you control for other fac-

tors, ... potentially putting them at risk for being diagnosed at a later stage for this type of cancer," David said.

For small-cell lung cancer, there are two main stages of diagnosis -- limited and extensive. Using these two stages as binary outcomes, David plans to use multivariate logistic regression to determine which SEER variables appear to be significantly associated with extensive stage at diagnosis.

"Marital status is going to be one of our primary research questions," David said. "Is there something about people who are single or unmarried but older? Maybe it would be lack of a stronger social support system, or there are theories about biological pathways for decreased immune response for people who are recently widowed."

He is also hypothesizing that those who are diagnosed with small-cell lung cancer at the later stage will also be more likely to die from the disease.

David has studied lung cancer in Appalachia in other projects as well. He, along with Dr. Shimin Zheng and former ETSU graduate Winn Ketchum, compiled data to create a map identifying a lung cancer belt, which is a visual representation of where rates of lung cancer deaths are highest in the U.S.

"We see this hopefully as a tool to encourage public dialogue about lung cancer ... because [the lung cancer belt] is something that's easy to look at,

and it's a tool to get people talking about it," David said.

He has also done research on cancer disparities in the Appalachian region.

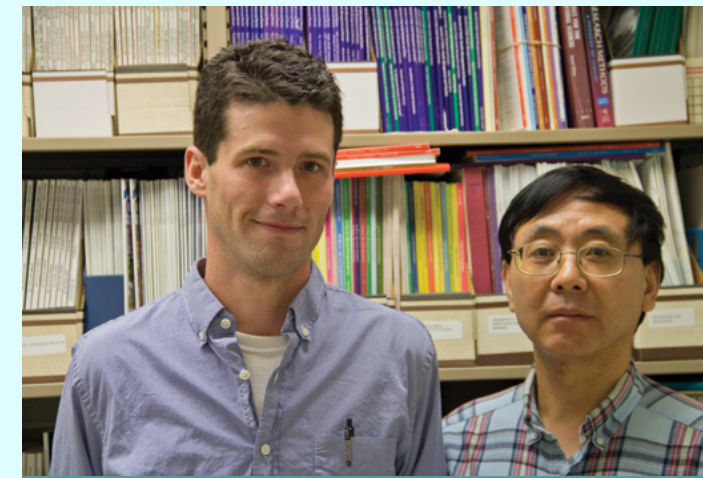
David came to ETSU because of his interest in rural health, but he quickly developed an interest in studying lung cancer in Appalachia because the disease is so often linked to a preventable cause -- smoking.

"It's kind of this paradox because it's something that's almost entirely preventable, and yet we haven't figured out a way to solve this problem," David said. "We're doing better. Death rates for lung cancer have been on the decline, but I say we're still not doing good enough when we still have the highest lung cancer death rates in the country. ... There are so many factors at the individual level, the family level, the community level, and the policy level that influence smoking or other risk factors for lung cancer."

David will be starting the final year of his three-year doctoral program in August. He has already published work in three journals, two of which are highly-regarded international journals.

"He studies hard and takes his responsibilities seriously," Dr. Zheng, assistant professor in the Department of Biostatistics and Epidemiology, said. "If you pass by his office, you can see almost every day he is sitting there and working."

After graduation, David hopes to obtain a fellowship in applied epidemiology at a local, state or federal health department.



David Blackley with Dr. Shimin Zheng

College of Public Health, and although I didn't get it, it really opened my eyes to what other things I could do in public health. I really enjoyed the work they're doing over there. In one of the classes I'm taking right now, we're doing community participatory research. We've gone into Unicoi County High School and promoted mental health awareness through health fairs. I like that they're going in and doing research and doing something. I'll complete my public health certificate in December, and then from there I'll decide if I want to go on with public health or go into health communication instead.

### How did your graduate degree help you?

My master's degree gave me confidence. I think I already had a lot of the skill set, I just didn't know how to use it appropriately. I did a lot of personal growth in my master's program, especially with the thesis because it took 18 months. There were a lot of moments I didn't think I was going to make it. ... I spent a whole month watching *America's Next Top Model* marathons, avoiding my thesis. I look back on my thesis writing process and think, "That was really horrible, but I got through it, and what came out of it was really good work."

### What advice do you have for current graduate students?

Just keep going. I got so caught up with the idea that I had to do everything perfect. For example, my thesis had to be the perfect thesis, but I had no idea how to write a thesis, let alone a perfect thesis. I had to let go of a lot of my ideas about perfection because it was slowing me down.

