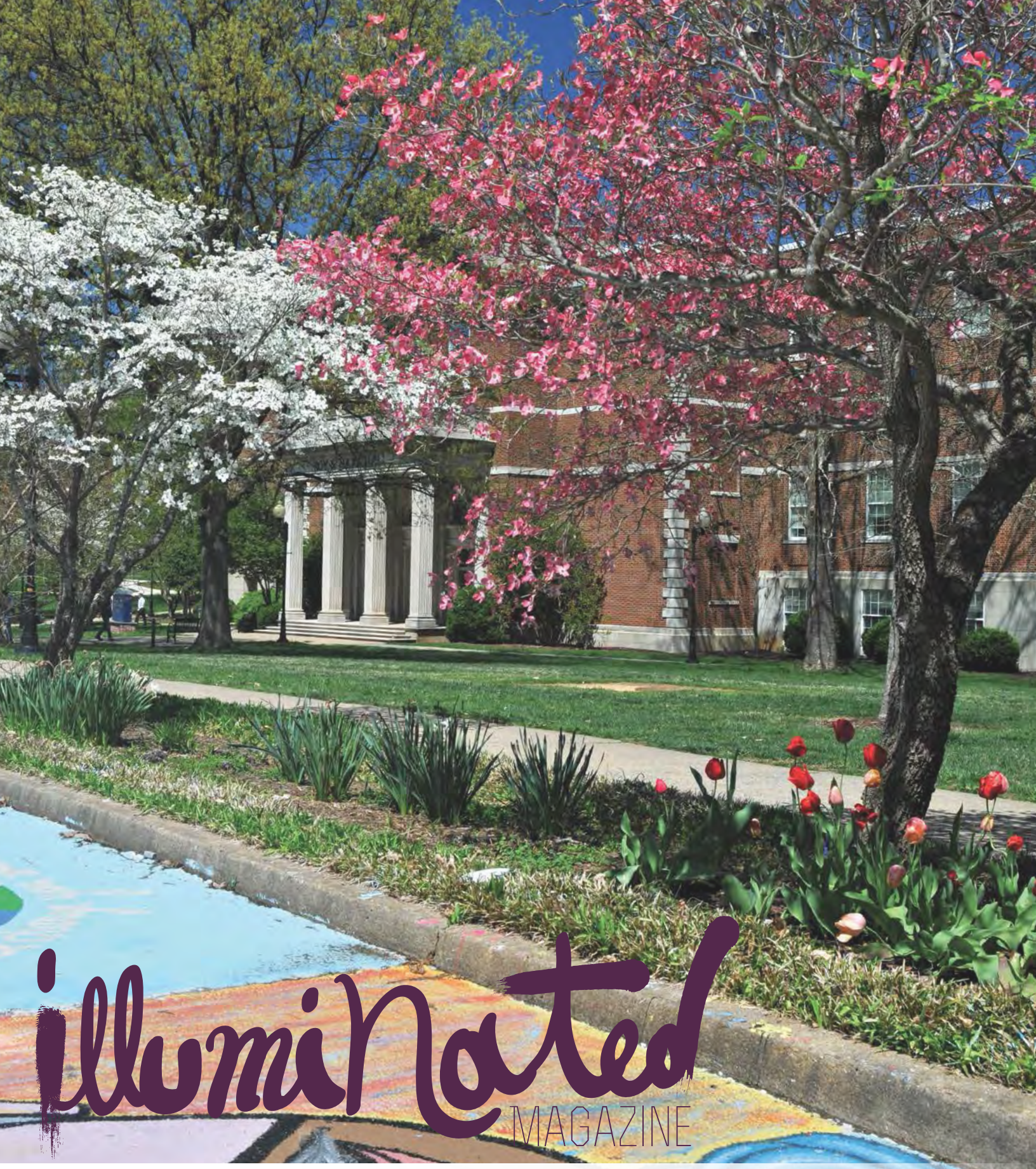
Spring 2015

Illuminated Magazine

School of Graduate Studies, East Tennessee State University



illuminated MAGAZINE

GRADUATE STUDENT RESEARCH MAGAZINE / ETSU SCHOOL OF GRADUATE STUDIES / SPRING 2015 / VOLUME 4 NO 11 /

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 2200 students enrolled in graduate programs at ETSU. Illuminated presents 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 happening on campus, and provides updates on alumni of ETSU graduate programs.

Enjoy!

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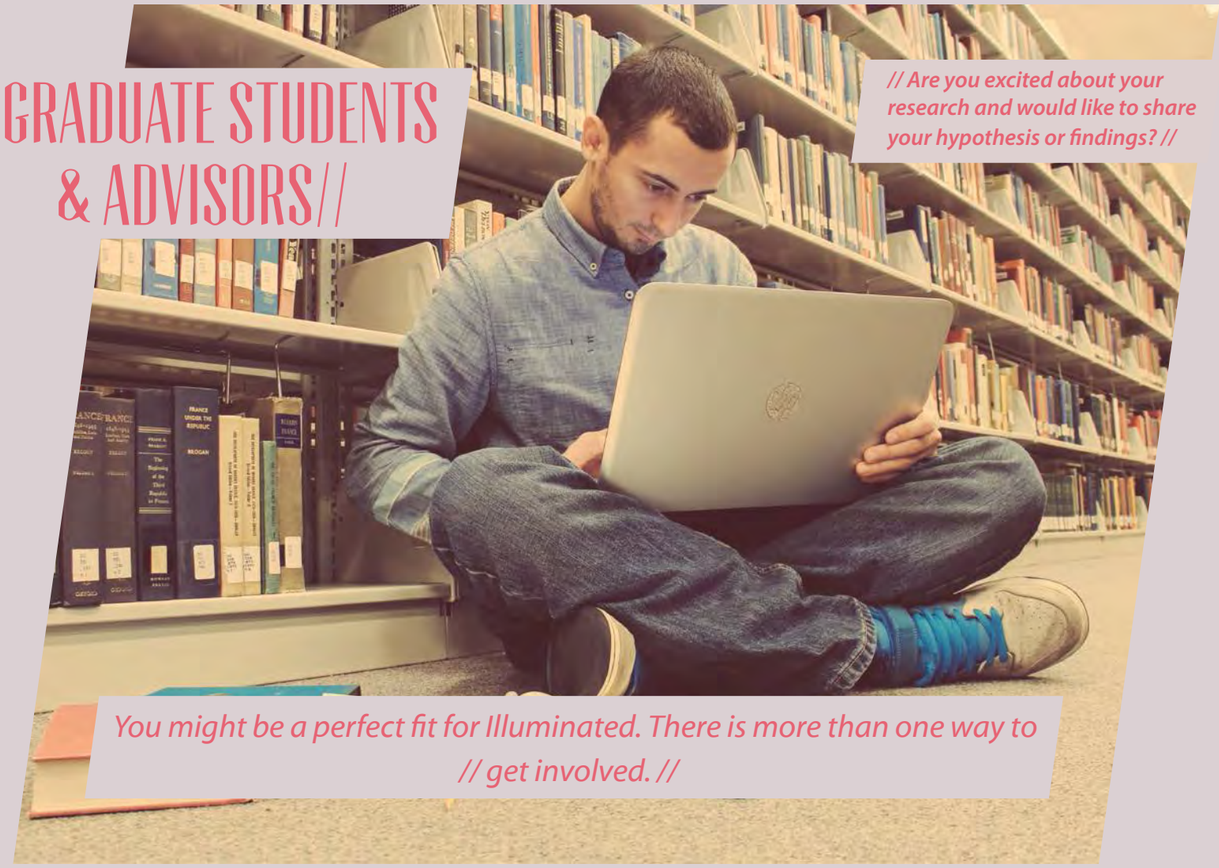

// Are you excited about your research and would like to share your hypothesis or findings? //

You might be a perfect fit for Illuminated. There is more than one way to // get involved. //

// For current graduate students and their advisors:

Are you or one of your graduate students working on a culminating experience (e.g., thesis, dissertation, capstone)? Your research could receive additional exposure through *Illuminated* Magazine and help educate the rest of the campus about your department and program. This is a unique opportunity to get your work recognized!