### What helped you the most in reaching graduation?

I couldn't have done my program without the support of the faculty members in the Department of Communication. The first semester of graduate school, I cried a lot. I went to Dr. Kinser and she said, "You're doing fine." I do not know if I would have stayed in the program had it not been for someone saying, "This is normal." And then finding Kelly Dorgan from Communication and Sadie Hutson from Nursing — both really took me under their wings and really molded me into a researcher. I'm just so grateful for them and their involvement in wanting me to succeed.



# Where Are They Now?



## Captain Daniel Williams

**Degree:** Doctorate of Audiology (Au.D.)

**Year of graduation:** 2012

**Program/Department:** Audiology

**Current employer:** US Air Force

**Title:** Chief, Audiology Implant Services

**Location:** Lackland Air Force Base, San Antonio, TX

### What are your work responsibilities?

I conduct diagnostic audiology to include hearing, vestibular, and electrophysiologic evaluations for all patient populations. My specific duties involve running the Audiology Implant Program for the Air Force, which includes cochlear implants, osseointegrated devices and middle ear implants. I ensure proper procedures for candidacy evaluation and patient rehabilitation for the aforementioned devices.

I am also involved with the Hearing Center of Excellence, a Department of Defense organization tasked with ensuring the highest level of hearing health care for all active duty service members and veterans. The scope of the program includes all aspects of audiology as well as ENT [ear, nose and throat] clinical research and treatment.

### What do you like about your job?

Not only am I an Audiologist, but I am also a Captain in the US Air Force. So I have a lot of collateral duties which concentrate on management and leadership skills. It also offers me the opportunity to broaden my career by working outside of the Audiology clinic and with career fields I would not traditionally experience on the civilian side.

# KINECT to the Game

Jerome Morrison  
Graduate Student

Todd Emma  
Graduate Advisor

Written By Mariam Ayad  
Design By Jerome Morrison



‘Get into the game’ has developed a whole new meaning with the introduction of motion-detecting video game software, like Microsoft’s Xbox Kinect. But Jerome Morrison, a master’s student in the New Media Studio program, thinks there’s a lot more potential for interaction between game and gamer than is currently available. For his capstone project, Jerome is creating a way for gamers to walk around in the game by swinging their arms.

“What I’m trying to accomplish is creating a walk gesture, because right now in the game, the depth isn’t really being used in the game space,” Jerome said. “There are games where you pose in place, like dance games, but the character is either moving along the rail of the game or the character is just completely static. What makes a lot of games fun is that you’re able to actually go around and explore.”

Giving gamers this additional mobility in the game will require writing, planning and programming. The Xbox Kinect, which is the device Jerome will be working with, already has the ability to detect depth. Using its visual camera and infrared camera, the Kinect can tell how far a user is from the device. Jerome wants to use this unique Kinect feature to allow users to do more in the video game play space onscreen.

“I’ve been kind of disappointed with a lot of

the Kinect games that have come out for Xbox,” Jerome said. “A lot of them seem very kiddy, not really utilizing the technology to its fullest capability.”

Jerome is working with former ETSU graduate, Josh Rarigh, who will be doing most of the programming for the project. The pair have already completed the first piece of the project – programming the computer software to detect when users are swinging their arms and making the on-screen characters walk forward as a result. They still have to create turning gestures, so that when the user turns to the right or left, the character also turns right or left.

Jerome’s work on this technology could have much broader applications outside of video games. There are many other researchers working on creating more ways to interact with the Kinect, and the technology is being applied in gaming, medicine and the military.

“One of the really interesting ways that I’ve seen for the Kinect is they implemented it in operating rooms for surgeons, so that surgeons no longer have to be touching the photographs or the X-rays of the patient,” Jerome said. “Instead, they just gesture to the Kinect. They wave at it, and they can just swipe through the images, so that they can remain completely sterile.”

Jerome’s capstone project will have another important component as well. He will create a video game based on Plato’s Allegory of the Cave, and gamers will be able to interact with the onscreen environment using his newly-programmed walking gesture. Jerome’s two-part project reflects the nature of the New Media Studio program, which combines art and digital media.

“The digital media component is about production, being able to produce and work with the technical aspect. The art side of the MA is looking for a more thoughtful reflection,” Todd Emma, assistant professor in the

digital media department, explained. “The Kinect stuff fulfills the digital media side and the Allegory of the Cave fulfills the art side.”

Jerome pursued his undergraduate degree in telecommunication production, which incorporated film and video studies, and his passion for visual story-telling is evident in his capstone project. He wants his final project to involve the gamer in a powerful story using new technology and incorporating digital art.

“With Jerome’s interest in cinema, art and interpretation, he is [wanting] to use video games as a fine art mechanic, the same way a paint brush is used,” Emma said. “That can be seen in his desire to use video games as a reflection of society. The research Jerome is doing with the Kinect goes into that in that he is attempting to lose the barrier of the computer to tell the story by using an interactive environment that takes away the system or the machine, ... so the reflection is truer to the purpose.”

Jerome hopes to work in the indie video game industry in the future.

“Video games are becoming more than just a game, something that you just mindlessly do just to waste time,” Jerome said. “They’re becoming these absolutely fantastic pieces of art. Things that are telling these literary stories that are the equivalent of some of the greatest novels of our time.”



Jerome Morrison (left) and Todd Emma stand in front of the Microsoft Kinect and the Unreal Development Kit

# Research Grant Awards 2012-13

The ETSU School of Graduate Studies was proud to present the following students with grants worth up to \$800 to aid their research. Each year, graduate students are selected for the award by members of the Graduate Council and graduate faculty.

## Wendy Bare

*History*

Title: Tennessee's 1834 Constitutional Convention and a Missed Opportunity to End Racial Slavery

- Advisor/Committee Chair: Dr. Steven Nash

## Sean Fox

*Biomedical Sciences*

Title: Characterization of an ABC Transporter Implicated in Bacterial-Candida Communication

- Advisor/Committee Chair: Dr. Mike Kruppa

## Sarah Hill

*Psychology*

Title: Identifying Barriers and Facilitators to Breast and Cervical Cancer Screening in Appalachian Tennessee

- Advisor/Committee Chair: Dr. Peggy Cantrell

## Teresa Boggs

*Early Childhood Education*

Title: The Effects of the Home's Physical Environment on the Communication Skills of Young Children with Autism Spectrum Disorder

- Advisor/Committee Chair: Dr. Pam Evanshen

## Laura Gilmore

*Geosciences*

Title: Analysis of the Raccoons from the Blacan of Florida, with Special Focus on the Size Morphs of Withlacoochee 1A, Florida

- Advisor/Committee Chair: Dr. Steven Wallace

## Russell Jackson Ingram

*Biology*

Title: Demography and Disease of *Lilium grayi* on Roan Mountain

- Advisor/Committee Chair: Dr. Foster Levy

## Joseph Kusi

*Biology*

Title: Variations in Plasticity of Leaf Morphology of three *Quercus* Species in Response to Environmental Factors

- Advisor/Committee Chair: Dr. Istvan Karsai

## Ronald McCall

*History*

Title: The Social and Economic Impact of Southern Plain Folk on Westward Expansion in the Early Antebellum Period

- Advisor/Committee Chair: Dr. Steven Nash

## Christopher McGoldrick

*Biomedical Sciences*

Title: Evaluation of Oxidized Protein Hydrolyase as a Prodrug Target in Prostate Cancer

- Advisor/Committee Chair: Dr. William Stone

## Kathryn Anna Quillin

*Biology*

Title: Habitat Characterization and Breeding Bird Survey of Alder Balds on Roan Mountain

- Advisor/Committee Chair: Dr. Fred Alsop

## Clara McClure

*Environmental Health*

Title: Long-term Recovery of South Indian Creek Following Road Construction

- Advisor/Committee Chair: Dr. Phillip Scheuerman

## Stephen McQueen

*Environmental Health*

Title: Evaluation and Intervention of Thermal Stress Exposure in Migrant Workers

- Advisor/Committee Chair: Dr. Kenneth Silver

## Lacey Ja Vinson

*Chemistry*

Title: Determination of the Factors Affecting the Yields of C1', C4', and C5' Oxidative Damage of the DNA Sugar Moiety by Carbonate Radical Anions

- Advisor/Committee Chair: Dr. Marina Roginskaya

## Kristin Leigh Walker

*Psychology*

Title: Suicidal Behavior: The Role of Social Problem Solving Ability in Rural, Primary Care Patients

- Advisor/Committee Chair: Dr. Jameson Hirsch



East Tennessee State University  
Box 70720  
Johnson City, TN 37614-1710  
<http://www.etsu.edu/gradstu>  
Phone (423) 439-4221

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