// For current graduate students and their advisors:

Did you or one of your students get accepted into an excellent doctoral program or receive an excellent career opportunity? We want to hear about it! Share your story in the "Where Are They Going?" section.

// For former graduate students and their advisors:

Do you know an outstanding student who graduated from ETSU more than a year ago? We want to hear from them! The "Where Are They Now?" section features former ETSU graduate students who are now professionals in positions across the country.

Form available: http://www.etsu.edu/gradstud/documents/illuminated_nomination_form.pdf

For more information on nominating students or getting featured in Illuminated, please contact:
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SPRING 2015 //

spring '15

Lucinda Langston

Geosciences, M.S.
Emphasis in Geospatial Analysis
// 2013

// WHERE ARE THEY NOW?

Where do you work?
I am an Archaeologist for the Bureau of Land Management (BLM) in Elko, Nevada. I also have remained active in academic research since graduating from ETSU and am currently collaborating with Jay Franklin (ETSU), among other colleagues, on numerous research projects conducted in the Upper Cumberland Plateau region of Tennessee.

What does your job entail?
As a BLM employee, I am part of an interdisciplinary team that helps to manage a variety of resources located on public lands. My job as an archaeologist with the BLM is to document and manage cultural resources (i.e., archaeological sites and areas of significance to local tribes) while also mitigating potential effects to those resources from activities such as mining, range improvements, and fire rehabilitation. As a researcher, I apply geospatial and geostatistical analyses to archaeological research questions. My main foci have been predictive modeling and spatial analysis of landscape patterns related to prehistoric use of rock shelters.

What is your favorite part about your position?
The thing I enjoy most about being an archaeologist with the BLM is the opportunity to both work with and learn from a diverse range of specialists and professionals. I feel as if I am challenged every day and there is always an opportunity to learn something new from the people I work with. This is similar to what I enjoy as a researcher. Besides getting to be a part of some stellar projects and excavations, I collaborate with an extremely talented group of people all equipped with unique skill sets and areas of expertise.

How has your master's degree from ETSU helped you?
Without a master's degree, I would not have been eligible for positions such as the one I currently occupy with the BLM. Also, completing my thesis as a requirement for my degree has undoubtedly helped me become a better writer and researcher.

What advice would you give to current graduate students?
To take a deep breath! Graduate school can be tough, and cranking out a 200-page thesis makes for many sleepless nights and a lot of anxiety. However busy and stressed you might feel during graduate school, take the time to both enjoy and appreciate the experience. Ask a lot of questions, have meaningful and thoughtful conversations with your mentors and peers, and absorb as much knowledge and wisdom as possible from those amazing people surrounding you. And if nothing else "Just remember what ol' Jack Burton does when the earth quakes, and the poison arrows fall from the sky, and the pillars of Heaven shake. Yeah, Jack Burton just looks that big ol' storm right square in the eye and he says, 'Give me your best shot, pal. I can take it.'"

Anything else you'd like to share?
My experience at ETSU, from undergraduate to graduate student to faculty member, provided me with much more than just a foundation for a successful career. I worked under and with an amazing group of professors and researchers and was afforded the opportunity to grow as an independent researcher and scholar. I owe a special thanks to the departments of Sociology and Anthropology and the department of Geosciences, as well as ETSU Honors College for years of both scholastic and financial support. As for my mentors- Jay Franklin, Jim Mead, Eileen Ernenwein, and Ingrid Luffman- their passion and dedication are truly inspiring, and I am thankful for their continued guidance and support. •

Larry Bowman

Biology, M.S.
Biological Sciences
// 2014

What university do you attend now?
Yale University, New Haven, Connecticut

What does your research entail?
I am a graduate student in Prof. David Post's lab at Yale, which investigates broad questions in ecology and evolutionary biology such as nutrient transfer between aquatic and terrestrial systems, food web dynamics, and the interplay between ecology and evolution. Though I am still formulating the larger questions that my dissertation research will address, I am motivated by questions in the eco-evolutionary interplay. My work will focus primarily on aquatic lakes in the Southern Connecticut region, and I will be asking questions about how organisms within those lakes will respond to different climate changes over time. I am interested in looking at different time scales of changes like short-term adjustments in behavior and coping strategies but also by more long-term changes such as adaptation and mutations. I have recently become interested in ice ecology and how variability in ice cover in lakes (i.e., thin vs. thick, opaque vs. clear, and duration of cover) changes productivity in an ecosystem. As climate continues to change, the "robustness" of organisms or their ability to survive becomes a critical question, and I hope to understand what "robustness" really means both ecologically and evolutionarily.

What's your favorite part about the research/work?
My favorite part about my research is that it encompasses various types of scientific research methods. For example, I spend long days in the field collecting fish and plankton from lakes, even drilling ice cores from their frozen surfaces! But I also get to spend a lot of time at my lab bench using various molecular and genetics techniques to answer my questions.

I am developing ecological theory to help understand how my system works. My project really integrates several different types of research, so I never get bored, and I thoroughly enjoy each piece. Another of my very favorite things about research, in general, is that you are joining a conversation that has been ongoing for generations and, in some cases, for hundreds of years. Much of the research that helped define my field was carried out by Prof. G. Evelyn Hutchinson on the very same lakes that I now study, and I have the opportunity to continue and expand on his work using modern techniques. This concept of a continuing conversation, one that is never truly over and will continue even after I am gone, is really compelling, especially when you consider that your work may inspire future generations to revisit long-standing questions.

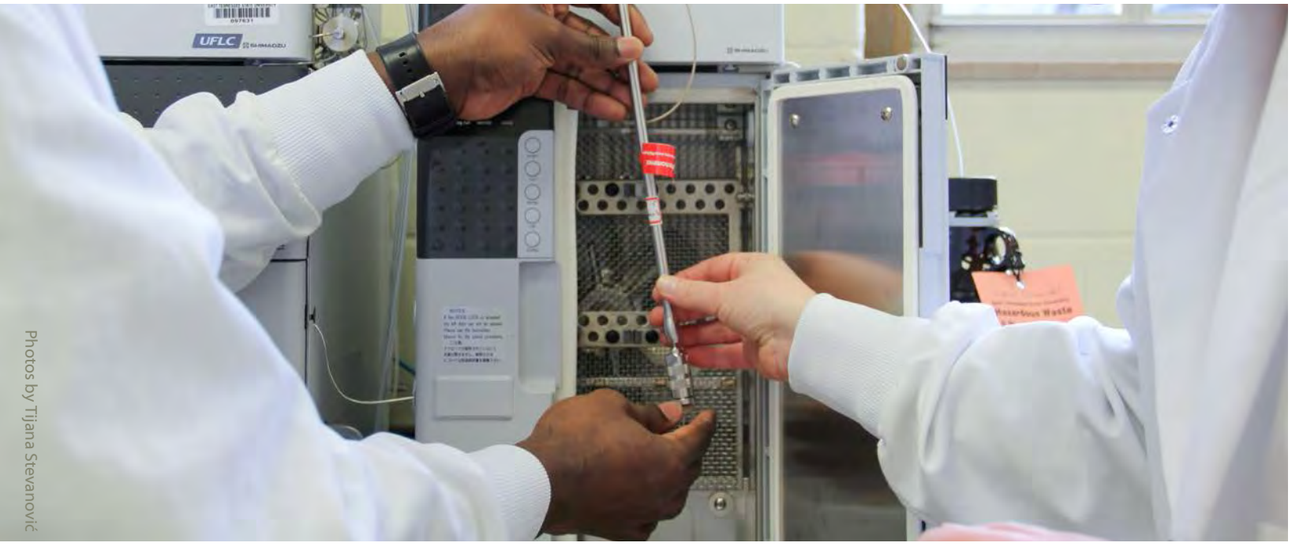
How has your master's degree helped you?
While at ETSU, I was in Prof. Lev Yampolsky's lab, where I learned invaluable techniques in molecular ecology that I have carried with me to my new lab. Aside from tangible resources that my master's program taught, more importantly, it cultivated and nurtured my ability to ask interesting and testable research questions. Because of my time at ETSU, I was able to "hit the ground running" in my new graduate program; I already had experience with graduate school and independent research.

What advice would you give to current graduate students?
My advice to graduate students would be to not take advisors and committee members for granted. My mentors at ETSU remain to this day some of the most important relationships I have both professionally and personally. Professors at ETSU are endless resources and incredibly helpful in many career and personal situations. Use them! My advice would be to take advantage of them as much as possible while you can, because those relationships can (and will be) important well after your time at ETSU.

Anything else you'd like to share?
One of the most important experiences I had while at ETSU was being part of the National Science Foundation's Graduate K-12 (GK-12) Fellowship program. Under this program, I was able to expand my professional network by adding professors, educators, teachers, policymakers, et cetera, which has been critical to my success in continuing my education and career. I was involved in GK-12 for both of my years at ETSU (2012-2014), where I partnered with Kindergarten teachers at North Side Elementary School and professors Gordon Anderson, Anant Godbole, and Aimee Govett at ETSU to bring my scientific inquiries into the classroom. An important part of science in today's world is making research accessible to the public, not just to an esoteric scientific community. The skills that I learned from communicating with my students at NSES, despite their age (4-6), taught me so much about teaching and relaying my science to non-experts. GK-12 allowed me to cultivate communication and leadership skills that have become indispensible in my professional career and have opened up numerous opportunities for me to partner with various organizations for outreach projects. I am truly grateful for the opportunities this grant offered me, and I encourage all graduate students to become involved in one of the numerous community outreach programs at ETSU. •

//INVESTIGATING THE PROTECTION MECHANISM OF DNA AND POLYPEPTIDE BINDING//

by Brandy Nickels//



Photos by Tijana Stevanović

This spring at ETSU, Modeste Tegomoh is continuing research on DNA and polypeptide binding as he pursues a Master of Science in Chemistry. Modeste came to ETSU from Cameroon in Central Africa to further his education and build upon his experience in mathematics, physics, and chemistry. He met and partnered with his thesis advisor, Dr. Marina Roginskaya, because he was interested in DNA and finding cures for cancer. He says of Dr. Roginskaya, "She really impressed me." He hopes to use his experience to work toward a cure for cancer and explore the effects of free radicals on human DNA. Dr. Roginskaya stated, "The ultimate goal is related to health issues…we rely on DNA to tell us about the body and can be related to major health risks of cancer and heart attacks, and degenerative diseases."

Although Modeste's research focuses on a very specific part of DNA function, it ultimately emphasizes the importance of understanding how DNA is damaged and what can be done to protect it from damage. In living cells, DNA is tightly packaged in chromatin via interaction with positively charged polypeptides named histones. This interaction protects DNA from free radical damage. In his research, Modeste creates and studies in vitro model systems of DNA-polypeptide complexes that mimic DNA-histone interactions in chromatin. Dr. Roginskaya commented that there is very little understanding or established research on how the protection of DNA occurs and that researchers in the field of Chemistry "try to start from scratch" in order to analyze only one small mechanism or process within the larger and infinitely complex system of the human body.

Modeste's work reexamines a process that has been largely thought of in terms of mechanisms that exist in the more complex systems surrounding the protected DNA molecule. He hopes to focus on the specific relationship between DNA molecules and polypeptides, which typically bind in a protective process. This detailed work contributes well to medical research to piece together the larger picture of how DNA functions in the body and how free radicals affect the body. The research is based on creating a stripped down model of the cell where the only factor considered is the relationship between DNA and polypeptides; other elements of the cell are not considered. According to Dr. Roginskaya, Modeste must "concentrate on the core" of the cell and get rid of all of the outside factors for the sake of this research, because the entire cell is too complicated for use in studying the binding of DNA to polypeptides.

In order to isolate a very specific and complicated process within the cell, Modeste is using commercially-available, native DNA to make DNA aqueous solutions and combining it with specific amounts of aqueous solutions of positively charged polypeptides, or proteins generally, to form what is termed a DNA-protein complex. Because polypeptides are positively charged and DNA is negatively charged, DNA and polypeptides are tightly bound in the complex due to electrostatic interactions. This complex serves as a protective barrier and is responsible for protecting the DNA from free radicals. Modeste is creating simple model systems, as compared to the complexity of an actual human cell, in order to see the structure and behavior of DNA molecules when they are combined with various protein or polypeptide types.

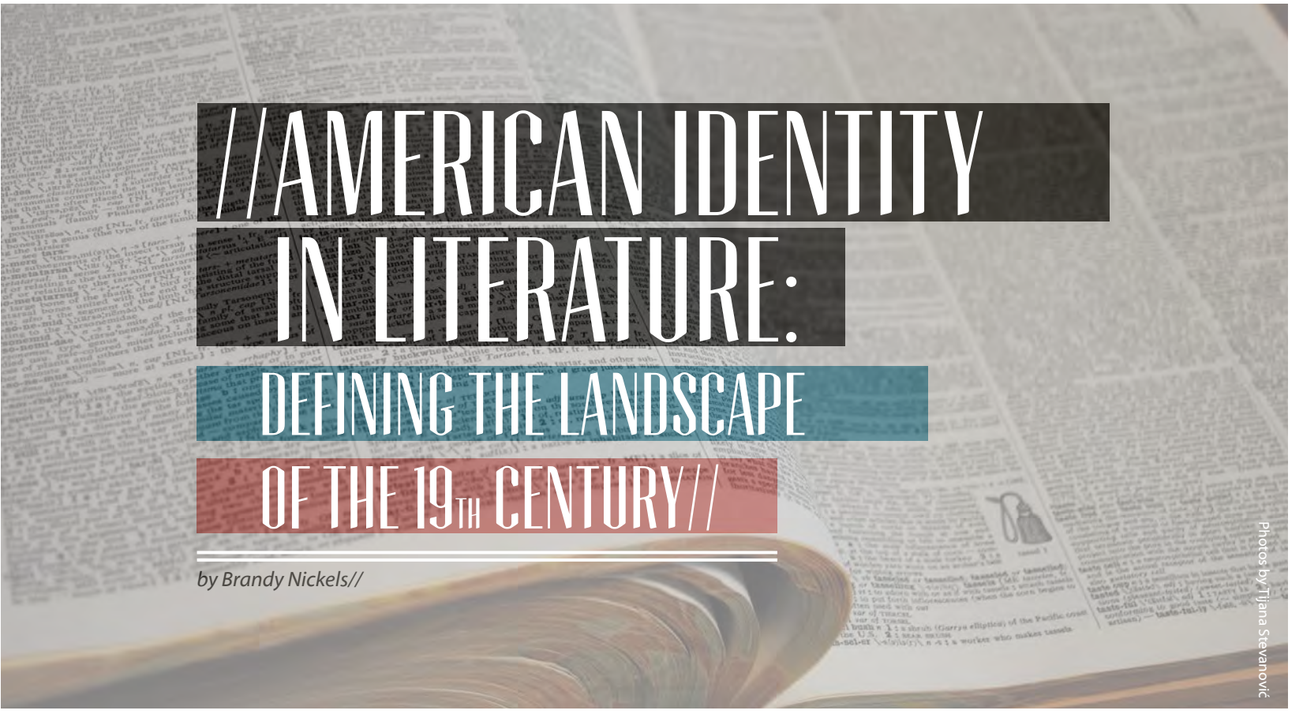
This method requires Modeste to experiment with various proteins and find proteins that combine well with the DNA material. Modeste then uses X-ray to irradiate the DNA-protein complexes, mimicking the oxidative stress that occurs in the body from ionizing radiation and other sources, and allows the resulting hydroxyl radicals to attack the DNA-protein complexes. The hypothesis in his initial stages of research is that oxidative damage or free radicals can be transferred to the protein within the complex, thus protecting the DNA itself from damage. If this hypothesis is true, DNA damage will be decreased as a result. Modeste is in the process of creating

//The hypothesis in his initial stages of research is that oxidative damage or free radicals can be transferred to the protein within the complex, thus protecting the DNA itself from damage. //

different DNA-polypeptide complexes for testing and is analyzing data for those that have been tested. Dr. Roginskaya commented about the thesis, "I gave Modeste a challenging project. He is just one student, and he is facing a challenge." The process for creating DNA-polypeptide complexes with required properties is quite time-consuming and complicated, and Modeste stated about his relationship with Dr. Roginskaya, "She is very nice and helps a lot; I have enjoyed working with her."

Modeste will be defending his Master's thesis in the fall of 2015, and he presented his research at the Appalachian Student Research Forum this spring. He also presented parts of his research in October of 2014 in Nashville at a regional conference held by the American Chemistry Society. He says of his future plans, "I would love to be a professor involved in research" and he would possibly like to study how drugs interact with the human body. •

Left, Dr. Marina Roginskaya /// Right, Modeste Tegomoh



//AMERICAN IDENTITY IN LITERATURE: DEFINING THE LANDSCAPE OF THE 19TH CENTURY//

by Brandy Nickels//

Photos by Tijana Stevanović

Jacob "Jake" Vines is exploring the landscape of written and visual art in early American history as the focus of his Master of Arts in English through the Department of Literature and Language at ETSU. His thesis traces several artistic portrayals of the American landscape in the 19th century, more specifically the prairie, and examines the progression toward acceptance of the American landscape and a new foundation for American ideals.

Jake's interest in his thesis topic began when he noticed a tension between European Romantic idealism and an attachment to "the physical nature of things" in the work of artists and authors of 19th century America. His thesis is primarily influenced by the scholarship of Barbara Novak, who marks the tension between idealism and physicality as the "distinctive tension of American literature and art in the 19th century." Jake is tracing this tension by focusing on three famous works of the time: James Fenimore Cooper's *The Prairie,* Washington Irving's *A Tour on the Prairies,* and Margaret Fuller's *Summer on the Lakes.* According to Jake, Cooper's *The Prairie* and landscape paintings by Thomas Cole showed the composition at the center of the painting and implied "religious and moral imperatives" which are direct reflections of the romantic idealism present in 19th century Europe and America. Jake expressed that Cooper and Cole had a "foot in two camps" in thinking of themselves as tied to the European Romantic tradition, and their work attempts to legitimize America by applying European ideals. He stated that America didn't have symbols of Romanticism, but "what America did have was a lot of landscape," so that it was natural for Cooper to be "appropriating European tropes onto the American landscape." The tension is best expressed in the idea that the artist was asking, "What does this landscape [the prairie] imply?" instead of observing the landscape in terms of its aesthetic beauty.

Jake discusses the background of the Hudson River School of landscape painters who were interested in finding an American identity in the landscape, and he points out that none painted the prairies until the luminist painters of the 1860s. A form of Romantic realism became apparent throughout visual works of art as luminist paintings were horizontally-oriented and played with long, sweeping views of the horizon. This form of painting paved the way for the American landscape to be viewed in its glory. "It wasn't until the ideal and real became unified in this transcendental mode of thinking…that artists and writers were able to see aesthetic beauty in the vast, horizontal flatness of the prairies," Jake stated. Noticing the tension in earlier landscape paintings, Jake next explored Irving's personal account of the landscape in *A Tour on the Prairies*. Jake commented that Irving "falls away from European references in the beginning of his travel narrative by undercutting with accounts of his actual experiences"… and in the end,"while

Photos by Tijana Stevanović

Left, Dr. Mark Holland /// Right, Jacob Vines

the prairie has got the best of him, he's willing to recognize it as something that his preconceptions aren't able to deal with." According to Jake, the shift toward an aesthetic appreciation for the American landscape begins to show in the way Irving intersperses moments of surrender to his natural surroundings during his travels through the prairie.

Jake concludes his thesis with a look at Fuller's *Summer on the Lakes* as he considers the 1860s luminist painter, Worthington Whittredge, and the simultaneously thriving transcendental movement. Jake comments that transcendentalists revised European Romantic ideals and forms so that "the real" is at the center of the piece. He argues that later works of the 19th century, particularly that of Fuller, attempt to unify the tension between idealism and physical reality. He says of Fuller, "she could not get rid of either…she has a strong attachment to intuition and sensation as well as the actual physical." Additionally, he sees in Fuller's work an "acceptance of authenticity and finding the ideal in the real." In essence, Fuller is finally able to see an aesthetic beauty in the prairies that isn't complicated by European romanticism. Jake also paraphrased Fuller's own words when he stated, "she learned to meet the prairie for what it is." Jake incorporated Whittredge, because he unifies the tension between ideal and real in a similar manner to Fuller. After commenting that Whittredge found more beauty in the prairies than in the Catskills or Rockies, Jake stated that "luminism was very influenced by Transcendentalism, and that understanding of a romance which arises from the real is what allows him-as well as Fuller-to see the prairies and something beautiful in their simplicity."

Essentially, Jake's thesis presents the identity development of the vast and largely uninhabited American landscape of the 19th century. Dr. Mark Holland, Jake's advisor, expanded on the discussion by stating, "In American culture there are two big themes; one is the new world and one is identity. He [Jake] is dealing with both of them." Jake is essentially further differentiating how these particular artists and writers are dealing with the similar questions concerning American identity.

When asked about the nature of the research and writing process, Jake spoke of his background in philosophy being of service to his current work because of his tendency to create an organized argument before he begins writing. His favorite part of the process is diving into researching our past and finding clues as to how we perceived America when it was new to European settlers. Dr. Holland spoke of the fact that "attention has shifted away from Irving in the last decade with the emphasis on political and social issues and feminism…Irving has essentially been pigeon-holed as an early American fictionist." Jake's aim is to localize his research to perceptions of the prairie exclusively and to add to the small amount of scholarship on travel narratives and particularly *A Tour on the Prairies.* When asked about their working relationship, Dr. Holland said, "Jake took off with that [a discussion in Holland's class about the painters and writers of the 19th century] and when you get into your reading deeply, you are already doing the synthesis…he's found the subject matter fascinating and has taken off with it." Jake commented that Dr. Holland teaches in a way that connects at a very personal, human level and that he admires the way he teaches American literature. Jake presented parts of his research at the Southern Appalachian Student Conference on Literature (SASCOL), he defended his thesis in March of 2015, and he presented parts of his research to Dr. Holland's undergraduate classes as well. After graduation, Jake plans to take a year off and then pursue a Doctorate degree. •

//THE PERFECT BALANCE:
COMBINING CHAOS THEORY AND FORCE PLATE ANALYSIS TO PREVENT NEUROLOGICAL DISEASES//

by Brandy Nickels//

// "How do balancing strategies and movements relate to overall human wellness?" //

With a goal of contributing to the field of preventative medicine, Allison Hilbun is bringing diverse skills and experiences to her research at ETSU. She will earn a Ph.D. in Biomedical Sciences while conducting research that combines traditionally separate academic fields in a creative way. With a bachelor's degree in Physics, she is accustomed to analyzing problems using mathematical processes. Additionally, she earned a master's degree in Kinesiology and Sport Studies and has extensive experience with motion analysis, which is typically used to optimize athletic performance. In her research, Allison is using force plate analysis, which has been almost exclusively used in the Exercise Science field for creating body composition profiles. She hopes that by implementing this device into the research in Biomedical Sciences, she can provide a powerful early diagnostic tool for different maladies including neurological diseases.

As she developed an innovative new goal for research and first pursued the degree, she approached Dr. Istvan Karsai, a faculty member in the Department of Biological Sciences. Dr. Karsai displayed an openness to interdisciplinary research and was supportive of her project and her innovative approach. When asked about their collaboration, Dr. Karsai commented, "I always like to support students who have ideas…she was very focused on this and very interested, so I decided I will help to develop her ideas and jump into a new field of research." The research question in its most elemental form, "How do balancing strategies and movements relate to overall human wellness?" led Allison to conduct tests using a force plate, which measures the amount of force being applied when a person makes contact with the plate.

During the first stages of testing, the test group was limited to ages 18-60, and Allison screened for eligibility using several physical fitness tests. Participants' height and weight measurements were recorded, and they were asked to list their current medications and any known neurological conditions.

The test consists of having each participant stand on the force plate on his or her dominant leg in a basic balancing position for 12 seconds. During the 12-second interval, software collects 1,200 separate measurements of force displacement. A variation on the test is conducted in which participants are asked to tie knots in a piece of fabric as they balance for an added stability challenge. The thousands of data points collected are then analyzed and compared to various health factors and participant characteristics.

After testing a group of healthy participants, Allison is currently limiting the analysis to the correlation between age of participants and the balancing strategies they exhibit. According to Dr. Karsai, "the heavy lifting" comes after the data collection, because the data is very complicated. He stated, "We are developing mathematical tools to study the data sets from different angles; we are able to detect very subtle shifts and differences as people are aging."

Because the research is so unique, Allison is responsible for laying the foundation by beginning with the most basic components and factors for analysis, particularly age correlations.

Through her initial analyses using Phase Space plots, Allison has found that younger participants exhibit more chaotic elements in balancing strategies and movements than older individuals. This means that they use isolated, quick movements to stabilize themselves, while older participants exhibit more of a continuous "oscillating eight pattern" when they are actively balancing on one foot. Allison's tentative theory for the findings attributes the chaotic balance patterns of young participants to energy efficiency, as more dissipative movements are known to conserve the body's energy. The assumption is that as we age, we develop a more continuous balance pattern to compensate for an increasingly slower reaction time.

Allison is applying Chaos Theory and the methodological approach of Complexity Science throughout the process, which take into account the patterns of balancing movements and focus on the complexities of chaotic movements. Chaotic movements often seem to be sporadic and random but are intricately connected to various bodily systems and neurological components. In a chaotic environment like the human body, symptoms do not necessarily originate from one source, but many symptoms of neurological diseases may be predicted and prevented by analyzing involuntary movements early on. Considering that classical medical diagnosis is based on existing symptoms after patients are showing signs of illness, Allison wants to apply her research to preventative medicine, which uses predictive diagnostic tools to measure changes in the body before a patient actually experiences any symptoms.

With this approach, Allison and Dr. Karsai have observed that the prevalent patterns in the force data indicate the degree of chaotic components, and these chaotic components have potentially strong connections to diseases affecting our neurological systems. Allison pointed to the fact that certain parts of the brain are responsible for involuntary movements, including balancing, and that small changes to those parts of the brain are known to affect balance long before the patient notices any symptoms of a neurological disease.

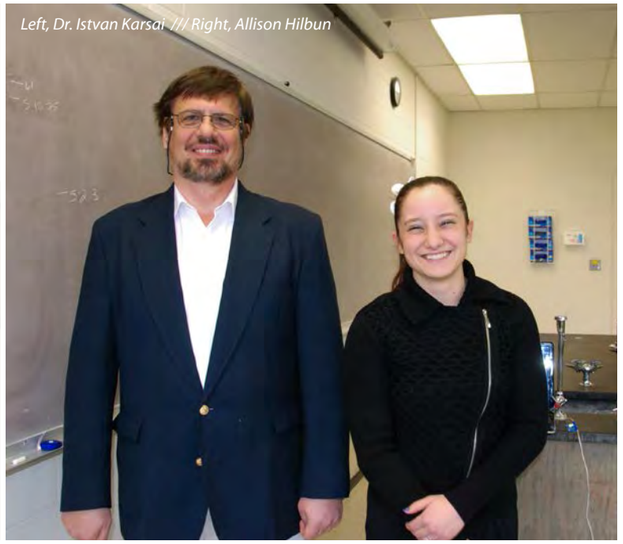
Current published research has considered balance from a mathematical perspective to show the correlation between how much a person sways and how unstable they are. Additionally, studies involving ballet dancers have shown that they actually sway more while balancing and have learned to increase the width of their sway as a tool for added stability. In essence, the same wide, continuous movement found in older participants has been adapted and applied by comparatively young athletes.

The next stage of Allison's research is currently an agreement with a local chiropractic office to use the force plate balance test with patients during their routine visits and to collaborate with professionals in musculoskeletal health. Allison hopes that it will become an easy diagnostic tool for various health statuses and will eventually be used in medical facilities during routine check-ups as a preventative measure. As the research builds relevance and validity, Allison would like to explore the correlation between balance strategies, mental health status, and chronic pain issues.

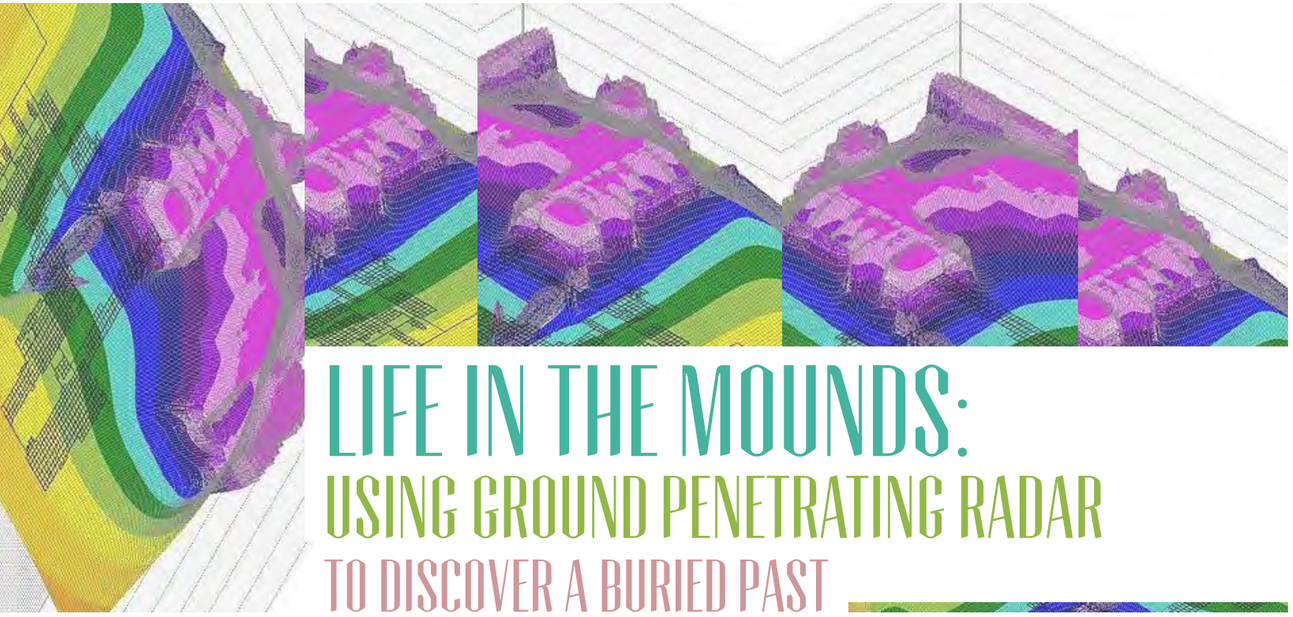
She will be presenting her research in a departmental seminar later this semester, and she has submitted a National Institutes of Health proposal. She stated concerning her plans for the future, "I've always wanted to be a professor…I'm very fond of teaching." Dr. Karsai expressed, "I am not worried about her. The skill set she is developing is very unique and sought after." He stated that not many people are able to bridge the gap between Biology and Mathematics, so her qualifications make her invaluable for academic research. •

Photos by Brandy Nickels

Force plate balance procedure



Left, Dr. Istvan Karsai /// Right, Allison Hilbun



LIFE IN THE MOUNDS:
USING GROUND PENETRATING RADAR TO DISCOVER A BURIED PAST

by Brandy Nickels//

The story of America's past is hidden in the soil, and Jeremy Menzer is making new discoveries in the Upper Cumberland Plateau region. Jeremy came to ETSU with undergraduate experience in geology and is currently conducting research in the Geosciences department in pursuit of a Master of Science degree. From the time he was old enough to play outside, Jeremy was playing in the dirt, and after a high school teacher encouraged him to pursue geology, he never looked back. His current thesis advisor, Dr. Eileen Ernenwein, spoke about the trust that is essential between them on trips to remote locations and emphasized the fact that Jeremy is a "reliable and hard-working person." In this unique working relationship, graduate students and advisors often camp together for weeks at a time and depend on each other in extreme conditions and often unpredictable situations. Now, having visited sites in Africa and Missouri with Dr. Ernenwein, Jeremy is focusing on a regional site closer to home for his thesis work.

In his discussion of the field of Archaeological Geophysics, Jeremy explains that he is "not pigeonholed into one time period" but specializes in a method rather than a time period or particular civilization or place. Archaeological Geophysics uses a combination of near surface geophysical techniques to map underground features and soil changes. The instruments measure various electric and magnetic properties of the subsurface. In this way, the techniques combine geology, archaeology, physics, and Geographic Information Systems (GIS) to interpret the data. The method at the center of Jeremy's work involves surveying large areas, even entire sites, to create an image of the larger spatial layout of buried civilizations. As a result, he initially spends days and weeks marking out sites and using a combination of magnetometry and ground-penetrating radar (GPR) to survey every inch of the surface. GPR is labor-intensive but is preferred in many situations, because it provides the best depth resolution when translated to computerized images and is capable of producing 2D and 3D images. GPR works by sending radar waves into the ground and measuring the energy reflected by changes in soil properties. After the data is collected using the GPR software, analysis involves a painstaking process of visually analyzing images from every angle, including side views of buried soil layers. By comparing patterns in each image of the same area, Jeremy formulates a hypothesis of the layout and possibility of buried artifacts and structures. During the summer of 2014, Jeremy led the geophysical portion of an archaeological field school located around the site that he would eventually decide to research for his thesis.

The Cumberland Plateau is home to farms and largely remote stretches of land, so not surprisingly, much of its history has been left in the ground for centuries. Jeremy was called in by ETSU's Dr. Jay Franklin to survey a mound, what is considered to be a Mississippian mound, discovered

Left, Jeremy Menzer /// Right, Dr. Eileen Ernenwein
GPR data collection at Pile Mound

Photos contributed from Jeremy Menzer

and preserved by a landowner on the Upper Cumberland Plateau in middle Tennessee. The term "Mississippian" refers to a prehistoric culture prevalent throughout the southeast of the United States from approximately 1000 to 1600 CE. This mound, named Pile Mound after the original landowner V. H. Pile, is estimated to be from the 13th century and is unique among the hundreds of Mississippian mounds discovered throughout the southeastern United States. Jeremy stated that the Cumberland Plateau has been overlooked by archaeologists surveying Mississippian mounds which earn their name because of their placement along the Mississippi River and its tributaries. These Native American mounds are typically considered to be found in lowlands, but Pile Mound defies the norm. Stones, more specifically some large samples of limestone and sandstone, were discovered in multiple piles, and other stones appear to have been placed as a flat, "paved" area; these stones are not typically found in Mississippian mounds and are sometimes found in Cherokee mounds. The "platform" indicates that the top of the mound may have been either the home of a chief or significant person in the community or the area may have been a sacred gathering place.

Pile Mound is bisected by a fence row which separates adjacent farms with different owners so that Jeremy has only been able to survey half of the mound which is estimated to be 1.5 meters high and 17-25 meters wide. Jeremy has permission to survey the other half of Pile Mound as well as a second mound which has been discovered by landowners on the adjacent property. He also hopes to survey another mound site, West Mound, approximately 10 kilometers away from Pile Mound. As word has spread in the area of his work, landowners are becoming aware of the possibility that significant stories may be waiting to be discovered right under their feet.

Jeremy graduates in Spring 2015 and hopes to continue his research at the site and region throughout the coming years. He is also planning to travel to sites in Peru and with Dr. Ernenwein to sites in France and Israel during the summer. Jeremy said of his choice in career that he likes being able to travel all over the world and be a specialist in his field while living in various environments and cultures. After he graduates, he plans to pursue a Ph.D. in the Environmental Dynamics program at the University of Arkansas.•

Jeremy tuning the electromagnetic induction (EMI) instrument

Left, Jeremy Menzer /// Right, Dr. Eileen Ernenwein

Botswana Africa

"My plan was to create an interactive piece, a video installation that will completely change the space and that will look like it's under the water completely…wrapping the whole space with underwater projections."

New Media Studio, M.A. // Tijana Stevanović, Graduate Student // Jonathan Hounshell, M.F.A., Faculty Advisor

OLD *meets* NEW
USING TECHNOLOGY TO CREATE LARGE-SCALE DIGITAL ART INSTALLATION

by Brandy Nickels//

Tijana installing panels at L.C. King Manufacturing

Born in Niš, Serbia, Tijana Stevanović first came to ETSU in 2010 as an undergraduate student through *World Learning's Forecast* international exchange program. She studied Graphic Design and returned to Serbia to finish her degree at her home university, University of Niš. Two years later, after graduating and working as a freelance graphic designer in Serbia, she returned to ETSU in the Fall of 2013 to pursue a Master of Arts in New Media Studio. Her love for art began at the age of 11 when her art teacher recognized her talent, and because she was shy, Tijana stated, "art opened me completely." New Media Studio is a field that she was drawn toward because of her interest in exploring concepts through different technologies and her desire to experiment with new forms. For her capstone project, her advisor, Jonathan Hounshell, encouraged her to embrace a large-scale digital art installation.

The Master of Arts in New Media Studio is centered around digital arts and the use of technology in unique ways. The focus is to create art using advanced digital graphics. Tijana first gained knowledge and experience in using the technologies through projects she completed in the Experimental Media course taught by Mr. Hounshell, and gained confidence to dream big for her capstone project. She commented about the course, "that class was really good for me; sometimes it was scary because it was experimental, and by experimental, I mean that you don't have a clue if something good is going to come out of it." Mr. Hounshell said regarding the class, "I wanted to push the students toward electronic art… mechanized, electronic types of experiments." After creating installation pieces for the class, Tijana felt inspired to make installation art for her final project. Tijana stated, "My plan was to create an interactive piece, a video installation that will completely change the space and that will look like it's under the water completely…wrapping the whole space with underwater projections." She had a vision for the project that required a large space and the possibility of logistical problems, but she thought of the statement made by Marina Abramovic who said that artists should always pursue the idea that scares them the most, because they will grow from the experience. With this inspiration, Tijana began with sketches and consultations with Mr. Hounshell. She wanted the project to be in a space that contrasted well with the digital aspect of the project; so she applied for the Artist in Residency program at L.C. King Manufacturing in Bristol, Tennessee.

The vision that came to life is an art installation that utilizes a large room (35' X 50') on the third floor of the L.C. King Manufacturing building and makes use of the building's aged appearance and industrial feel.

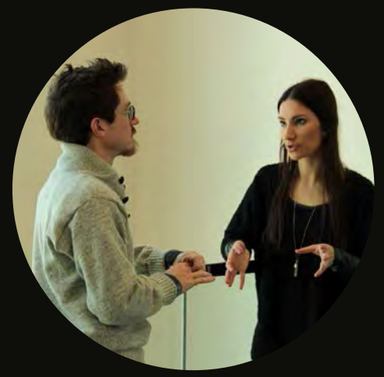
The large-scale installation required hanging long plastic panels to cover the entire ceiling area. Tijana had to enlist the help of friends during the plastic panel installation, with plastic being hung across constructed wire drapery to appear wave-like. The ultimate goal is for the entire room to feel as though it has been submerged in water.

In order to achieve this illusion, Tijana used three large-scale projectors and one wireless projector mounted to the ceiling and projected videos that she directed and filmed prior to installation. Weeks before installing projectors and bringing the vision to the space, she directed the filming of an underwater video by placing a GoPro Hero 4 camera on the bottom of the Olympic-sized swimming pool in ETSU's Basler Center for Physical Activity and by enlisting a group of swimmers to swim, dive and move naturally in the water. As she directed the actors, she controlled the camera from the edge of the pool with a smartphone application.

When the underwater video is projected from several angles onto all of the walls as well as the plastic draperies, the room becomes an interactive, underwater space. Tijana explained that the space at L.C. King plays a significant role in portraying the vision accurately, because the age of the building adds a dynamic and interesting element for the viewer. She commented that she appreciates all of the help she received from Chris Stuart, the Director of Marketing and Communications for L.C. King Manufacturing Co., and other workers in the factory during the construction phase of her installation. The exposed brick, old refinished wood floors, and rafters allow the viewer to be more imaginative and suspend reality, creating the feeling of actually being underwater. Tijana wanted to emphasize the rustic elements that come with an old space built in 1914 and combine them with the perfection of modern digital projection.

During the making of her capstone Project, Tijana relied on guidance from Mr. Hounshell on a consistent basis as she found the right space, applied for the Artist in Residence program, negotiated the terms of the installation, and planned the logistics of creating an installation on such a large scale. Unlike many fields where a set method is expected and courses of action are limited, the Master of Arts in New Media Studio requires imagining and reimagining uses for technology and then collaborating to make the imagined vision real. Because of the necessity for openness and flexibility in the creative process, Hounshell primarily provided guidance and served as a problem solver when Tijana needed to change her approach or find a new perspective. During the making of Tijana's project, installing the plastic panels for projection required her to try several methods and to approach the materials while thinking about the ultimate visual goal. Collaboration is a continuous process and both student and adviser contribute to the final outcome. In March, 2015, Tijana held an unveiling of her project and invited professors and friends to view the installation and provide feedback. The installation, "UnderSurface," was featured in an exhibit open to the public on April 28th, 2015. As the second component of her capstone exhibit, Tijana created promotional materials including brochures, posters, and video that advertised the final exhibit and documented her creative process. The final part of the capstone project in New Media Studio is the supporting written document which outlines the artistic process and explains the concept of the installation.

After graduating, Tijana plans to work in the field of Graphic Design and continue installation art. Her website, which she is continuously updating, will also feature the capstone project and a wide range of her art. •



Left, Jonathan Hounshell, M.F.A. ///
Right, Tijana Stevanović

Left, Billy Brooks /// Right, Dr. Arsham Alamian

Photos by Tijana Stevanović

//DRUG ABUSE AND DEPENDENCY:
ARE THERE DIFFERENCES BETWEEN INDIVIDUALS RESIDING IN URBAN AND RURAL AREAS?//

by Brandy Nickels//

Through his work in Public Health and Epidemiology, Billy Brooks is conducting research to address a regional drug epidemic and improve tools for measuring the severity of the issue. Billy resides in Asheville, North Carolina and commutes daily to complete research focused on improving a currently-utilized diagnostic assessment tool that seemingly does not account for environmental and cultural aspects of participants' lives. Billy earned a bachelor's degree in Statistics with a minor in Environmental Studies from the University of North Carolina Asheville, a Master of Public Health degree with a concentration in Biostatistics from ETSU, and now he is pursuing a Doctor of Public Health with a concentration in Epidemiology while working with his advisor, Dr. Arsham Alamian.

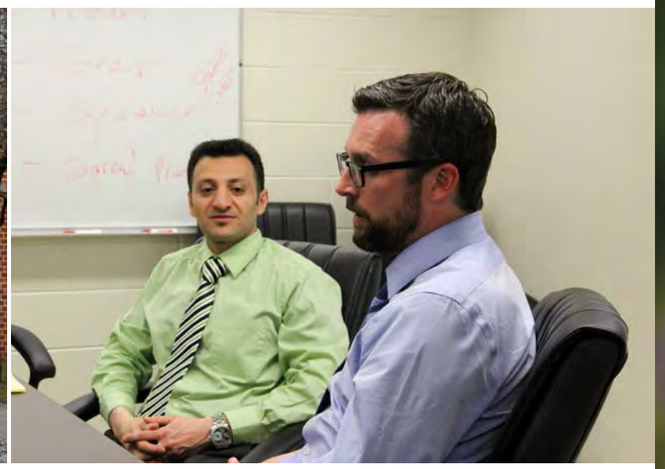
Billy first became interested in the prescription drug abuse epidemic when he visited Harlan, Kentucky for a volunteer trip with ETSU Alternative Spring Break. In the area, he noticed the shell of a foundation, remnants of a house that was burnt down after being condemned. The house had been used as meth lab, and Billy began to see first-hand the desolation of the area as a result of drug abuse and manufacturing. Furthermore, his research was inspired by the contributions he has made as a member of the ETSU Diversity-Promoting Institutions Drug Abuse Research Program (DIDARP) funded by the National Institute of Drug Abuse. This interdisciplinary working group, comprised of ETSU faculty and graduate students and various professionals in the community, is dedicated to creating a long-term "center for drug abuse prevention" in the region, and Billy regularly attends and contributes to the group along with Dr. Alamian. Through his experiences working with DIDARP, Billy became particularly interested in prescription drug use and dependency and more specifically opioid dependency.

// Billy's analysis plan for his dissertation includes multiple research questions related to differences in urban and rural participants. //

The National Survey on Drug Abuse and Health, which is administered to approximately 75,000 households annually, is the source of data for Billy's dissertation work. Of particular interest to Billy is a drug abuse and dependency measure consisting of 11 items. The 11 items are based on the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-4) criteria; of these 11 items, 4 items focus on abuse and 7 items focus on dependency, with each item coded as a binary response choice of "yes" or "no". One of his research objectives is to examine differences in participant response according to geographic region such as "urban" vs. "rural." This is important because death from unintentional overdoses has increased dramatically in rural areas. In addition, Billy's analysis plan for his dissertation includes multiple research questions related to differences in urban and rural participants. He hypothesizes that participants, especially from rural, isolated areas such as Appalachia, might score differently on the DSM-4 measurement tool compared to a more urban sample. His sample consists of several thousand participants, all of whom self-report past year non-medical use of a controlled substance.

Billy's analysis plan will focus more specifically on the following. First, he will investigate the validity issues regarding the abuse/dependency measure using an exploratory and confirmatory factor analysis. Second, depending on the outcome of this factor analysis, a structural equation model (SEM) will be used to examine how demographic variables such as sex, race, ethnicity, and age vary between rural and urban participants and the risk of abuse and dependency. Finally, a latent class analysis will be conducted to identify potential differences in clustering of types of drugs abused by rural and urban geographic designation. At this point, the data is still being analyzed and no results are available. Dr. Alamian is working closely with Billy in his analysis of multiple data points and possible implications.

Throughout the research process, Billy stated that Dr. Alamian "was very available" and that he "felt supported" in his research journey. Dr. Alamian commented on Billy's work by stating, "I commend his work…it takes determination and motivation." Billy has won numerous awards including the Outstanding Dr.PH Student Award (2014), Chair's Award for Excellence in Service (2013), and the Public Health Student Association LeadershipAward.
Billy has been very active in student organizations on campus, and taught undergraduate courses at ETSU in Epidemiology and Biostatistics, but he is currently focusing solely on his research. He has presented work from the DIDARP group at the American Public Health Association annual meeting in New Orleans, Louisiana and will defend his dissertation in the summer. He is planning to graduate in the summer of 2015 and wants to continue his teaching and research as a university professor. •



1. Dr. Bonny Copenhaver
May 2002/ Educational Leadership, Ed.D.

A Portrayal of Gender and a Description of Gender Roles in Selected American Modern and Postmodern Plays.

She is currently the Wisconsin Indianhead Technical College (WITC-Superior) Campus Administrator and Vice President of Academic Affairs.

2. Deidre Freyenberger
May 2013/ Professional Communication, M.A.

Amanda Knox: A Content Analysis of Media Framing in Newspapers Around the World

She currently works at Cambridge Investment Research in Fairfield, Iowa. She coordinates and updates social media sites for financial advisers, and she designs and updates financial forms.

3. Dr. Faye Nelson
December 2002/ Educational Leadership, Ed.D.

A Qualitative Study of Effective School Discipline Practices: Perceptions of Administrators, Tenured Teachers, and Parents in Twenty Schools

She is currently the principal at Seymour Middle School, Seymour, Tennessee.

4. Alisha Parks
December 2013/ Criminal Justice and Criminology, M.A.

The Effects of Family Structure on Juvenile Delinquency

5. Chad Fraley
December 2007/ Professional Communication, M.A.

Design and Construction of the Audrey II Puppet Series for the Play "Little Shop of Horrors"

He has been an ETSU employee in eLearning for 17 years and went full time in 2008.

6. Phillip Wyrick
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Police Militarization: Attitudes Toward the Militarization of the American Police

7. Gregory Byrd
May 2005/ History, M.A.

General Ishii Shiro: His Legacy is That of Genius and Madman

He earned a Master of Arts in History (European and Asian History) and Master of Arts in Teaching, both from ETSU. Currently, he is Adjunct Faculty at Carson Newman University and Walters State Community College. He also works part time for the Sevier County School System.His degrees have opened doors in the History community that have allowed him to pursue his goal of teaching History at the college level. They have also given him the opportunity to speak for Historical Society meetings and events. He believes that ETSU's History department helps to prepare students with the knowledge and experiences needed to succeed in the field of History. He has been offered openings in different summer institutes both in the United States and abroad. These opportunities would not have been possible without his M.A. in History.

8. Dr. Morgen Houchard
December 2005/ Educational Leadership, Ed.D.

Principal Leadership, Teacher Morale, and Student Achievement in Seven Schools in Mitchell County, North Carolina.

He is currently Assistant Superintendent of Schools for Mitchell County and an Adjunct Professor in the Educational Doctoral Program at Gardner-Webb University.

9. Dr. William Thompson
December 2002/ Educational Leadership, Ed.D.

The Effects of Character Education on Student Behavior

He was principal at Northview Elementary in Sevier County, Tennessee, when he completed his degree. He left the school system in June of 2006 after 21 years in public education and accepted a position in Human Relations with the U.S. Department of Defense in Huntsville, Alabama. He retired in 2013 as Chief, Manpower and Classification, Human Resources Directorate, Missile Defense Agency. He lives on the Tennessee River in the small town of Rogersville, Alabama, which is his wife's hometown.

10. Dr. Matt Hurt
December 2012/ Educational Leadership, Ed.D.

A Comparison of Inclusion and Pullout Programs on Student Achievement for Students with Disabilities

He is currently working for the Region VII superintendents' group which contains 19 school divisions in far southwestern Virginia. This is a new program this year undertaken by the superintendents to build a regional curriculum and work collaboratively to make sure all schools meet full state and federal accountability measures. This Comprehensive Instructional Program is currently working with the highest performing teachers from across the region to build a viable curriculum which will be made available to all teachers next year.

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